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Analysis of Differential Prediction of Law School Performance by Gender Subgroups Based on 2005–2007 Entering Law School Classes

Deborah A. Suto
Lynne L. Norton
Lynda M. Reese

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Executive Summary

In the law school admission process, it is essential that the criteria used for admission be fair to all subgroups in the applicant population. One method used to evaluate the fairness of the admission process is to compare the predicted and actual first-year averages (FYAs) at each law school for various subgroups of the applicant population. The purpose of this study is to address questions of differential prediction between male and female first-year law school students based on data for the 2005, 2006, and 2007 entering classes of 188 law schools. The data were available from the Law School Admission Council (LSAC)-sponsored correlation studies.

Statistical analyses were used to predict FYAs using three traditional predictors: undergraduate grade point average (UGPA), Law School Admission Test (LSAT) score, and the best predictive combination of UGPA and LSAT score. A separate analysis was conducted for each law school included in the study, resulting in three prediction equations for each individual law school.

None of the three prediction equations evaluated were deemed to be problematic. That is, none of the prediction equations significantly overpredicted or underpredicted FYAs for male or female students across the schools studied. The magnitude of overprediction or underprediction across members of each gender subgroup was found to be less than one tenth of a standard deviation, on average, for each prediction equation. The degree of differential prediction was greatest for the model using UGPA alone, but these differences were still too small to be of practical significance. As an illustration, consider a law school that has a grading scale from 0 to 4.33 with an observed mean of 3 and standard deviation of 0.44. Then, for example, an underprediction of one tenth of a standard deviation for female students at such a law school would mean that their FYAs were underpredicted on average by a factor of 0.044. Overall, the results of this study do not support the concern that the use of LSAT scores or the traditional combination of LSAT scores and UGPAs results in unfair admission decisions with regard to gender.

While considering the results of this study, the reader should keep in mind that the results refer only to subgroup behavior and not to individuals. That is, the performance of individuals within a subgroup whose FYAs are overpredicted on average may still be underpredicted, and vice versa.

Finally, it is worth repeating that the average amount of overprediction or underprediction of FYAs found was always very small, regardless of the prediction equation that was used. In other words, this study provided no evidence that LSAT scores, UGPAs, or a combination of those two measures unfairly predict future law school performance for either gender subgroup.

Introduction

In the law school admission process, it is essential that the criteria used for admission be fair to all subgroups in the applicant population. One method used to evaluate the fairness of the admission process is to compare the predicted and actual first-year averages (FYAs)—a measure of student performance in the first year of law school—for each law school for various subgroups of the applicant population. If one subgroup of the applicant population experiences either significantly more overprediction (average predicted FYA greater than the average actual FYA) or underprediction (average predicted FYA less than the average actual FYA) than some other subgroup, then *differential prediction* is said to occur. The purpose of this study is to address questions of differential prediction between male and female first-year law school students based on data from the 2005, 2006, and 2007 entering classes of 188 law schools.

Questions of differential prediction are not new to Law School Admission Council (LSAC)-sponsored research, nor are they unique to the Law School Admission Test (LSAT) or to the law school admission process. Several studies using LSAT data to investigate questions of differential subgroup prediction have been sponsored previously by LSAC (e.g., Anthony & Liu, 2000; Anthony, Reese, & Pashley, 1998; Duffy & Pashley, 2003; Duffy & Roussos, 2000; Harris, Roussos, & Pashley, 1998; Linn & Hastings, 1984; Powers, 1977; Schrader & Pitcher, 1976a, 1976b; Stilwell & Pashley, 2003; Suto, Norton, & Reese, 2007; Wightman & Muller, 1990). Prediction issues have been the subject of research studies for other admission-testing programs such as the Scholastic Aptitude Test (e.g., Breland, 1979; Mattern, Patterson, Shaw, Kobrin, & Barbuti, 2008; Ramist, Lewis, & McCamley-Jenkins, 1994; Strickler, Rock, & Burton, 1991; Willingham, Lewis, Morgan, & Ramist, 1990); the ACT (e.g., Noble, 2003; Noble, Crouse, & Schulz, 1996); and the GMAT (e.g., Braun & Jones, 1981). Numerous studies focusing on the same questions in the arena of employment testing have been reported (e.g., Houston & Novick, 1987; National Research Council, 1989; Schmidt & Hunter, 1981). Most of these studies concluded that although there is evidence of differential prediction for minority subgroups, the evidence is generally in the direction of overprediction rather than underprediction. That is, the use of the pooled regression model tends to overpredict minority performance on the criterion variable.

This study is largely a replication of the earlier studies by Suto et al. (2007), Duffy and Pashley (2003), Duffy and Roussos (2000), and Harris et al. (1998) and is part of an ongoing effort to address the following question: Do the traditional predictors, undergraduate grade point average (UGPA) and LSAT score, demonstrate differential prediction between male and female law school students when used either separately or in combination to predict law school performance?

