The influence of candidates’ physical attributes on patient ratings in simulated assessments of clinical practice

C. A. Brown, K. Badger, M. D. Reid, R. Westacott, M. Gurnell, M. W. R. Reed, G. Chamberlain, E. Hatfield, A. Sharif & A. H. Sam

To cite this article: C. A. Brown, K. Badger, M. D. Reid, R. Westacott, M. Gurnell, M. W. R. Reed, G. Chamberlain, E. Hatfield, A. Sharif & A. H. Sam (2022): The influence of candidates’ physical attributes on patient ratings in simulated assessments of clinical practice, Medical Teacher, DOI: 10.1080/0142159X.2022.2093177

To link to this article: https://doi.org/10.1080/0142159X.2022.2093177
The influence of candidates’ physical attributes on patient ratings in simulated assessments of clinical practice

C. A. Brown**  a, K. Badgerb, M. D. Reidb, R. Westacottc, M. Gurnelld, M. W. R. Reede, G. Chamberlainb, E. Hatfieldb, A. Sharifb and A. H. Samb

Division of Health Sciences, Warwick Medical School, Coventry, UK; Imperial College School of Medicine, Imperial College London, London, UK; Birmingham Medical School, University of Birmingham, Birmingham, UK; Wellcome–MRC Institute of Metabolic Science, University of Cambridge and NIHR Cambridge Biomedical Research Centre, Cambridge University Hospitals, Cambridge, UK; Brighton and Sussex Medical School, University of Sussex, Brighton, UK

ABSTRACT

Background: We have previously shown that clinical examiners’ scoring is not negatively impacted when a candidate has a tattoo, unnatural hair colour, or a regional accent. We investigated whether these physical attributes in exam candidates impact patient scoring.

Methods: Simulated/real patients were randomly assigned to watch five videos of simulated candidate performances of a cranial nerve examination: clear fail, borderline, good, ‘clear pass’ without an attribute, and ‘clear pass’ with one of the attributes (tattoo, purple hair, accent). Participants scored domains of communication and professionalism. We compared scores for the clear pass candidates with and without attributes.

Results: One hundred and eighty three patients participated. The total scores for the candidates with tattoos and purple hair were higher than the candidate with no physical attribute (p < 0.001). For the candidate with a Liverpool English accent no difference was identified (p = 0.120).

Conclusions: The presence of certain physical attributes (tattoos or purple hair) was associated with higher scores given by patients to candidates in a simulated physical examination station.

Introduction

Assessments based on observations of clinical skills, including history taking and physical examination, are integral to the assessment of clinician competence and often contribute to high-stakes assessments. Currently in the UK there is no standard approach to clinical skills assessment and as such there is significant institutional variation (MacDougall 2015). However, in 2024 the UK Medical Licensing Assessment (UKMLA) will be introduced. This will combine an Applied Knowledge Test (AKT) with a Clinical and Professional Skills Assessment (CPSA) to ensure those who obtain registration with a licence to practise medicine in the UK meet a common threshold for safe practice. It is therefore important to begin to explore those variables that could potentially contribute to variance in such high stakes assessments.

The use of professional simulated patients (SPs), who are trained to accurately and consistently portray a role, and ‘real’ volunteer patients (VPs), who usually have a condition or clinical sign that a newly graduating junior doctor would be expected to be familiar with, is a key aspect of clinical skills assessment. However, the extent to which simulated patient scoring of candidates is incorporated in assessments is variable and an array of rating tools are in use.

Importantly, patient ratings have been shown to differ from those of clinicians, and it has been suggested that these reflect valid differences in perspective, which can enrich student assessment (Thistlethwaite 2004). Assessments that use simulated patients have been found to reliably and validly measure aspects of professional behaviour and communication skills (van Zanten et al. 2005; Weidner et al. 2010). Inclusion of one or more measures of patient experience demonstrates that assessors value the patient voice and is in accordance with the shift to clinical care models where patients are seen as key stakeholders in their healthcare (Wallace et al. 2002). As with examiner scoring, an individual patient’s assessment of an exam candidate may theoretically be affected by several sources of rater errors and be subject to stereotype biasing. Interestingly, previous research has yielded mixed findings, with some studies suggesting physical

