The hypothesis that tests of precollege aptitude/achievement are poor predictors of later college grades because of uneven changes in aptitude development over these years was investigated. A battery of 11 tests administered before college entrance was readministered to 59 female and 67 male college seniors. Correlations obtained from high school and college grade point averages were compared with residual change scores (representing the difference between the college senior score and that predicted from the high school senior score). Contrary to expectation, college senior correlations showed the same pattern as found with high school tests: reasonable validities for the first 3 years and no correlations in the senior year. Although this sample developed intellectually in college, aptitude change appeared relatively uniform throughout the sample. The unreliability of senior grades which are based on disparate course selection was offered as an explanation of fourth year unpredictability. (Author/JS)
Tested was the hypothesis that precollege aptitude/achievement measures are poor predictors of later college grades because of uneven changes in aptitude maturation over these years. A precollege battery of 11 tests was readministered to 59 female and 67 male college seniors. Compared were correlations with the 12 quarterly GPA's for high school tests, college senior tests, and residual change scores. Contrary to expectation, college senior correlations showed the same pattern as found with high school tests: reasonable validities for the first three years and zero correlations in the senior year. Although this sample matured intellectually in college, aptitude change appeared relatively uniform across individuals. Unreliability of senior grades based on disparate course selection was offered to explain fourth year unpredictability.

Humphreys (1968) has recently documented the fact that although precollege aptitude measures have appreciable validity with freshman grades, a startling degree of shrinkage occurs in predicting grades for subsequent semesters of college. He interpreted this finding as documenting the need for changing admission and retention policies. He argued, for example, that college grades were so unstable that students dropped on the basis of early performance might do acceptable work later on. He felt this instability of grades in turn might rest on differential rates of aptitude maturation over the college years and suggested that retest data in the college senior year could test the hypothesis that the low correlation between a precollege test and senior grades was due to a shift in the rank ordering of individuals on
that tested aptitude. If this were so, aptitudes measured in the senior year ought to correlate as highly with senior grades as freshman aptitudes do with freshman grades.

During spring 1967 senior volunteers (59 women and 67 men) at the University of Washington were paid to retake the same battery of precollege aptitude/achievement measures administered four years earlier. This sample which had made normal progress over four years of college was significantly superior to the freshman class in which it entered. Significant intellectual growth occurred on all tests with equal rates of maturation in each aptitude for the sexes (Lunneborg, in press). However, when intellectual change was treated as deviation from predicted growth (a residual change score representing the difference between the college senior score and the one predicted from the high school senior score) it was found that the sexes differed in the manner and extent to which the college environment had been effective (Lunneborg and Lunneborg, 1968). Male deviations from expected growth were more often correlated with various course criteria and survey items of background and educational orientation. Female deviations, on the other hand, were essentially uncorrelated with these educational criteria while being highly intercorrelated, e.g., females who matured more verbally than predicted also matured more quantitatively than predicted.

The retest data for this sample allow a test of Humphreys' question regarding the nature of aptitude maturation during college (all references will be to his 1968 report). Had in his study precollege test scores correlated as highly with later GPA's as with early GPA's, then whatever maturation occurred would have been uniform for all Ss. The notion of the late bloomer
would never have arisen. But given that precollege test scores are not highly related to later college GPA's, if college senior test performance were found to correlate highly with later college GPA's (and less well with early GPA's), then it could be assumed that aptitude maturation had occurred at different rates in different individuals. It would also mean that such tests were always valid "predictors" of college performance if administered at the same time. A similar maturation hypothesis can also be tested with this sample by correlating residual change scores with quarterly GPA's. If aptitude maturation proceeds unevenly, as Humphreys speculated, then those Ss who matured the most (have college senior test scores higher than predicted from high school performance) should tend to get better grades as seniors than those who matured less during this period. Residual scores and quarterly GPA's should correlate more highly as later quarters are considered. In spite of not knowing when the gain was achieved, it will have been achieved by more and more people as time passes. All of these hypothetical situations presume that all quarterly GPA's are equivalent in relation to the aptitudes measured.

Method

For the sample described above GPA's were computed for each of the 12 quarters constituting the four academic years following entrance. N for any quarter never dropped below 119, but Ss' missing a quarter or graduating early meant not all of these GPA's were based on 126 cases. In addition to intercorrelating the quarterly GPA's, they were correlated with high school grades and with three scores for each of 11 precollege tests: high school score, college senior score, and residual score as defined earlier.
Unlike Humphreys' sample no attempt was made to weight correlations for different colleges and sexes because of sample size. College majors were among women: humanities 42%, social science 34%, natural science 22%, and business 2% (N = 1). Majors among men were: engineering 28%, natural science 25%, social science 22%, humanities 14%, and business 11%.

