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Statistical Laws and the Use of Statistics in Law: A Rejoinder to Professor Shoben

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Wary that I may be contributing to an already overdrawn discussion, it is necessary that I rejoin Professor Shoben's reply.[1] The reply contains important errors and misunderstandings which should be brought to the reader's attention, particularly a reader unfamiliar with quantitative methodology. Following the order of my article and Professor Shoben's reply, this rejoinder is divided into three sections. First, however, a general comment on the role of quantitative methodology in the law is appropriate.

A major theme of Shoben's criticism is that while my analytic techniques may be appropriate for social scientific analyses of discrimination, they are "not responsive to the relevant legal questions."[2] By this Shoben means the techniques are not useful to the lawyer who litigates employment discrimination cases. This is not true. First, quantitative methodological techniques are not uniquely appropriate to a specific area of inquiry. Quantitative methodology and the statistical laws which regulate the use of a particular method are identical whether the area of study is the behavior of individuals or organizations in an economic, social or legal context.

Second, although the equal employment opportunity legislation is not written in terms of quantitative methodology, there is, as noted in the introduction to my article, a trend towards operationalizing legal concepts of discrimination, equal employment opportunity, affirmative action and other related concepts in quantitative terms. The prime example of this is the Uniform Guidelines on Employee Selection Procedures (U.G.E.S.P.)[3] which are a major focus of my article.

The purpose of my article is to indicate some problems in current quantifications of legal concepts and regulations. Some of the problems, such as those in Shoben's *Harvard Law Review* article,

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[1] Shoben, *In Defense of Disparate Impact Analysis Under Title VII: A Reply to Dr. Cohn*, 55 IND. L.J. 515 (1980).

[2] *Id.* at concluding sentence.

[3] 43 Fed. Reg. 38,295 (1978).

appear to result from a lack of understanding of statistical laws.[4] Other problems, such as the measurement of "adverse impact" in the U.G.E.S.P., stem from a failure to consider how measurement issues must intrude on the formulation of legal regulations.

The lack of knowledge of quantitative methodology among lawyers, judges and law professors is obviously subject to remedy. What may be more difficult is to convince the authors of statutes and regulations that if they want litigation in quantitative terms, the legal concepts must be constructed so that their quantification is true to their original meaning.[5] It is in this area of determining the appropriate use of statistical information that the quantitative analyst may be useful. Given this perspective, Shoben's observation that my article is unresponsive to "the relevant legal questions" may be rejoined by noting that these questions cannot be properly formulated without a competent understanding of the analytic techniques which courts are asking to provide the answers.

Population Data Cannot Be Used As Sample Data

Shoben begins her critique by noting that "we are in perfect agreement as to the underlying assumptions that must be met with situations using statistical inference. Rather, our disagreements revolve around questions of law and logic."[6] In fact, the opposite is true. We disagree concerning a very basic issue in quantitative methodology: the distinction between a sample and a population, and the relationship between them. Several errors in Shoben's reply are noteworthy.

First, Shoben states that "[i]n statistics a population is the set of people or items in which one is specifically interested."[7] While this is true, it is an incomplete definition. The crucial definitional element is that all the people or items in the population must be available to be sampled; each must have a nonzero probability of selection. In statistics, a population is the set of people or items from which a sample can be drawn.

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[4] Shoben, *Differential Pass-Fail Rates in Employment Testing: Statistical Proof Under Title VII*, 91 Harv. L. Rev. 793 (1978).

[5] This problem is not unique to employment discrimination law or law in general. Another example of this problem is the social welfare legislation designed to reduce poverty. This legislation and its implementation have been less effective as a result of problems in the measurement of poverty, income adequacy and related concepts.

[6] Shoben, *supra* note 1, at text following n.9.

[7] *Id.* at text accompanying n.12.