Practice point

- Scores awarded by patients to candidates in medical assessments may be influenced by the presence of certain physical attributes.
attributes such as ethnicity can impact attainment in clinical exams whilst others have not shown differences (Schleicher et al. 2017; Yeates et al. 2017; Sam et al. 2021b). However, within society it is evident that stereotype biases do exist and these have been shown to impact patient perceptions within healthcare. For example, extravagant hair colour (Yonekura et al. 2013) or tattoos (Baumann et al. 2016; Broussard and Harton 2018) have been shown to negatively impact patient perspectives in a healthcare setting. In addition, people with a Liverpool English accent have been perceived as less trustworthy than those with a Standard Southern British English (SSBE) accent (Torre et al. 2018). Importantly, previous research in this area has largely focussed on patient scoring during in-person assessment, when there is the possibility of an audience effect whereby those present may facilitate or inhibit performance (Chen et al. 2019). Here, we use a video-based design to mitigate this source of bias.

Understanding whether candidates’ physical attributes can impact the scores they are awarded by simulated patients during high stakes clinical examinations (and lead to differential attainment) is therefore important. To address this, we developed a study in which standardised videos that had previously been validated in a study of clinical examiners (Sam et al. 2021a, 2021b) were individually scored by a group of simulated and real patient volunteers to determine if physical attributes influenced the scores which were awarded for different candidates who were performing at comparable levels.

**Methods**

**Study design**

A single-blinded, video-based, experimental, randomised, internet-based design.

**Procedure**

Seven 10 minute videos were created of simulated candidates completing a cranial nerve examination. The same simulated patient was used in all videos to ensure standardisation. There was no examiner visible in the videos and the same voiceover was edited into the video to provide required examiner instructions. The simulated candidates were volunteer Clinical Teaching Fellows working with Imperial College London and all are White females of similar ages. Four of the videos demonstrated the simulated candidates performing the examination at the ‘clear fail’ (CF), ‘borderline’ (BL), ‘clear pass’ (CPX) or ‘good’ (GD) performance standard. The other three videos showed a candidate performing at a ‘clear pass’ level with either purple hair (CPH), tattoos (CPT), or a Liverpool English accent (CPA). The simulated candidates in all videos except CPA performed with a SSBE accent. The simulated candidates in all videos except CPH had either brown or blonde hair. Each candidate followed a script created by a panel of experienced examiners to ensure they were performing at the appropriate level and to standardise those performing at the ‘clear pass’ level. Three master sets of five videos were then created; with every set including a video of a candidate performing at each of the overall performance levels as well as one video of a candidate with a physical attribute performing at a ‘clear pass’ level (Figure 1). To minimise the impact of ordering effects on scoring from these three master video sets, a final total of 12 different video sets were created. The ordering of the five videos differed across the 12 sets and each participant was randomly allocated to one of the 12 video sets (Supplementary Appendix 1).

**Recruitment and consent**

The study was approved by the Education Ethics Review Process at Imperial College London (EERP2021-011). Participants were informed of the study, that they were taking part in a study exploring inter-rater reliability amongst patient assessors but were not informed that the study aimed to evaluate the impact of physical attributes on scores and performance levels. Demographic data about the participants but no identifiable information was collected. Participants were required to be volunteer patients (VPs) or simulated patients (SPs) with previous experience in medical assessments or teaching. Participants were informed that completion of the marksheets for all five videos and submission of the post-completion questionnaire was evidence of consent. Participants were able to withdraw from the study by closing the web browser at any time prior to completion of the study but due to the lack of collection of identifiable data, were not able to withdraw after submitting their results. Any incomplete data was not used in the analysis.

