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A preliminary study of emotional intelligence, empathy and exam performance in first year medical students ☆

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Abstract

A group of 156 first year medical students completed measures of emotional intelligence (EI) and physician empathy, and a scale assessing their feelings about a communications skills course component. Females scored significantly higher than males on EI. Exam performance in the autumn term on a course component (Health and Society) covering general issues in medicine was positively and significantly related to EI score but there was no association between EI and exam performance later in the year. High EI students reported more positive feelings about the communication skills exercise. Females scored higher than males on the Health and Society component in autumn, spring and summer exams. Structural equation modelling showed direct effects of gender and EI on autumn term exam performance, but no direct effects other than previous exam performance on spring and summer term performance. EI also partially mediated the effect of gender on autumn term exam performance. These findings provide limited evidence for a link between EI and academic performance for this student group. More extensive work on associations between EI, academic success and adjustment throughout medical training would clearly be of interest.

☆ Ethical approval from the College of Medicine and Veterinary Medicine was sought and received for this investigation. Student information was gathered and used in accordance with the Data Protection Act.

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1. Introduction

There is considerable interest in establishing whether individual difference measures (other than intelligence) act as predictors of student academic success. A substantial literature devoted to this topic has produced evidence for associations between personality and other traits and success at university. Studies using the five-factor model personality traits of Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A) and Conscientiousness (C) have consistently identified C as a predictor of academic success independent of degree subject (e.g. Chamorro-Premuzic & Furnham, 2003a, 2003b; Ferguson, James, O'Hehir, & Saunders, 2003; Paunonen & Ashton, 2001); this result is unsurprising given that C includes facets of competence, dutifulness and achievement-striving. The situation for other personality traits is less clear, but there are reasonably consistent findings of negative associations of exam success with N (e.g. Chamorro-Premuzic & Furnham, 2003a, 2003b), and positive associations with O (e.g. Farsides & Woodfield, 2003; Phillips, Abraham, & Bond, 2003). For N, the negative associations with performance are likely to be related to anxiety and stress vulnerability (Chamorro-Premuzic & Furnham, 2003a, 2003b). The associations of O with intellectual interest and curiosity, and its positive relationship with IQ have been evoked to explain O/performance associations (Phillips et al., 2003).

In addition to personality, other dispositional predictors of academic success have been identified. A number of studies have shown the importance of coping style, with students showing coping styles classified as active or task-focussed being more academically successful and less likely to drop out (Endler, Kantor, & Parker, 1994; Shields, 2001; Struthers, Perry, & Menec, 2000). Internal locus of control has also been found to be positively associated with academic success (Findley & Cooper, 1983) and academic self-efficacy to be positively associated with both student retention and average grade level (Robbins et al., 2004).

1.1. Emotional intelligence as a possible predictor of student academic success

Given the above findings, it seems likely that individual differences in emotional skills and competencies as assessed by measures of emotional intelligence (EI) may also relate to academic success. Some recent work on first year psychology students at a Canadian university (Parker, Summerfeldt, Hogan, & Majeski, 2004) has shown that students who obtained high marks at the end of their first year scored significantly higher on EI than a comparison group who obtained poor grades and were at risk of dropping out. A second study (Parker, Austin, Hogan, Wood, & Bond, 2005) has shown that alexithymia (related to low EI) is a significant predictor of low student success in the first year, with an effect size comparable to that of entry qualifications. A study of first-year students by Schutte et al. (1998) also found a positive association between EI and end-of-year marks. These findings indicate that students with higher levels of interpersonal EI skills (who presumably find it easier to handle the social aspects of starting at university) and intrapersonal EI skills, such as stress management, are better able to handle the transition from school to university; it is not currently clear whether the inter- or intra-personal aspects of EI are more important, or whether both play an equal role in first-year student adjustment. Studies not spe-

cifically limited to first-year students have produced mixed results. Of two studies on groups of students enrolled on introductory psychology courses (who would not all necessarily be in their first year at university), one (Newsome, Day, & Catano, 2000) found no association between EI and exam scores whilst the other (O'Connor & Little, 2003) found some weak associations. A study by Barchard (2003) on a group of upper-division students showed significant associations between a number of EI subscales and exam performance, but did not find evidence for EI measures having incremental predicative validity for exam success over cognitive ability and personality. Positive associations between EI and academic performance were also found in a study of postgraduate students by Jaeger (2003).

