DOCUMENT RESUME

ED 291 178 EC 201 792

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TITLE An Examination of Admissions Practices at the North Carolina School of Science and Mathematics.
PUB DATE Apr 87
NOTE 23p.; Paper presented at the Annual Meeting of the National Council on Measurement in Education (Washington, DC, April 21-23, 1987).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academically Gifted; *Admission Criteria; Grade Point Average; High Schools; Mathematics; Prediction; Residential Schools; Sciences; *Special Schools; Statistical Analysis
IDENTIFIERS *North Carolina School of Science and Mathematics

ABSTRACT

Admissions practices at the North Carolina School of Science and Mathematics, a residential high school for gifted students, were examined. Data from students applying in 1983 and 1984 (over 800 per year) were available, as were grades of students admitted in 1983. A series of multiple regression studies showed that selection and first year grades could be accurately predicted. This finding suggested that statistical methods of selection could logically replace at least a portion of a more labor intensive clinical method. Additional analyses showed that students admitted in each year significantly outperformed other applicants on all objective measures. Recommended is a two-stage approach to selection with 260 semi-finalists being selected strictly on a statistical basis and the remaining 140 semifinalists selected by school officials. Semifinalists would then be interviewed by admissions committees and final selection be based partly on committee recommendations and partly on the discretion of school officials. Other recommendations involved more detailed definitions of admissions standards and expanded studies of school outcomes. (DB)

AN EXAMINATION OF ADMISSIONS PRACTICES AT THE NORTH CAROLINA SCHOOL OF SCIENCE AND MATHEMATICS

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Paper presented at the annual meeting of the National Council on Measurement in Education (Session I-3), Washington, DC, 1987.

ABSTRACT

Admissions practices at a residential high school for gifted students were examined. Data from students applying in 1983 and 1984 (over 800 per year) were available, as were grades of students admitted in 1983. A series of multiple regression studies showed that selection and first year grades could be accurately predicted. This result meant that statistical methods of selection could logically replace at least a portion of a more labor-intensive clinical method. Additional analyses showed that students admitted in each year significantly outperformed other applicants on all objective measures.

The present study was conducted under the aegis of the North Carolina School of Science and Mathematics (NCSSM), a residential public high school for gifted North Carolina eleventh and twelfth graders. The primary purpose of the study was to evaluate the admissions procedures in place at NCSSM in 1985-86 and to recommend improvements. Such an evaluation sheds light not only on a specific school and its practices but also on admissions in a broader sense.

Backgroun

Two fundamental issues must be addressed in any admissions study. First, it is usually the case that admissions officers wish to maximize some outcome. State and federal mandates have identified at least three goals for NCSSM, and school administrators and staff have attempted to make those goals clear and attainable. Once outcomes have been established, the second issue involves measurement: how to measure the outcome, and how to predict it.

Regarding outcomes, there is no lack of goals, both global and minute; to which educational institutions may aspire. Lenning, Munday, Johnson, Vander Well, and Brue (1974b) reviewed hundreds of admissions studies and identified at least twenty different categories of schooling within seven categories. Some of these include intellectual development (creativity, thinking skills), personality development (autonomy, self-confidence), motivation (vocational maturity, need for achievement), social development, participation in extracurricular activities, aesthetic/cultural development, moral/philosophical development, and benefits to society. Any of these outcomes would be relevant to the NCSSM applicant/student populations. An examination of the success of the selection process could therefore focus on any or all of them.

It seems unfortunate that, in most instances, only one outcome measure is examined. This is typically first year grades, persistence, or admission to the next level of schooling. In the present study, only one student outcome was available: first year grades. Societal and school outcomes (ethnic balance, sex equity, regional fairness) were also considered.

Once an outcome is identified, it may be predicted any number of ways. Again there are two major decision points: which predictors to use and how to combine them. On the former subject, Lenning, Munday, Johnson, Vander Well and Brue (1974a) identified several categories of predictors, including personality, motivation, attitude, habits, interests, activities, self assessment, biographical information, demographic characteristics, and others. Then there are test scores, grades, and related predictors. Add to this list letters of reference, rating forms, personal interviews, essays, and a host of increasingly subjective information and the task of the admissions officer is complete.

