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The relationship between facilitating emotional cues and medical students' clinical communication performance in qualifying exams

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Abstract

A cross-sectional study design explored the relationship between medical students' Objective Structured Clinical Examination (OSCE) clinical communication ratings and their responsiveness to simulated patient (SP) verbal emotional cues in their qualifying OSCE. Data were collected from two cohorts of fourth-year medical students (n = 37), and responses to patient cues that facilitated further disclosure or related discussion – known as provide space *responses – from two OSCE communication stations were measured by coding video footage with the Verona Consensus Coding Scheme (VR-CoDES).*

The 37 medical students were representative of the larger cohort (n = 508) in terms of age). A significant positive correlation with a medium effect was found between OSCE clinical communication ratings and provide space *responses. OSCE clinical communication ratings could differentiate between students who adopted patient-centred facilitative behaviours and those who did not.*

Keywords: communication; emotional cues; medical students; OSCE; video coding

1. Introduction

In patient-centred models of medicine, doctors give due consideration to psychological and social aspects of patients' health alongside the biological (Holmström and Röing 2010: 168). This requires patient-centred communication, a core function of which is 'responding to patient emotion' (Epstein and Street 2007; Levinson *et al.* 2010; Street and De Haes 2013; Hafskjold *et al.* 2017). The emotive aspects of clinical communication that doctors and medical students are encouraged to notice and explore include patient cues and concerns. .

The General Medical Council (GMC) in the UK has adopted a patient-centred approach to curriculum delivery and assessment, and has explicitly outlined that clinical communication skills be routinely and reliably assessed (Brown 2008; General Medical Council 2018). This assessment typically takes the form of an Objective Structured Clinical Examination (OSCE). The OSCE measures students' competence broadly across several clinical and clinically related skills under simulated conditions and in a standard format (Rushforth 2007).

It is surprising that no study has explored the relationship between medical students' clinical communication ratings and their responses to emotional cues in qualifying OSCE exams. In the UK, typically, the fourth-year OSCE is the medical student's final qualification OSCE before undertaking their final fifth (placement) year. Furthermore, it is not clear how sensitive the OSCE is in measuring and micro-coding patient-centred clinical communication skills, such as emotional responsiveness (De Haes and Bensing 2009; Hick 2009). The research questions are as follows: do medical students' responses to simulated patient emotional cues in the fourth-year OSCE influence their OSCE clinical communication ratings (examiner scores); and how do students respond to simulated patient emotional cues in the fourth-year OSCE? Based on limited research, the hypothesis is that there is a positive and significant relationship between medical students' OSCE clinical communication ratings and how medical students' facilitate responses – known as *provide space* responses – to simulated patient cues in the OSCE.

In the following sections, we first present a concise literature review on medical students' responses to emotional cues. Next, the methods section discusses the participants, procedure, measures and data analytical procedure. We then discuss the participant characteristics and cohort representativeness, after which the results section explores the OSCE clinical communication ratings, emotional cues and responses. This is followed by a discussion section, and then a conclusion that includes a summary of key findings, an overview of the limitations of the study, the practical implications of the study (despite its research limitations) and trajectories for future research.

2. Literature review: Responding to emotional cues

A broad cross-section of evidence links patient-centred communication to improved health outcomes for both the patient and the healthcare professional (Stewart *et al.* 2000; Epstein and Street 2007; Brown 2008; 2010; General Medical Council 2018). Effective patient-centred communication – which includes responding to patient emotional cues – has been linked specifically to increased patient and physician satisfaction, better treatment adherence and compliance, fewer referrals and diagnostic tests, more appropriate medical decisions, fewer medical errors and malpractice claims and better patient–provider engagement (Stewart *et al.* 2000; Epstein and Street 2007; Brown 2010; Ciechanowski *et al.* 2010; Holmström and Röing 2010; Cherry *et al.* 2018; Barbosa *et al.* 2019). Effective doctor–patient communication has also minimised doctors' fatigue and frustration, by helping patients take responsibility for their care; improved doctors' job satisfaction; and reduced burnout (Levinson-Miller *et al.* 2003, Cherry *et al.* 2018).

