**Validating relationships among attachment, emotional intelligence & clinical communication**

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# Abstract

**Background**: Cherry et al. found that emotional intelligence (EI) mediates the negative influence of first-year medical students’ attachment styles on their patient-provider communication (PPC). However, in that study, students were examined on a relatively straightforward PPC skill set and were not assessed on their abilities to elicit relevant clinical information from standardised patients (SPs). The influence of these psychological variables in more demanding and realistic clinical scenarios warrants investigation.

**Aim**: To validate previous research findings by exploring the mediating effect of EI on the relationship between medical students’ attachment styles and their PPC across an ecologically valid PPC Objective Structured Clinical Examination (OSCE).

**Methods**: Second-year medical students completed measures of attachment (ECR-SF, a 12 item measure which provides attachment avoidance and attachment anxiety dimensional scores) and EI (MSCEIT, a 141-item measure regarding the perception, use, understanding and management of emotions), prior to their summative PPC OSCE. PPC was assessed using OSCE scores. Structural equation modelling (SEM) was used to validate Cherry et al.’s model of the relationships between attachment style, EI and PPC.

**Results**: 296/382 (77.49%) students participated. Attachment avoidance was significantly negatively correlated with total EI scores (r= -.23, p<.01); total EI was significantly positively correlated with OSCE scores (r=.32, p<.01). A parsimonious SEM confirmed that EI mediated the negative influence of attachment avoidance on OSCE scores. It significantly predicted 14% of the variance in OSCE scores, twice as much as the 7% observed in the previous study.

**Conclusion**: In more demanding and realistic clinical scenarios, EI makes a greater contribution towards effective PPC. Attachment is perceived to be stable from early adulthood, whereas EI can be developed using targeted educational interventions. Validation of this theoretical model of PPC in second-year medical students strengthens the potential educational implications of EI.

# Introduction

The association between effective patient-provider communication (PPC) and patients’ physical and psychological well-being is well documented.1, 2 Because of this, effective PPC is outlined by regulatory bodies as a core component of clinical practice and its principles are taught and assessed during undergraduate and postgraduate medical education.3-9 However, there remains at the heart of PPC research a serious issue worthy of study: medical students and doctors differ in their abilities to *identify* when patients are showing emotional distress and *respond* to this distress in an appropriate manner, congruent with patients’ needs.10 Theoretical pluralism is recommended when investigating this issue due to the complex nature of PPC,11 and two related psychological theories have been proposed as influencers of providers’ PPC: attachment theory,12 and the theory of emotional intelligence (EI).13

The main tenet of attachment theory is that individuals develop close bonds with their primary caregiver(s) in infancy, and these translate into internal working models which influence how they conceptualise and relate to others in close relationships, such as the doctor-patient relationship.14 Two dimensions of attachment exist;15 attachment anxiety, which represents the degree to which an individual becomes involved in emotive situations or feelings,16 and attachment avoidance, which represents the degree to which an individual avoids intimacy and emotional expression.17 Attachment theory has mostly been applied to psychotherapy or mental health settings, with research demonstrating links between health providers’ attachment styles and their PPC.18 Attachment theory may therefore provide one mechanism to account for individual differences in medical students’ and/or doctors’ PPC.12, 19-24 However, attachment styles cannot easily be modified25 and therefore if attachment influences PPC, the resulting educational implications may amount simply to educating students about its possible influence. A psychological characteristic related to attachment style, which has also been tentatively linked to PPC, is an individual’s EI.26-34

EI is the degree to which an individual is able to perceive, use, understand and manage their own and others’ emotions35 and develops in childhood, partly as a function of attachment style.36 EI may help doctors to simultaneously correctly identify patients’ emotional distress, manage their own emotions and intervene appropriately during medical consultations. In contrast to attachment, EI can be developed over the course of an individual’s medical education through targeted educational interventions;37, 38 increasing EI may therefore also positively influence their PPC. Given the developmental differences in EI and attachment outlined above, a model was proposed, in which it was hypothesised that attachment will negatively influence EI, which in turn will positively impact on PPC.39