Results

Table 1 compares with Humphreys' results using high school rank as a predictor of college grades. The subject areas of social studies and electives were consistently poor predictors, however, English, foreign language, mathematics, and natural science grades showed the same pattern as Humphreys' rank which dropped gradually from .39 to .22 from the first to the last semester. The table also shows both the high level of achievement obtained by this group in high school and the steady increase in their grades during college. Note that the standard deviations for the quarterly college criteria display little more variability than the SD's reported for Humphreys' 1600 students. And despite higher GPA's over time, the constancy of these standard deviations means, as it did in Humphreys' study, that the shrinkage in validities is not due to any attenuation in the range of the criteria.

Consistent with Humphreys' findings with ACT tests given prior to college entrance, the tests administered here in high school all had useful validities ranging from .18 for spatial ability to .43 for data sufficiency against first quarter grades as may be seen in Table 2. Although all high school tests had appreciably reduced correlations with senior year grades, quarters 10, 11, and 12, a careful examination of Table 2 suggests that for only two tests, English usage and spelling, was there a consistent reduction
in validity over the first three years. For all other high school measures
the drop was instead a dramatic one between the junior and senior year. Thus,
the ACT test data reported by Humphreys are more similar to present high school
grade data than to present test data, i.e., both ACT and high school GPA's
exhibited a steady decrease in validity over four years.

Table 2 also reveals that the correlations of tests administered this
sample as college seniors remarkably paralleled the above patterns for high
school tests. While college senior test correlations tended to be lower than
high school validities, they were again highest for the first three college
years with the senior quarter correlations dropping to near zero values.
Equally disappointing were the results of correlating residual change scores
with quarterly grades. Both of these negative findings can be largely
explained by the last item in Table 2, the four-year stability coefficients,
\( r_{12} \). These coefficients were remarkably high suggesting that college senior
test performance is more determined by high school test performance than by
maturation during college. The residual change scores were, therefore,
necessarily unreliable and could not be expected to show strong correlations
with any criteria. One residual change score was associated significantly
with quarterly grades--spatial ability which as deviation from predicted
change was even more highly correlated than high school spatial ability
scores.

Examination of the quarterly GPA intercorrelations displayed the same
pattern of diminishing \( r \)'s the further separated the two quarters as reported
by Humphreys. Adjacent quarter correlations revealed an interesting pattern
over the four years. The correlations were, for the first year, .60 and .62;
Table 1

Correlations of High School Grades with Quarterly College Grades

(Decimal points omitted)

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Note.--For \( N = 126 \), \( r = .18 \) and .23 for .025 and .005 points of significance respectively.
Table 2
Correlations of Quarterly College Grades with High School and College Senior Tests and Residual Change Scores
(Decimal points omitted)

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for the second year, .55 and .62; third year, .69 and .63. In the senior year, however, quarters 10 and 11 correlated .37, and 11 and 12, .48. The comparable values for Humphreys' semesters were .56 first year, .56 second year, .55 third year, and .54 for the fourth year. The senior year GPA's for this sample appear unreliable from quarter to quarter as well as being uncorrelated with all the aptitude/achievement scores.

Discussion

These results provide no evidence for the hypothesis that differing rates of aptitude maturation during college lie behind the lack of validity of precollege aptitude/achievement measures with later college grades. College senior test scores were no more highly correlated with later college grades than were test scores earned prior to college entrance.

Certainly the present sample matured intellectually during college both in terms of tested aptitudes (Lunneborg, in press) and in terms of grades (Table 1), even though the issue of scale of measurement in grades assigned freshmen vs. seniors cannot be definitely resolved. (Despite the rising average grade for this sample, the standard deviations of GPA's remained constant, as Humphreys also found.) But although the group as a whole grew on these aptitude/achievement measures, the long-term stability of the measures was high enough that the rank ordering of individuals as freshmen was as predictive of later college success as their rank ordering as college seniors.

The discrepancy between these results and Humphreys' lies primarily in the unreliability of the senior grades for this sample quarter to quarter compared with earlier grades which contrasts with Humphreys' near constancy
of adjacent semester correlations. With such low reliabilities the failure of senior grades to correlate with either precollege or senior test scores is not surprising. Second, the stability of validities over the first three college years for this battery, administered before and after college may be because this battery measures more "aptitude" than "achievement" in contrast with less stable predictors such as high school GPA's and ACT tests.

What these data suggest is that the substance of senior year college courses precludes easy global prediction for any segment of that period. On the other hand the similarity in content between precollege predictors and initial college course work may facilitate early prediction as does the fact that this initial course work is more common across a group than the highly disparate course selections made when college requirements have been met. Given that this "vicissitude" of the college experience may account for poor senior predictability, recommendations for admission and retention are not so easy to devise or recommend.
References