Identifying and responding to patient emotional cues, however, is difficult. Patients often present such cues indirectly (Levinson *et al.* 2000; Bensing *et al.* 2010; Griep *et al.* 2016; Del Piccolo *et al.* 2017). It has also been argued that doctors fail to respond due to self-perceived inadequacy when dealing with patient emotion or by adopting a doctor-centred approach (Levinson *et al.* 2000; Bensing *et al.* 2008).

The OSCE, as the 'gold standard' for assessing medical students' clinical communication in the UK, should differentiate and assess students on their ability to identify and respond to emotional cues. However, only a few studies have explored how medical students responded to emotional cues in high-stakes exams such as the OSCE, and these were undertaken several years ago and relate to the early years of medical training (Atherton *et al.* 2009; Hick 2009; Zhou *et al.* 2013). Recent research has focused on the influence of factors such as attachment styles on clinical communication ratings in the OSCE (Cherry *et al.* 2013; Cherry *et al.* 2014; Fletcher *et al.* 2016). Despite this, the standardised nature of the OSCE has been linked to a plethora of research supporting its validity and reliability (Newble 2004; Rushforth 2007; Turner and Dankoski 2008; Walsh *et al.* 2009; Howick *et al.* 2018). Indeed, a review conducted 13 years ago by Patrício *et al.* (2009) found 104 published papers on the OSCE, with several researchers providing evidence for the OSCE as an objective, valid and reliable method of assessing clinical competence.

3. Methods

3.1. Participants

A cross-sectional design was employed as data was collected at a single and crucial point in the medical students' assessment (i.e., their final, fourth-year qualifying OSCE) (Mertens 2005). A complete cohort of fourth-year medical students in two consecutive year groups were approached for consent to participate in the research. This was undertaken in two steps. First, consent was requested from the medical students to collect data related to their age, gender and OSCE clinical communication examiner ratings. Consenting students from the first stage were then approached for further consent to be videoed in an OSCE clinical communication station.

Inclusion and exclusion criteria were as follows.

Inclusion criteria:

- medical students undertaking their final OSCE in fourth year (first attempt) (n = 632);
- medical students who consented to the collection of demographic data (age, gender) and OSCE clinical communication examiner ratings (n = 508, 85%);
- OSCE examiner and SP consent for voice recording (as part of video recording students); and
- medical students who consented to be videoed in an OSCE clinical communication station (n = 37).

Exclusion criteria:

- medical students undertaking reassessments in their fourth-year OSCE;
- medical students who did not consent to the collection of demographic data (age, gender) and OSCE clinical communication examiner ratings (n = 127, 15%);
- OSCE examiner and SP who did consent for voice recording; and
- medical students who did not consent to be videoed in an OSCE clinical communication station.

3.2. Procedure

Ethical approval for research with human subjects was obtained by the University Research Ethics Committee (PCBS015A). Informed consent was obtained from all participants.

All fourth-year medical students who had previously consented to the anonymised collection of demographic data and OSCE clinical communication ratings were informed of the study via an email two weeks prior to their final exams. The email correspondence informed students that if they consented, a clinical communication station in their final fourth-year OSCE would be video recorded. The video recorder was placed in the corner of the OSCE station and was controlled remotely (turned on and off as appropriate). All students were informed of the presence of the video recorder. Immediately prior to the OSCE, consent forms were distributed to potential participants. OSCE examiners and OSCE simulated patients were also provided with consent forms and information sheets prior to the OSCE.

The selected station was chosen due to its strong emotional content after negotiation between two of the authors (Leadbetter and Fletcher) and the clinical skills team. The identified OSCE stations for the two consecutive cohorts were a paediatric scenario with the parent of a 13-year-old girl who had been self-harming, and a non-adherent patient with diabetes mellitus who had recently lost a partner due to a diabetic-related illness. It was agreed that these stations were considered optimal for assessing patient-centred clinical communication. In both stations, the students were required to take a detailed history, be sensitive and non-judgemental and show respect and understanding. The stations were subject to standardisation procedures across the two cohorts. This included conversion of clinical communication ratings to z-scores across the two cohorts (Section 3.2), and analysis to ensure that each cohort was provided with similar and varied opportunities to respond to SP cues and concerns (Section 3.3).

3.3. Measures

As described above, the participating medical students' fourth-year OSCE clinical communication ratings (examiner scores) were collected and they were videoed in an OSCE communication skills station. The videos were then micro-coded to explore medical students' responses to SP emotional cues.