This model was tested with first-year medical students, in a summative Objective Structured Clinical Examination (OSCE).39 Support for the model was gained; significant relationships were observed between medical students’ overall OSCE scores and both their attachment avoidance and EI, but when these relationships were modelled using structural equation modelling (SEM), EI was the only direct correlate of PPC, accounting for a small but significant proportion in the variance in students’ PPC. These findings indicated that students with higher levels of EI may be better able to monitor, evaluate and implement effective communication strategies when interacting with SPs, irrespective of their attachment styles.39 However, in this study, the participants were assessed on a relatively simple PPC skill-set, and were not examined on their abilities to communicate with emotionally distressed standardised patients (SPs) whilst eliciting relevant clinical information. It is therefore unclear how attachment style and EI may influence more ‘complex’ PPC, such as those required to effectively balance the often competing tasks of biomedical and psychosocial information gathering.40 The purpose of the current study, therefore, is to validate the model by exploring the influence of second-year medical students’ attachment styles and EI on their PPC with SPs in an OSCE, whereby a more complex skills-set is assessed. It is hypothesised that second-year medical students’ EI will mediate the negative influence of their attachment avoidance on their PPC.

# Methods

## Procedure

In May 2011, after sitting a 3-station summative PPC OSCE, second-year medical students at the University of Liverpool (n=386) were invited to complete questionnaires assessing EI (the Mayer-Salovey-Caruso Emotional Intelligence Test41 (MSCEIT)) and attachment (the Experiences in Close Relationships-Short Form42 (ECR-SF)). Participation was voluntary; participating students also allowed the researchers access to their PPC OSCE scores. This study followed the same procedure as that of Cherry et al.39 and was approved by the University of Liverpool’s Medical Education Research Ethics Committee.

## Materials

### Attachment

The ECR-SF,42 a 12-item self report measure, was used to assess attachment. Participants rate the extent to which each item best describes their feelings about close relationships. Sample items include “I do not often worry about being abandoned” and “My desire to be very close sometimes scares people away”. A 7-point Likert scale, containing options that extend from a (‘Strongly Disagree’) to 7 (‘Strongly Agree’) is used to score each item. Individuals receive two scores upon completion which correspond with the two dimensions underlying adult attachment;43, 44 each score ranges from 6 to 42, with a high score representing high attachment anxiety and/or attachment avoidance and a low score representing the opposite. The ECR:SF demonstrates good internal and test-retest reliability for both attachment anxiety (reliability co-efficient alphas of .78 and .83 respectively) and attachment avoidance (.84 and .80 respectively).42

### Emotional Intelligence

The MSCEIT was used to assess EI.41 The MSCEIT is a 141-item self-report, ability-based measure which measures how well an individual is able to perceive, facilitate, understand and manage their own and others’ emotions by, for example, asking participants to rate their perceptions of the intensity of various emotions present in numerous photographs of facial expressions. It produces a total EI score, two Area scores, four Branch scores and eight Task scores. Figure 1 and Table 1 summarise the structure of the MSCEIT and the Area and Branch score components respectively.

FIGURE 1 HERE

TABLE 1 HERE

MSCEIT scores are computed by the test publisher as empirical percentages positioned on a normal distribution curve with a mean score of 100 and standard deviation of 15. Full-scale reliability of .92 and Area reliabilities of .90 and .85 for Experiential and Strategic scores respectively, have been reported.41 To maximise reliability, the two Area scores and the overall EI score were used throughout this paper, in line with the publisher’s recommendations.41

### The OSCE

Students sequentially completed three PPC OSCE stations (a frustrated and worried SP presenting with symptoms of a gastro-intestinal bleed; an embarrassed and defensive SP presenting with a sprained wrist and co-morbid alcoholism; and a concerned and assertive SP requesting information about a bone scan). In each station, examiners rated students’ performance using the modified-LUCAS, a checklist based on the LUCAS.45 The modified-LUCAS is tailored slightly to the requirements of each station, but always assesses competence across a range of areas, including the basic skills required for effective PPC (i.e. the 10 items in the LUCAS),45 skills in gathering psychosocial and biomedical information, appropriateness of provision of information (where relevant), and skills in effective engagement with SPs showing emotional distress. This approach reflects the emphasis on flexibility and tailoring in PPC,40 and allows for assessment of a range of complex PPC skills. Each item is assessed using a Likert scale. Numerical scores for each station are then computed, which are subsequently summed across relevant stations and then transformed into an overall percentage score for each student.

## Response rate and analysis

Two hundred and ninety-six students (77.49%) participated, of which 265 (89.53%) completed the ECR:SF and 163 (55.07%) completed the MSCEIT; 133 students (43.92%) completed both. OSCE data were available for all participants.

