Validation of the General Classification Test For Selection Of Commissioning From the Ranks Candidates

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Abstract

The General Classification test is used in screening all officer candidates for the Canadian Forces. This paper summarizes the research conducted evaluating the test's predictive validity in selecting candidates nominated under the Commissioning From the Ranks program. On-job performance, as measured by the Performance Evaluation Report, was used as the criterion. Results indicated that the GC correlated significantly with the intellect component of officer performance, as identified by a factor analysis, but not with other performance factors. Similar results were found using a comparison sample of officers-in-general.

Introduction

In assessing individuals for commissioning as officers, the Canadian Forces (CF) screens candidates using the General Classification (GC) test, a measure of general learning ability. The present study of the GC test in officer selection was conducted in response to questions and observations regarding the use of the test in the selection of candidates nominated for Commissioning From the Ranks (CFR). This highly competitive program is open to superior servicemembers in the rank of Sergeant and above who have 10 years or more of service, meet education requirements, and achieve a satisfactory GC score. Candidates nominated for the program have proven themselves as superior senior NCOs and are considered by their Commanding Officers to possess necessary officer-like qualities. This study attempted to establish the validity of the GC for predicting subsequent CFR performance and to compare obtained results with the validity of the test in predicting performance for a sample of officers-in-general.

At the time of its development by the Royal Canadian Air Force during WWII, the GC was found to be an effective predictor of success in both flying and technical training. Later studies have shown it to correlate with: CF tests of verbal, mathematical, clerical, mechanical and electronic aptitude which are used for other ranks trade assignment (Rampton, Skinner, & Keates, 1972); aircrew selection tests (Saudino, 1982); and a measure of aptitude for second language training (Amyot, 1983). A recent CF study (LeGras & Staples, 1983) reports a correlation of 0.75 between GC scores and total scores on the Weschler Adult Intelligence Scale - Revised (WAIS-R).

In addition to its correlation with other aptitude measures, the GC been found to predict training performance for both officers and other ranks candidates. Studies have demonstrated that the GC is positively related to success in other rank recruit (Mullin, 1978) and trades training (Ellis & Saudino, 1981), officer cadet university performance (Vandyke, 1982), and pilot training (Vandyke, 1982). It has also been shown to correlate with job performance ratings for other rank members (Simpson, 1982).

This wide range of information regarding the test's relationships with other aptitude tests and with training and job performance measures, for both

other ranks and officers, lends credibility to the acceptance of the GC test as both a measure of general learning ability or intelligence and as a useful selection instrument. Its use in officer selection is based on the assumption that a minimum standard of intelligence is required of all officers and that the more intellectually capable candidate has a greater likelihood of succeeding in officer training and in subsequently demonstrating superior on-job performance. Consequently, the same GC cut-off is applied for all commissioning programs, regardless of whether the candidate is being considered for acceptance through a civilian entry plan or rough an in-service program. In recent years, little research has been directed at assessing the effectiveness of the test in predicting officer performance. The purpose of this study was to address this research issue.

Method

Sample. The CFR sample consisted of 250 Anglophone junior officers (Lts and Capts) selected for Commissioning From the Ranks in the years 1975 to 1982. A sample of 243 Lts and Capts was chosen at random from the officer population to serve as a "officers-in-general" comparison group.

Test. The GC is a 30-minute, 80-item multiple choice test used in the initial screening of both officer and other rank CF applicants. Separate norms and cut-offs are applied in the assessment of these two groups. English and French versions of the test are used as appropriate. The research summarized in this paper is based on the results from Anglophone samples only.

Criterion. A key consideration in this study was the choice of performance criterion to be used. In the validation of most selection tests, because of the ease of collection and standardization of scoring, training course results are commonly adopted as the performance to be predicted. The relationship of the GC to training results has been summarized above. For the CFR population, use of training information was considered inappropriate because of the lack of uniformity in the training of CFRs, due to differences in precommissioning ranks and officer classifications course structure. Furthermore, due to their years of experience in a related trade, the CFR pass rate on course is typically very high. This limited variability in course performance, particularly when only "pass/fail" results are available, would not yield the degree of discrimination between individuals necessary for test validation.

A more meaningful source of criterion data was deemed to be officer performance as measured by the annual Performance Evaluation Report (PER). The PER is a job performance measure that provides a readily available, standardized assessment for all officers, regardless of rank, classification, or specific employment. It rates the individual on 20 Performance Factors (PFs) and Professional Attributes (PAs), as well as on Potential for the next higher rank. A full list of the assessment categories is shown in Table 1. PFs and Potential are rated on a seven-point Likert-type scale, and PAs on a five-point scale.

Computerized annual PER data exist for all officers for the four year period, 1979-1982. This provided a total of 84 possible variables which could be used in the analysis, i.e., 21 PER assessment items X 4 years. Given the unworkable number of correlation coefficients this would produce (several of which would be expected to be significant by chance alone) the performance variables had to be combined or reduced. This was done by two means.