Student performance in the OSCE is scored on a criterion-based structured rating form designed to reduce examiner variation between stations. The rating sheet was originally based on the reliable and valid Liverpool Undergraduate Communication Assessment Scale (LUCAS) (Humphris and Kaney 2001; Huntley *et al.* 2012). OSCE clinical communication was rated by examiners along a five-point scale from *excellent* to *very poor*, and included patient-centred and procedural communication: greeting introduction and identity check; audibility and clarity of speech; non-verbal behaviour; elicitation of patients' ideas, concerns and expectations; empathy and responsiveness; clarification and summarising; and consulting style and organisation. The LUCAS category of *professional behaviour and conduct* was excluded from the present study, as the rating for this did not directly assess medical students' clinical communication skills (Huntley *et al.* 2012).

The Verona Coding Definition of Emotional Sequences (VR-CoDES) (Del Piccolo *et al.* 2011; Zimmermann *et al.* 2011; Del Piccolo *et al.* 2017) was used to explore how medical students responded to SP and patient emotional cues. This coding scheme was developed by the Verona Network on sequence analysis. The network sought to define micro-behaviours in health communication explicitly, resolve some of the difficulties inherent in patient–provider communication and find a common framework and language in healthcare communication (Del Piccolo *et al.* 2011; Del Piccolo *et al.* 2017).

The scheme is divided into two main processes (corresponding to two manuals). This first involves identifying patient (or SP) cues/concerns. The VR-CoDES-CC defines a cue as a 'verbal or non-verbal hint that suggests an underlying unpleasant emotion and would need a clarification from the health provider' (Zimmermann *et al.* 2011: 141). Examples include '*I feel rotten inside*' or '*I was bent in two*'. A concern is defined as a 'clear and unambiguous expression of an unpleasant current or recent emotion where the emotion is explicitly verbalised, with or without a stated issue of importance for the patient' (Zimmermann *et al.* 2011: 141). Examples include '*I am depressed*' and '*I am worried about my headaches*'.

The main distinction between a cue and a concern is its explicitness. The former is usually an indirect hint or clue from an SP, while the latter is explicitly verbalised by an SP. Given that concerns must be explicitly verbalised, they are easier to detect and code. For this study, however, cues must also have a verbal element to be detected and coded, as the SPs (who expressed the cues and concerns) were not videoed but only audio recorded. Nonetheless, cues and concerns both have negative emotional content that requires further exploration and/or acknowledgement by the health provider (medical student), and hence they were combined for the primary analysis. A frequency count of the total number of cues/concerns for each participant was conducted.

The second process involves coding provider responses. As noted above, those that facilitate further disclosure or discussion related to the cue are called *provide space* responses. Such responses include silence, content exploration and empathy (see Figure 1 for a list of *provide space* response categories).

