sented in percentage form it is not possible to compute correlations or related statistics or to determine their significance. One also wonders about the reliability of self-reported grades. Finally, some portion of the relationship may be due to the fact that students with higher grades may be given higher starting salaries.

The second study (*3*) concerns the classification of Terman's gifted group (based on I.Q.'s obtained in 1921) into the 100 most successful and the 100 least successful. Although this is far from a random sample of college graduates, the study did find that the most successful group did receive a higher percentage of "A" grades and academic honors in college. However, some of the other differences between these two groups included higher socioeconomic background for the "most successful" group, higher level of education for their parents, and better emotional adjustment as indicated by divorce rate, use of liquor, and other measures. These factors certainly have an effect on both grades and vocational success.

As Lindgren points out, there is a general consistency in personality and performance over time. There is clearly a need for better methods of evaluating student performance and for determining how that performance is affected by social and emotional factors. If we want to help students to change and improve, to self-actualize, to make career decisions, then we need something much more sensitive than a grade point average.

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Lindgren's defense might have been stronger had he relied on more substantial accomplishments than worldly rewards to uphold the validity of college grades. Earnings may not be the most reliable criterion of achievement, nor do they always correlate with school grades; the mean income of academic personnel, who usually were in the upper ranks in school, is not higher than that of alumni in industry or private practice. It might be more instructive to see how college grades correlate with graduate scores because these two sets of data represent similar cognitive and affective behaviors, and undergraduate records play a major role in the selection of applicants to professional schools.

The results have not been too impressive, if we consider the conclusions of early studies (*1*). Recent surveys, of which the following are a fairly representative sample, have shown little improvement. A scale, but not always the same, of the Medical College Admissions Test often correlated with medical class rank (*2*); and the latter criterion was independent of composite MCAT scores (*3*). College grade averages were related to basic sciences grades in medical school, but neither correlated with performance in clinical years (*4*). This lack of association between early and late grades, respectively, was also found between medical school grades and professional competence of practitioners (*5*). That this dissociation might not be particular to medicine was revealed by a comparison of undergraduate grade point averages with productivity in engineering research (*6*). One wonders what causes such a divergence in the grading system.

Which cognitive processes can tests measure? Recall of facts, analysis or evaluation of novel data or ideas, skill in applying information, and synthesis of discrete concepts into a unified theory or conclusion. Most examinations, however, test only straight recall (*7*) as if it were to be the major lifelong activity of graduates. Medical students experience the fallacy of this assumption when they leave their classrooms for the clinics at the end of their first 2 years. Until that time, they have been judged on their ability to recite on cue, but thereafter they have to retrieve, to select, to organize, and to apply their knowledge. This sharp break between cognitive requirements coincides with the divergence in their grades. It is blurred by the simultaneous occurrence of important changes in motivation and other psychological factors that can also influence educational processes.

Which affective behaviors bear on performance? Attention, reaction or interest, attitudes, and systemization of values. These categories have been defined but little is yet known of their respective effects upon accumulation and application of knowledge, acquisition and utilization of abilities, and mastery of skills, in school *and* in real life. . . .

Interferences with the predictive validity of grades are so complex that, until some progress has been made in this field, examinations should be used only for three purposes: Informing students of their progress; instructors, of the effectiveness of their programs; and the public, of the qualifications of recent graduates (*8*). Short predictive validity indicates the necessity for periodic recertification in critical professions, especially those which utilize fast-changing technologies and lack adequate internal supervision. Such tests, however, should determine professional competence rather than the ability to recite highly specialized or esoteric facts which are forgotten more quickly than they can be memorized.

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Tissue Culture

Since a number of investigators are now using chemically defined media developed for tissue culture, the standard formulas and methods of preparation were collected by the Tissue Culture Association, Inc. and have been published [*In Vitro* **6**, part 2, 89 (1970)]. Manufacturers and investigators using cells are encouraged to employ these formulas and describe any deviations in detail in scientific publications. The Association is now studying standards for quality control in synthetic media. Suggestions are invited.

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