Methods

Sample

The sample used in this study is drawn from the 2005, 2006, and 2007 entering law school classes. With a few exceptions, the data closely mirror the data that were used for the 2008 LSAT Correlation Studies. In general, this study includes law schools in the United States and Puerto Rico that participated in the 2008 LSAT Correlation Studies and had sufficient gender data available for the combined years of classes. Six Canadian law schools were excluded from this report because their UGPA data did not come from the Law School Data Assembly Service (LSDAS). In addition, there were nine schools not examined in the 2008 LSAT Correlation Studies that were examined in this one. These include schools that had data available for 2005 and/or 2006, but did not have data available for 2007 as well as schools that provided data for 2007 after the 2008 LSAT Correlation Studies had been completed. In summary, this study examines data from 188 law schools, 179 of which were analyzed in the 2008 LSAT Correlation Studies. Of the 188 schools included in this study, 166 had data available for all 3 years of interest, 9 schools had data available for 2 of the years, and 13 schools had 1 year of available data. The total pool includes 103,327 law school students across 3 years of entering classes. The data from each law school are combined across years to ensure stability in the analyses and to remain consistent with previous studies. The data are analyzed separately for each law school.

LSAT Version

All students whose data were used in this study were tested with the version of the LSAT given in 2007 or earlier. The test included five 35-minute sections. One section was a variable section containing material used to pretest new questions or preequate new test forms (the variable section does not contribute to a test taker's score). The other four sections contained items designed to measure analytical (or deductive) reasoning, verbal (or informal logical) reasoning, and reading comprehension. The specific item-type makeup was as follows:

Item Type	No. of Items	Time
Reading Comprehension	26–28	35 minutes
Logical Reasoning A	24–26	35 minutes
Logical Reasoning B	24–26	35 minutes
Analytical Reasoning	22–23	35 minutes

The total number of scored items on the most recent version of the LSAT ranged from 100 to 102. A single score derived from the sum of the total number of questions answered correctly across the four scored sections was then equated and reported on an LSAT scale that ranges from 120 to 180. A timed writing sample was administered at the end of the test. Beginning in June 2005, the writing sample was extended from 30 minutes to 35 minutes. This writing assessment was not scored by LSAC, but copies of the writing sample were sent to all law schools to which the test taker applied.

Variables Used in the Study

The variables analyzed in this study are those that are currently used in the correlation studies: FYA, UGPA, and LSAT score. LSAT score and UGPA are the *predictor variables*, or the variables that are used to predict performance in the first year of law school. FYA is the *criterion variable*, or the variable that is predicted using LSAT and UGPA. Only students for whom data were available on each of the three variables were included in this study.

Additional operational details related to these three variables are given as follows:

- *First-year average***.** This variable is the average grade earned by a student in the first year of law school. FYA is provided for each student by his or her law school. Different law schools use different scales for first-year grades. To maintain the confidentiality of the individual law schools and to allow direct comparison across law schools, FYA values were transformed to a scale having a mean of 50 and a standard deviation of 10. Results presented in this report are on the transformed 50/10 scale.

- *Undergraduate grade point average***.** The average grade earned by each student during his or her undergraduate study is computed by the LSDAS, or according to LSDAS procedures. Grades computed in this manner are expressed on a scale from 0 to 4.33. The UGPAs used in this study are the same as those used in the correlation studies carried out for the individual law schools.

- *LSAT scores***.** Only LSAT scores reported on the 120–180 score scale were used in this study. For students with multiple LSAT scores, a single arithmetic average (i.e., mean) of the multiple scores was used. If any student took the test more than three times, only the most recent three scores were averaged.

Analysis Methods

This study was undertaken to evaluate the fairness and appropriateness of using LSAT score and UGPA to predict performance in law school for male and female students from a single prediction equation. This equation is developed from the combined data of all male and female students. In other words, the study sought to evaluate the potential for differential prediction between male and female law school student subgroups. The methods used to predict FYA in the current study were the same as those used in the ongoing predictive validity studies for individual schools that participate in the correlation studies. As in the correlation studies, data were pooled from the 3 years under investigation in order to achieve stable results within schools. The evaluation included descriptive, validity, and predictive analyses. These analyses were carried out separately for each law school for male and female subgroups. The following is a more detailed description of these analyses:

- *Descriptive analysis.* This analysis presents statistics comparing male and female student populations.

- *Validity analysis.* This analysis computes and compares the correlation coefficients for the different subgroups. Correlation coefficients are used to measure the linear relationship between predictor variables and the criterion variable (FYA). Correlation values were calculated separately for each law school included in the study and averaged across schools.

- *Predictive analysis.* Three separate least-squares regression calculations were used to predict FYA using LSAT score alone, UGPA alone, and a linear combination of UGPA and LSAT score as predictors. The difference between the predicted and actual FYA was calculated for each student within a law school and averaged for each subgroup at each school.

Results

The results from this study are presented in three sections. The first section includes descriptive data about female and male first-year law students. The second section reports the validity coefficients between the predictor variables and FYA for each gender subgroup. In the third section, the results of applying the prediction equations derived using the total group data (i.e., male and female first-year students combined) are reported for the separate subgroups.