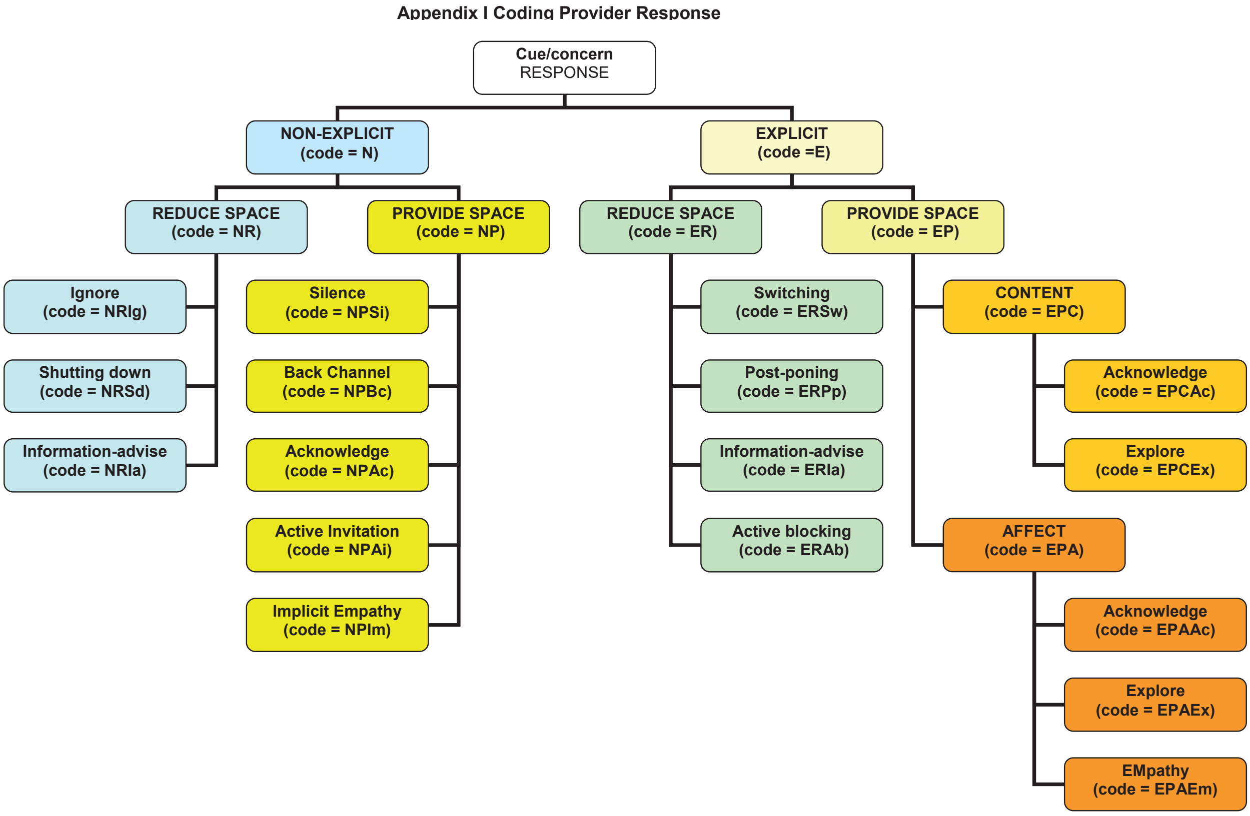
All *provide space* responses were grouped together for analysis. *Reduce space* responses were not included in the primary analysis, as the focus is on facilitative behaviours, with *reduce space* responses expected to have the opposite directional correlation outcome to *provide space* responses. The percentage of *provide space* responses as a proportion of total cues was calculated for each participant. For example, if a medical student responded by providing space to seven out of 10 patient cues, then *provide space responses* would be 70%.

Reliability data emerged from inter-rater reliability studies and coding data on VR-CoDES (cues/concerns) (Atherton *et al.* 2009; Vatne *et al.* 2010; Zimmermann *et al.* 2011; Zhou *et al.* 2013; Del Piccolo *et al.* 2017; Cherry *et al.* 2018) and VR-CoDES-P (provider responses) (Del Piccolo *et al.* 2011; Del Picolo *et al.* 2017). Studies with medical students in the OSCE by Mazzi *et al.* (2013) also found good inter-rater reliability figures for responses, with 90.2% agreement, while Atherton *et al.* (2009) found Kappa coefficients from .63 to .73 for responses with three trained raters. Eide *et al.* (2011) established high levels of agreement between patient and coders on what defines an emotional cue/concern, with *provide space* responses perceived by both experts and lay people as the best response to patient emotion (Mazzi *et al.* 2013). Eide *et al.* (2011) proposed that the verbal focus of the coding system, the detailed descriptions, the verbalisations of emotions (specified by categories) and the focused and detailed coding all contribute to the accuracy of coding (Eide *et al.* 2011).

3.4. Data analytical procedure

All data were entered into Statistical Package for Social Sciences (SPSS) version 27 (IBM 2020) for descriptive and inferential statistical analysis.

Figure 1. *Verona Consensus Coding Scheme (VR-CoDES): response classification (source: Del Piccolo et al. 2009: 16)*



Throughout, the data were systematically checked (and reported) to ensure relevant assumptions were met. If relevant assumptions were not met for parametric tests, the appropriate non-parametric test was conducted, in this case a Spearman's rank order correlation. An independent samples *t*-test also explored if there were significant differences in the number of cues presented for the two OSCE stations.

A Spearman's rank order correlation was also used to test the primary hypothesis, which is that there is a positive and significant relationship between medical students' provide space responses and their OSCE clinical communication ratings. The strength of the association was reported, with effect size as r^2 values. For a Spearman's rank order correlation, the effect size varies from 0 (no relationship) to 1 (perfect relationship) (Dancey and Reidy 2007), and the present analysis follows Cohen's (1988) proposal that a correlation of less than 0.3 is a small correlation (effect), an r value of 0.3 to 0.5 is a medium correlation, while an r value above 0.5 is a large correlation.

