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CPA EXAM PERFORMANCE — CAN IT BE EXPLAINED?

By W. Marcus Dunn and Thomas W. Hall

While the rigorous nature and difficulty of the Uniform Certified Public Accountant Examination (CPA exam) are common knowledge, the various candidate attributes which contribute to the success or failure on the exam are not well known. This is principally due to two reasons. First, very little research has been performed in this area, and second, the research which has been done has not been widely disseminated. This is somewhat surprising in view of the fact that (1) the CPA exam is the common prerequisite for and a major hurdle to entry into the profession of public accounting; (2) only about 10 percent of those taking the exam are successful on their first attempt; and (3) 25-30 percent of candidates are never successful.

This paper presents a summary of what is currently known regarding the association between various candidate attributes and performance on the CPA exam, and, based on this summary, offers advice to the aspiring CPA candidate. Most of the research findings reported on herein are the result of a major ongoing research program initiated in 1964 as a joint effort of the AICPA, state boards of accountancy

and the National Association of State Boards of Accountancy (NASBA). The purpose of the research program, entitled the Uniform Statistical Information Questionnaire (USIQ), is to identify the characteristics of CPA candidates and to assess their association with success on the CPA exam. To date characteristic information has been obtained about candidates writing the five CPA exams from November, 1964 to November, 1966, the 1970 exams, the 1975 exams and the 1980 exams (these studies are published by the AICPA).

Success on the CPA Exam — What Are the Contributing Factors?

The relationships between CPA exam performance and the following candidate attributes have been studied by various researchers:

1. Academic achievement as measured by college grade point average (GPA) or accounting GPA.
2. Scores on the Scholastic Aptitude Test (SAT) and American College Test (ACT) — SAT and

ACT are the principal standard admission tests used to screen undergraduate college applicants and are used as measures of innate math and verbal abilities.

3. Scores on the AICPA Level II Test. This test, developed by the AICPA and sometimes referred to as a mini-CPA exam, is often given to accounting seniors and first year staff accountants to evaluate their knowledge of topics covered in the typical undergraduate accounting curriculum. This test measures achievement rather than aptitude.
4. Hours of independent study spent specifically in preparing for the exam.
5. CPA review program participation.
6. Number of accounting hours taken.
7. Graduate study.
8. Accounting work experience.
9. Years out of college and age of candidate.
10. Examination experience as measured by the number of candidate examination sittings.
11. Program quality as measured by differences in performance by candidates at different schools.

The findings regarding the relationship between the above factors and performance on the CPA exam are presented in the following paragraphs.

Academic Achievement

Not surprisingly, a positive association has been found between GPA and CPA exam scores. This positive association exists for both a candidate's overall GPA and accounting GPA. Leathers, Sullivan and Bernstein, reporting on the results of an analysis of 1980 CPA exam candidates completing the USIQ (hereafter, 1980 USIQ study), found the correlations between accounting GPA and exam scores to range from a low of .32 to high of .40. Correlations for overall GPA were slightly lower and ranged from .30 to .38.¹ Reilly and Stettler found similar correlations between overall GPA and exam scores in their study of 187 first time Illinois and Kansas candidates writing the November, 1965 and May, 1966 CPA

exams.² In an analysis using a multiple regression model, they found college GPA to be the most significant explanatory variable of the differences in CPA exam scores.

Scholastic Aptitude

Logically, the greater a candidate's academic ability, the better he/she should perform on the CPA exam. This expectation has been confirmed by all the USIQ studies completed to date. In the 1980 USIQ study, the reported correlations between SAT scores (both verbal and math) and CPA exam scores ranged from a low of .18 to a high of .30. The correlations between SAT verbal scores and CPA exam scores were similar to the correlations between SAT math scores and CPA exam scores except for accounting practice where the correlations for SAT math scores were consistently higher than the correlations for SAT verbal scores. Similar results were found to exist for candidate ACT scores. Reilly and Stettler also reported significant positive correlations between SAT scores and exam scores. Their multiple regression analysis indicated that SAT scores were second only to GPA in explaining the variation in performance among candidates.