Descriptive Statistics

Descriptive statistics for the first-year students within the law schools used in this study are presented in Tables 1–5 and in Figures 1 and 2a–2c.

Table 1 describes the overall gender subgroup breakdown among the 185 schools that participated in the 2008 LSAT Correlation Studies. Table 2 provides similar information for the 188 schools included in the current study. A comparison of the two tables confirms that this study's sample is very similar to that of the 2008 LSAT Correlation Studies. Of the 103,327 students who self-reported as male or female at the 188 schools represented across the 3 years of this study, 48,236 (46.7%) self-reported as female and 55,052 (53.3%) self-reported as male. It should be noted that some students did not indicate their gender, so subgroup percentages do not necessarily add up to 100. The percentage of female students participating in this study and the 2008 LSAT Correlation Studies is consistent with the 47% first-year female enrollment rate reported by the Law School Admission Council and the American Bar Association (2008) for all law schools over that 3-year period. Tables 1 and 2 indicate minor fluctuations in the percentages of male and female students, with the percentages of female students remaining slightly lower than the percentages of male students. These variations have also been reported by the Law School Admission Council and the American Bar Association (2008). On average, the number of male students in this study is about 14.1% greater than the number of female students. This represents an increased disparity over the 6.7% more male students than female students reported by Suto et al. (2007) for 2002, 2003, and 2004 and also an increase over the 2.3% more male students than female students reported by Duffy & Pashley (2003) for 1999, 2000, and 2001.

TABLE 1
Number and percentage of male and female first-year law school students among schools that were included in the 2008 LSAT Correlation Studies

			Male Students		Female Students	
Entering Class	Total	Number of Schools	Number	%	Number	%
2005	33,073	169	17,491	52.9	15,574	47.1
2006	34,036	174	18,426	54.1	15,600	45.8
2007	36,069	185	19,023	52.7	17,023	47.2
Pooled data	103,178	185	54,940	53.3	48,197	46.7

TABLE 2
Number and percentage of male and female first-year law school students among schools that were included in the current study

			Male Students		Female Students	
Entering Class	Total	Number of Schools	Number	%	Number	%
2005	33,245	169	17,606	53.0	15,633	47.0
2006	34,365	176	18,595	54.1	15,760	45.9
2007	35,717	184	18,851	52.8	16,843	47.2
Pooled data	103,327	188	55,052	53.3	48,236	46.7

Table 3 provides a distribution of law schools by percentage of subgroup enrollment at the 188 law schools. It indicates that most individual law schools have a larger percentage of male students than female students.

TABLE 3
Distribution of law schools by percentage of subgroup enrollment

% Subgroup Enrollment	Male		Female	
	%	Number	%	Number
≤ 30	0	0	0	0
31–40	3.7	7	11.2	21
41–50	21.8	41	69.2	130
51–60	67.6	127	17.0	32
61–70	6.9	13	2.7	5
≥ 71	0	0	0	0

Figure 1 presents the distribution of the law schools based on the percentages of female and male students at each law school (see Table 3). There are two sets of bars on the histogram, the solid bars representing data for male students and the crosshatched bars representing data for female students. The numbers on the vertical axis are the midpoints of each percentage category. Each category includes the lower bound percentage and goes up to, but does not include, the upper bound percentage. One hundred forty-seven schools (78.2%) had an average first-year class size that consisted of 50% or more male students as opposed to only 43 schools (22.9%) that had an average class size of 50% or more female students. Please note again that because a small percentage of students did not indicate their gender, the total percentage of female and male students at each school does not necessarily add up to 100. Overall, Figure 1 indicates that most of the 188 schools had a greater percentage of male students than female students.

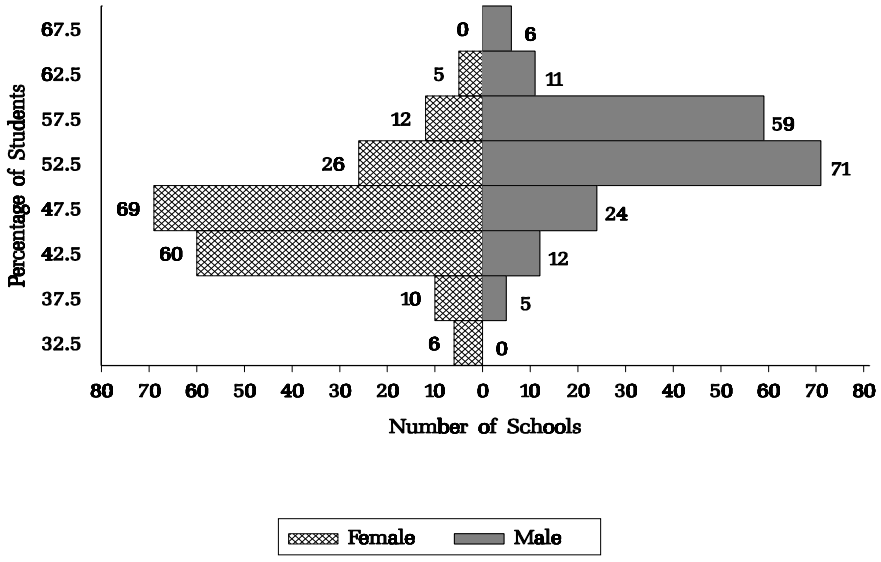

FIGURE 1. *Frequency distribution of percentage of female and male first-year students at the participating law schools*