**Patient measures**

Participants were asked to assess the candidates at the level expected of a newly qualified doctor (Foundation Year 1 Doctor). Participants viewed the five videos and completed an online marksheet contemporaneously (Figure 2). Participants marked each candidate in two domains; ‘Communication skills’ and ‘Professional skills.’ Both domains were scored between 0 and 4, with a maximum possible total score of 8. Participants were also asked to assign each candidate a global impression: ‘I would not choose to see this doctor,’ ‘I would be reluctant to see this doctor, but would if required,’ ‘I would be willing to see this doctor’ or ‘I would choose to see this doctor and would recommend them to others.’ Finally they were asked to ‘Please provide further written feedback on the candidate’s performance’ via a free text box. The participant information sheet outlined to participants that they were
able to return to mark sheets for previous candidates but were not able to pause, rewind or replay the videos, to reflect marking in exam conditions. Following completion of the mark sheets for all five videos, participants were asked to provide demographic details including whether they were a professional patient actor or a volunteer patient, gender, ethnicity, the geographical region where they worked and their associated medical school. They were also asked to quantify their previous assessment and teaching experience.

**Statistical analysis**

Data management and analysis were conducted using Stata V16. For each candidate a total score from 0 to 8 was calculated by summing the two domain scores of communication and professional skills. For each participant, the difference between the total score awarded to CPX and the total score of the clear pass candidate with an attribute [CP(H/T/A)] was calculated. The median difference across participants, interquartile range (IQR) scores for each candidate were as follows: CPX median score 6, IQR 6–8; CPH median score 8, IQR 6–8; CPT median score 8, IQR 7–8; CPA median score 7, IQR 6–8. Individual Wilcoxon matched-pairs signed-ranks tests were performed on the total scores for the clear pass candidate with no attribute when compared to each clear pass candidate with an attribute. For the candidate with purple hair (CPH) and for the candidate with tattoos (CPT) this indicated that scores were statistically significantly higher than the candidate with no stereotypical attribute (CPX) (Table 2). For the candidate with a Liverpool English Accent there was no statistically significant difference (Table 2).

**Results**

**Participants**

Two hundred and forty three patients participated in the study of whom one hundred and eighty three were included in the analysis (sixty participants did not complete viewing and rating all of the candidates). Table 1 shows the demographic details of all participants included in the analysis. Participants included in the study have been involved in medical education at 35 different UK medical schools, as volunteer patients (VPs), most of whom were recruited due to the presence of a clinical condition of interest to medical student learning or as professional actors who work as simulated patients (SPs).

**Total scores**

Total scores, the sum of communication and professional skills domain scores which excludes the Global Imression Grade, for all four clear pass candidates (CPX, CPH, CPT and CPA) ranged from 2 to 8. The median and inter-quartile range (IQR) scores for each candidate were as follows: CPX median score 6, IQR 6–8; CPH median score 8, IQR 6–8; CPT median score 8, IQR 7–8; CPA median score 7, IQR 6–8. Individual Wilcoxon matched-pairs signed-ranks tests were performed on the total scores for the clear pass candidate with no attribute when compared to each clear pass candidate with an attribute. For the candidate with purple hair (CPH) and for the candidate with tattoos (CPT) this indicated that scores were statistically significantly higher than the candidate with no stereotypical attribute (CPX) (Table 2). For the candidate with a Liverpool English Accent there was no statistically significant difference (Table 2).

**Global impressions**

The global impression for the four clear pass candidates (CPX, CPH, CPT and CPA) varied from ‘I would not choose to see this doctor’ to ‘I would choose to see this doctor
Impact on candidates’ scores, our findings suggest that the presence of a notable characteristic may lead to higher scores possibly as the candidate stands out. In relation to the tattooed candidate these findings are novel, as previous research has identified either no discernible difference or negative impacts on patient perceptions (Baumann et al. 2016; Broussard and Harton 2018; Cohen et al. 2018). Additionally, whilst higher scores were demonstrated for the candidate with purple hair both in this study and a previous study looking at medical examiners (Sam et al. 2021b), previous research has demonstrated that extravagant hair colours impact negatively on patient perceptions (Yonekura et al. 2013). Therefore while these findings are important in developing understanding about the impact of bias on scoring in medical assessments, it perhaps highlights the unpredictability of the impact of stereotype bias. As stereotypes are linked to social context, these findings may relate to changing societal norms or cultural differences between two different countries (UK and Brazil). For example the increased acceptability of tattoos identified within our study may relate to increasing numbers of people with tattoos, but this requires further investigation (Spears and Manstead 1989).