AICPA Level II Scores

All the USIQ studies reveal positive correlations between AICPA Level II test scores and scores on the CPA exam. For the 1980 USIQ study, the correlations were .45 for Practice, .42 for Theory, .32 for Audit and .30 for Law. The considerably higher correlations for Theory and Practice are probably due to the financial accounting orientation of the AICPA Level II Test.

Hours of Independent Study

Prior to the 1980 USIQ study, no research had investigated the effect of candidate independent study on exam performance. Intuitively, one would expect that the more time spent preparing for the exam, the better one's performance should be. Results of the 1980 USIQ study confirmed this expected relationship. Depending on the exam section, the correlations between candidates' exam scores and hours of independent study were found to range from a low of .29 to a high of .39. The magnitude of these correlations indicates that independent study

may be more influential in determining exam scores than candidate scholastic ability and thus, candidates with lesser scholastic ability can compensate by increasing their hours of independent study.

CPA Review Course

The popularity of CPA review courses as a means of preparing for the CPA exam remains strong. In 1980, 57 percent of candidates sitting for the CPA exam for the first time had taken a review course of some kind — up from 53 percent in 1975, 41 percent in 1970 and 36 percent in 1966. Does the increased popularity of review courses suggest that they improve the probability of a candidate passing some or all parts of the CPA exam? The answer is yes according to the 1980 USIQ study which reports "... (review) courses aid the candidates to perform better regardless of the section involved." Data presented in the 1980 USIQ study indicate that among first-time candidates, individuals completing an in-class review course (excludes correspondence courses) earned full or partial exam credit 48 percent of the time whereas individuals not taking an in-class review course earned full or partial exam credit only 38 percent of the time. Similar results were reported for repeat candidates.

The conclusions of the 1980 USIQ study regarding the above may be premature because there is no assurance that candidates who take review courses are equivalent to candidates who do not take review courses. Differences in such attributes as academic achievement, motivation, and scholastic aptitude could, for example, account for the difference in the success rates of the two groups. The relationship of a review course with exam scores was evaluated by Reilly and Stettler, after taking into account the effect of GPA, SAT scores, and various other candidate characteristics. They found that the review course "was not a significant factor since it accounted for less than one point difference in score on the average and was never statistically significant". Given the increasing popularity of CPA review courses and their cost to candidates, more research on the benefit of such courses is needed.

Number of Accounting Hours Taken

The 1966, 1970 and 1975 USIQ studies found little association between the number of hours of accounting a candidate has and his/her score on the CPA exam. One explanation for this somewhat puzzling lack of association may lie in the small variability in the number of accounting hours reported by CPA candidates in these studies. For example, the 1975 study indicated that 88 percent of all first time candidates had from 24 to 30 plus hours of accounting (the highest number of accounting hours reportable in this study was "30 or more") while only three percent had less than 18 hours of accounting. This lack of reported variability renders more difficult the identification of any relationship between accounting hours and exam scores.

The 1980 USIQ study allowed for greater variability as the reported range of accounting hours was from "12 or less" to "54 or more." For candidates with undergraduate training only, positive correlations were found between accounting hours and exam scores on each part of the exam and ranged from .04 to .10. For candidates with either graduate training only or both undergraduate and graduate training, positive correlations were found for all parts but auditing. However, additional accounting hours should not be expected to improve exam scores without limit. The 1980 study reports that for candidates with undergraduate training only, additional accounting courses up to 42 hours appeared to improve examination performance, after which declining results commenced. Obviously, accounting courses of a highly specialized nature, such as oil and gas accounting, international accounting, or tax research, are not likely to contribute much to CPA exam success.

