An Objective Group Questionnaire as a Substitute for a Personal Interview in the Admissions Process to a Dental School

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Abstract

The paper discusses the need for reliable and valid measures of personality and motivational factors in the prediction of success and attrition in a dental school. The admissions system currently used in most schools includes personality factors that are measured by an interview. The present study examined whether the interview could be replaced by an objective group questionnaire, thus increasing standardization and objectivity and avoiding the possible biases of the interview. The relationship between the standardized questionnaire score and the interview score in a dental school in Israel was examined as well as the relationship between the standardized questionnaire score and the admissions decisions. The results showed that the questionnaire and the interview probably measure a common construct, enabling us to tentatively recommend a two-stage admissions process: all candidates meeting certain academic criteria should be asked to answer the questionnaire; those candidates scoring above a certain percentile on the questionnaire should either be admitted outright or invited for an interview.

The interview is one of the selection techniques most widely used in the medical and dental school admission process. Over 95% of those schools interview candidates as part of their selection process for admission, and nearly all of them conduct semi-structured interviews with all candidates (Elam & Johnson, 1992; Elam, Johnson, Wiese, Studts, & Rosenbaum, 1994; Johnson & Edwards, 1991). Interview ratings ranked first in importance among five pre-admission variables in selecting candidates (Johnson and Edwards, 1991).

Johnson and Edwards (1991) formulated a questionnaire concerning the interview process for medical school applicants and sent it to all 127 accredited medical schools in the United States. The questionnaire addressed the following areas: the interview's status as a predictor; interviewers and interview structure, interviewer training; and the utility of interview data.

Regarding the interview's purpose and status, they found (based on data collected from the 92 schools responding) that the interview had two major purposes at their schools: it served (a) as a means of assessing candidates' non-cognitive strengths and weaknesses and (b) as a means of recruiting additional students. Two other common purposes of interviewing were to predict applicants' success as medical students (53%) and to provide a realistic preview of what medical school is like for applicants (47%).

Regarding the interview processes, they found that most of these processes were structured loosely (providing a minimum of guidelines for interviewers) to moderately (providing some guidelines for interviewers). Interviewers were free to ask most questions; they might have been given a list of characteristics or questions to be used as a guide, but formally derived characteristics were not the norm. The questions tended to address the applicants' educational, economic and social

background, experience and knowledge of the profession, source of motivation, interpersonal behavior or manner, responsibility and commitment, and achievements. Forty percent of those responding reported not using any scale; evaluation was informal. Another 35% used simple Likert-type scales for each characteristic that was examined, anchored by simple adjectives and numerical values at each level. Only few schools (6%) used behaviorally anchored rating scales, with behavioral examples anchoring numerical levels.

Regarding summary ratings, Johnson et. al (1991) confirming Puryear and Lewis's (1981) results found that most interviewers were required to provide a subjective narrative statement or an accept/reject/conditional type of rating. Sixty percent of medical schools require interviewers to submit reports which address a series of general topics (e.g., experience and knowledge of the profession, source of motivation for medicine, etc.), but 39% of the schools require only an open-ended summary, thereby leaving the exact content of the report entirely at the discretion of the interviewer.

Elam et al. (1994) found a general lack of comparability of recorded material across interviewers. Some interviewers include a great deal of information, while others make one-word judgments. In addition to the subjectivity of the interview judgments, the interpersonal setting of the interview is likely to produce biases due to the different cultural backgrounds of the candidates and the interviewers (Beveridge, 1968; Rich 1968; Shaw, Martz, Lancaster, & Sade, 1995; Sidney & Brown, 1959; Tubiana & Ben-Shakhar, 1982). Even when the interview is structured, it is likely to be affected by different styles of interviewing (Heller, Davis & Myers, 1996).

Johnson and Edwards (1991) suggested a number of ways in which interviews can be structured to improve their psychometric qualities. Based upon the selection

research of Campion, Pursell, and Brown (1988), and upon Edwards, Johnson, and Molidar (1990), they described four elements which are essential to a well-structured admission interview: (1) a systemic job analysis, or Success Analysis of Medical Students, which generates necessary applicant characteristics; (2) standard questions derived from the job analysis; (3) behaviorally anchored rating scales to measure each characteristic; and (4) use of an interview panel instead of one-to-one interviews.