Taken together, the EI/academic success results to date suggest that more work is needed to establish the conditions (student and course type, method of EI assessment) where EI has some ability to predict academic success. There seems to be a possibility that EI skills may be particularly useful at the point where students are making the transition to the university environment, which typically involves leaving home, less immediate availability of emotional support from parents/family, making new friends and dealing with stressors associated with adjustment to university study, but may become less salient once this transition has been made successfully.

1.2. Emotional intelligence—issues specific to medical students

Examining the effects of EI on academic progress in medical students is of particular interest since EI plays a dual role with respect to this group. All the above discussion on the potential contribution of inter- and intra-personal EI to academic success and adjustment apply to medical students. In the UK medicine is studied as an undergraduate degree, so the possible role of EI in relation to first-year student adjustment and progress applies to first-year medical students. In addition, there is an increasing recognition in the medical education literature that EI skills are important for doctors, with much of the discussion being focussed on the need for interpersonal EI/empathy when dealing with patients, although there is also recognition that intrapersonal EI may be relevant to the high-stress working environment which doctors are required to deal with. These considerations have led to some debate on and implementation of EI/empathy training as a medical degree component (e.g. Glick, 1993; McMullen, 2002; Shapiro, Morrison, & Boker, 2004), and suggestions that EI assessment might be used as part of the selection process for medical students (Carrothers, Gregory, & Gallagher, 2000).

Whilst discussing the issues related to EI in medical students it is also relevant to mention gender effects. Female medical students generally show better academic performance than males (Ferguson, James, & Madely, 2002). Higher scores on EI are often (although not invariably) found in females (e.g. Van Rooy, Alonso, & Viswesvaran, 2005), whilst for empathy females are generally found to have higher scores than males (Hoffman, 1977; Hojat et al., 2001). This raises the possibility that EI and/or empathy levels may be a contributory factor to male/female differences in academic success.

1.3. The present study

In the present study both an EI scale and a Physician Empathy Scale (Hojat et al., 2001) were completed by a group of first-year medical students. The students also self-reported on their

feelings about a communication skills exercise (Talking With Families). Exam results for these students were available for two courses, one with scientific content (Biomedical Science) and one that was more oriented to general issues in medicine (Health and Society). In the light of the above literature review, together with general considerations of the content of medical course sub-components, and of current EI models (as reviewed for example by Matthews, Zeidner, & Roberts, 2003) the following hypotheses were formulated:

- Exam scores would be positively correlated with EI scores, consistent with previous findings for first year students (Parker et al., 2004; Schutte et al., 1998) with a larger effect for Health and Society (which has some EI-relevant content) than for Biomedical Science.
- High EI students would express more positive feelings about the Talking With Families exercise, as this course component taps into interpersonal/social skills which are a subcomponent of EI.
- EI scores and Physician Empathy scores would be positively correlated, since empathy/awareness of the feelings of others is a subcomponent of EI.
- Females would score higher on EI and empathy than males, as found in previous studies (Hoffman, 1977; Hojat et al., 2001; Van Rooy et al., 2005).
- Females would obtain higher exam marks than males, as has been found previously in medical students (Ferguson et al., 2002).

2. Method

2.1. Participants

The participants were 156 first year medical students (51 males, 103 females, two students did not state their gender). The mean age was 18.61 years, standard deviation 1.57 years. The majority (88%) of the group were in the age range 17–19 years with the remaining 12% being in the age range 20–28 years.

2.2. Materials

2.2.1. Emotional intelligence

The EI scale described by Austin, Saklofske, Huang, and McKenney (2004) was used. This scale contains 41 items and gives an overall EI score and three subscale scores: Optimism/Mood Regulation, Appraisal of Emotion and Utilisation of Emotion. The first two subscales provide measures of intrapersonal and interpersonal EI. Previous work on this scale has established satisfactory internal reliability for full-scale EI and the first two factors (Austin et al., 2004). Evidence for the scale's validity has been obtained from examination of its correlations with related scales, with personality and with outcomes theoretically linked to EI, for example life satisfaction and social network size and quality (Austin, Saklofske, & Egan, 2005).