Not quite. Now comes the task of combining all those measures. Should they simply be quantified and combined in a giant regression analysis (statistical prediction) or should panels of experts patiently and creatively sift through all the available information (clinical prediction)?

While the distinction between clinical and statistical prediction no doubt predates P.E. Meehl, it was his monograph (1954) that clearly defined the dichotomy and set its boundaries. Meehl (1965) even published a "box score" of sorts to show the relative efficacy of predicting outcomes via equations vs. expert opinion. Wiggins (1973) more clearly stated the rules of the contest: give the same information

to a clerk (or computer) and a clinician and see who makes better predictions of a socially relevant criterion.

Herein lies the problem of the present study. How does one best attain the many goals set for an institution, admit the most promising candidates, assure race and sex equity, maintain a broad base of regional support, and maintain an identity? The following sections describe in some detail a basically clinical approach in place at NCSSM in 1985-86, an alternative statistical approach, and a mixed approach combining the best features of both.

The Clinical Approach

For the purpose of this paper, the overall admissions process may be divided into four phases:

1. Application
2. Review/Selection of Semifinalists
3. On-Campus Interview
4. Review/Selection of Finalists

Some of these are described in greater detail later in this report.

Application. This stage of the process includes recruitment and identification activities. Each year approximately 800 North Carolina tenth graders apply to NCSSM. Many of these 800 students might not have applied were it not for the efforts of NCSSM staff who travel to all parts of the state to describe the benefits of the school, work with local school officials, and identify students who may be suitable candidates.

Students may be nominated by school staff or officials or students may simply complete an application. This application must be accompanied by teacher comments, a ninth grade transcript, and scores obtained on a variety of tests. Grades and some test scores are routinely available for North Carolina students; for example, California

Achievement Test (CAT) scores are normally available. Other tests, such as the Scholastic Aptitude Test (SAT) must be taken by the student at his or her expense. When all scores, letters of support, and other materials are received by the NCSSM, the application process ends and the review process begins.

Review/selection of semifinalists. All documents pertaining to a single applicant are organized in a folder. These folders are reviewed by at least three educators, some of whom may be employees of the NCSSM and some of whom are invited by the director of admissions to participate. Each year, 20-25 educators from around the state participate in selection. Each educator evaluates the folders holistically on a scale of 1 to 5 (half scores such as 2.5, 3.5, are also possible). To ensure reliability and consensus, the three ratings on any one folder must be no more than half a point apart. Thus, for example, a folder receiving ratings of ., 3, and 4 would be sent to a second group of three educators for further discussion. In this manner each folder (applicant) receives a total index between 3 and 15. It should be noted that each educator evaluating a folder is free to place whatever weight he or she deems appropriate to each item in the folder. While the forced consensus serves to minimize totally subjective evaluations, it cannot eliminate the effects of vocal or persuasive group members. Nor does it completely overcome the residual effects of "hard" or "easy" raters.

Some of these concerns are addressed by the discretionary powers given to the school's director and the director of admissions. For example, approximately 400 students are identified as semifinalists. The procedure described above nets only about 260 students (i.e., those 260 candidates with the highest total index scores). The director of

the school and the director of admissions then examine the geographic characteristics of this group and add another 80 students in such a way that geographic (congressional district) characteristics conform to predetermined targets. The final 60 students are selected in such a way as to balance race, sex, and high school size/type representation. Table 1 shows a typical target composition. These targets are based on actual counts of students in the tenth grade. Targets by sex are influenced by dormitory space.

Table 1
"Ideal" Composition of Semifinalists Selected in 1984

By Region

1	24 ± 5	(19-29)
2	44 ± 9	(35-53)
3	64 ± 13	(51-77)
4	48 ± 10	(38-58)
5	72 ± 14	(58-86)
6	72 ± 14	(58-86)
7	40 ± 8	(32-48)
8	36 ± 7	(29-43)

By Race

Asian	2 ± 0	(2)
Black	122 ± 24	(98-146)
Hispanic	1 ± 0	(1)
Indian	6 ± 1	(5-7)
White	269 ± 54	(215-323)

By Sex

Female	194 ± 39	(155 - 233)
Male	206 ± 41	(165 - 247)

On-campus interview. The four hundred or so semifinalists are invited to NCSSM in the spring of their sophomore year for a personal tour and interview. Interviews are conducted by school staff who undergo a six-hour training session.

