Selection and Success of Students in a Hospital School of Nursing

The authors suggest that the use of pre-entrance selection tests for nursing candidates can lead to better selection procedures and possibly fewer dropouts.

Elizabeth A. Willett, Ph.D., Reverend Pius A. Riffel, S.J., Ph.D.; Lawrence J. Breen, Ph.D.; and Sister Elidor J. Dickson, C.S.J.,B.A.

Screening procedures that utilize general and specialized tests of vocational and educational aptitudes have been incorporated into the selection programs of professional nursing training institutions in the United States over the past four decades.[1] Although not as widespread in Canada, screening procedures that make use of standardized tests are being used indirectly by the admissions committees of some hospital schools. St. Michael's School of Nursing in Toronto, through the cooperation of the hospital's psychological services, has made use of a relatively comprehensive battery of standardized tests since 1964 as part of its pre-entrance selection process.

Reasons for testing

The reasons usually given for the use of such tests have been summarized by Dent and include the following : First, the admission of students who later withdraw involves a financial loss. Second, the morale of some students or of an entire class may be affected by the admission (and later withdrawal) of students who encounter considerable difficulty with the program. Third, the quality of instruction can be seriously affected. Fourth, some highly qualified candidates, especially should they apply late, may be rejected because of the acceptance of less qualified candidates. Last, but certainly not of least importance, lack of success may seriously affect the psychological growth and development of those less qualified candidates who are later forced to withdraw.[2]

Scope of present research

To determine the predictive value of the tests used in the St. Michael's Psychological Services Nursing Candidate Selection Battery, the present research project was established. Specifically it had as its objective the evaluation of the effect (s) of the pre-entrance testing program on students selected for the 1967-1968, and 1969 graduating years.

It was with predictability that the present study was primarily concerned, but not in a singular way. Rather it was an investigation that attempted to assess : 1. the efficacy of pre-entrance screening procedures in nursing candidate selection ; 2. the predictability of specific psychometric instruments in relation to success during the three-year period as well as on the Registered Nurses' Association of Ontario (RN) examinations ; and 3. the factors that differentiate successful candidates (class) from those who withdrew from the program (dropouts), accepted candidates who did not come into the program (ADNC), and those candidates who were rejected (rejects).

Description of tests used

Although the battery of tests used by St. Michael's Hospital psychological services in screening nursing candidates has been modified from time to time, basic instruments such as the College Qualification Tests (CQT), Forer Structured Sentence Completion Test (FSSCT) and the General Information Questionnaire (GIQ) were used for the 1967, 1968, and 1969 graduating classes—those classes for which pre-entrance assessment data were analyzed in the present investigation.

The CQT is a series of scholastic ability tests developed by Bennett, Bennett, Wallace, and Wesman for use by colleges and other post-secondary educational institutions in admission, placement, and guidance procedures.[3] The three tests involved in the series yield six scores ; Verbal ; Numerical ; Information, from which score can be derived two separate scores for Science and Social Science ; and Total. The Verbal test consists of 75 vocabulary items ; 50 of these require identification of synonyms, and 25, identification of antonyms. The Numerical test contains 50 items drawn from arithmetic, algebra, and geometry. The Information test is composed of 75 items, half of which deal with the

natural sciences (physics, chemistry, and biology), the other half with social studies (history, government, economics, and geography).

Verbal and numerical tests have a long history of success in predicting academic achievement. Research has shown vocabulary to be one of the most efficient measures of verbal ability. Although not effective in as many areas as tests of verbal ability, those tapping numerical ability have also been useful predictors "even in fields which do not obviously require numerical ability.[4]

The inclusion of the Information subtests of the CQT (Science and Social Science) in the St. Michael's Hospital Psychological Services Nursing Candidate Selection Battery represents the widely held belief that a measure of the educational background a student brings to any institution of higher learning will be indicative of his or her future academic success. Although the student's high school record is a reflection of her formal educational history, and *may be* a good predictor of later academic success, there are serious limitations attendant to its exclusive use.