2.2.2. Physician empathy

The Jefferson Physician Empathy Scale (Hojat et al., 2001) was devised as the result of a series of studies using US doctors and medical students. The 20-item scale assesses empathy in the context of patient care. For use with a UK sample the substitution of the term 'doctor' for the term 'physician' used in the original scale items was considered appropriate. Example items are: 'The best way to take care of a patient is to think like a patient', 'Emotion has no place in the treatment of medical illness' (reverse scored), 'Patients feel better when their feelings are understood by their doctors'.

2.2.3. Talking with families scale

This 14-item scale was constructed to assess students' attitudes to the Talking With Families communication skills exercise described below. Sample items are: 'I felt I coped well with the challenges of communicating with the patient' and 'I felt frustrated when the interviewee would not give me a direct answer' (reverse scored).

2.3. First year medical course content and structure

Year 1 of the Edinburgh MBChB programme is a three-term structure comprising two parallel strands of Health and Society and Biomedical Science modules. Each strand includes clinically relevant material, and students meet both real and simulated patients. There is a policy of "mixed-mode" teaching and learning that includes lectures, practicals and tutorials, supported by e-learning materials. Integration of content between the strands is achieved through a series of problem-based tutorials using cases based on the course learning objectives. Each strand has a common assessment structure of in-course assignments, peer-assessment and end of term examinations. All students follow the same course.

Talking With Families is a community-based practical set within the Health and Society strand. All students are attached to a GP tutor and conduct two interviews (in pairs) with the parents of a young child to elicit their experience of health and illness in the family. Interviews are preceded by two preparatory tutorials and there are review tutorials after both interviews. Each student submits a written report on this exercise, which is marked.

2.4. Procedure

Participants completed the EI scale at a class session early in the autumn term; the questionnaire also included a section for age, gender, identifying information (used to link to the subsequent questionnaire and to exams; this was taken as the student's university ID number, so anonymity was preserved). Participants also signed a consent form to allow later access to their scores on the Talking with Families exercise, and to their exam grades in the autumn, spring and summer terms. A questionnaire containing the EI scale, the Physician Empathy scale and the attitudes to Talking With Families scale was completed in a class session during the spring term. Examinations taken at the end of each of three terms provided comparative data.

3. Results

3.1. Reliabilities

For the EI scale, which was administered on two separate occasions separated by 11 weeks, test-retest reliabilities were: total EI 0.75, Optimism/Mood Regulation 0.73, Appraisal of Emotion 0.70, Utilisation of Emotion 0.65. Internal reliabilities are shown in Table 1. The Utilisation of Emotion subscale was omitted from further analyses on account of its low internal reliability.

3.2. Age and gender differences

Descriptive statistics for the scales for the whole sample and for males and females separately are shown in Table 2. No significant associations were found between age and any of the questionnaire scores either from evaluating correlations or by examining group differences between the majority group of younger (age 17–19) students and the older minority (age 20 or above) students. Given the small number of older students in the group, and the narrow age range in the sample, these results are not particularly informative. Table 2 shows females scoring higher than males on EI, EI subscales and physician empathy. Performing t-tests on the repeat-measures EI scales and physician empathy scores and employing a Bonferroni corrected significance level of 0.007 showed only one significant difference which was for EI in the spring term ($t[152] = 2.97$, $p = 0.003$, Cohen's $d = 0.51$).

3.3. Correlations

Table 3 shows correlations amongst EI (measured in spring term), empathy and the Talking With Families Scale. It can be seen that all scores are positively and significantly correlated, and that students' positive feelings about the Talking With Families exercise are particularly strongly associated with overall EI and with the Appraisal of Emotion (interpersonal EI) subscale.

Table 1
Scale internal reliabilities (Cronbach's alpha)

Scale	Reliability
EI(1)	0.84
EI(2)	0.84
Optimism/Mood Regulation (1)	0.69
Optimism/Mood Regulation (2)	0.73
Appraisal of Emotions (1)	0.77
Appraisal of Emotions (2)	0.81
Utilisation of Emotions (1)	0.62
Utilisation of Emotions (2)	0.66
Physician Empathy	0.85
Talking With Families	0.80

For the EI full-scale and subscale scores (1) and (2) refer to the first and second administrations.