Discussion

We set out to determine whether the presence of certain physical attributes might adversely impact scores awarded to examination candidates by simulated or real patients. However, perhaps unexpectedly, our study showed that patients gave higher scores to candidates with either purple hair or tattoos than to the candidate with no discernible physical attribute. There was no statistically significant difference between the candidate with a Liverpool accent and the candidate with no discernible physical attribute. These findings overlap with those of our previous study which showed that amongst examiners the presence of purple hair colour resulted in higher scores, but the presence of tattoos or a Liverpudlian accent resulted in no significant differences (Sam et al. 2021b). Whilst it is reassuring that any potential assessor biases did not appear to translate into a negative impact on candidates’ scores, our findings suggest that the presence of a notable characteristic may lead to higher scores possibly as the candidate stands out. In relation to the tattooed candidate these findings are novel, as previous research has identified either no discernible difference or negative impacts on patient perceptions (Baumann et al. 2016; Broussard and Harton 2018; Cohen et al. 2018). Additionally, whilst higher scores were demonstrated for the candidate with purple hair both in this study and a previous study looking at medical examiners (Sam et al. 2021b), previous research has demonstrated that extravagant hair colours impact negatively on patient perceptions (Yonekura et al. 2013). Therefore while these findings are important in developing understanding about the impact of bias on scoring in medical assessments, it perhaps highlights the unpredictability of the impact of stereotype bias. As stereotypes are linked to social context, these findings may relate to changing societal norms or cultural differences between two different countries (UK and Brazil). For example the increased acceptability of tattoos identified within our study may relate to increasing numbers of people with tattoos, but this requires further investigation (Spears and Manstead 1989).

Limitations

This study used video recordings of simulated candidates performing a clinical examination, and therefore findings may not be generalisable to other assessment formats (Of note, it would be interesting to analyse the impact within the context of a clinical history station where interpretation of professional and communication skills may differ). Furthermore, the transferability of our findings to an in person (face-to-face) assessment may be limited as the videos used in the study only provided a single lens viewpoint and did not include examiner interactions with candidates. For participants it is possible that social desirability bias has created artificial inflation in the ratings as participants may have been consciously attempting to remain ‘fair’ in their scoring. Additionally, despite efforts to control other sources of variability amongst the actors used, it is possible that some of the observed effects resulted from variations between

Table 1. Demographic Details of Patient Participants according to video set viewed.

| Role                        | n (%) | CPH n (%) | CPT n (%) | CPA n (%) |
|-----------------------------|-------|-----------|-----------|-----------|
| Professional Simulated Patient (SP) | 183 (100.0%) | 63 (34.4%) | 59 (32.2%) | 61 (33.3%) |
| Volunteer Patient (VP)      | 40 (21.9%) | 14 (22.2%) | 10 (16.9%) | 16 (26.2%) |
| Male                        | 95 (51.9%) | 35 (55.6%) | 28 (47.5%) | 32 (52.5%) |
| Female                      | 85 (46.4%) | 27 (42.9%) | 31 (52.5%) | 27 (44.3%) |
| Prefer not to say           | 3 (1.6%) | 1 (1.6%) | 0 (0.0%) | 1 (1.6%) |
| Assessment Experience       | None  | 3 (1.6%) | 0 (0.0%) | 1 (1.7%) | 2 (3.3%) |
|                             | 1–2 exams | 10 (5.5%) | 1 (1.6%) | 4 (6.8%) | 5 (8.2%) |
|                             | 3–4 exams | 19 (10.4%) | 7 (11.1%) | 5 (8.5%) | 7 (11.5%) |
|                             | 5+ exams  | 150 (82.0%) | 55 (87.3%) | 49 (83.1%) | 46 (75.4%) |
| Prefer not to say           | 1 (0.5%) | 0 (0.0%) | 0 (0.0%) | 1 (1.6%) |
| Teaching Experience         | None  | 34 (18.6%) | 12 (19.0%) | 10 (16.9%) | 12 (19.7%) |
|                             | 1–2 sessions | 10 (5.5%) | 1 (1.6%) | 4 (6.8%) | 5 (8.2%) |
|                             | 3–4 sessions | 7 (3.8%) | 1 (1.6%) | 5 (8.5%) | 1 (1.6%) |
|                             | 5–10 sessions | 17 (9.3%) | 7 (11.1%) | 5 (8.5%) | 5 (8.2%) |
|                             | 10+ sessions | 110 (60.1%) | 40 (63.5%) | 34 (57.6%) | 36 (59.0%) |
| Prefer not to say           | 5 (2.7%) | 2 (3.2%) | 0 (0.0%) | 2 (3.3%) |