The first section of my article criticizes Shoben's article[8] for defining an employer's current applicants as a sample from a "population" of all potential applicants. I note that the current applicants do not form a sample, but rather constitute a population in themselves and that it is incorrect to consider the applicants' test performance data as sample data subject to tests of statistical significance. Shoben argues that the group of applicants must be defined as a sample because it is the larger group—current and future test-takers—which interests the court.[9]

While the court has a legitimate interest in the question of whether the observed difference in groups' test performance indicates a general bias in the test procedure, it is wrong to use this interest as the rationale for treating the test performance data as sample data. The current applicants cannot be a "sample" from a larger "population" of current and future applicants because future applicants have a zero probability of being included in this "sample." Past misuse in litigation of population data as sample data, liable to tests of statistical significance, does not nullify the error. Neither the Supreme Court nor the Almighty has the power to make an ex post facto transformation of census data into sample data. Shoben appears not to understand that the relation between a sample and a population is determinant, not amendable to the needs of the analyst or the litigants.[10] Thus, it is evident that there is a rather basic difference in our understanding of statistics, a difference which has led me to argue that Shoben's article is incorrect

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[8] Shoben, *supra* note 4.

[9] Shoben, *supra* note 1, at text preceding n.19.

[10] Shoben misleads the reader by listing a series of statistics texts, implying they support her claim that a population can be defined on the ad hoc basis of the analyst's needs. *Id.* at n.12. An examination of those texts available to this author, H. BLALOCK, SOCIAL STATISTICS (2d ed. 1972); G. SNEDECOR & W. COCHRAN, STATISTICAL METHODS (6th ed. 1967); A. EDWARDS, STATISTICAL METHODS (2d ed. 1967), indicates that none support this claim.

Also misleading is Shoben's implication that L. KISH, SURVEY SAMPLING (1965), would consider the data on test performance of all job applicants as sample data, albeit "haphazard sample" data. Shoben, *supra* note 1, at n.24. Kish is discussing data such as those obtained from archaeological discovery or astronomical observation, where one infers from the existence of one artifact or heavenly phenomenon that others also exist. L. KISH, SURVEY SAMPLING 19 (1965). Kish's discussion of unrepresentative "haphazard samples" is irrelevant to the issue of whether population data of an employer can be considered sample data. Parenthetically, archaeologists and astronomers do not use tests of statistical significance to argue that their discovery indicates the general existence of the phenomenon. It is the assumption that observed physical events are not unique that permits physical scientists to use "haphazard samples." Analysts studying behavior, *e.g.*, biologists and sociologists, can not generally make this assumption. However, this issue is distinct from that of whether one can take population data and treat it as sample data from a pseudo-population which contains members other than those in the actual population.

in proposing the use of statistical significance tests on the difference in average test scores between groups taking an employment selection test.[11]

What is puzzling about Shoben's reply on this point is that it appears to be motivated by a belief that for quantitative information to be useful in litigation it must be conceived of as sample data.[12]

This misunderstanding provides a good example of the interpretative problems which develop when statistical concepts are not explicitly considered in the formulation of legal concepts. The data on the performance of current test-takers are sufficient to prove the "adverse impact" of the test on minority selection. These data can show that current applicants are being discriminated against, and the inference, one which is *nonstatistical* in nature, can be drawn that unless the employer changes the test, "future applicants" will also suffer from discrimination.

Taking these same data, conceiving of them as sample rather than complete information, and performing a test of statistical significance of group differences in average scores does not make these data more relevant to the population defined in a class action. There is complete information on current applicants, but neither information nor the statistical basis to infer information on future applicants. The group "all present and future applicants" cannot form a population from which a sample can be drawn. Therefore, there is no way to obtain information on the entire group. The legally defined group simply cannot be described in quantitative terms.

Perhaps an example will demonstrate the error of Shoben's argument. Following Shoben's understanding of statistics, we may conceive of this year's national Decennial Census as a "sample" of the present and future residents of the United States. The 1980 census undoubtedly will reveal a difference in the average incomes of whites and blacks. Shoben, by treating this complete count information as sample data, would wish to perform a test of the statistical significance on this difference in average incomes. This difference would be "statistically significant." Shoben's analysis would lead one to conclude erroneously that there are racial differences in income not only among existing residents, but also among those yet unborn.

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[11] Shoben, *supra* note 4.

[12] Shoben, *supra* note 1, at text accompanying n.19.

The census data, properly conceived of as census data, indicate a racial difference in income among current residents. That this racial difference in average income will be evident in 1990, 2000 or any other year, is not capable of being determined from the 1980 census data. An argument can be made that this racial difference is not limited to 1980; however, to make this argument requires not only the 1980 census data, but also the assumption that the determinants of income differences will remain constant over time.