Each semifinalist participates in a 30-minute interview with a faculty member who rates him or her on eight psychological factors and seven personal factors. These factors are described in a Training Manual for Interviewers (Research and Evaluation Associates, 1984) and are summarized below:

- Psychological Factors
  - Need to achieve
  - Interest in science and mathematics
  - Commitment to attending
  - Motivation to learn
  - Attitude about life
  - Ability to adapt
  - Self-confidence
  - Approach to problem solving

- Personal Factors
  - Clarity of expression
  - Openness
  - Friendliness
  - Imagination
  - Intellectual potential
  - Enthusiasm
  - Sparkle

The training manual describes how to begin, conduct, and end the interview. Sample questions are offered, and specific criteria are offered for evaluating individual responses as well as the entire interview. At the close of the interview, the faculty member rates the semifinalist, places the rating in the student's folder and begins another interview. When all semifinalists have been interviewed, the fourth and final step begins.

Review/selection of finalists. At the time semifinalists are interviewed, school staff are also busy completing their folders. Student grades are updated to include first semester sophomore year grades, missing test scores, recommendations, and other pertinent information. The final piece of information to be added is the interviewer's rating. At this point, 20-25 educators from around the

state convene at the school to rate semi-finalists and select approximately 220 finalist and alternates. The procedures followed are identical to those followed in the selection of semifinalists, i.e., teams of three educators examine each folder, assign holistic ratings, work toward consensus, and arrive at a summary rating between 3 and 15. As before, 65 percent of the finalists are selected purely on the basis of these ratings. The rest are selected by the school's director of admissions to balance the demographic characteristics of the class.

Results. The selection procedure requires admissions teams to examine twenty or more variables in evaluating candidates. The admissions staff then must review these same data plus summary evaluations rendered by the evaluation teams. The school's director and the director of admissions must then balance all the objective data and all the team evaluations with state mandates to make sure that students are not discriminated against because of race, sex, region, or congressional district.

Given the influence of non-objective factors, the admissions process separated candidates into three groups that were remarkably distinct with respect to all objective measures considered. The three groups - finalists, semifinalists, and others - differed significantly on virtually every objective measure used. Table 2 shows the mean scores of the three groups on the objective measures in 1983. Table 3 shows the same data for 1984. As one can see, the groups differed significantly on nearly every measure, with the finalist group scoring highest. For 1983, the multivariate F statistic was 12.64 ($p < .01$), indicating that the groups differed not only on single measures but in a global sense as well. For 1984, the multivariate F statistic was 14.99 ($p < .01$). We view these findings as remarkable, especially

since little direction was given to admissions teams regarding how they should evaluate applicants' records.

Table 2
Group Differences on Selection Measures: 1983

Variable	Others (N=445)	Semi-Finalists (N=154)	Finalists (N=226)	F (df=2,667)	p
Grade Point Average	3.57	3.75	3.89	37.28	<.01
Math Grade	3.50	3.72	3.83	26.10	<.01
Science Grade	3.55	3.68	3.82	18.46	<.01
English Grade	3.42	3.58	3.66	8.83	<.01
CAT Reading	89.30	93.74	95.48	19.52	<.01
CAT Language	90.30	94.86	96.08	25.55	<.01
CAT Math	88.22	93.76	95.57	44.83	<.01
SAT Verbal	443.28	488.83	516.64	42.34	<.01
SAT Math	479.50	551.10	589.60	116.06	<.01
Test of Standard Written English	454.46	490.91	514.56	30.35	<.01
Ravens Progressive Matrices	23.96	26.21	28.03	63.58	<.01
Biographical Inventory: Academic Performance	43.25	58.34	60.80	58.68	<.01
Biographical Inventory: Creativity	46.48	52.54	53.58	8.26	<.01
Biographical Inventory: Career Maturity	52.09	53.57	51.06	.12	.73
Biographical Inventory: Educational Orientation	49.90	53.55	55.19	5.09	.02
Mean Rating	4.50	4.68	4.79	25.40	<.01