The inter-rater reliability for VR-CoDES (cues/concerns and provide space responses) was completed prior to undertaking primary analysis. The intra-class correlation coefficient (ICC) was recommended as a reliable measure of inter-/intra-rater reliability for coding doctor (medical student)–patient interactions (Qian *et al.* 2022). The first stage was to gain inter-rater reliability for cues/concerns. The researcher and expert coder each blind-coded a random sample of 20 transcripts (which also included references to non-verbal cues). The dataset was chosen as part of a training package that was completed prior to data collection; this allowed for further training if coding issues were identified. The transcripts varied in duration and in number of cues/concerns (between four and 29). An intra-class correlation of 0.87 was established, indicating substantial reliability for cues/concerns between researcher and supervisor. Next, a random sample of transcripts was again blind coded to establish 'face' agreement on *provide space* responses. Substantial intra-class correlations for *provide space* responses (0.82) and *reduce space* responses (0.88) were established. The reliability estimates obtained for this investigation were therefore rigorous and in line with previously accepted reliability values of other medical communication coding schemes (Heaven and Green 2001; Roter 2005).

4. Comparability of the sample and the larger cohorts

Thirty-seven medical students participated in this study, which is part of a larger project comprising two cohorts of consecutive fourth-year medical students (n = 508, 85% of student population). Independent samples t-tests and Chi-squared analysis were employed in the descriptive analysis to examine if the participants in this study were representative of the larger fourth-year cohort in terms of age, gender and OSCE clinical communication ratings.

Sixteen (43%) were male and 21 (57%) were female. After checking that the relevant Chi-squared test assumptions were met (independent groups and categorical variables), the analysis supported the conclusion that there was no significant difference in the proportions of males and females χ^2 (1, n = 508) = 0.87, p = 0.35 in this study and in the larger fourth-year cohorts.

The ages in years of the participants ranged from 22 to 34 years, and this was also similar to the larger cohorts. The mean age of the study sample at the time of the OSCE was 24.16 years (*SD* 3.01), whereas for the larger cohorts combined it was 23.41, (*SD* 2.95). Prior to the independent t-test, relevant assumptions were checked (dependent categorical variable, independence of observations, no significant outliers, normally distributed). Levene's test for equality of variances was non-significant (p = 0.17), further indicating that there was homogeneity of variances for age within the sample and the larger cohorts . The independent samples t-test also found no significant difference between these two groups (t (508) = 1.50; p =0.14).

Further, as discussed above, communication skills ratings were collected from two OSCE stations (for two cohorts of students). These ratings were subjected to standardisation procedures to ensure the two datasets could be combined for analysis. This involved conversion of individual communication ratings to z-scores for each station. The process ensured variances in mean and standard deviations for each station were adequately accounted for.

Here, the analysis explored whether the 37 medical students were similar to the larger cohorts in relation to OSCE clinical communication ratings. Again, relevant assumptions were checked (dependent categorical variable, independence of observations, no significant outliers, normally distributed) prior to the independent t-test. Levene's test for equality of variances was again non-significant (p = 0.27), here indicating that there was homogeneity of variances in OSCE communication ratings. The independent samples t-test found no significant difference between the 37 medical students (M = -0.12; *SD* = 0.87) and the larger cohorts (M = 0.01; *SD* = 0.01) (t (506) = 0.75; p =0.46).

5. Results

5.1. *VR-CoDES: Emotional cues and responses*

Across the 37 coded consultations there were 485 cues (90% of the dataset) and 54 concerns (10% of the dataset). The mean number of cues per medical student-SP interaction was 13.11 (*SD* = 3.51), with the number of cues ranging from eight to 28 per interaction. The mean number of concerns per medical student-SP interaction was 1.46 (*SD* = 1.71), with the number of concerns ranging from 0 to 8 (9 interactions had no concerns). Due to small numbers of concerns, all cue and concern data were collapsed for the primary analysis. The mean number of cues and concerns per medical student-SP interaction was 14.57 (*SD* = 3.80) (see Table 1).