Table 1
CF Officer Performance Evaluation Report Items

Performance Factors	Professional Attributes	Potential
PF1 Acceptance of Responsibility	PA1 Professional Knowledge	Potential
PF2 Application of Knowledge	PA2 Appearance	
PF3 Problem Analyis	PA3 Physical Fitness	
PF4 Decision-Making	PA4 Conduct	
PF5 Preparation and Planning	PA5 Intellect	
PF6 Delegation	PA6 Integrity	
PF7 Oral Expression	PA7 Loyalty	
PF8 Written Expression	PA8 Dedication	
PF9 Performance Under Stress	PA9 Courage	
PF10 Cooperation		
PF11 Development of Subordinates		

The first means of combining the data was to average the ratings of the individual performance items over the four assessment years. This served to reduce the number of criterion variables to 21 and also increased the reliability of the ratings by minimizing the effects of error variance due to differences in raters, employment factors, experience in the job, etc. The second step was to factor analyse PER scores in order to identify the underlying components of officer performance being evaluated by this instrument. A common factor analysis using varimax rotation was conducted on the averaged results of the 1979 to 1982 PERs for a sample of junior officers (N=1802). This yielded six factors which accounted for 69.9% of the common variance. Table 2 identifies the factor names, together with the PER items loading on each, based on a factor weight inclusion criterion of 0.30.

Table 2
PER Items Loading on Each PER Factor

1. Job Performance:
   Acceptance of Responsibity
   Application of Knowledge
   Problem Analysis
   Decision-Making
   Preparation and Planning
   Performance Under Stress
   Cooperation
   Delegation
   Professional Knowledge
   Dedication
   Potential

2. Intellect:
   Oral Expression
   Written Expression
   Professional Knowledge
   Intellect
   Application of ' 'dge
   Problem Analysi:
   Preparation and Planning
   Potential

3. Professionalism:
   Conduct
   Integrity
   Loyalty
   Dedication
   Acceptance of Responsibility
   Cooperation

4. Management of Subordinates:
   Delegation
   Development of Subordinates

5. Fitness and Appearance:
   Appearance
   Physical Fitness

6. Courage:
   Courage

A rational examination of the factors shown in Table 2 suggested that the Intellect factor should be the component of officer performance which the GC would be expected to predict most strongly, followed to a lesser degree by the Job Performance factor. On the other hand, there was no theoretical basis from which to conclude that that the GC should have any relationship with the remaining factors (e.g., Courage, Fitness and Appearance).

Procedure. All available PER results for each CFR officer were averaged, yielding PER item scores which were based on rated performance over one, two, three, or four years, depending on time since commissioning. Factor scores were calculated for each individual, based on the averaged PER item scores and using the factor weights generated from the factor analysis conducted on the general junior officer sample. The six resulting scores were correlated with precommissioning GC scores yielding Pearson product-moment correlation coefficients. A similar analysis was carried out for the officers-in-general sample.

Results and Discussion

The correlation coeffients between GC and the six PER factors derived for the CFR and officers-in-general samples are shown in Table 3.

Table 3
Correlations Between GC Score and PER Factor Scores
For CFR and Officers-in-General Samples

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
CFR Sample (N=250)	r=.0469 ns	r=.1770 p<.01	r=-.0914 ns	r=.0181 ns	r=.0577 ns	r=-.0224 ns
Officers-in-General Sample (N=243)	r=-.0529 ns	r=.1661 p<.01	r=.0124 ns	r=-.0400 ns	r=.0792 ns	r=.0378 ns

As the above results indicate, the GC test was found to be significantly correlated with the Intellect factor for the CFR group as anticipated. The correlations for all other factors were not significantly different from zero. A similiar pattern of correlations was found for the officers-in-general sample, suggesting that the same relationship exists between GC test scores and performance ratings for officers selected from either population. Clearly, the GC is equally effective in the prediction of performance for both groups, negating the possible argument that the test may be of limited use in the selection of CFRs.

While the observed correlation between GC and the Intellect performance is significant, it is quite small. This is not unexpected however, in view of several possible confounding variables. First, the GC score distribution for the CFRs was restricted by the prior application of a selection cut-off. Correcting for this restriction of range, using test distribution information for all other rank members in the rank of Sgt or above, increases the correlation coefficient to 0.21. A similar correction for the officers-in-general sample yields a correlation coefficient of 0.17.

Additionally, the magnitude of the correlation coefficients obtained in this study was limited by the instruments themselves. The GC has been shown to have good reliability as determined by the split-half and KR-20 internal consistency methods, yielding values of .88 and .90 respectively (Rampton, Skinner, & Keates, 1972). No reliability values for the PER have been established but it is known that measures of this sort, which are based on subjective assessments of a large number of raters over an extended period of time, are typically lower by comparison (Borman, 1978). These factors would establish upper limits to the possible correlation coefficients that might be obtained. Notwithstanding the noted methodological constraints, obtained results indicate that it is not unreasonable to employ the GC test as one of several assessment instruments for selecting officers for the CF Commissioning From the Ranks program.

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