Table 3
Group Differences on Selection Measures: 1984

Variable	Others (N=418)	Semi-Finalists (N=152)	Finalists (N=274)	F (df=2,784)	p
Grade Point Average	3.45	3.67	3.82	67.94	<.01
Math Grade	3.31	3.58	3.76	38.55	<.01
Science Grade	3.35	3.63	3.79	30.69	<.01
English Grade	3.21	3.41	3.64	25.83	<.01
CAT Reading (Percentile)	87.92	95.80	95.67	43.66	<.01
CAT Language (Percentile)	90.18	96.34	96.58	45.05	<.01
CAT Math (Percentile)	86.31	94.59	96.32	89.38	<.01
SAT Verbal	430.23	513.36	530.62	107.07	<.01
SAT Math	471.73	571.69	608.10	176.73	<.01
TSWE	446.59	522.50	528.17	85.72	<.01
Ravens	23.72	26.73	27.92	65.16	<.01
Biographical Inventory: Academic Performance	41.59	53.80	63.29	43.59	<.01
Biographical Inventory: Creativity	49.72	49.34	53.02	2.03	.13
Biographical Inventory: Career Maturity	51.76	44.73	48.51	4.07	.02
Biographical Inventory: Educational Orientation	52.40	52.93	57.28	1.91	.15
Mean Rating	4.44	4.61	4.87	12.13	<.01

One might well argue that the large univariate and multivariate F values are due to the presence of the 'Others' group, and that the real test of admissions is the clarity of the distinction between semi-finalists and finalists. Table 4 shows a comparison between these two groups. In 1983, finalists scored significantly higher than semifinalists on every measure except English grades, CAT Language and Biographical Inventory subtests. In 1984, finalists scored significantly higher on every measure except CAT Reading, CAT Language, Test of Standard Written English, mean rating, and three of the Biographical Inventory subtests (Creativity, Career Maturity, Educational Orientation). T^2 values were significant for both years, 3.56 ($p < .01$) for 1983 and for 1984.

Table 4
Comparison of Finalists and Semi-Finalists
on Performance on Objective Measures

	t Statistics (p values)			
Measure	1983		1984	
Grade Point Average	15.31	(< .01)	11.82	(< .01)
Math Grade	2.67	(.10)	6.72	(< .01)
Science Grade	4.34	(.04)	9.20	(< .01)
English Grade	.37	(.54)	12.48	(< .01)
CAT Reading	5.85	(.02)	.01	(.96)
CAT Language	3.38	(.07)	1.04	(.31)
CAT Math	8.28	(< .01)	11.56	(< .01)
SAT Verbal	8.32	(< .01)	7.23	(.01)
SAT Math	15.77	(< .01)	7.27	(.01)
TSWE	9.09	(< .01)	1.28	(.26)
Ravens	19.14	(< .01)	7.48	(.01)
Biographical Inventory: Academic Performance	.84	(.36)	14.24	(< .01)
Biographical Inventory: Creativity	.11	(.74)	2.02	(.16)
Biographical Inventory Career Maturity	.66	(.42)	2.32	(.13)
Biographical Inventory: Educational Orientation	.32	(.57)	2.45	(.12)
Mean Rating	6.68	(.01)	2.58	(.11)
Hotelling's T^2	3.56	(< .01)	3.56	(< .01)

The Statistical Approach

The statistical approach was based on the development of a multiple regression model with first year grades as the criterion variable and all the information in candidates' folders as predictors. The development and application of this model are described below.

Applicant data from the 1983 and 1984 admissions seasons were selected for their recency and completeness. First year grade point averages were also available for those students admitted in 1983. While such data were also available for 1984 finalists, the merging of selection data and grades proved unsatisfactory and was abandoned. The following variables were available for all students:

Region
Sex
Race
Social Security Number
Ninth Grade Grade Point Average (GPA)
Math Grades
Science Grades
English Grades
CAT Scores (Reading, Math, Language, Total Battery)
SAT Scores (Verbal, Math, Test of Standard Written English)
Teacher Ratings (11 different scales)
Biographical Inventory (4 subtests)
Ravens Progressive Matrices
Decision Status (3 categories)

The sizes of the three groups were as follows: 825 candidates in 1983, 844 candidates in 1984, and 183 finalists with 1983-84 grade point averages for NCSSM courses.