Analysis was conducted with PASW 19.0.0.1. Demographic data for the sample were first analysed. Because no reliability data were available for the modified-LUCAS, an alpha coefficient, using the whole cohort’s (n=366) anonymised OSCE data, was calculated. This indicated acceptable levels of reliability (α=.80) and supported the rationale to use students’ overall percentage scores rather than consider individual station scores. Pearson’s product moment correlations were then used to examine relationships between EI, attachment and OSCE scores, and finally the SEM developed by Cherry et al.,39 was fitted to the data.

In SEM, observed scores (directly measured indicators, such as EI branch scores) that are believed to contribute to a construct are combined to form latent variables (an inferred abstract concept, such as EI); the hypothesised causal relationships between latent variables are then tested statistically. One advantage of SEM is that it adopts a hypothesis testing approach with the direction of relationships stated *a priori;* SEM is therefore considered to be a more stringent approach than other statistical methods (e.g. computing and interpreting correlation matrix data).46

In the current study, AMOS 20.0 (IBM, SPSS, Inc., Chicago, IL, USA) was used to fit the SEM. Parameters were estimated with maximum likelihood estimations, to yield optimal parameter estimates, and a chi-squared test assessed the fitness of the data to the hypothesized model fit.47 A non-significant chi-squared result indicates good fit by indicating no significant difference between the model’s covariance structure and the observed covariance matrix. Additional model fit indices such as the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the chi-squared statistic divided by the degrees of freedom (CMIN⁄ d.f.) were also considered. An acceptable model is indicated by a CFI ≥ 0.95, an RMSEA ≤ 0.06,48 and a CMIN⁄ d.f. < 3.0.49 As the model was run only with data from the 133 participants with a ‘full data set’ (i.e. EI, attachment and OSCE data), particular attention was paid to the RMSEA and CFI as they are less sensitive to overestimation of goodness of fit where sample size is less than 200.50 Bootstrapping was applied (n=500) to obtain best estimates of the model parameters and more precisely assess the significance (in conjunction with the bias-corrected confidence intervals) of the direct and indirect effects of attachment and EI on overall OSCE scores.51

# Results

## Demographic characteristics

Participants’ and non-participants’ age (t(294)=-.42, *p*=.68), gender (χ²(1)=.12, *p*=.75) and ethnicity (t(294)=.21, *p*=.84) did not differ. Table 2 presents participants’ descriptive data.

TABLE 2 HERE

## Correlations

TABLE 3 HERE

Table 3 illustrates correlations between independent and dependent variables. Attachment avoidance was negatively correlated with Area, total EI scores, and overall OSCE score at the 1% and 5% levels. No significant correlations were observed between attachment anxiety and either EI or OSCE score. OSCE score was positively correlated with Branch, Area and total EI scores at the 1% level.

## Structural equation modelling

Data were applied to the final model produced by Cherry et al.39 to estimate model fit. Minimisation was successful and the data were an acceptable fit to the model (*Χ2*[1, n=133] = .71, *p*=.40; CMIN/ d.f.=.71, RMSEA=0.00 (90% confidence boundary 0 to 0.22), CFI=1.00). Figure 2 displays the final model, including standardised path coefficients for each path.

FIGURE 2 HERE

As previously observed,39 attachment avoidance significantly negatively predicted total EI score, accounting for 7% of the variance, but was not significantly related to overall OSCE score. Total EI score significantly predicted overall OSCE score, accounting for 14% of the variance. Bootstrapping indicated zero was not within any of the estimated regression weight’s confidence intervals, indicating that the modelling of the parameters was justified given that the estimates were significantly different from zero. Both the standard error of the bootstrapped standard error estimates and the bias were low, indicating that the regression weights produced by the model can be interpreted without fear that departures of multivariate normality from the small sample biased the calculation of the parameters. No modification indices were estimated to make a significant contribution to the model (i.e. a modification index value of over 4), therefore no subsequent modifications were made to the model and it was treated as final.

# Discussion

The objective of the study was to validate the theoretical model proposed by Cherry et al.39 by exploring the mediating effect of EI on the relationship between medical students’ attachment styles and their PPC in a more demanding and realistic PPC OSCE. A parsimonious SEM revealed that attachment avoidance, whilst accounting for a small proportion of the variance in total EI scores, did not significantly predict overall OSCE scores; total EI was the only significant predictor of overall OSCE scores, accounting for 14% of the variance in overall PPC scores. The consistency of the findings across both studies, irrespective of the complexity of skills being assessed, indicates the robustness of the theoretical model of PPC and allows for conclusions to be drawn regarding the mediating influence of medical students’ EI on the relationships between their attachment and their PPC.