Table 2. Difference between CPX Total Score and each attribute (CPH, CPA and CPT) total score.

| Difference = (CPX – CP(H/P/T)) | n     | Median | IQR   | Wilcoxon Matched Pairs | z-value | p-value |
|--------------------------------|-------|--------|-------|------------------------|---------|---------|
| CPH                            | 63    | 0      | -2 to 0 | -4.181 | <0.001   |
| CPA                            | 61    | 0      | -1 to 0 | -1.565 | 0.120    |
| CPT                            | 59    | -1     | -2 to 0 | -3.873 | <0.001   |

Negative values of median difference indicate that the candidate with the attribute has a higher total score than the candidate without the attribute.
candidates. As participation was voluntary, self-selection bias may mean results are not generalisable to the entire patient population involved in medical education. There may also have been demographic factors in the participants that were not identified (such as age/gender/shared characteristics with candidates in the videos) that impacted on outcomes, but this study was not powered to analyse this degree of granularity. Importantly, this study compares the impact of bias on candidates performing at a ‘clear pass’ standard, and therefore the impact of bias on candidates performing at different standards may vary from our findings. We also recognise the impact that mark schemes may have on outcomes and our results may therefore not be generalisable if significantly different scoring rubrics are used. It is also important to acknowledge that due to a low number of volunteer patient participants the study was not powered to enable a meaningful comparison between the volunteer and professional simulated patient populations. Finally, this study was completed at a single time point, but any systematic effect of bias based on stereotype activation may vary over time as societal attitudes towards individual attributes also change.

Future work

Further work is required to explore these findings, including analysis of effects in the real-world setting, assessing other clinical domains such as history taking, in other types of assessment, in the clinical context with workplace-based assessment and with other physical attributes. The role of both simulated and real patient scoring in assessment requires further research as we move towards patient-centred education and consider a national clinical assessment in the United Kingdom.

Acknowledgements

The authors are grateful to Professional Role Players Ltd and Phill Doulton for recruitment of simulated patients to the study. The authors are also grateful to the Medical Schools Council for administrative support with the study.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

MG is supported by the National Institute for Health Research (NIHR) Cambridge Biomedical Research Centre [BRC-1215-20014]. CAB is supported by the NIHR Applied Research Collaboration (ARC) West Midlands. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care. The Medical Schools Council funded the recruitment of the simulated candidates, simulated patient and sourcing of the recording equipment for this study.

Notes on contributors

C. A. Brown, PhD, SFHEA, is a Professor of Medical Education at Warwick Medical School. She has research interests in selection and assessment and teaches quantitative methods at all levels in Higher Education.

K. Badger, FHEA, MACadMED, was a Clinical Education & Research Fellow at Imperial College London and is now a trainee in Public Health.

M. D. Reid, MA, MB, BCHir, MACadMED, MRCP, was a Clinical Education & Research Fellow at Imperial College London and is now a trainee in Geriatric Medicine at Kingston Hospital.

R. Westacot, MB, BCh, FRCP, is a Senior Lecturer in Medical Education at Birmingham Medical School and an Acute Medicine Consultant at University Hospitals of Leicester NHS Trust (CCT in Nephrology).

M. Gurnell, PhD, MA(MEd), FHEA, FACadMED, FRCP, is Clinical SubDean at the University of Cambridge School of Clinical Medicine and Professor of Clinical Endocrinology at the Institute of Metabolic Science & Department of Medicine. He is current Chair of the Medical Schools Council Assessment Alliance.