Table 2
Descriptive statistics for the group and for males and females separately

	Group mean (SD)	Male mean (SD)	Female mean (SD)
EI(1)	154.47 (13.15)	151.20 (13.60)	155.97 (12.78)
EI(2)	154.42 (14.34)	149.59 (15.68)	156.74 (13.21)
Optimism/Mood Regulation (1)	46.53 (4.71)	45.65 (5.03)	46.93 (4.55)
Optimism/Mood Regulation (2)	46.37 (4.82)	45.57 (5.12)	46.72 (4.68)
Appraisal of Emotions (1)	38.79 (4.63)	38.02 (5.38)	39.10 (4.21)
Appraisal of Emotions (2)	38.96 (5.14)	37.51 (6.15)	39.67 (4.48)
Physician Empathy	81.65 (7.78)	79.61 (8.62)	82.61 (7.16)
Talking With Families	54.20 (5.33)	53.18 (6.33)	54.74 (4.76)

Table 3
Correlations amongst test scores

	EI	Opt/MR	Appraisal	Physician Empathy
Physician Empathy	0.35^{***}	0.32^{***}	0.30^{***}	
TF	0.51^{***}	0.39^{***}	0.54^{***}	0.39^{***}

Opt/MR = Optimism/Mood Regulation, Appraisal = Appraisal of Emotions, TF = Talking With Families Scale. All correlations significant at $p < 0.001$, $N = 156$.

3.4. EI, gender and exam performance

Autumn term EI scores (which were antecedent to all the exams) were found to be uncorrelated with performance on any of the Biomedical Science exams. EI was significantly associated with score on the Health and Society exam, but only for the first exam taken at the end of the autumn term ($r[154] = 0.22$, $p = 0.007$); EI was not significantly correlated with Health and Society performance later in the year. None of the questionnaire measures was significantly correlated with the Talking With Families report mark. Females were found to score significantly higher than males on the first two Health and Society exams (employing a Bonferroni corrected significance level of 0.008) ($t[154] = 3.48, 3.01$; $p = 0.001, 0.003$; Cohen's $d = 0.60, 0.52$); there were no gender differences in scores on the Biomedical Science exams. The partial correlation between EI and first Health and Society exam score remained significant with gender controlled for ($r = 0.18$, $p = 0.024$). Physician empathy scores were not significantly correlated with any exam scores.

Given the lack of significant correlations, EI clearly has no direct effect on Health and Society exam scores in spring and summer. To explore whether direct effects of gender on exam performance on this course component later in the year occurred, structural equation modelling was used. The initial model used was based on the following assumptions: (1) gender and EI measured at time 1 would have significant effects on performance on the first Health and Society exam (Exam 1), (2) there would be direct effects of time 1 Health and Society exam performance on time 2 Health and Society exam performance (Exam 2) and of time 2 exam performance on time 3 exam performance (Exam 3) and (3) EI measured at time 2 would be strongly related to EI measured

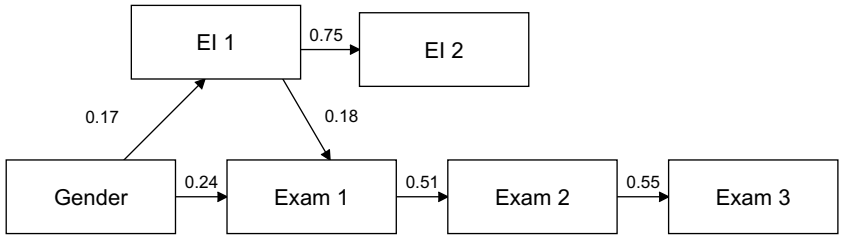

Fig. 1. Structural equation model for exam performance. Exam 1, 2, 3 = Health and Society exam scores in autumn, spring, summer. EI 1, 2 = EI scores in autumn and spring terms.

at time 1. This model contained all the paths shown in Fig. 1 other than that between gender and EI measured at time 1.