The mean number of cues for the paediatric OSCE scenario was 15.04 (*SD* 4.03) and for the non-adherent diabetic OSCE it was 13.11 (SD 2.62). Relevant assumptions were checked (dependent categorical variable, independence of observations, no significant outliers, normally distributed) for the independent samples t-test. Levene's test for equality of variances was non-significant (p = 0.27), indicating that there was homogeneity of variances. No significant difference was found in the number

Table 1. *Mean number of simulated patient (SP) cues and concerns in the objective structured clinical examination (OSCE)*

	Mean (SD)	number	*n*	minimum	maximum
Cues	13.11 (3.51)	485	37	8	28
Concerns	1.46 (1.71)	54	28	0	8
Total	14.57 (3.80)	539	37	0	28

of cues/concerns between the two cohorts' OSCE clinical communication stations (t (37) = 1.61; p =.111). The medical students therefore had a similar number of opportunities to respond to SP cues in both stations. This provided support for combining of OSCE communication data for analysis.

4.1.1. Responses

As shown in Table 2, the most common *provide space* response to cues was *content exploration*. The most common *reduce space* response to cues was *switching*.

The most common *provide space* response to concerns was *affective exploration*. The most common *reduce space* response to concerns was *switching* (Table 3). *Switching* was therefore the most frequent response across all responses.

The mean proportion of *provide space* responses was 63.3% (SD = 16.71). The range of *provide space* responses per participant ranged from 33% of the cues and concerns to 91%.

5.2. Primary analysis

Shapiro-Wilk test for normality (w (3) = 0.76; p = 0.02) was significant, indicating that there was significant deviation from a normal distribution. Hence, a non-parametric Spearman's rank order correlation was performed once relevant assumptions were met (ordinal/interval or ratio data, paired observations and a monotonic relationship between variables). A significant positive correlation with a medium effect (r = 0.49, p =0.002) was found for OSCE clinical communication ratings and *provide space* responses. The co-efficient of

Table 2. *Medical students' responses to simulated patient (SP) cues in the objective structured clinical examination*

Response category	Response types	*n*	% of responses
Reduce space	Ignore	21	4
	Shutting down	0	–
	Information advise (explicit)	33	7
	Information advise (implicit)	19	4
	Switching	111	23
	Postponing	2	< 1
	Active blocking	0	–
	Total	*186*	*38*
Provide space	Silence	10	2
	Backchannel	20	4
	Acknowledge	23	5
	Active invitation	41	8
	Empathy (implicit and explicit)	32	7
	Content acknowledgement	47	10
	Content exploration	94	19
	Affective acknowledgement	14	3
	Affective exploration	18	4
	Total	*299*	*62*
Total		485	100

Table 3. *Medical students' responses to simulated patient (SP) concerns in the objective structured clinical examination*

Response category	Response types	*n*	% of responses
Reduce space	Ignore	2	4
	Shutting down	0	–
	Information advise (explicit)	3	6
	Information advise (implicit)	1	<2
	Switching	11	20
	Postponing	1	<2
	Active blocking	1	<2
	Total	*19*	*35*
Provide space	Silence	0	–
	Backchannel	4	8
	Acknowledge	2	4
	Active invitation	0	–
	Empathy (implicit and explicit)	2	4
	Content acknowledgement	5	9
	Content exploration	7	13
	Affective acknowledgement	4	7
	Affective exploration	11	20
	Total	*35*	*65*
Total		54	100

determination (r^2) value was 0.24, indicating that the medical students' responses to SP emotional cues (*provide space* responses) in the OSCE accounted for 24% of the variance in clinical communication ratings.

6. Discussion

Our primary analysis identified a significant positive correlation with a medium effect ($r = 0.49$, $p = .002$) between the OSCE clinical communication rating and *provide space* responses. Withstanding methodological issues (see conclusion section) and a lack of directly comparable research, the evidence from this study suggests that the OSCE can differentiate adequately between students based on their skills in identifying and responding to simulated patient (SP) emotion (Cherry *et al.* 2013; Cherry *et al.* 2018). Fourth-year medical students' ability to respond to emotion in a simulated setting appears to be important for faculty ratings in the OSCE.