Shoben's reply to the first section of my article also includes discussion of the issue of bias in samples and an irrelevant discussion of the external validity of laboratory experiments.[13] As my article points out, there is no issue of sample bias since the test-takers are a population, not a sample.[14] Shoben's discussion of the strep throat experiment merely points out the fundamental difference in inferential process between experimental and survey research. In experiments, the inference that group differences are the result of the treatment effect, rather than idiosyncrasy, is based on the random assignment of subjects to treatment and control groups. In order to infer that the observed effect of a treatment on the subjects exists in the general population, it is formally required that the experimental subjects be a random sample of the population. This formal requirement is often ignored in experimental research, particularly medical research where individual differences in anatomy and physiology are assumed to have inconsequential effects on the ability to generalize the results to the population. In nonexperimental survey research, the inference that group differences observed in the sample also exist in the population is based on the random selection of population members for inclusion in the sample.

The example of applicants taking an employment test is not an experiment; the applicants are not randomly assigned to racial groups. Therefore, group differences in test performance are not subject to the inferential process common in experiments. Shoben's lengthy discussion in this section of the reply is irrelevant to the nonexperimental testing example.[15]

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[13] *Id.* at text between nn.24 & 39.

[14] Cohn, *On the Use of Statistics in Employment Discrimination Cases*, 55 IND. L.J. 493, text following n.13 (1980).

[15] For a seminal discussion of the problem of "external validity," *i.e.*, the problematic aspects of generalizing laboratory experimental results to a larger population, see D. CAMPBELL & J. STANLEY, EXPERIMENTAL AND QUASI-EXPERIMENTAL DESIGNS FOR RESEARCH (1963).

THE "4/5THS" RULE AS A LITMUS TEST

The second section of my article establishes that the U.G.E.S.P.'s quantitative measure of "adverse impact," the ratio of selection rates between groups, is too imprecise an indicator of discrimination to be the basis of prosecutorial decisions. It demonstrates that the products of quantitative research are inadequate criteria on which to base the decision whether to litigate the validity of the employer's employment selection procedures. My article suggests that the one quantitative measure which is relevant and observable, the ratio of the hiring rates among those who do pass the test, (H/S), be used in conjunction with the results of "direct qualitative analyses of the procedures used in the process," *i.e.*, the validation studies of selection procedures which are described in the U.G.E.S.P.[16]

Shoben's reply criticizes me for taking a position opposite to the one I advocate.[17] The issue discussed in the second section of my article is not whether validation studies of selection procedures should be replaced with other analyses. The issue is whether the U.G.E.S.P.'s quantitative measure for determining the necessity of litigating job validation is adequate. I argue that the "bottom line" strategy, *i.e.*, the use of the "4/5ths rule," to decide which employer's selection procedures should be scrutinized, is ill-conceived. I do not advocate the use of "applicant flow data" but merely use it to show the inadequacies of the "4/5ths rule."[18] The "4/5ths rule" is an attempt to quantify the legal concept of "adverse impact." It is also an example of an error which is the consequence of inadequate interaction between the formulation of the legal concept and the development of a quantity to measure it.

The problem arises with the ordering of the information used to develop a prima facie case of discrimination, and this problem is the focus of the second section of my article. The U.G.E.S.P. first require a determination whether there is a negative consequence of the selection procedures by asking if there is a selection rate differential of twenty percent or more between minority and majority groups. If there is, the selection procedures should be examined for job-relatedness.[19] This section of my article demonstrates that this

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[16] Cohn, *supra* note 14, at text accompanying n.24.

[17] Shoben, *supra* note 1, at text between nn.42 & 44.

[18] *Id.* at text between nn.71 & 81.

[19] Uniform Guidelines on Employee Selection Procedures § 4C, 43 Fed. Reg. 38,295 (1978).

first level of investigation is inadequate; the "4/5ths rule" can or cannot be violated regardless of the job-relatedness of the selection procedures. Thus, there is the danger that the issue of the job-relatedness of the selection procedures may never reach the stage of litigation.

Shoben's reply does not directly address the central issue of whether the "4/5ths rule" should be the litmus test to determine if litigation of the validity of the selection procedures is necessary. My argument is that as long as there is the possibility of group differences in qualifications for the job, the "4/5ths rule" is a bad litmus test, for employers can in one case discriminate and not violate the "4/5ths rule," and in another case, not discriminate and still face litigation as a consequence of violating the "4/5ths rule."[20] Any test which can produce both "false negatives" and "false positives" is a bad test.