The issue of whether a selection interview can be replaced by an objective measure was examined by Tubiana and Ben-Shakhar (1982). They investigated the results of replacing the interview used by the Israeli Defense Forces to measure the motivation of soldiers to serve in a combat unit with an objective group questionnaire. The expectation was that the replacement of the interview with the questionnaire would not reduce the general validity of the classification system. The results of their study showed that the interview and the questionnaire were essentially equivalent predictors of the criterion.

The purpose of this study

The present paper deals with the process of admissions to a dental school – a school that faces a serious problem of student attrition. Attrition occurs for various reasons, in particular those pertaining to motivational and personality factors. It was clear to many of the faculty members at the school that any valid measure for predicting success as well as attrition in the dental school must include personality and motivational factors.

The goal of the present study was to examine the effects of replacing the interview with a group questionnaire. The hope was that this would increase standardization and objectivity, avoid the possible biases of the interview, and save

time, manpower and effort, all without any loss to predictive validity. The questionnaire that was developed was based on the following principles: (1) it had to cover about the same content as the interview; and (2) it had to be objective and easy to score.

An appropriate criterion for validating such a system would be a measure of the scholastic and clinical performance of the admitted students during the course of their studies. However, no such measures were available at the time the study was conducted. Instead, it was decided to examine the relationship between the standardized questionnaire score and the interview score as well as the relationship between the standardized questionnaire score and the admissions decisions (based on the interview for qualified candidates). These relationships would provide some evidence regarding the extent to which the questionnaire could serve as a replacement for the interview in the future.

It is important to note that the interview evaluation had no bearing on actual admissions decisions in question. The questionnaire was employed solely on an experimental basis with an eye to future use.

The admissions process currently employed by dental schools in Israel
It is worth noting that in Israel, dental school studies start from the first year of undergraduate studies (in contrast to the US, where dental schools are graduate schools).

At present, the dental schools base their admissions decisions on the following measures:

1. A scholastic aptitude measure which is a weighted score of two measures: the average score on the high school matriculation diploma (based on high school

teachers' evaluation of students' scholastic achievement in various subjects

and on external exams) and the score on the Psychometric Entrance Test

(PET) which is a scholastic assessment test (similar to the American

Scholastic Assessment Test – SAT).

2. An interview intended to measure personality factors. The interview is

individually administered to candidates who exceed a certain cutoff score on

the cognitive ability measure mentioned above.

The interview

The interview is conducted by two faculty members and a psychologist, and lasts for

about 40 minutes. The goal of the interview is to identify those candidates whose

personality does not seem to be suitable for dental studies. The outcome of this

interview is a general evaluation of the candidate on a scale of 1 to 5. A candidate is

rejected if all three interviewers assign to him a score of 1; a candidate is invited for a

second interview if two of the interviewers assign to him a score of 1; otherwise, a

candidate is admitted. Ten to twenty percent of the qualified candidates are rejected

based on the interview.

Method

In general, the construction of the questionnaire included Johnson and Edward (1991)

elements essential to the construction of a completely structured admission interview.

A small-scale job analysis was conducted among various groups of dentists: faculty

members, practicing dentists, dentists who had left the profession, dentists who

expressed satisfaction from their profession, and dental students. Standard questions

derived from the job analysis were formulated.

Additional questions included in the questionnaire were selected from a list of questions that interviewers use during the interview. To be included in the questionnaire, each question had to have a clear rationale regarding what it measured (based on the job analysis). Criteria for scoring each question were based on this rationale, and a detailed scoring guide was developed (see examples in Appendix 1). The questionnaire was reviewed by faculty members of the dental school and revised accordingly.

The Questionnaire. The questionnaire included 23 open-ended questions divided into two parts (after two questions had been removed as described below):

1. <u>Motivation</u>, experience with and knowledge of the profession (11 questions).