As shown above, the findings may be generalised as the sample is representative of the larger fourth-year cohort in terms of age, gender and OSCE communication ratings. This helped strengthen arguments that differences in outcomes (OSCE communication ratings and *provide space* responses) were due to medical student communication factors and not because of the confounding variables, such as age, gender or OSCE station. Furthermore, although the sample was taken from one medical school, the teaching, curriculum and assessment of students within this school is consistent other UK medical schools, in accordance with the *UK Consensus Statement on the Content of Communication Curricula in Undergraduate Medical Education*. This establishes a patient-centred approach to teaching and assessment, in which clinical communication is fully integrated throughout the curriculum (Von Fragstein *et al.* 2008). This includes the integration of clinical communication skills training with simulated patients (particularly in Years 1 and 2), practice with patients on placement (the focus of Years 3–5), the formal assessment of clinical communication at university (the OSCE) and on clinical placement and individual learning opportunities relating to clinical communication.

Across the 37 coded OSCE consultations, 539 SP cues were presented. The mean number of cues per interaction was 14.57 ($SD = 3.80$). This provided medical student participants with several opportunities each to respond to SP emotional cues in both OSCE stations, and thus increased the reliability of the findings. For comparison, previous studies with medical students that have also combined cue and concern data for analysis have highlighted inconsistencies in opportunities to respond to SP cues (number of SP cues and concerns) in the OSCE (Atherton *et al.* 2009; Zhou *et al.* 2013; Ortwein *et al.* 2017). Atherton *et al.* (2009), in a study with first year medical students in the OSCE, found a mean number of 5.87 cues/concerns per OSCE interaction, while Zhou *et al.* (2013) found a mean number of 8.85 cues/concerns in a shorter five-minute OSCE. Hick (2009), however, found a greater proportion of cues – 20.24 – in a 10-minute fourth year OSCE using the same coding tool (VR-CoDES). The discrepancies in the number of cues presented may be due to the subjectivity of the coding tool, and the variation in OSCE stations.

Overall, 63.3% of participants' responses in the present study *provided space* for further disclosure, while Atherton *et al.* (2009) reported a figure of 57.68% for first-year students. This similarity is surprising, , as the results would be expected to indicate that fourth-year students would be more competent in identifying and responding to emotion. It could be explained by the differences in complexity and emotional content of the OSCE in the fourth year compared to the first-year OSCE. Comparisons are, however, nevertheless relevant, given that these studies utilised the same coding scheme (VR-CoDES).

Despite this, a broad range of *provide space* response rates (33%–91%) was noted, although some students did not explore most SP emotional cues. Various explanations have been provided in the literature as to why doctors fail to respond to patients' emotional and psychosocial cues. Although these explanations apply to doctors (mostly General Practitioners) interacting with patients outside the OSCE setting, they may provide some insight into why some medical students in the present study also failed to respond. Applicable reasons include factors related to keeping control and focus on the medical agenda given the time-constraints (Zandbelt *et al.* 2007); discomfort due to self-perceived inadequacy when dealing with emotion (Levinson *et al.* 2000); a lack of training (Levinson *et al.* 2000; Zimmermann *et al.* 2007); and emotional cues as not easy to detect due to their indirect expression (Griep *et al.* 2016; Del Piccolo *et al.* 2017). Under a stressful and time-limited environment such as the OSCE, it is likely that medical students fail to explore SP cues in order to keep control of the consultation and ensure that all procedural communication outcomes (such as body language, eye contact, summarising) are met (Zandbelt *et al.* 2007). This is consistent with the finding that *switching* was the most frequent *reduce space* response, as this is a strategy to keep control.

The descriptive statistics revealed that the medical students were, however, more likely to respond to direct emotional concerns (as opposed to more frequent indirect cues) with affect and empathy than with content exploration. This is supported by previous research indicating that cues and concerns required different skills and patient-centred responses from medical students (Zimmermann *et al.* 2007; Zimmermann *et al.* 2011; Finset *et al.* 2013; Del Piccolo *et al.* 2017). Cues required further exploration, clarification and facilitating skills, while concerns required exploration, empathic responses and acknowledgement (Zimmermann *et al.* 2011; Del Piccolo *et al.* 2017). Concerns, as direct expressions of emotion, are easier to detect. Their associated responses require an emotional engagement with the patient regardless of personal skills and confidence in dealing with patient emotion (Levinson *et al.* 2000; Griep *et al.* 2016; Del Piccolo *et al.* 2017).