Of note is that EI accounted for twice as much of the variance in OSCE scores than observed in first-year medical students,39 indicating that EI is a greater, albeit small, predictor of effective ‘complex’ PPC. This is particularly pertinent given that the students in the current study had all received teaching in the recognition and management of patients’ emotional distress, as well as individualised clinical placements. Subjective early experience whilst on placement shapes students’ PPC development,52 therefore it is relevant to note the continued mediating effect of EI, seemingly irrespective of previous experience or teaching. Whilst a large proportion (86%), of the variance in PPC was *not* explained by attachment avoidance or EI, the potential educational implications arising from these data ought to be considered, particularly because the relationships observed in the current study can be considered more generalisable to clinical practice than the findings of Cherry et al.39 alone.

In order to score highly in the current OSCE, students had to supplement their PPC skills with a range of behaviours designed to build and maintain a natural rapport with emotionally distressed SPs. OSCE stations were designed to challenge students and therefore behaviours that were incongruent with promoting engagement or fostering a therapeutic relationship were scored poorly. Interestingly, the strength of the correlations between PPC and the psychological variables, whilst small, was higher than those previously observed,39 indicating that the influence of attachment avoidance and EI on PPC is greater in complex, emotionally demanding consultations, such as those in the current study. Such consultations are thought to activate attachment processes,23 thus potentially accounting for the stronger observed relationships between attachment avoidance and PPC. Similarly, the ability to recognise SPs’ feelings and emotions (a component of EI) may be a particularly valuable attribute when communicating with more emotionally expressive patients.

Interestingly, the distribution of attachment scores indicated a range of underlying comfort with close relationships, with the majority of students scoring towards the middle of both dimensions. Their attachment patterns are representative of those in other published medical student samples.19, 21, 39, 53 However, despite being administered simultaneously, only 55% of the cohort completed the MSCEIT, which may be due to the difference in length between the two measures. Students’ total EI scores (83.73, SD 16.60) were lower than both the test publisher’s normative mean of 100, and of that of other medical student samples54, 55of a similar age, developmental level and cognitive ability.[54](#_ENREF_54), [55](#_ENREF_55) However, it must be borne in mind that ability-based EI is a developmental ability which increases with age.37, 38 Participants’ mean age was 19.6, yet only 13.6% of the normative sample used to determine MSCEIT population norms were aged between 17 and 24, hence possibly accounting for the lower levels of EI in the current study.41

## Strengths and limitations

The validation of the indirect and direct relationships between attachment avoidance, EI and medical students’ PPC is a strength of this study; these data provide a platform on which to base subsequent research.39 Additionally, the results indicate the consistency of the findings in early year medical students, regardless of students’ level of educational development and complexity of PPC assessed. Finally, the use of SPs and standardised scenarios allowed for collection of comparable data to Cherry et al.39 but use of more demanding and realistic OSCE scenarios increased the validity of the findings.

However, as with any study, limitations of the current approach must also be considered. First, the approach taken did not allow for assessment of SPs’ perceptions of students’ PPC, which may differ from that of an examiner. Second, whilst the sample size was much increased from that of Cherry et al.,39 a response rate of less than 100% limits the generalisability of the findings. Third, OSCEs allowed for all students to receive a standardised clinical encounter56 but meant that data may not be generalisable to PPC in the clinical milieu.57, 58 Fourth, it must also be noted that the vast majority of variance in OSCE scores and other outcomes was *not* explained by students’ and doctors’ attachment styles and EI, therefore indicating that other variables not measured in this study are likely to have had predictive value, such as personality traits,59 cognitive ability or learning style,60 prior teaching61 and transient health states such as depression, anxiety and perceived stress levels.62 Fifth, it is important to note that SEM is based on correlations and therefore no inferences can be made as to causal relationships between variables. Finally, participants’ gender and ethnicity were not considered in the SEM as the sample size was not large enough to split and cross-validate the model with sufficient power to detect moderate effect sizes and demonstrate its stability. These limitations should be taken into consideration when interpreting the findings.