Analyses. Analyses included computation of the correlation between each variable and first year grade point average (GPA) for 1983 finalists. These analyses were followed by multiple regression analyses. The purpose of these analyses was to find a set of variables that would best predict 1983-84 GPA. The resulting model was then applied to all 1983 and 1984 candidates to yield predicted first year

GPA. Differences amoung groups with respect to estimated GPA were then analyzed.

Results. Results of the various analyses are presented by stage: correlation analysis, model building, and cross validation.

It is useful to examine zero-order correlations between predictor and criterion variables prior to model building in order to determine patterns that may prove useful. Table 5 presents the correlations between predictor variables and first year GPA.

Table 5
Correlations Between Predictor Variables and First Year GPA (N=183)

Predictor Variable	Correlation
Ninth Grade GPA	.49
Math Grades	.25
Science Grades	.37
English Grades	.32
CAT Reading	.31
CAT Math	.32
CAT Language	.25
CAT Total Battery	.29
SAT Verbal	.39
SAT Math	.45
Test of Standard Written English	.34
SAT Total	.46
Ravens Progressive Matrices	.16
Biographical Inventory: Academic Performance	.41
Biographical Inventory: Creativity	.00
Biographical Inventory: Career Maturity	-.12
Biographical Inventory: Educational Orientation	.28
Teacher Rating: Observant	.14
Teacher Rating: Inquisitiveness	.09
Teacher Rating: Experimental	.05
Teacher Rating: Persistent	.11
Teacher Rating: Self-Starter	.15
Teacher Rating: Innovative Performance	.21
Teacher Rating: Analytical	.22
Teacher Rating: Capacity for Learning	.20
Teacher Rating: Leadership Ability	.17
Teacher Rating: Desire to Achieve	.06
Teacher Rating: Self-Confidence	.11

Ninth grade grade point average was the best single predictor of first year grade point average at NCSSM (r=.49). This finding should not be at all surprising (cf. Educational Testing Service 1980; Table

1). Next in line were SAT Total (r=.46) and SAT Math (r=.45). Biographical Inventory: Academic Performance was a strong predictor of first year GPA with a correlation coefficient of .41.

The correlations reported in Table 5 gave some indication as to the development of a model to predict first year GPA. In order to be useful, a model must withstand the test of time. Therefore, rather than construct a model for each year of admissions data, we created one model for 1983 (using 1983-84 GPA as the dependent variable) and cross-validated it with 1984 data. Table 6 presents the final prediction model based on 1983 admissions data.

Table 6
Summary Statistics for 1983 Admissions Model

Variable	Coefficient	t	p (2-tailed)
Ninth Grade GPA	.266	2.47	< .01
Science Grades	.251	3.53	< .01
CAT Math	.011	2.21	.03
SAT Verbal	.008	2.20	.03
SAT Math	.014	3.68	< .01
Biographical Inventory: Creativity	-.003	-3.26	< .01
Biographical Inventory: Educational Orientation	.006	5.16	< .01
Constant	-1.171	-3.26	< .01

Multiple R^2 = .50 Adjusted Multiple R^2 = .48
Standard Error of Estimate = .339
$F(7,165) = 16.90$; $p < .01$

The coefficients shown in Table 6 can be used to construct a model of first year performance. This model is expressed below:

Predicted First Year GPA = -1.171 + .266 (Ninth Grade GPA)
+ .251 x (Science Grades) + .011 x (Math Grades)
+ .008 x (SAT Verbal) + .014 x (SAT Math)
- .003 x (Biographical Inventory: Creativity)
+ .005 x (Biographical Inventory: Educational Orientation)

The model given above was used to predict first year GPA for the

183 students for whom actual first year GPA was available. It was then possible to compare and determine the nature and extent of any systematic over- or underprediction of grades. Table 7 shows the actual and predicted first year GPAs for all 183 students and by sex, race, and region.

