attempt to examine the relationship between a health belief model and compliance, the following could occur.

Questions	Answers	Univariate difference
1. Do you see your diabetes as a minor problem?	No (50%) Yes (50%)	No
2. Do you believe treatment will prevent complications?	No (50%) Yes (50%)	No
Multivariate difference		Yes

If 50% answered yes and 50% answered no to each of the questions, there would be no univariate difference between responses to each question. However, if the individuals who answered no to question 1 were the same persons who answered yes to question 2, then there would be a significant difference at a multivariate level, indicating that there was a pattern of response in the group. Such a combination of responses might be related significantly to compliance.

Another common mistake is using less than the most sensitive techniques for analyzing the data we collect. Whenever we have measures on patients before and after treatment, it makes sense to analyze all the data, taking into account the individual differences that existed before treatment. The most obvious way to allow for such differences is to calculate a difference score. If a patient weighed 350 pounds before taking a drug and 300 pounds after, we could say that he lost 50 pounds. If another patient weighed 150 pounds before and 100 pounds after, we would likewise say that he lost 50 pounds. However, this simple and obvious procedure of subtracting initial weight from final weight may not be as innocuous as it seems. It has the effect of lumping all people who lost 50 pounds together for analysis as if they were the same. But, a heavy person who loses 50 pounds may be medically different from a light person who loses 50 pounds. Simple difference scores are much more complicated mathematically than they seem. It has been shown that they have many undesirable statistical properties and may lead to false conclusions because they place people together who are really different.

As an example, in a carefully planned drug study, the authors of an article reported that the effects of several drugs on schizophrenic patients were ineffective when they used difference scores. In fact, they concluded: "There can be little doubt that insofar as drugs are concerned, this paper reports only negative findings. No significant differences were found with an individual drug or combination of drugs over a period of 16 weeks. This was true whether the apparent drug effects were compared with each other, with the initial ratings, or with the predrug phase."[2] Since the authors had published their scores for each patient before and after treatment, Clyde et al.[2] were able to demonstrate the results when the correct statistical technique (multivariate analysis of covariance) was applied to the data. This procedure makes allowances for differences in initial ratings but on a sounder basis than simply subtracting initial from final ratings and analyzing the difference scores. Contrary to the authors' report, the analysis of covariance showed that one of the main effects of the drugs was significant at the 3% level, in that one of the drugs actually made the patients worse.

Statisticians have many valuable techniques for analyzing interrelationships in multivariate data. Almost all of these methods have been programmed for computers. Sophisticated statistical techniques can never take the place of a sound research design that delineates ahead of time the variables and groups required to test a hypothesis. This, I would suggest, is what Skyler had in mind regarding fuzzy studies. Statistical fishing expeditions and manipulations post-hoc have little to do with the specific type of statistic used. However, no longer need an investigator plan and carry out a good study only to miss the significant findings because he employs crude statistical methods that are 30 years out of date.

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Properties of Dextrostix

We have recently carried out a study designed to investigate several properties of Ames Dextrostix (Ames, Elkhart, Indiana) used for home blood glucose monitoring. The Dextrostix were read using an Ames Glucometer.

First, we wished to confirm Sönksen's statement that halving the reaction time of blood with the Dextrostix and doubling the reading gives an accurate value for high blood glucose concentrations.[1] We measured glucose in 33 blood samples using paired Dextrostix, one in contact with blood for 60 s (recommended procedure), the other for 30 s. The 30-s values, when doubled, were virtually identical to the 60-s values (14.6 ± 4.9 mmol/L versus 14.8 ± 4.6 mmol/L, respectively; mean ± SD). We showed previously, using the recommended procedure, that readings with Ames Dextrostix were unreliable when blood glucose was ≥15 mmol/L.[2] Shortening the reaction time therefore extends the effective range of the Dextrostix and should overcome the problem of inaccuracy at high blood glucose concentrations.

TABLE 1
Effect of suboptimal storage conditions on performance of Ames Dextrostix

	Blood glucose (mmol/L)			
	N	$\bar{x}$	SD	Coefficient of correlation
Reference group	40	9.08	6.11	
Group I	40	9.21	6.22	0.98
Group II	40	9.61	6.69	0.98

Second, the effect of storage conditions before use on the performance of Ames Dextrostix was assessed. We divided bottles of Dextrostix into two groups at ambient laboratory temperature (24°C): group I was stored capped and group II was stored uncapped. Over a period of 2 mo blood samples were assayed using strips from each group and the results compared with those obtained using strips from previously unopened bottles (reference group). Results from both groups were similar to those from the reference group (Table 1), indicating that storage of Dextrostix under less-than-ideal conditions does not significantly alter their accuracy.

Finally, we investigated the effect of storage conditions after use to determine if Ames Dextrostix would maintain their initial developed color; the ability to reread the strips some time after the initial reading to check the original result would be useful in some clinical situations. We found that the developed color of Dextrostix, stored after use at ambient temperature in dessicated bottles, was unstable and faded rapidly in a nonuniform fashion. After 24 h the strips read only 34 ± 13% of their initial value. However, when stored singly, dessicated in a bottle at −20°C, developed color was retained. Under the latter conditions, the readings 1 wk after use were 95 ± 5% of initial values. On removal of the strips from −20°C to ambient temperature, the developed color remained stable for up to 2 h. Although storage at −20°C tends to make rereading of Dextrostix inconvenient, it should be feasible in a hospital situation where strips used during the night could be checked the following morning. Patients on home glucose monitoring, who were in possession of a freezer, could have their results checked at a follow-up clinic visit.

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Dextrostix Reactivity Variation

Recalibration of the Dextrometer and Glucometer (Ames Division, Miles Laboratories, Elkhart, Indiana) whenever starting a new bottle of Dextrostix was recommended in a recent article in DIABETES CARE, and by the Ames Company. On the other hand, the manufacturers of Glucoscan (Lifescan, Mountain View, California), a rival meter, do not provide a method for recalibration and apparently believe that Dextrostix reactivity variation is not significant.

We recently evaluated Dextrostix reactivity variation in 14 Dextrostix supplied by our patients. The interval of time since the patient's opening of the container varied from 1 to 31 wk. Eight lot numbers were represented. The patient-supplied Dextrostix and 15 control Dextrostix from a single source were reacted with venous blood in random order, single-blinded, and measured by a Glucoscan meter.

The mean values of the patient-supplied Dextrostix and the control Dextrostix were 138 versus 141 mg/dl, respectively; the standard deviations were 16 versus 17 mg/dl, respectively; and the ranges of values were 122–149 versus 125–154 mg/dl, respectively. The values for variability of the control readings were similar to those previously reported in DIABETES CARE.

We conclude that variability in Dextrostix reactivity may be insignificant, especially when compared with variability of the operator technique. Further studies should be conducted to substantiate these findings since they affect patients' cost and selection of meters.

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Cutaneous Complication of CSII Therapy

The cutaneous complications of continuous subcutaneous insulin infusion (CSII) have recently been reviewed by Pietri and Raskin.[1] I have noted an additional complication, which seems worthy of mention since it responded to a specific form of therapy.

The patient, a 12-yr-old boy, was placed on CSII because of inadequate control on conventional therapy. He used the Auto-Syringe AS*6C pump (Auto-Syringe, Inc., Hooksett, New Hampshire) with U-36 insulin. The insulin was pre-