M. W. R. Reed, MD, BMSci, MBCHB, FRCS, is a breast cancer Surgeon who has been Dean of Brighton and Sussex Medical School since 2014.

Table 3. Global impression scoring awarded to candidate with no clear attribute (CPX) and the candidates with purple hair (CPH), tattoos (CPT) and an accent (CPA) by each patient participant (n (%)).

| Global Impression n (%) | 1 would not choose to see this doctor’ | 1 would be reluctant to see this doctor, but would if required’ | 1 would be willing to see this doctor’ | 1 would choose to see this doctor and would recommend them to others’ |
|------------------------|--------------------------------------|---------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------|
| CPH                    | 0 (0.0)                              | 0 (0.0)                                                       | 0 (0.0)                             | 0 (0.0)                                                         |
| ‘I would not choose to see this doctor’ | 0 (0.0)                              | 0 (0.0)                                                       | 0 (0.0)                             | 0 (0.0)                                                         |
| ‘I would be reluctant to see this doctor, but would if required’ | 1 (1.6)                              | 1 (1.6)                                                       | 8 (12.7)                           | 7 (11.1)                                                        |
| ‘I would choose to see this doctor and would recommend them to others’ | 0 (0.0)                              | 1 (1.6)                                                       | 18 (28.6)                          | 27 (42.9)                                                       |
| CPA                    | 0 (0.0)                              | 0 (0.0)                                                       | 0 (0.0)                             | 0 (0.0)                                                         |
| ‘I would not choose to see this doctor’ | 0 (0.0)                              | 0 (0.0)                                                       | 0 (0.0)                             | 0 (0.0)                                                         |
| ‘I would be reluctant to see this doctor, but would if required’ | 0 (0.0)                              | 0 (0.0)                                                       | 2 (3.3)                             | 3 (4.9)                                                         |
| ‘I would choose to see this doctor and would recommend them to others’ | 0 (0.0)                              | 1 (1.6)                                                       | 16 (26.2)                          | 9 (14.8)                                                        |
| CPT                    | 0 (0.0)                              | 0 (0.0)                                                       | 0 (0.0)                             | 0 (0.0)                                                         |
| ‘I would not choose to see this doctor’ | 0 (0.0)                              | 0 (0.0)                                                       | 0 (0.0)                             | 0 (0.0)                                                         |
| ‘I would be reluctant to see this doctor, but would if required’ | 0 (0.0)                              | 0 (0.0)                                                       | 0 (0.0)                             | 1 (1.7)                                                         |
| ‘I would choose to see this doctor and would recommend them to others’ | 0 (0.0)                              | 1 (1.7)                                                       | 6 (10.2)                           | 6 (10.2)                                                        |

I would choose to see this doctor

I would be reluctant to see this doctor, but would if required

I would be willing to see this doctor

I would choose to see this doctor and would recommend them to others

I would not choose to see this doctor

I would be reluctant to see this doctor

I would be willing to see this doctor

I would choose to see this doctor and would recommend them to others

Global Impression

1 would not choose to see this doctor

1 would be reluctant to see this doctor, but would if required

1 would be willing to see this doctor

1 would choose to see this doctor and would recommend them to others
having moved from Sheffield University Medical School where he was head of Undergraduate Assessment for medicine. He is currently Co-Chair of Medical Schools Council and Chair of the education subcommittee.

G. Chamberlain, MBChB, MAcadMEd, was an Undergraduate Clinical Teaching Fellow at Imperial College Healthcare NHS Trust and is now an Internal Medicine Training (IMT) trainee.

E. C. I. Hatfield, MB BChir, MA Oxon, MA Cantab, FRCP, is a Consultant Physician and Endocrinologist and Director of Clinical Studies at Charing Cross Hospital, Imperial College Healthcare NHS Trust and Honorary Senior Lecturer at Imperial College London.

A. Sharif, MBBS, MD, FRCP, is a Consultant Physician, Gastroenterologist and Hepatologist, and Director of Clinical Studies at London Northwest University Hospital NHS Trust, Northwick Park site.