2. <u>Personality</u> factors, including honesty and credibility, responsibility and commitment, persistence, self-evaluation, inter-personal behavior, promptness and accuracy, and technical skills (12 questions). Of the 12 questions, some related to the candidate's past experience (8), and others were general questions (4).

Following administration of the questionnaire, a training workshop was conducted during which six raters discussed and agreed on the final criteria for each question. Only questions for which clear scoring instructions could be written and which had a high degree of inter-rater agreement were included in the final score. It was not possible to formulate a clear scoring guide for two questions, and these were excluded from the questionnaire.

Following this workshop, each question was scored independently by two raters according to the scoring guide. The score on each question was the mean of the two raters' scores. For each candidate, the following scores were calculated: (1) a total score based on all questions (23 questions); (2) a motivation score based on the

first part (11 questions); and (3) a personality score based on the second part of the questionnaire (12 questions).

Subjects. The experimental questionnaire was administered to all candidates to the dental school for the academic years 2000 and 2001, who were invited for an interview (131 candidates in 2000 and 165 candidates in 2001), a total of 296 subjects.

Procedure. Each candidate was asked to fill out the questionnaire before being called in for an interview.

Results

Since the results of the two sets of data (relating to the academic years 2000 and 2001) turned out to be highly similar, results are reported for the combined group. Table 1 presents the correlations between the independent evaluations of the two raters.

Table 1

Inter-rater correlations for each score

Score	Number of questions	Correlation
Motivation	11	.84
Personality	12	.91
Total	23	.91

The correlations indicate a high degree of agreement between the two raters. The internal reliability of the questionnaire was calculated using Cronbach's Alpha coefficient. Table 2 presents the reliability coefficients of the questionnaire scores.

Table 2

Cronbach's Alpha coefficient for the various scores

Score	Reliability
Motivation	.69
Personality	.58
Total	.71

Given that the questions are open-ended and subjective, the observed level of the resulting reliabilities is reasonable.

The correlation between the Motivation and Personality scores was .52, between the total score and the Motivation score: .84, and between the total score and the Personality score: .90. The last two correlations indicate that the two parts of the questionnaire bear approximately equal weight in determining the total score on the questionnaire.

Table 3 presents the mean, standard deviation, minimum and maximum of the variables included in the study.

Table 3

Descriptive statistics for the questionnaire scores, matriculation grades and PET

Score	Mean	SD	Min	Max
Motivation	23.7	6.3	7.5	42
Personality	21.6	8.1	4.5	45
Total	45.3	12.5	14.5	75.5
Matriculation	10.5	0.51	9.2	11.7
PET	694	32.4	605	771

As expected, the standard deviation of the matriculation grades and PET scores within this selective group of candidates is quite small compared with the general population of applicants to the universities (.77 and 100 for the matriculation grades and PET scores respectively).

The relationship between the questionnaire scores and other scores. Table 4 presents the correlations between the questionnaire total score and the matriculation grades, PET score, and the final decision regarding admissions, based on interviews only, (admit = 1 and reject = 0).

Table 4

Correlations between the questionnaire score and other variables

	Total score on questionnaire
Matriculation	-.37
PET	.33
Final decision	.34

The correlation between the interview score and the final decision was .64. Since the final decision is a function of the interview score only, this correlation is the maximum value possible between the final decision and any other variable. Thus, the correlation of .34 between the final decision and the questionnaire total score is not negligible. The correlations for the variable "final decision" with the other variables were: 0.28 with Motivation, 0.24 with Personality, 0.16 with PET, and -0.15 with the matriculation grades. These correlations support the notion that the questionnaire and the interview probably measure a common construct.

The Interview. The interview score was defined as the sum of the three interviewers' scores following the first interview (when there was more than one). The correlations between the interview score and the other variables are presented in Table 5.

Table 5

Correlations between the interview score and other scores

	Correlation with the first interview score
Decision after first interview	.67
Final decision	.64
PET	.19
Matriculation grades	-.24
Total score on questionnaire	.40
Motivation	.33
Personality	.31

As expected, the correlations of the interview score with the cognitive measures were relatively low. Medium-size correlations were found between the interview score and the questionnaire scores, indicating that the traits being measured by them share common variance.