Bennett *et al* have summarized the major difficulties inherent in placing any critical reliance on high school records :

"Grading standards vary from one high school to another so that grades may not be at all comparable. Students may take courses quite different in inherent difficulty, one student earning A's in easy courses while another earns B's in more challenging subjects. Informal education, the learning which takes place outside the school setting, is only accidentally reflected in high school grades."[5]

The inclusion of the Information subtests, originally prepared to provide a uniform survey of the student's academic knowledge, served as an indicator of the breadth of information she had previously acquired, and on which she would be expected to build in the future.

In addition to providing a predictive tool as well as uniform information about candidates' academic background, the use of the CQT allowed for comparisons between St. Michael's Hospital School's candidates and those college freshmen entering a university program leading to a degree in nursing. Such comparisons were possible as the 24,000 students from 37 colleges and universities in 22 states on whom the tests were originally standardized, were grouped from all schools according to degree sought.

Another psychometric tool that has always been a part of St. Michael's Hospital Psychological Services Nursing Candidate Screening Battery is the Forer Structured Sentence Completion Test (FSSCT). The FSSCT can best be described as a projective technique that allows for indirect assessment of the candidate's personality dynamics.

Forer structured his sentence stems to elicit responses (completions) reflecting the subject's reactions to inter-personal figures (mother, females, father, males, groups, authority) ; wishes ; causes of own aggression, anxiety and fear, depression, failure, and guilt ; reactions to aggression, rejection, failure, responsibility, and school. Forer states, "...the use of highly structured items allows for wide coverage of the attitude-value system and points up evasiveness, individual differences, and defense mechanisms."[6]

One of the major advantages of a technique such as the FSSCT is that it is indirect in its approach to personality assessment. Distortion of personality due to the subject's own "halo" effect is largely precluded when projectives are employed. Unfortunately, the major disadvantage of tests such as the FSSCT, also stemming from its indirect, qualitative approach, is that the completions do not lend themselves well to quantification for purposes of research. Although some research inroads have been made into the use of sentence completion tests, they still present the problems which obtain when data has to be coded on a subjective, judgmental basis.

Also subject to difficulties inherent in projective techniques, such as the FSSCT, is the General Information Questionnaire (GIQ). The GIQ was originally developed at St. Vincent's School of Nursing in New York, and later copyrighted by Coville.[7] The responses to this questionnaire were used directly by both Psychological Services and St. Michael's School of Nursing admissions committee in screening candidates. Included in the GIQ are 27 self-rating scales that reflect the subject's level of self-confidence, ability to make decisions, courtesy, tact, ambition, and so on.

Additional screening instruments

In addition to the GIQ, FSSCT, and CQT, other instruments used at St. Michael's include the Raven's Progressive Matrices (Ravens), Minnesota Multiphasic Personality Inventory (MMPI), and the Sixteen Personality Factor Questionnaire (16PF). The Ravens assesses an individual's capacity to apprehend meaningless figures, see the relations between them, conceive the nature of the figure completing each system of relations presented, and, by so doing, develop a systematic method of reasoning.[8] Thus, in broad terms, the Ravens can be considered a test of intelligence.

The MMPI, a test for assessing personality functioning, was devised by Hathaway and McKinley partly to "...lessen the conflict between the psychiatrist's conception of the abnormal personality and that of psychologists...who must deal with abnormality among more nearly normal persons," and partly "in the hope that it might be nearly universal in both its interpretation and its applicability to individual cases."[9] The MMPI allows for the assessment of personality characteristics on the basis of scores on the following nine clinical scales ; hypochondriasis, depression, hysteria, psychopathic personality, masculinity-femininity characteristics, paranoia, psychasthenia, schizophrenia, and hypomania. Other MMPI scales that are useful in personality assessment include the lie (L) score, validity (F) score, and a measure of social isolation (Si).