A. H. Sam, PhD, FRCP, is Head of Imperial College School of Medicine and a Consultant Physician and Endocrinologist at Imperial College Healthcare NHS Trust.

ORCID

C. A. Brown http://orcid.org/0000-0002-7526-0793
M. D. Reid http://orcid.org/0000-0002-8998-0265
R. Westacott http://orcid.org/0000-0001-9846-1961
M. Gurnell http://orcid.org/0000-0001-5745-6832
M. W. R. Reed http://orcid.org/0000-0001-7442-2132
A. H. Sam http://orcid.org/0000-0002-9599-9069

References

Baumann C, Timming A, Gollan P. 2016. Taboo tattoos? A study of the gendered effects of body art on consumers’ attitudes towards visibly tattooed front line staff. J Retail Consum Serv. 29:31–39.

Broussard KA, Harton HC. 2018. Tattoo or taboo? Tattoo stigma and negative attitudes toward tattooed individuals. J Soc Psychol. 158(5):521–540.

Chen T-C, Lin M-C, Chiang Y-C, Monrouxe L, Chien S-J. 2019. Remote and onsite scoring of OSCEs using generalisability theory: a three-year cohort study. Med Teach. 41(5):578–583.

Cohen M, Jeannmonod D, Stankevicz H, Habeeb K, Berrios M, Jeannmonod R. 2018. An observational study of patients’ attitudes to tattoos and piercings on their physicians: the ART study. Emerg Med J. 35(9):538–543.

MacDougall M. 2015. Variation in assessment and standard setting practices across UK undergraduate medicine and the need for a benchmark. Int J Med Educ. 6:125–135.

Sam AH, Reid MD, Thakerar V, Gurnell M, Westacott R, Reed MWR, Brown CA. 2021a. National inter-rater agreement of standardised simulated-patient-based assessments. Med Teach. 43(3):341–346.

Sam AH, Reid MD, Thakerar V, Gurnell M, Westacott R, Yeates P, Reed MWR, Brown CA. 2021b. The influence of candidates’ physical attributes on assessors’ ratings in clinical practice. Med Teach. 43(3):554–559.

Schleicher I, Leitner K, Juenger J, Moeltner A, Ruesseler M, Bender B, Sterz J, Schuettler K-F, Koenig S, Kreuder JG, et al. 2017. Examiner effect on the objective structured clinical exam—a study at five medical schools. BMC Med Educ. 17(1):71.

Spears R, Manstead A. 1989. The social-context of stereotyping and differentiation. Eur J Soc Psychol. 19(2):101–121.

Thistlethwaite J. 2004. Simulated patient versus clinician marking of doctors’ performance: which is more accurate? Med Educ. 38(4):456.

Torre I, Goslin J, White L, Zanatto D. 2018. Trust in artificial voices: a “congruency effect” of first impressions and behavioural experience. Conference: the Technology, Mind, and Society.

van Zanten M, Boulet JR, Norcini JJ, McKinley D. 2005. Using a standardised patient assessment to measure professional attributes. Med Educ. 39(1):20–29.

Wallace J, Rao R, Haslam R. 2002. Simulated patients and objective structured clinical examinations: review of their use in medical education. Adv Psychiatr Treat. 8(5):342–348.

Weidner AC, Gimpel JR, Boulet JR, Solomon M. 2010. Using standardized patients to assess the communication skills of graduating physicians for the comprehensive osteopathic medical licensing examination (COMLEX) level 2-performance evaluation (level 2-PE). Teach Learn Med. 22(1):8–15.

Yeates P, Woolf K, Benbow E, Davies B, Boohan M, Eva K. 2017. A randomised trial of the influence of racial stereotype bias on examiners’ scores, feedback and recollections in undergraduate clinical exams. BMC Med. 15(1):179–179.

Yonekura CL, Certain L, Karen SKK, Alcantara GAS, Ribeiro LG, Rodrigues-Junior AL, Baddini-Martinez J. 2013. Perceptions of patients, physicians, and Medical students on physicians’ appearance. Rev Assoc Med Bras. 59(5):452–459.