# Conclusions and Future Directions

The validation of a theoretical model of PPC and confirmation of the mediating influence of EI on the relationship between medical students’ attachment styles and their PPC has implications for selection and teaching of medical students. The findings add to the growing body of literature suggesting the importance of considering attachment theory and EI with respect to PPC. Attachment is perceived as relatively stable over an individual’s lifetime63 and thus attachment might be best viewed as an attribute which impacts on PPC but which is largely resistant to modification21. However, considerable research attention has been paid to the development of EI during medical students’ years in medical school, and whether competencies underpinning EI can be actively developed.37, 38 This is because, far from being a stable trait, it has been suggested that this type of “intelligence” can actually be enhanced through structured educational interventions which help students to learn how to perceive, appraise, and express emotion, access and generate emotions when appropriate, and regulate and understand them.38, 64, 65 A more detailed summary of the role of EI in medicine, particularly with relation to selection and education of emotionally intelligent students, is beyond the scope of this paper, and interested readers are therefore encouraged to refer to Cherry et al.65

We recommend, based on the findings of this study and those of Cherry et al.,39 that researchers conduct further research to validate these findings and to explore their impact in more detail, within the wider context of the clinical encounter, before implementing education interventions, in line with the recommendations of Cherry et al.,65 based on these data. In addition to the methodological difficulties associated with implementing EI-based education into medical curricula, it is possible that there are both non-recursive and recursive relationships that could be further explored in future cross sectional and longitudinal studies to better inform educators regarding the potential role of EI in medical curricula.

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*Figure 1*

*The Structure of the MSCEIT*

*Figure 2*

*Final Model of the Relationships between Attachment Avoidance, Emotional Intelligence and* Objective Structured Clinical Examination *Scores*

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1

1

1

.80\*\*\*

.82\*\*\*

.33\*\*\*

-.12

-.26\*\*

Experiential EI

r2=.64

Strategic EI

r2=.67

Attachment avoidance

PPC score

r2=.14

1

1

\* = significant at *p*<.05, \*\* = significant at *p*<.01, \*\*\* = significant at *p*<.001

**Note:** *e* = measurement error in observed variables; r = residual error; r2 = coefficient of determination; rectangular boxes indicate observed variables (i.e. variables that are directly measured); oval boxes indicate latent variables (i.e. variables that are not directly measured by which are determined from observed variables)

*Table 1*

*Summary of main components of MSCEIT Area and Branch Scores*

|  |  |  |
| --- | --- | --- |
| Area Scores | Experiential Emotional Intelligence | Ability to perceive emotional information, relate it to other sensations and use it to facilitate thought |
| Strategic Emotional Intelligence | Ability to understand emotional information and use it for planning and self-management |
| Branch Scores | Perceiving Emotions | Ability to identify emotions in self and/or others |
| Facilitating Thought | Ability to use emotions to improve thinking |
| Understanding Emotions | Ability to understand complexities of emotional meanings/situations/transitions |
| Emotional Management | Ability to manage emotions in own life and/or others’ lives |

*Table 2*

*Summary of demographic information and measures*

|  |  |  |
| --- | --- | --- |
| **Demographic** | ***Value*** | ***Range*** |
| Age in years | 19.62 (SD 2.19) | 17-42 |
| Number of female participants | 163 (55.07%) | - |
| Number of White British participants | 197 (66.79%) | - |
| Experiential Emotional Intelligence (Area 1) | 84.90 (SD 17.70) | 44.76-120.89 |
| Strategic Emotional Intelligence (Area 2) | 86.05 (SD 15.52) | 47.06-125.10 |
| Total Emotional Intelligence | 83.73 (SD 16.60) | 53.17-127.51 |
| Attachment avoidance | 16.71 (SD 5.96) | 6-36 |
| Attachment anxiety | 19.68 (SD 5.07) | 7-36 |
| Overall OSCE score (%) | 67.10 (SD 6.90) | 43.79-84.53 |

Note: MSCEIT=Mayer Salovey Caruso Emotional Intelligence Test; ECR-SF= Experiences in Close Relationships- Short Form; OSCE=Objective Structured Clinical Examination; SD= standard deviation

*Table 3*

*Correlations between examined variables*

|  |  |  |  |
| --- | --- | --- | --- |
| **Emotional Intelligence Scores** | **Attachment avoidance** | **Attachment anxiety** | **OSCE score** |
| Experiential Emotional Intelligence (Area 1) | -.24\*\* | -.07 | .27\*\* |
| Strategic Emotional Intelligence (Area 2) | -.20\* | -.08 | .31\*\* |
| Total Emotional Intelligence | -.23\*\* | -.06 | .32\*\* |
| Overall OSCE score | -.21\*\* | -.08 | - |

\* p<0.05, p<0.01