Table 4 describes the number of included law schools by average size of gender subgroup. Of the 188 schools included in this study, 97 had average female first-year class sizes of between 50 and 99 students. This was the largest number of schools at any of the class-size groupings for female students. By comparison, 87 schools had average male first-year class sizes between 50 and 99 students. This, too, is the largest number of schools at any of the class size groupings for male students. A total of 83 schools had 100 or more male first-year students on average and a total of 63 schools had 100 or more female first-year students on average. Overall, there were no dramatic differences between male and female students in the number of law schools categorized by size of gender subgroup.

TABLE 4
Summary of the number of included law schools by average size of gender subgroup

	Size of Gender Subgroup				
	<50	50–99	100–149	150–199	≥ 200
Gender Subgroup					
Male	18	87	60	13	10
Female	28	97	46	11	6

Table 5 provides descriptive statistics by gender subgroup for the three variables used in the study to measure performance. The data indicate that LSAT scores and FYAs tend to be higher for the male subgroup while UGPAs tend to be higher for the female subgroup. These results are consistent with those for law school applicant populations. The standard deviations demonstrate a different pattern, with more variation in the criterion variable (FYA) for the female subgroup; the variation in each of the two predictor variables is higher for the male subgroup.

TABLE 5
Descriptive statistics of study variables for included law schools

Gender	Number	Mean LSAT		Mean UGPA		Mean FYA	
Subgroup	of Schools	Mean	*SD*	Mean	*SD*	Mean	*SD*
Male	188	157.11	5.57	3.31	0.19	50.26	0.62
Female	188	155.85	5.42	3.44	0.16	49.66	0.71

Figures 2a–2c show performance data for the law students included in this study. The histograms in these figures represent the distribution of the law schools included in this study according to the mean difference (calculated at each school) between male and female first-year law school students on three measures: LSAT score, UGPA, and FYA. A positive number indicates that male students outperformed female students on the measure of interest. A negative number means that female students outperformed male students on the measure of interest.

Figure 2a presents a histogram of the difference in LSAT means between male and female students. There are 188 values, one for each school. The histogram indicates that the LSAT mean was higher for male students compared to the LSAT mean for female students at all but three schools. The histogram shows that 127 (67.6%) of the schools observed mean differences between 0 and 1.50. Of the schools in which the mean for male students was higher, only three experienced more than a 3-point mean LSAT difference between male and female students. While all but three of the differences favored male students, the magnitude of most of the differences was small.

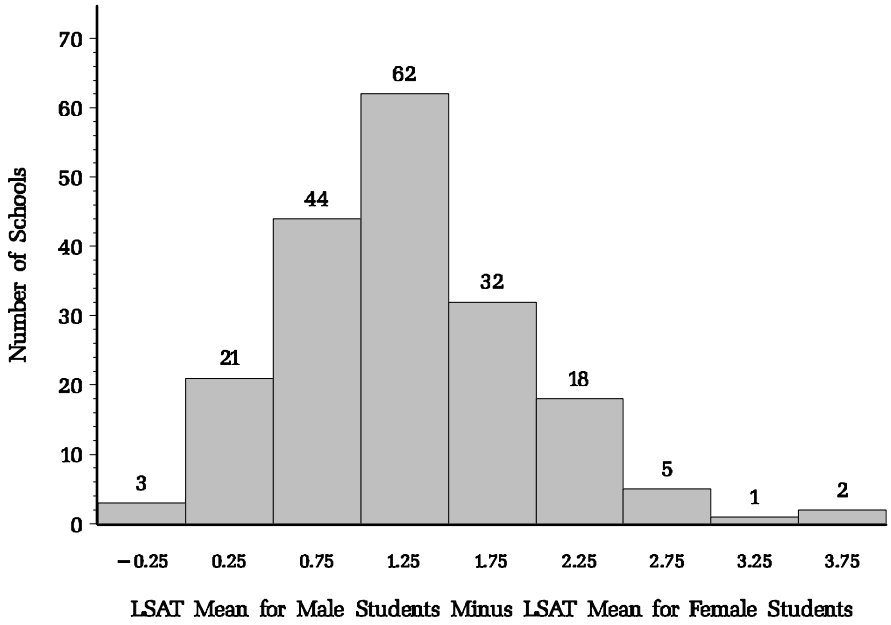

FIGURE 2a. *Frequency distribution of differences between LSAT means for male and female students at the participating law schools*

Figure 2b presents the difference in UGPA means between male and female students. Whereas male students tended to have higher LSAT means, Figure 2b indicates that female students had higher UGPA means at most of the participating schools. The female UGPA mean was higher than the male UGPA mean at all but three of the schools. Most of the schools (about 84%) fall between –.20 and 0 on the difference scale.