Table 7
Predicted vs. Observed First Year Grade Point Average

Group	N	Observed GPA	Predicted GPA	Difference	Significant
All Students	183	3.26	3.27	.01	No
Females	77	3.28	3.26	.02	No
Males	101	3.24	3.28	.04	No
Black	35	2.90	2.99	.09	No
White	116	3.33	3.32	- .01	No
Asian	20	3.50	3.55	.05	No
Hispanic	4	3.14	3.08	- .06	No
Indian	3	2.99	2.99	0.00	No
Region 1	12	2.98	3.13	.15	No
Region 2	19	3.10	3.18	.08	No
Region 3	36	3.40	3.36	- .04	No
Region 4	22	3.20	3.26	.06	No
Region 5	33	3.28	3.29	.01	No
Region 6	29	3.29	3.27	- .02	No
Region 7	13	3.15	3.27	.12	No
Region 8	14	3.40	3.24	- .16	No

Grades for male and female student grades were predicted with great accuracy. Similarly grades of students of all races and all regions of the state were accurately predicted. These findings strongly support a single equation system as opposed to one which provides separate equations by sex, race, or region.

To test this model further, it was applied to all 1983 and 1984 applicants and used to compare estimated first year GPAs for finalists, semifinalists, and others. If the selection process worked and if the measures have predictive validity, then finalists should have had the highest predicted GPAs, semifinalists the second highest, and other students the lowest. Table 8 summarizes the predictions for these groups.

Table 8
Predicted First Year Grade Point Average by Year and by Group

	Year of Application	
Group	1983	1984
Finalists	3.28	3.31
Semifinalists	3.12	3.16
Other	2.81	2.72
F value	91.56	166.11
p	< .01	< .01

As Table 8 shows, the model predicted significantly higher first year GPA for finalists than for the other groups. There was a steady progression downward from finalist to semifinalist to other for both years. It is also noteworthy that predicted grades for each group were fairly constant across years, indicating some stability in the applicant pool. This also suggests that the model focused on stable traits rather than those which fluctuate from year to year.

Thus, it would appear that the statistical approach also worked. Qualified candidates were selected and the total time invested was about two days for one person and a computer. But success is generally a relative quality. To determine just how successful the statistical approach was, it was necessary to compare its performance with respect to all known socially relevant criteria.

Comparison of the Two Approaches

Tables 9 and 10 show the relationship between the two approaches in terms of students admitted. Large differences were found for both years.

Table 9
Comparison of Predicted and Actual Status
for 1983 Applicant Pool

Actual Status (Clinical)	Predicted Status (Statistical) Not Selected	Selected	Total
Selected	105	121	226
Not Selected	490	109	599
Total	595	230	825

Table 10
Comparison of Predicted and Actual Status
for 1984 Applicant Pool

Actual Status (Clinical)	Predicted Status (Statistical) Not Selected	Selected	Total
Selected	106	166	272
Not Selected	465	107	572
Total	571	273	844

Tables 9 and 10 show tremendous differences in selection patterns. Using predicted GPA alone, 42 percent of all finalists would not have been selected (46 percent in 1983 and 39 percent in 1984). Conversely, 11 percent of those not selected by the Office of Admissions would have been selected on the basis of predicted GPA alone.

We have noted that those selected in 1983 and 1984 scored significantly higher on objective measures than those not selected. Yet predicted GPA is based on a set of those same measures. Why such large discrepancies then? The reader is reminded that differences between selected and nonselected groups were mean differences; many selected individuals scored lower on many objective measures than did many individuals who were not selected. Selection based strictly on predicted GPA alone allows no such occurrences.

Does this mean that statistical prediction is unthinkable? Certainly not. It simply means that such an approach cannot be used to select all finalists. However, such an approach could be used to select when 30-40 percent are selected by the director of the school and director of admissions to balance demographic characteristics as is currently done. The following example is offered to demonstrate the effect of combining statistical with clinical prediction. Table 11 shows the number of finalists actually selected by sex, race, and region in 1984 along with the numbers of semifinalists who have been available

simply on the basis of predicted first year grade point average.