7. Conclusion

The GMC guidelines (2018) state that medical graduates must be able to elicit patients' questions, concerns, information and preferences in a consultation. Despite this clear statement, however, limited research has explored how medical students respond to emotional cues in the OSCE and the relevant studies are limited to first- and second-year students, several years ago (Atherton *et al.* 2009; Zhou *et al.* 2013). The present study thus addresses important gaps in the literature by exploring the relationship between medical students' specific and measurable communication behaviours in their final qualifying fourth-year

OSCE, using an innovative, systematic and robust coding tool specific to health communication (Zimmerman *et al.* 2007; Del Piccolo *et al.* 2011; Del Picolo *et al*. 2017).

The findings indicate that OSCE clinical communication ratings could differentiate between students who adopt patient-centred facilitative behaviours (*provide space* responses) and those who do not. This provides support for the assessment of medical students' clinical communication skills via the OSCE and support for VR-CoDES as valid measures of medical students' clinical communication skills. Future research, however, is required to explore if relationships between *provide space* responses in the OSCE transfer to *provide space* responses in clinical practice with a larger sample of medical students – that is, if responsiveness to emotional cues in the OSCE transfer to patients in practice.

Further research (with a larger sample) is required to examine medical students' *provide space* responses across all clinical scenarios (to include clinical ratings). If medical students embrace the notion that clinical communication is positively related to clinical elements, then this could motivate further engagement in clinical communication teaching and practice.

Medical students and doctors can be trained and/or exposed to interventions that increase the likelihood of identifying and responding to patient emotional cues, consistent with a patient-centred approach (Gask *et al.* 1987; Blanch-Hartigan 2012). Given that a proportion of the medical students in the present study missed a large percentage of SP emotional cues, a practical implication is that such training opportunities to increase emotional cue recognition and responsiveness should be included in the curriculum. Multidimensional approaches have had the most success in increasing emotional cue-recognition and responses, with the opportunity to practise with feedback seen as critical (Thompson *et al.* 2010). It is therefore plausible that personalised video footage of medical students in their formative OSCE, incorporating feedback on VR-CoDES analysis, be used as a tool to aid in emotional cue-recognition (Barbosa *et al*. 2019). Furthermore, if it is outlined to medical students that a strong significant relationship exists between such facilitative behaviours (*provide space* responses) and communication ratings, then this could increase student motivation given the direct link to examination results.

Despite the clear practical implications of findings, there are limitations of the study that need consideration. The use of video recordings for research purposes may have also increased the *social desirability* of communication behaviours and responses to cues by medical students (Bryman 2001). The medical students were aware of the nature of the research and the video procedure, and thus they may have interacted under observation in ways that may not accurately reflect their intrinsic beliefs and communication behaviours (Coleman 2000; Laidlaw *et al.* 2015).

The VR-CoDES has 17 different types of coded responses. As some codes were rarely used, the codes were combined for analysis. Although this increased the reliability of coding (high inter-rater reliability was established for identification of cues and *provide space* responses due to the highly detailed and systematic micro-coding procedure), collapsing data into *provide space* responses may therefore not have captured differences in individual responses, thus limiting the analysis of micro-behaviours related to communication (Zandbelt *et al.* 2007).

The coding scheme also lacked specificity in that, although the tool does acknowledge non-verbal behaviour, the explicit focus is on negative verbal behaviours (Griep *et al.* 2016) – that is, the video procedure adopted for this study focused on the verbal behaviours of the SP (cue and concern expression), but both verbal and non-verbal responses from the medical student (*provide space* responses) were videoed and coded. This is another limitation of the study, as many psychological consultations have non-verbal behaviour and associated cues as the predominant form of communication (Mehrabian 1971; Del Piccolo *et al.* 2017). To allow for a more accurate examination of non-verbal cues, future research is required where both the medical student and the SP are videoed.

Perhaps most importantly, the VR-CoDES assumed that the *provide space* responses were the most adequate or most patient-centred response (Vos and De Haes 2007; Zimmermann *et al.* 2007). However, medical students need to be flexible, to ensure a genuinely patient-centred approach that allows them and SPs to explore cues/concerns in more detail (Zandbelt *et al.* 2006). The students need not only to be able to recognise cues, but to make *provide space* responses that are appropriate. In this way they will avoid misunderstandings, poor and incomplete diagnoses and non-adherence, and be able to develop a joint management plan for the patient (Levinson *et al.* 2000; Bensing *et al.* 2010; Cherry *et al.* 2018).

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