Shoben's discussion of the irrelevance of group differences in "qualifications" also requires a response.[21] Shoben argues that although group differences in qualifications may have relevance in "a scientific study of differences between groups defined by race, sex, or national origin, . . . it is a red herring in the Title VII context."[22] She appears to think that there is a difference between legal and social scientific measures of discrimination, and the consequences of discrimination. As those familiar with the social scientific literature of discrimination will recognize, the discussion of appropriate measures of discrimination and analytic models in the last two sections of my article describes the type of research economists and sociologists have been doing for the past decade. This type of analysis has also been used in litigation.[23] Shoben's distinction between scientific and legal evidence of discrimination, especially with respect to her treatment of the concept of "qualifications," is artificial.

Shoben's argument against the use of the concept and measurement of qualifications may be confused. Following her comment that qualifications are "red herrings," she says that the criterion of

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[20] Cohn, *supra* note 14, at Table I & accompanying text.

[21] Shoben, *supra* note 1, at text between nn.44 & 50, and between nn.52 & 63.

[22] *Id.* at text between nn.56 & 57. The reader should note that neither Shoben nor I argues that group differences in qualifications are necessarily the result of innate racial or gender differences. Differences in such qualifications as level of educational attainment, job experience or physical health may be caused by group differences in access to opportunity, geographical location, familial environment or any of several other factors.

[23] *See, e.g.*, Oaxaca, *Male-Female Wage Differentials in the Telephone Industry*, in EQUAL EMPLOYMENT OPPORTUNITY AND THE AT&T CASE 17 (P. Wallace ed. 1976).

job-relatedness of the test (the validation of the selection procedure) is the sole legal issue.[24] In a very limited situation she is correct. If the selection procedures accurately test for the true requirements of the job, *i.e.*, job-relatedness is established and the outcome is determined solely by the individual's qualifications which meet these requirements, there is no need to inquire into group differences in qualifications. The effect of group differences in qualifications will be evident as group differences in selection rates. Group differences in qualifications are not irrelevant; they are still a determinant of group differences in selection rates. It is merely that the results of the selection procedures completely reflect these differences. If this is the point of Shoben's reply, there is no disagreement.

However, the situation where the outcome of the selection procedures is determined solely by the individual's qualifications which meet the job requirements is rare. In the common situation, where the outcome of the selection procedures is influenced by unmeasured qualifications, group differences in selection rates can be determined by both discriminatory employment practices and unmeasured group differences in qualifications.[25]

The confusion over these issues is not unexpected. The U.G.E.S.P. strategy is to use an assumed consequence of discrimination (violation of the "4/5ths rule") as the rationale for investigating the cause of discrimination (discriminatory employment practices). This is a poor strategy because there may be several true causes of the violation of the "4/5ths rule," including both differential qualification of applicants and discrimination. It is for this reason that I advocate abandoning the "bottom line" strategy which uses the "4/5ths rule" and replacing it with direct qualitative analyses of the selection procedures and information on the hiring rates of those who pass the procedures.

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[24] Shoben, *supra* note 1, at text following n.58.

[25] The distinction made in Shoben's reply between garden variety job qualifications and "special skills," *id.* at text following n.59, is also irrelevant. The concept of "qualifications" in my article includes both credentials, *i.e.*, the "special skills" discussed by Shoben, and other market-valued characteristics of individuals, *e.g.*, intelligence and health. Although it is obviously easier to determine if an applicant has the proper credentials than to determine the applicant's intelligence, the effects of both types of qualifications on an applicant's ability to pass the selection procedures are similar. The probability of passing an employment test which requires a high school education is the same for an applicant with a diploma as for the high school dropout with the equivalent knowledge. For the purpose of my demonstration that the "4/5ths rule" is inadequate, Shoben's distinction is irrelevant.

THE USE OF ANALYTIC MODELS TO DETERMINE BFOQ AND DISCRIMINATION

A misunderstanding of statistical laws produced Shoben's criticism of the first section of my article; a misunderstanding of my argument produced the criticism of the second section; a misunderstanding of how one argues a hypothetical appears to have produced the criticism of the third section. The third section presents a nontechnical description of the use of the statistical control approach to estimating causal relationships.