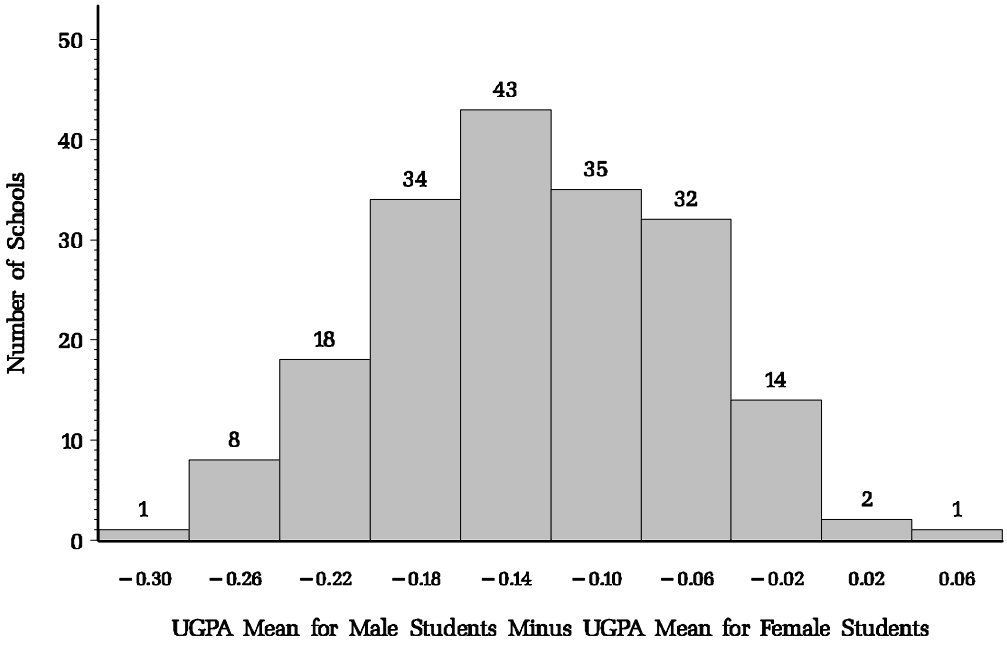

FIGURE 2b. *Frequency distribution of differences between UGPA means for male and female students at the participating law schools*

Figure 2c presents the difference between FYA means for male and female students at the participating law schools. The differences in FYA means appear to slightly favor the male subgroup. The percentage of schools in which the mean for male students was higher was about 68%. The majority of the schools (about 84%) had differences in mean for male students and mean for female students between –2.00 and 2.00. Only eight schools (about 4%) had differences of 3 points or more; two of these differences were in favor of female students and six of them were in favor of male students.

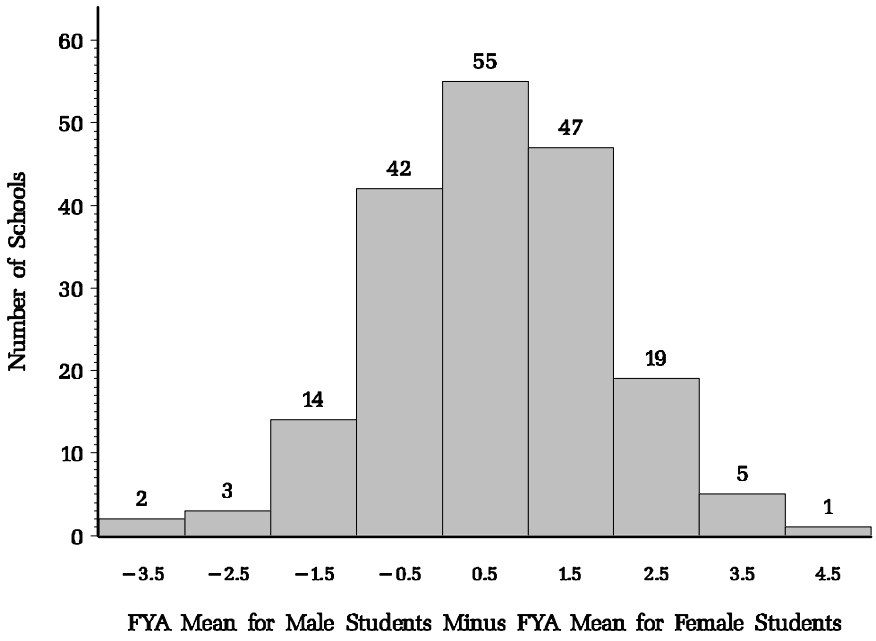

FIGURE 2c. *Frequency distribution of differences between FYA means for male and female students at the participating law schools*

Predictive Validity

The relationships between the predictor variables (LSAT and UGPA) and the criterion variable (FYA) are measured through the computation of correlation coefficients. Correlation coefficients can range in value from –1 to 1, where 1 represents a perfect positive linear relationship. The correlation coefficients for each subgroup were calculated separately by law school and averaged. Table 6 provides the correlations between the predictors—both alone and in combination—and FYA. For each gender subgroup, LSAT had a higher correlation than UGPA while the combination of LSAT and UGPA produced higher correlations than either predictor variable alone. All correlations were higher on average for the female subgroup than for the male subgroup.