The EQS package (Bentler, 1995) was used for the modelling; the Lagrange test for the addition of paths and the Wald test for the removal of paths were used (Bentler, 1995; Byrne, 1994). Examination of the output for the initial model showed reasonable fit, but the Lagrange test was significant for the addition of a path between gender and EI, whilst the Wald test did not indicate the deletion of any paths. Adding the indicated path (which corresponds to partial mediation of the effect of gender on Exam 1 score by EI) and rerunning the model gave fit statistics for the modified model of: mean standardised absolute off-diagonal residual 0.048, normed fit index 0.88, non-normed fit index 0.86, comparative fit index 0.92. The Lagrange test did not indicate the inclusion of any additional paths; in particular paths from gender to Exam 2, Exam 3 were not indicated, suggesting that the effects of gender later in the year are indirect, with previous exam performance being the only direct predictor of subsequent performance. The Wald test did not indicate the deletion of any paths from this model.

4. Discussion

The findings from this study of first year medical students provide some limited support for the hypothesis that EI may be related to academic success in this group, with EI showing a significant association with exam mark only for the autumn exam and only for the Health and Society course component, a more limited finding than reported in previous work on first year students taking non-medical courses. The present results can however be regarded as supporting the idea that EI is relevant to student success in first year when adjustment to the university environment is taking place (Parker et al., 2004, 2005; Schutte et al., 1998).

The present study was constrained in being limited to a single year's intake of students at one UK university. Further studies of medical students both in the first year of their course (to establish whether this finding is robust) and in later years (to assess any effects of EI with respect to other course components and to later progress) is clearly required. The present findings suggest that high-EI medical students may be advantaged in the early stages of the course, although the mechanism for this is unclear. Interestingly, a similar effect has been found in a different learning context: student workgroups of high average EI have been found to have an initial advantage in problem-solving performance, but this advantage is not maintained long-term (Jordan,

Ashkanasy, Härtel, & Hooper, 2002). The positive association between EI scores and students' attitudes to the Talking With Families communication exercise shows that high-EI students found this exercise a more positive experience, although this did not result in higher marks. The reason for this is not clear, but the fact that the interviews were done by pairs of students may be relevant, as the success or otherwise of the interview might depend on the combined EI abilities of the two students rather than on their individual EI levels. The indirect method of marking (i.e. marking reports of interviews rather than a more direct 'live' assessment) might also be a factor. It is not clear whether the EI/attitude association represents a real effect of EI in the process of assimilating this particular experience, or a method effect related to self-report. More detailed study of the associations between EI and the ability of medical students to communicate with patients would be of interest.

Scores on the Physician Empathy scale (Hojat et al., 2001) were found to be positively associated with EI scores and the Talking With Families Scale as expected. These associations, and the good internal reliability found for this scale demonstrate that although the scale was developed using US students (who by contrast to UK students enter medical training at postgraduate level), it has good psychometric properties when used with UK undergraduate medical students.

Female students were found to be more successful in the Health and Society exam component, a result consistent with previous findings on gender difference in academic performance of medical students (Ferguson et al., 2002), but suggesting that females may be advantaged only on some course components. Previous findings on male/female differences in EI and empathy (Hoffman, 1977; Hojat et al., 2001; Van Rooy et al., 2005) were also partially confirmed, with higher scores being observed for females on all scales, but with the gender differences mostly failing to reach significance when the effect of multiple comparisons was corrected for. Structural equation modelling suggested that there was a direct effect of gender on exam performance in autumn term only, with subsequent exam performance being predicted by previous performance. EI was found to partially mediate the effect of gender on exam performance. This suggests that the observed better performance of females in medical courses (Ferguson et al., 2002) may be in part, but not entirely, accounted for by EI differences.

This study provides some interesting preliminary information on the relationship between emotional intelligence and academic performance in medical students. In view of the wide interest in this topic, which stems from the overlap between EI and the interpersonal skills needed by doctors (Carrothers et al., 2000; McMullen, 2002), the possible effects of EI in medical training are worthy of further investigation. Longitudinal monitoring of EI levels in UK medical students throughout their training would also be of interest, given that there is evidence from some US studies of empathy decline during training (Hojat et al., 2004). More work is needed to establish the relevance of EI to the various stages of medical training and also to specific course components.

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