Graduate Study

The Commission on Professional Accounting Education (*A Postbaccalaureate Education Requirement for the CPA Profession*) recently recommended a postbaccalaureate accounting education as a prerequisite to sit for the CPA exam. Consistent with this recommendation, all USIQ studies have indicated that graduate study

AICPA Level II test scores and hours of independent study correlate positively with CPA exam performance.

contributes to performance on the CPA exam. The 1980 USIQ study reveals that candidates with a master's degree in accounting achieved, on average, 41 percent greater success in passing any part of the CPA exam than candidates with only a bachelor's degree.

Unfortunately the USIQ studies do not take into account individual differences in abilities between undergraduate and graduate students. Typically the students who pursue a graduate degree have, as a group, higher GPAs and SAT scores than those students, as a group, obtaining only a bachelor's degree and, therefore, graduate students would be expected to do better on the CPA exam than undergraduate students. Reilly and Stettler, after taking such factors as GPA and SAT scores into account, found graduate study to have no significant impact on examination performance. In view of these different conclusions, additional research on the impact of graduate study on examination performance is needed.

Work Experience, Years Out of College and Age

Students, teachers, and employers often express the belief that work experience contributes to a better understanding of accounting concepts and rules. That is, actual application of concepts and rules lends meaning to them and facilitates both interest and understanding. An extension of this belief might be that experience contributes to overall accounting knowledge and therefore should be positively associated with CPA exam performance. However, research to date does not support such a conclusion but consistently has indicated that work experience contributes little to performance on the exam. For example, results of the 1980 USIQ study indicate that the correlations between candidate work experience and exam

scores are quite low and often negative in value.

In attempting to explain this lack of association, Sanders writes that

The correlation between work experience and grades on the CPA examination of candidates sitting for the CPA examination for the first time in May 1970 was insignificant. It appears that the knowledge and skill acquired from work experience are offset by loss of knowledge acquired in college and a diminished ability to take academic tests. The CPA candidate should be encouraged to take the examination near the completion of his college work or soon thereafter.³

Since work experience and years out of college should be highly correlated it is not surprising that research does not indicate any significant relationship between the number of years out of college and performance on the CPA exam. Likewise no relationship has been found between the age of a candidate and performance on the CPA exam.

Examination Experience and the Benefit of Persistence

The 1980 USIQ study reported that, with the exception of auditing, first-time candidates tended to have higher pass rates than repeat candidates. However, among repeat candidates with one to four prior sittings, performance across all sections tended to improve with examination experience. These results might be explained as follows. Candidates sitting for the exam more than one time are, as a group, probably less able than those candidates who complete the exam on their first sitting and thus, overall, repeat candidates have lower pass rates than first-time candidates. However, failure on the first attempt would signal the need for additional study which, if done, should contribute to a higher future pass rate. Supporting this view is Stettler's study of 1975 Kansas candidates wherein he found that the average improvement from the first to second exam was about six points.⁴ Obviously one important benefit of examination experience is its impact on failing candidates regarding the necessity for adequate preparation.

Another phase of Stettler's study involved 344 Kansas candidates who attempted any of the four exam parts from November, 1960 through May, 1962. Stettler found that persistence has a high payoff: "Of first importance is the fact that although only five percent of the 344 candidates in the sample passed the examination on their first attempt, another 64 percent of the candidates eventually passed, apparently as a result of persistence and additional study." Furthermore, when nonserious candidates (defined as those not seeking reexamination after failing the first time) were excluded, the ultimate success rate was 76 percent of the serious candidates. For 31 of these serious candidates, success was obtained only after 10 or more attempts on at least one part of the examination.

School Attended

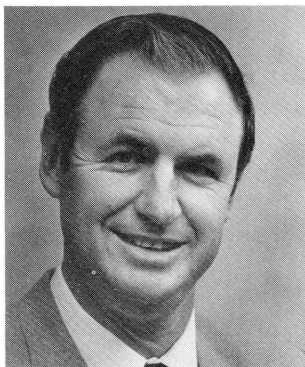
The USIQ studies combine candidates from all states and schools and therefore do not provide any insight into differences in performance attributable to the quality of a candidate's accounting education as measured by the school where his education was obtained. In the Reilly and Stettler study, the school attended was found to make a significant difference in examination scores obtained — this suggests program quality differences. Unfortunately the candidates from schools with the highest scores also tended to take a CPA review course where as those candidates from schools with relatively lower scores typically did not take a review course. Therefore Reilly and Stettler were unable to differentiate the effect of school attended from the effect of a review course. Additional research into the effect of school attended on exam performance should be undertaken.