TABLE 6
Correlations of LSAT scores and UGPA with FYA by subgroup

Gender Subgroup	Number of Schools	Number of Students	Correlation		
			LSAT	UGPA	LSAT, UGPA
Male	188	55,052	0.29	0.28	0.43
Female	188	48,236	0.38	0.32	0.50

Predicting First-Year Averages

The primary research question addressed by this study was whether or not LSAT, UGPA, and the combination of these two predictor variables differentially predicted FYA for male and female law school students. One method to address the question of differential prediction is to determine how accurately LSAT scores, UGPA, and the combination of LSAT score and UGPA predict performance in law school for male and female subgroups. Figures 3–5 examine the differences between predicted and actual FYAs for the male and female subgroups. Using least-squares regression, separate equations were derived to predict law school FYA for the total group of law school students within each individual law school for LSAT alone, UGPA alone, and the combination of LSAT and UGPA. Differences between predicted and actual FYA were then calculated for each subgroup based on each regression equation. For the difference calculation, the mean actual FYA earned by students at a participating school was subtracted from the mean predicted FYA for students at the school. A resulting negative difference indicates that the regression equation underpredicted the mean (or average) performance of a subgroup in a law school, while a positive value indicates that the regression equation overpredicted the mean performance of a subgroup in a law school. Because each school has a distinct grading scale, a conversion was made to allow comparisons across law schools and to preserve the confidentiality of the school-level data. FYAs were converted to a 50/10 scale; that is, the mean for the total group of students at each school was set to 50 and the standard deviation to 10. Distributions of the differences between predicted and actual FYA means are presented graphically for each prediction equation for each subgroup. To further summarize these data, the weighted average of the mean residuals between predicted and actual FYA for each prediction equation/subgroup combination is provided in Table 7.

TABLE 7
Summary of mean residuals between predicted and actual FYA by gender subgroup

Gender Subgroup	LSAT	UGPA	LSAT, UGPA
Male	0.110	–0.756	–0.344
Female	–0.125	0.864	0.394

Figure 3 presents the results for the model that used LSAT score as the predictor of FYA. These results indicate that when LSAT alone is used as the predictor, the FYA mean for female students is more likely to be slightly underpredicted and the FYA mean for male students is more likely to be slightly overpredicted. About 63.8% of the schools underpredicted mean FYAs for female students and 64.4% of the schools overpredicted mean FYAs for male students. The differences between predicted and actual mean FYA fell within one point of zero at 90.4% of the schools for female students and at 93.6% of the schools for male students. No schools displayed overprediction or underprediction as great as two points for either male or female students. In fact, only eight schools had differences between predicted and actual FYAs of more than 1.5 points. Since the number of students varies from one school to another, a weighted average was calculated to determine the average residual between predicted and actual FYAs for each gender subgroup. Table 7 shows that across all male students, the average residual was 0.110 points. Across all female students, the average residual was –0.125 points. Because FYAs were converted to a 50/10 scale, the average amount of overprediction and underprediction observed when only LSAT score was used as the predictor variable was extremely small.