The MMPI, used as a post-entrance test, was administered to all applicants accepted into the 1967 graduating year at St. Michael's. In the present study it was used to assess the personality differences between the class and dropouts.

Another instrument devised by more basic research in psychology to give the most complete coverage of personality possible in a brief time is the 16PF. Cattell and Eber report. "The personality factors measured are not just peculiar to the 16PF Test. They have been established as unitary, psychologically-meaningful entities in many researches in various life situations."[1] It is this very meaningfulness that makes the 16PF an attractive instrument for use as a screening device. The 16PF assesses personality along the following dimensions: Reserve, Intelligence, Emotional Stability, Humility, Prudence, Expediency, Restraint, Self-reliance, Trust, Practicality, Forthrightness, Confidence, Conservatism, Dependency, Control and Tension.

Although the literature is replete with studies assessing the success of selection procedures used in nursing schools, none of them have used batteries identical with those employed by St. Michael's Hospital psychological services. Thus, it seemed logical that St. Michael batteries be studied to determine the effectiveness of the specific tests used in each battery and their differential predictability. Success in nursing, for the purposes of the present research project, was operationally defined in terms of the candidate's academic and/or clinical performance during her three-year training period as well as in terms of her RN examination results.

Statistical procedures

All scores for candidates in their respective year were subjected to correlational analysis to determine which of the screening devices provided scores that were valid predictors of success in the nursing program, that is, showed significant correlations with academic and/or clinical marks and RN examinations results. To determine the psychological differences between accepted candidates (class), accepted applicants who did not enter the school (ADNC), rejects and dropouts, individual analysis of variance of each of the psychological variables were also carried out. All analysis were handled by an IBM 360/60 computer.

Intellectual ability test results

Correlations between CQT scores and RN examination results that reached statistical significance ($p=0.05$) are presented in *Table I*. In terms of the magnitude of the correlations as well as their number, the CQT Total score appeared to the best predictor of success in nursing as measured by the RN examinations. Although not consistent predictors across the three years, the Verbal and Science scores also showed significant correlations with RN examination results.

As far as correlations between CQT scores and school marks were concerned, it was also the CQT Total that showed the greatest number of correlations with marks. For the 1967 year, significant correlations were established between CQT Total scores and 13 out of 27 (48 percent) academic and/or clinical marks; for the 1968 class, 8 out of 20 (40 percent) of the academic and/or clinal marks; and for the 1969 class, 9 out of 19 (47 percent) of the academic and/or clinical marks.

Science scores followed closely by those of the Verbal test also showed significant correlations with marks, although correlations were not found to exist

TABLE 1

Significant Correlations Between CQT Scores and RN Examination Results

CQT Scores	*Numerical*	*Verbal*	*Social Science*	*Science*	*Total*
RN Examinations					
1967 ; N=58					
Medical Nursing				.31	·37
Surgical Nursing	.25			.24	.37
Obstetric Nursing	.32			.32	.38
Pediatric Nursing	.28			.39	.45
Correlation (r) $=·21$, $p<05$; $r=30$, $p<·01$; $r=40$, $p<·001$					
1968 ; N = 83					
Medical Nursing	.20	.25		.29	.35
Surgical Nursing					
Obstetric Nursing		.25			.22
Pediatric Nursing	.25	.22	.18		.31
$r = .18$, $p < ·05$; $r=.26$, $p < ·01$; $r = ·36$, $p < ·001$					
1969 ; N-84					
Medical Nursing		.33		.28	.29
Surgical Nursing		.30	.23	.30	.32
Obstetric Nursing	.31	.23		.31	.35
Pediatric Nursing		.31		.34	.34
$r = .20$, $p < ·05$; $r=.28$, $p < .01$; $r = .39$, $p < ·001$					

between these test scores and as many marks as was the case with the CQT Total scores. Approximately one-quarter to one-third of the academic and/or clinical marks each year were found to be correlated with CQT Science and Verbal scores. An even lower percentage of marks was found to be correlated with the Numerical and Social Science scores, the latter showing the least number of correlations with marks.