Shoben's comment is that a quantitative method widely used in all nonphysical sciences during the last twenty years is inappropriate to determine causality when legal issues are involved.[26] The problem is not that the empirical tests of causal relationships in law are fundamentally different, but rather the legal concepts of causal relationships were not formulated with the notion of empirical testing in mind.

Shoben's lack of understanding is evident in several of her critical remarks. First, she states that "[t]his model is limited in its usefulness because it appears to rely on a concept of *intentional discrimination* in its approach to 'detecting' discrimination."[27] Shoben is incorrect in assuming the model's usefulness requires job qualifications which explicitly mention a basis of discrimination. In fact, the thrust of the discussion is to demonstrate how empirical analysis can determine which of the different decisionmaking models—models which differ in their covert inclusion of a discriminatory basis (sex)—is being used by the employer in the hiring decision.[28]

Similarly, Shoben's criticism that the "subjective component" of the hiring process is not liable to investigation with the analytic model is erroneous. The partial correlational analysis described in the paper is neutral with respect to the source of the residual variation between sex groups in the probability of being hired.

Perhaps the most misplaced criticism in Shoben's reply is her

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[26] Shoben, *supra* note 1, at text between nn.82 & 98.

[27] *Id.* at text between nn.82 & 83 (emphasis added).

[28] Shoben's assumption that the analytic technique is only useful when there is intentional discrimination may be due to my description of the alternative decisionmaking models HIRE* and HIRE**, Cohn, *supra* note 14, at text following n.37. Including SEX in these equations does not mean that the employer has included "male preferred" in the job description. This discussion of the decisionmaking models is intended to indicate that an employer's use of sex as a criterion, whether overt or covert, is detectable through the empirical analysis reported in Table III, *id.*

rejection of the analytic model because it is posited on the assumption that the job qualifications in the hypothetical example are valid. Shoben says that unless these qualifications are valid, the analytic model and the example are irrelevant.[29] This is true. It is also true that the weightlifting requirement is a valid qualification for the job. I specifically state in my example that "[a]n analysis of the job indicates that there are three qualifications necessary for success in the position."[30] It is a hypothetical example of a hypothetical employer, and in this hypothetical company the hypothetical job has a valid requirement of being able to lift a one hundred pound weight. Shoben's long discussion of the need for validating the job requirement is inappropriate, for I have posited the requirement to be valid in my hypothetical example. The question the analytic model is designed to answer is whether a characteristic such as sex or age can be a BFOQ, given that there are valid job qualifications which are correlated with gender or age. This question is analytically and legally *different* from the question of whether the job qualifications in themselves are valid.

Shoben's criticism continues by implying that this analytic model is inappropriate, given recent court formulations of the BFOQ concept.[31] Once again, the crux of the issue is the transformation of the legal concept into quantitative terms. Shoben points out that the Supreme Court has narrowly defined the test of a sexual BFOQ, limiting it to where "the employee's 'very womanhood' would 'directly undermine her capacity' to do the job."[32] She argues that as a result of this narrow definition "[Cohn's] underlying assumption that a higher correlation might substantiate the claim is incorrect."[33]

This criticism may be interpreted in two ways. First, the criticism may mean that the Supreme Court's verbal discription of the basis of a sexual BFOQ cannot be expressed in terms of a correlation coefficient. The general question this section of my article addresses is how it can be empirically determined that a personal characteristic like "very womanhood" is a valid job qualification, *i.e.*, a BFOQ. The degree of relationship between gender and the individual's capacity to do the job determines the size of the correlation coefficient between sex and the job qualification. This point

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[29] Shoben, *supra* note 1, at text following n.84.
[30] Cohn, *supra* note 14, at text following n.30.
[31] Shoben, *supra* note 1, at text between nn.87 & 93.
[32] *Id.* at text accompanying n.88.
[33] *Id.* at text following n.87.

is easily understood with a comparison of the age and sex BFOQ statuses in the hiring decision of the hypothetical employer. In this example there is no empirical evidence that "very womanhood" directly undermines a person's capacity to do the job, *i.e.*, the valid job requirement of lifting weight. The correlation between SEX and LIFT is only moderate.[34] In contrast, age does directly undermine one's capacity to do the job, as the older an individual is, the less likely it is the person can meet the valid job requirement of staying on the job for five years. This is empirically demonstrated by the perfect negative correlation between AGE and STAY.[35] The question I address in the third section of my paper is precisely that posed by the Supreme Court.