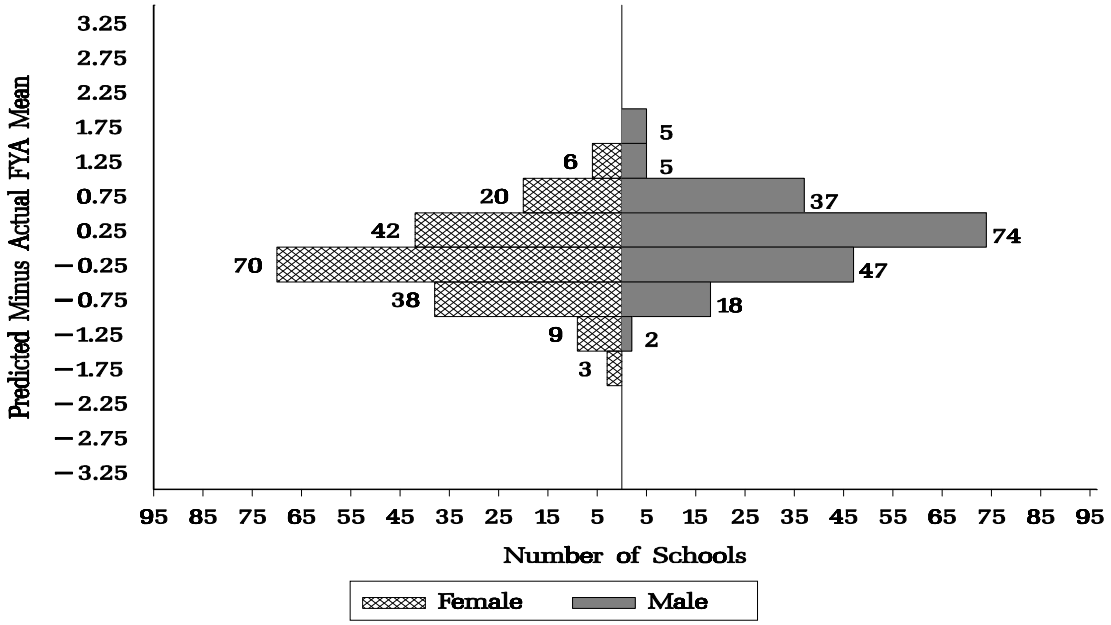

FIGURE 3. *Frequency distribution of differences between predicted and actual FYA means for female and male students at participating law schools using LSAT score as the predictor variable*

Figure 4 presents the results for the model that used only UGPA to predict FYA. These results indicate that the use of UGPA alone in predicting FYA resulted in a slight tendency to overpredict FYA for female students and underpredict FYA for male students. About 94.1% of the schools overpredicted FYA means for female students, and 93.1% of the schools underpredicted FYA means for male students. Again, for most of the schools included in this study, residuals between predicted and actual FYAs fell within one point of zero when UGPA alone was used as the predictor variable, but this result was not as pronounced as when LSAT was used as the sole predictor. Approximately 56.4% of the schools fell within this range when predicting FYA means for female students, and 70.2% of the schools fell within that range when predicting FYA means for male students. For male students, only one school had a difference of more than 2 points. For female students, only one school had a difference of more than 3 points and four schools had a difference of more than 2 points but less than 3 points. As shown in Table 7, across all male students, the average residual between predicted and actual FYA was –0.756 points. Across all female students, the average residual between predicted and actual FYA was 0.864 points. Although still quite small (less than 1/10 of a standard deviation, on average), the magnitudes of differences observed between predicted and actual FYA means for both gender subgroups were greater for the equation using UGPA alone as the predictor than was observed for the equation using LSAT alone as the predictor.

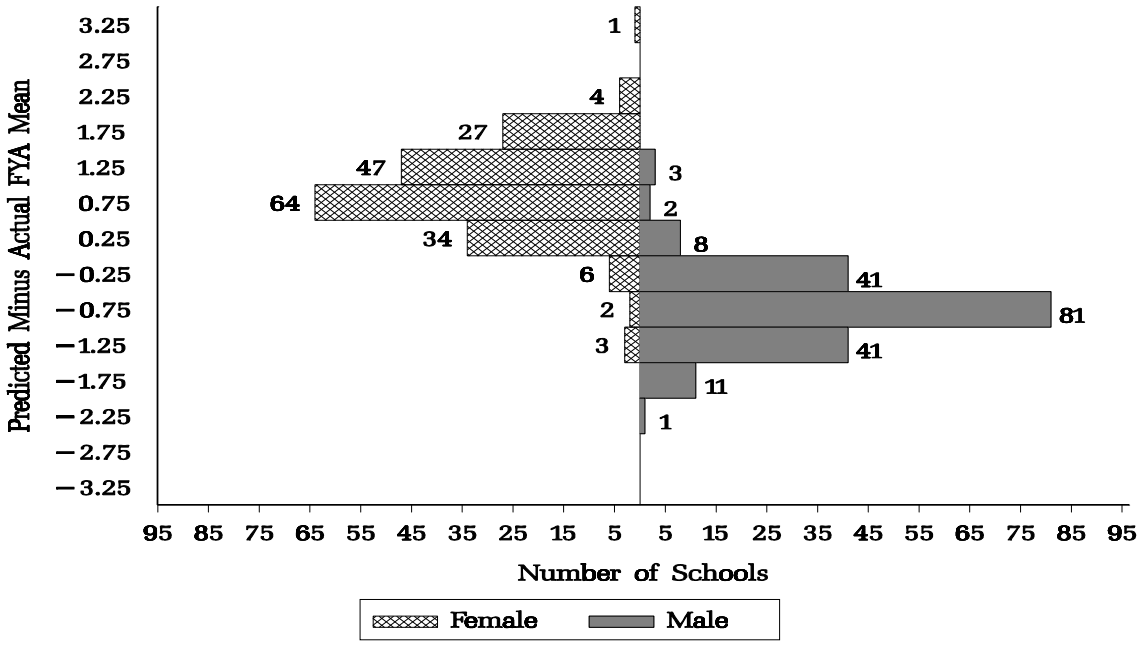

FIGURE 4. *Frequency distribution of differences between predicted and actual FYA means for female and male students at participating law schools using UGPA as the predictor variable*