Table 11
Comparison of Finalists Needed with Semifinalists Available through Formula Admissions

By Sex	Semifinalists Available	Finalists Needed
Female	196	88
Male	229	123
By Race		
Asian	36	21
Black	20	41
Hispanic	3	2
Indian	4	1
White	362	140
By Region		
1	29	12
2	37	26
3	70	43
4	47	25
5	84	38
6	90	35
7	37	17
8	31	15

As one can see, the selection of semifinalists by predicted GPA alone balances sex and region, and almost works for race. The greatest shortcoming of the procedure has to do with the availability of black semifinalists. By this procedure only 20 black semifinalists were identified from the 1984 applicant pool. Yet, 41 black students were admitted in 1984. It is impossible to predict how many black semifinalists would have been available in 1984 if semifinalist status had been based entirely upon judges' ratings. Obviously, such was not the case. Similarly, with 103 black applicants in 1984, the number of black semifinalists could easily have been increased by action of the school's director and the director of admissions.

In effect, the formula admissions procedure works quite well in identifying semifinalists, particularly when the safeguards currently

afforded (i.e., discretionary openings filled through administrative action) are employed. The obvious difference is that the current procedure for selecting semifinalists consumes approximately 60-70 person days, whereas the procedure described above requires less than two days for one person. Since all the data used in the prediction are routinely collected and stored on the computer, the only additional task is to enter the prediction equation and print out the results. Indeed, it is likely that even the amount of time required of the school's director and director of admissions would be reduced since no balancing by sex or region was shown to be necessary in the example provided.

Conclusions

The present study has shown that when only one relatively objective outcome is at issue, a statistical approach to selection is at least as effective as a clinical one and far more efficient. The best approach when multiple criteria are involved, especially when one or more criteria concern complex social equity issues, is to employ a two-stage approach.

We have recommended such a two-stage approach to officials of the North Carolina School of Science and Mathematics. Specifically, we recommended that 260 semifinalists be selected strictly on a statistical basis with the remaining 140 semifinalists selected by school officials. These 400 semifinalists would then be interviewed by admissions committees and the selection of the 200 finalists would be based partly on committee recommendations and partly by discretion of school officials. This procedure reduces the total time commitment of all parties and fulfills all objectives and mandates regarding admission.

Other recommendations made to the North Carolina School of Science

and Mathematics and which seem relevant to a broader audience are summarized below.

1. Define in greater detail admissions standards and expected outcomes.

Why does your school exist? Even large universities with tens of thousands of students, scores of departments and a dozen or more schools and colleges have some common set of goals. These must be articulated and every candidate for admission must be viewed in light of these goals. The questions that must then be answered are "Can this candidate meet or make reasonable progress toward these goals?" and "Can we provide an environment that fosters attainment of these goals for this candidate?"

2. Expand studies of school outcomes.

Too many admissions studies focus on first year GPA or entry to the next level of scholarship. As Lenning et al. (1974b) pointed out, education has hundreds of desirable outcomes. Some are more appropriate to some schools than to others. Clearly defining the goals and objectives of an institution is the first step toward delineating future outcome studies. As long as there is no attempt to predict complex outcomes, there will be no systematic way to address them in the admissions process.

3. Delete from the application process those information sources which do not contribute to admission decisions or which are technically flawed.

Hargadon (1981) reported that out of 1,463 colleges responding to a survey of admissions practices, 494 (34 percent) admit virtually all who apply. For such schools, it seems ludicrous to require any sort of test score or other evidence of admissibility. In recent years, some schools have actually ceased to require SAT and ACT scores because they do not

play an important role in admissions decisions. Indeed, Hargadon (1981) reported that 37 percent of public, four-year institutions do not place much emphasis on test scores. It seems a waste that many of these schools will continue to require applicants to submit ACT or SAT scores that will sit unexamined in a folder somewhere.

For NCSSM, we recommended the deletion of the teacher rating scale strictly on technical grounds. The eleven 5-point rating scales yielded means all in excess of 4.5. Many schools face the same problem of sifting through glowing letters of recommendation and inflated checklist scores. If these instruments actually contribute to admissions decisions, then they should be retained. Otherwise they should be discontinued.

Participating in admissions decisions forces individuals to focus not just on the candidates but on the school as well. Admission is as much a reaffirmation of the school's mission as it is a confirmation of a candidate's credentials. All aspects of the process must continually be held up to the light and examined carefully.

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