Distribution of rejection decisions by questionnaire score. An examination of the distribution of rejection decisions by questionnaire score provides another perspective on the relationship between the interview and the questionnaire. All in all, 296 candidates were interviewed, of whom 49 were rejected. Table 6 presents the number of rejected applicants by their percentile score on the questionnaire.

Table 6

Number of rejected applicants above and below a percentile score on the questionnaire

Score	Percentile	Number of rejections above	Number of rejections below
62.5	Top 10%	0 (0%)	49 (100%)
56	Top 20%	1 (2%)	48 (98%)
51	Top 30%	4 (8%)	45 (92%)
48	Top 40%	6 (12%)	43 (82%)
45.5	Top 50%	6 (12%)	43 (82%)
41.5	Top 60%	11 (23%)	38 (77%)
38.5	Top 70%	17 (35%)	32 (65%)
34	Top 80%	27 (55%)	22 (45%)
28	Top 90%	38 (81%)	11 (19%)

All candidates who scored within the top 10% on the questionnaire were admitted (based on the interview). On the other hand, 11 candidates (23%) were rejected from among those who scored within the bottom 10%. Out of those who scored above the 60 percentile score, only six were rejected. The remaining 43 rejections were of candidates who scored below it.

These results enable us to make a tentative recommendation for policy makers regarding admissions decisions. The recommendation is to conduct the admission process in two stages: first, have qualified candidates fill out the questionnaire. After the questionnaires have been scored and a cut off score has been define (e.g., the 60th percentile score), a decision should be made whether to admit a candidate directly or

to invite him/her for an interview. Choosing a high rather than a low cutoff score means that more candidates will be interviewed.

Discussion and Summary

The present study examined whether an admissions interview could be replaced by an objective group questionnaire, thus increasing standardization and objectivity and avoiding the possible biases of the interview. The results suggest that the interview and the questionnaire might be fairly equivalent indicators of the motivational and personality factors they measure. To be able to make a more confident statement regarding this equivalence, some clinical performance criteria are needed. Nevertheless, the results of this study suggest that the questionnaire might be an adequate pre-screening tool. It might save interviewers substantial amounts of time by allowing them to interview a smaller number of candidates, while the cost in validity is probably small to negligible.

As mentioned above, more data are being collected and analyzed regarding candidates who were admitted for the academic years beginning in 2000 and 2001. It is hoped that these data will provide us with more evidence regarding other variables, such as future academic and clinical performance.

Notes

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Appendix 1

Two questions from the questionnaire and their scoring guide

Example 1

Did you consult with anyone before you decided to study dentistry?

- Who were the people you consulted with? How familiar were they with the profession?

- Specify the information you received from them.

The best answer should include the following three components:

1. The applicant consulted with people who could give him or her realistic information.

2. These people pointed out to the applicant the foreseeable advantages, challenges and benefits of working in the profession, as well as the disadvantages, difficulties and risks involved.

3. The applicant demonstrated substantive, up-to-date knowledge of the profession. For example, the applicant observed the dentist's work other than from the patient's chair prior to deciding on this course of study.

Scoring: 1 point for each component (0-3)

Example 2

List some of the difficulties that dentists encounter in their work. Be specific and explain your answer.

The best answer should include a list of foreseeable difficulties, such as:

- Difficulty of working alone.

- Professional – correct diagnosis and treatment; not making serious mistakes.

- Difficulty of working with patients.

- Physical – keeping body and hands in the same position for several hours.

- Emotional – causing the patient pain.

- Emotional – identifying patients' reactions by their facial expressions.

- Emotional – withstanding patient pressure: requests for treatment, discounts on payments, patients waiting to be treated.

- Emotional – absence of feedback (recognition and appreciation) on the quality of one's work.

- Marketing – building a patient base.

- Economic – establishing a clinic.

Scoring: According to the number of different difficulties listed