Figure 5 presents the results for the model that used the combination of LSAT and UGPA to predict FYA. Similar to the prediction model using UGPA alone, this histogram indicates that the use of LSAT score and UGPA together results in slight overprediction of FYA for female students and slight underprediction of FYA for male students, on average; but these differences are not as great as those observed when UGPA alone was used as the predictor. Figure 5 shows that 81.4% of the schools overpredicted FYA means for female students, and 80.9% of schools underpredicted FYA means for male students. Most of the overprediction and underprediction that did occur fell within the range of −1.0 to 1.0. Approximately 86.2% of the schools fell within this range when predicting mean FYAs for female students. Mean FYAs for male students were overpredicted or underpredicted within the same range at 92.0% of the included schools. All schools had mean residuals of less than 2 points for both gender subgroups. Table 7 shows that, across all male students included in this study, the average residual between predicted and actual FYA was −0.344 points. Across all female students included in this study, the average residual was 0.394 points. Even though a slight tendency toward underprediction was observed for male students and a slight tendency toward overprediction was observed for female students, the magnitude of these differences was generally rather small.

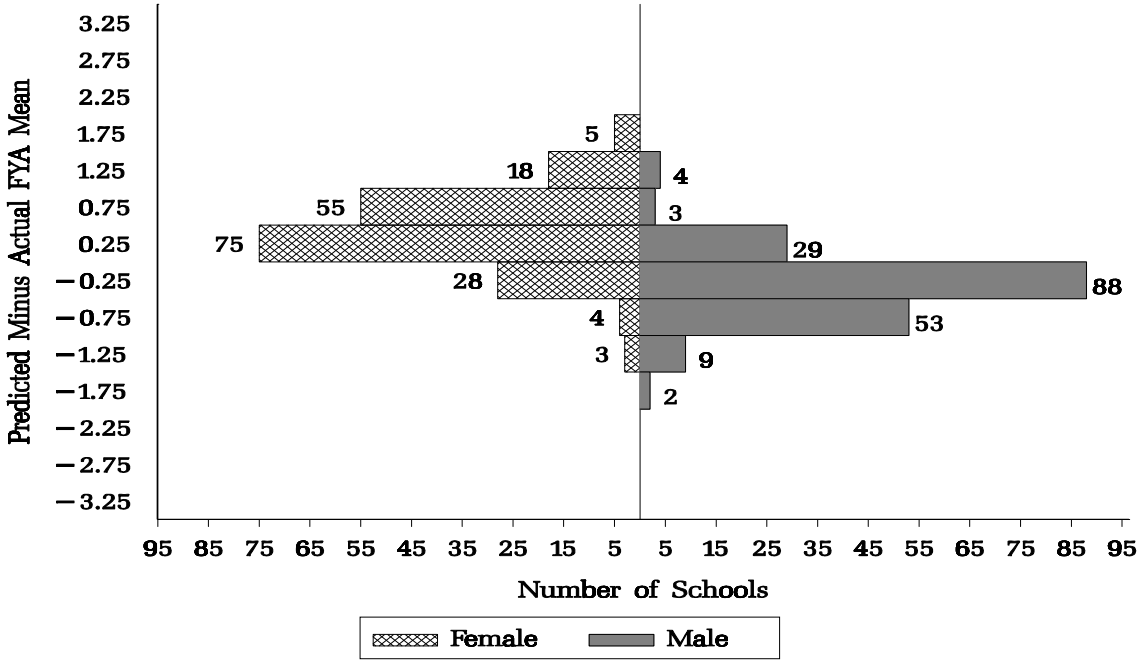

FIGURE 5. *Frequency distribution of differences between predicted and actual FYA means for female and male students at participating law schools using the combination of LSAT score and UGPA as predictor variables*

Conclusions

This study analyzed data from 188 law schools to determine whether evidence exists of differential prediction between male and female students. Like previous LSAC studies of its kind, this study relied on a regression model–based definition of fairness in selection. That is, the prediction would be considered unfair if the regression equation consistently and systematically excluded members of an identifiable subgroup as a result of seriously underpredicting the performance of its members (or seriously overpredicting the performance of some other subgroup).

None of the three prediction equations evaluated were deemed to be problematic. That is, none of the prediction equations significantly overpredicted or underpredicted FYAs for male or female students across the schools studied. The magnitude of overprediction or underprediction across members of each gender subgroup was found to be less than one tenth of a standard deviation, on average, for each prediction equation. The degree of differential prediction was greatest for the model using UGPA alone, but these differences were still too small to be of practical significance. As an illustration, consider a law school that has a 0 to 4.33 grading scale with an observed mean of 3 and standard deviation of 0.44. Then, for example, an underprediction of one tenth of a standard deviation for female students at such a law school would mean that their FYAs were underpredicted on average by a factor of .044. Overall, the results of this study do not support the concern that the use of LSAT score or the traditional combination of LSAT score and UGPA results in unfair admission decisions with regard to gender.

At least two caveats should be remembered while evaluating the results of this study. First, only differences in *average* predicted performance were analyzed. That is, the performance of individuals within a subgroup whose FYAs are overpredicted on average may still be underpredicted, and vice versa. Second, differential prediction is only one aspect of an overall construct validity evaluation. Other aspects, such as the strength of the correlation between a predictor and a criterion variable, should also be considered when deciding whether prediction equations are valid.

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