The mean CQT percentiles for each group averaged across the three years are presentd in *Table* 2 In each year the five scores were found to differentiate the rejects from the other three groups at the 0·05 level of statistical significance or higher.

Since the CQT, a measure of scholastic ability, the Ravens, a test of intelligence, and the intelligence dimension of the 16PF are all instruments that tap intellectual functioning, it seemed reasonable to compare them in terms of predictive value. Because of the many significant correlations established between CQT scores and school and RN examination results, the CQT stands out as an excellent predictive instrument. On the other hand, the Ravens test employed in the screening of the 1967 and 1968 applicants to St. Michael's School of Nursing. was found to be correlated with only two school marks in 1967 and four in 1968, although it did show significant correlations with three or four RN examinations in 1967, but only one in 1968.

The intelligence dimension of the 15PF was found to be correlated with all four RN examination results in 1968, but showed no correlations with the 1969 RN examination results.

Personality test results

Although the intelligence dimension of the 16PF was not shown to be a consistent predictor of success in nursing as defined in terms of RN examination results, this is not to say that the other dimensions of the 16PF were not valuable predictive tools. For the 1969 group, the reserve, emotional stability, restraint, practicality, conservatism, and control factors showed significant correlations with the RN examination results. In addition, the 16PF was a valuable instrument in differentiating between the groups.

The dimensions on the 16PF that differentiated between the class and dropout groups in 1968 were those of emotional stability, self-reliance, and practicality, and, in 1969, reserve. As far as differences in reserve were concerned, the dropouts were much more outgoing, warmhearted, easygoing, and participating. These are desirable characteristics ; but when they are operating in a student's personality to the extent that she is spending considerable time fulfilling such aspects of her personality, she is not likely spending as much time as is required at her studies.

TABLE 2

Mean CQT Percentiles for Each Group (N=665)

	Class (*N*=246)	*Drop-Outs* (*N*=65)	*ADNC* (*N*=130)	*Rejects* (*N*=224)
CQT Percentile				
Total	68.37	66.66	65.96	40.37*
Science	51.19	48.84	55.28	35.21*
Social Science	49.84	50.99	40.21	32.54*
Verbal	65.34	63.66	66.82	42.43*
Numerical	82.55	77.35	75.99	63.76*

*$p < .05$

As far as the 16PF factors that discriminated between these two groups in the 1978 year are concerned, the class were found to be more stable emotionally and less easily upset ; more self-reliant and realistic ; and more practical, that is, careful, conventional, more regulated by external realities than were the dropouts.

Another instrument used in the Pre-entrance Nursing Candidate Selection Battery was the General Information Questionnaire. Analysis of variance indicated that the following scales differentiated between the class and dropout groups ; decision-making, courtesy, moral standards, responsibility, science, persuading others, listening, tolerance and study habits. In most cases it was the dropouts who rated themselves higher on these scales. This is consistent with the unrealistic attitudes reflected in their 16PF profiles.

Although the self-ratings taken from the General Information Questionnaire differentiated between the class and dropouts, they were not particularly valuable predictive instruments in terms of their ability to establish significant positive correlations with academic and/or clinical mark and RN examination results. Also the Wish-To-Be-A-Nurse, Reaction-to-Failure, and Attitude-to-School scores derived from the FSSCT were not particularly valuable as far as their predictive ability was concerned. Because the Wish-To-Be-A-Nurse score was found to be correlated with school marks as well as RN examination results in 1967, it was also analyzed for the 1968 and 1969 classes. In 1968 it was found to be correlated with only one mark, that of psychology II, and in 1969, with one RN examination, that of medical nursing in which a negative correlation ($r = -.20$) was established. In other words, the greater the applicant's wish to be a nurse as reflected in her FSSCT, the poorer her performance on the medical nursing examination.

(*Conld. on page 231*)