An alternative interpretation of Shoben's criticism of the usefulness of the correlational analysis is that such analysis is unnecessary because the Court has said that only a perfect relationship between sex and a job qualification can establish sex as a BFOQ. In the case of a sexual BFOQ, a dichotomous distinction between a perfect relationship (a correlation coefficient of 1.0) and a less than perfect relationship (a correlation coefficient of less than 1.0) is appropriate if the job qualification in question totally determines one's ability to perform the job. The Court's verbal description of what constitutes a sexual BFOQ, while not stated using the terminology of quantitative methodology, is interpretable in this manner. However, this dichotomy of a perfect and imperfect correlation between a personal characteristic and a job qualification does not apply to age. As discussed in my article[36] there is an inconsistency in legal standards of the required strength of relationship between the job qualification and sex or age before the characteristic is a BFOQ. It is the lack of a legal standard of the degree of correlation between age and the job qualification which currently limits the applicability of the analytic model in litigation. The model itself is perfectly appropriate to determine whether a characteristic can be considered a BFOQ. Furthermore, the partial correlational analysis of the relationship between AGE, STAY and HIRE (the variables in the model) provides direct empirical evidence of whether a personal characteristic is the basis of discrimination.[37]

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[34] Cohn, *supra* note 14, at text between nn.33 & 36.
[35] *Id.* at text between nn.35 & 37.
[36] *Id.* at n.30.
[37] *Id.* at text between nn.37 & 38.

SUMMARY

The motivation for writing my article and the confusion expressed in Professor Shoben's reply derive from the same source: the trend toward quantification of legal concepts. My criticism of specific uses of quantitative methodology in employment discrimination cases is that they are incorrect applications of standard analytic concepts and techniques. Shoben's reply does not acknowledge this, but instead argues that my suggestions for improvement do not reflect the standard use of quantitative methodology in law. The errors of the standard use of quantitative methodology in law are reflected in Shoben's reply.

The conception of the test performance information of an employer as sample data, liable to statistical inference, is not only erroneous, but is motivated by a false need to generalize the results to other persons. The criticism that my proposed analytic techniques are useless because they are not designed to test the validity of employment selection procedures is misplaced. The second section of my article is a criticism of the use of the U.G.E.S.P. "bottom line" strategy as a litmus test to decide whether the validity of the employer's selection procedures should be litigated. Nowhere in my article do I suggest that the analysis of "applicant flow data" should replace the selection procedure validation process described in the U.G.E.S.P. Similarly, the criticism of my discussion of the use of correlational measures to determine empirically the validity of a BFOQ claim and discrimination in employment practices is irrelevant. Here again, Shoben criticizes the article because it discusses issues other than the validation of the employment selection process.

I suspect both the brevity of my article and my attempt to discuss quantitative methodology in a nontechnical manner may have contributed to Shoben's misunderstandings. However, the issue of translating legal concepts and relationships into quantitative terms remains. As noted in the conclusion of my article, the examples of misuse of quantitative information suggest the need for a more sophisticated understanding and use of quantitative methodology among lawyers. Shoben's reply is additional evidence of this need.

Being familiar with the limitations of quantitative methodology, I am not completely sanguine about the process of quantifying legal concepts. The meaning of a legal concept, such as discrimination, and the intent of a regulation to reduce it, often suffer when translated into quantitative terms. Problems of operationalization

of theoretical concepts into quantitative measures are common in all areas of inquiry. Certainly progress in my own disciplines of economics and sociology has been retarded as a result of the difficulties of translating abstract theoretical concepts into quantitative measures. It has also been the case that the process of quantification has resulted in the reformulation of theoretical concepts and the "relevant questions" which are asked. The law cannot be immune from this phenomenon.

It would also be incredibly inefficient if lawyers did not borrow the techniques of quantitative methodology from other disciplines. Lawyers and judges cannot merely appropriate the language and procedures of quantitative methodology without considering the meaning of its concepts. Statistical principles and legal concepts can be compatible, but their compatibility requires an awareness of the meaning and standard uses of statistical techniques.

As I note in the conclusion of my article, there is no need for lawyers to become statisticians. However, there is an obvious need for greater understanding of the proper use of quantitative methodology among lawyers. To paraphrase a famous caveat, a lawyer who analyzes his own data has a fool for a statistician.