Conclusions

GPA, SAT and ACT scores, AICPA Level II test scores, and hours of independent study have been found to be significantly and positively associated with performance on the CPA exam. Mixed or inconclusive findings exist regarding the effect on CPA exam scores of number of accounting hours, graduate study, taking a CPA review course, school attended and exam experience. Work experience,

years out of college, and age have not been found to be associated with CPA exam performance.

To date the models developed for predicting performance on the CPA exam explain less than 35 percent of the variation in candidates' test scores.⁵ This leaves over 65 percent of the variation in test scores unaccounted for and means that a prediction of examination performance using currently available models runs a high risk of error. Much of the unexplained variation in performance among candidates may be due to differences in the nature and quality of the accounting education received and to the differences in the motivation and preparation of candidates for the CPA exam. Therefore, future research should be directed towards integrating these factors into existing prediction models.



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Advice for the Aspiring CPA

Given the research findings to date, the following counsel is offered for consideration by those seeking a career in accounting with the expectation of becoming a Certified Public Accountant:

1. Evaluate one's aptitude for the subject matter of accounting. SAT and ACT scores should be considered in this evaluation.
2. Carefully select a college recognized for having a quality professional accounting program.
3. Study diligently and master the material presented — good grades, while not a perfect measure of one's knowledge of a subject matter, are still the best measure available.
4. Evaluate readiness to successfully complete the CPA exam by examining objectively one's accounting program and the grades achieved. Consider taking the AICPA Level II Test and using the score on it as an indicator of CPA exam readiness.
5. Take preparation for the CPA exam seriously — through adequate preparation the probability of success can be substantially improved. Based on the conclusions reached in item four above, a good CPA review program may be a sound investment.
6. Do not delay taking the exam in order to gain practical experience — the exam should be taken during the last semester of an accounting program or immediately upon its completion.
7. Do not take the exam for the experience — take it with the serious intent of passing it.
8. If at first you don't succeed, try, try again.

Footnotes

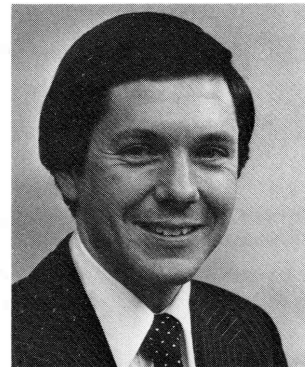
¹Park E. Leathers, James A. Sullivan, and Jerome Bernstein, *Uniform Statistical Information Questionnaire: 1980* (New York: AICPA, 1982), p. 32. This AICPA sponsored study, which is a major source for the information presented in this paper, will subsequently not be footnoted but will be cited as the 1980 USIQ study.

²Frank K. Reilly and Howard F. Stettler, "Factors Influencing Success on the CPA Examination," *Journal of Accounting Research*, Autumn, 1972, p. 314. Hereafter this study will not be footnoted but will be cited as the Reilly and Stettler study.

³Howard P. Sanders, "Factors in Achieving Success on the CPA Examination," *Journal of Accountancy*, December 1972, p. 87.

⁴Howard F. Stettler, "On Giving Guidance to the CPA Candidate," *The Accounting Review*, April, 1978, pp. 512-513.

⁵The amount of explained variation in the test scores of CPA candidates is measured by a statistic known as R². The multiple regression model used in the Reilly and Stettler study revealed an R² of 32.2 for Law, 31.9 for Theory, 28.5 for Auditing and 27.4 for Practice.



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