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Changes in Medical Students' Emotional Intelligence: An Exploratory Study

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Background: The ability to recognize and adapt to affective states in one's self and others, emotional intelligence is thought to connote effective, compassionate doctor–patient communication. Unfortunately, medical training has been shown to erode some of the very attributes it purports to instill in students. ***Purpose:*** The objective is to examine changes in students' emotional intelligence and empathy across an undergraduate medical curriculum. ***Methods:*** During M1 orientation and again following M3 clerkship training, students in the University of Kentucky College of Medicine Class of 2004 completed the Trait Meta-Mood Scale (TMMS) and Davis' Interpersonal Reactivity Index (IRI). Baseline changes in specific dimensions were examined for both male and female students. ***Results:*** Reliability of subscales was generally acceptable ($\alpha \geq .70$). Sixty-four students provided data at both time points. Compared to baseline, two of three TMMS dimensions—attention to feelings and mood repair—were significantly ($p \leq .05$) lower at follow-up. One IRI dimension—empathic concern—was also significantly lower at Time 2, whereas another, Personal Distress, was significantly higher. However, differences generally reflected only small effect sizes. No significant gender interactions were noted. ***Conclusions:*** Despite quite modest effect sizes, findings suggest that students' abilities to effectively manage affective states may be subject to some minor fluctuation across the undergraduate educational continuum. However, whether these observed declines constitute meaningful, clinically relevant changes remains unclear.

The growing consumerism of patients, movement toward patient-centered care, and the expanding realm of clinical competencies have all highlighted the need for a broader range of inter- and intrapersonal skills among practicing physicians.[1]

In this vein, it has been suggested that emotional intelligence (EI) may be a potentially useful construct in assessing desirable cognitive and noncognitive abilities or aptitudes in health professionals.[2,3]

Derived from Howard Gardner's notion of multiple intelligences,[4] psychologists John Mayer and Peter Salovey defined EI as including "verbal and nonverbal appraisal and expression of emotion, the regulation of emotion in the self and others, and utilization of emotional content in problem-solving"[5] (p. 433). Although EI has been most commonly examined in corporate and leadership contexts—where it has been purported to rival traditional intelligence (IQ) as a predictor of job performance[6]—EI may be equally relevant to patient care, where the ability to adapt to complex, interpersonal contexts and diverse circumstances is also an essential skill.

For example, because recognizing and responding to patients' nonverbal, emotional information is key to satisfaction,[7,8] EI-related abilities could be important for physicians in guiding interactions with patients and building the rapport and trust necessary to establish a sound doctor–patient relationship. Indeed, physicians' abilities to communicate both verbally[9] and nonverbally[10] may, in some specialties, be indirectly linked to future malpractice claims.[11] Furthermore, by being attuned to one's own and others' emotional states, EI may allow health professionals to more effectively manage stressful[12] or traumatic experiences.[13]

Within medical education, EI is intuitively among those noncognitive factors deemed to be desirable in future physicians.[14] Although outcomes research is in the infancy stages, Wagner and her colleagues[15] documented a modest correlation between physicians' EI and patient satisfaction and found that only one dimension—"happiness"—was a significant predictor. Stratton and his associates[16] found certain dimensions of EI and empathy, a related construct, to be positively correlated with medical students' communication skills as demonstrated in a multistation clinical performance exam.

What remains unaddressed, however, is how or to what extent medical training itself nurtures or inhibits students' abilities to "monitor one's own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and actions."[17] Despite efforts to develop physicians who are empathetic, compassionate, and professional, the latent effects of informal or "hidden" curricula can be profound[18]—eroding some of the very attributes medical training purports to instill. Indeed, researchers have noted declines in empathy, altruism, and self-confidence—along with corresponding increases in cynicism, stress, and feelings of victimization.[19–22] It has been further reported that as many as 75% of medical students become more cynical about academic life and the medical profession as they progress in their training.[23]

Examining similar changes in students' EI, however, poses some potential challenges, as the traitlike (relatively stable) and statelike (relatively mutable) aspects of the construct have not been clearly delineated. Moreover, whereas EI is thought to follow a developmental trajectory (like cognitive intelligence), no empirical evidence suggests that it is immutable—or implies conditions under which it may be impacted. Indeed, in the only attempt to document EI change in this population, Wagner and her colleagues[24] noted significant declines in students' overall EI scores during undergraduate medical training—including interpersonal, intrapersonal, and general mood domains. This study, then, further examines changes in medical students' EI and a related construct, empathy, at two key time points in their medical education: upon entrance to medical school and again following completion of their core (clerkship) clinical training.

METHODS

During 1st-year orientation (T1) and again following completion of their 3rd-year clinical training (T2), students at the study institution voluntarily completed a confidential, two-page questionnaire containing the Trait Meta-Mood Scale (TMMS) and Davis's Interpersonal Reactivity Index (IRI). The study protocol was approved by the medical center Institutional Review Board.

The TMMS assesses relatively stable individual differences in individuals' abilities to recognize, discriminate, and regulate their moods and emotions. The 30-item short form version asks respondents to rate on a 5-point Likert scale, ranging 1 (*strongly disagree*) to 5 (*strongly agree*), their level of (dis)agreement with statements pertaining to (a) *Attention to Feelings* (e.g., "I pay a lot of attention to how I feel"), (b) *Mood Repair* (e.g., "Although I am sometimes sad, I have a mostly optimistic outlook"), and (c) *Clarity of Feelings* (e.g., "I am usually very clear about my feelings"). Higher scores indicate higher levels of self-reported emotional intelligence. The TMMS has been successfully used in medical student samples.[2,16]

Davis's IRI[25] asks respondents to indicate on a 5-point Likert scale, ranging 1 (*does not describe me well*) to 5 (*describes me very well*), their personal correspondence with 28 statements pertaining to four 7-item dimensions of empathy:

1. *Perspective Taking* is the tendency to embrace another's point of view.
2. *Empathic Concern* is the regard or sympathy for another's feelings.
3. *Personal Distress* is the response to another's difficult interpersonal situations.
4. *Fantasy* is the use of imagination to experience the feelings and actions of characters in creative works.

Only the first three dimensions were used in this study, with higher scores representing higher levels of self-reported empathy. The IRI, too, has been successfully applied in medical student populations,[2,16,26] and correlation analyses have revealed good convergent and discriminant validity.[27]

Between-subjects analyses of mean item differences were examined using *t* tests for independent samples, whereas main and interaction effects were explored using a 2 (pre–post) × 2 (sex) repeated measures analysis of variance. Alpha was set at .05 or less for all analyses.

RESULTS

Of the 93 students eligible to participate in the study, 72 (77.4%) and 81 (87.1%) provided responses to the TMMS and IRI measures at T1 (baseline) and T2 (follow-up), respectively. From these, data were reliably linked for 64 students (35 male, 29 female)—for a final response rate of 68.8%. To allow the calculation of item means, mean replacements of missing data were applied to 6 participants who lacked responses for three or fewer items. All reliability estimates were made prior to mean substitutions. Individual analyses run with and without mean substitutions revealed no substantive differences in the pattern of significant findings.

Internal consistencies (α) of TMMS and IRI subscales ranged from .59 to .80 at T1, and .73 to .90 at T2 (see Table 1). Mean subscale item scores tended to be higher for female participants—with women students scoring significantly higher at baseline (T1) on the Attention to Feelings dimension of the TMMS (4.28 [f] vs. 4.00 [m], $p \leq .01$), and the Empathic Concern (4.39 [f] vs. 4.14 [m], $p \leq .05$) and Personal Distress dimensions of the IRI (2.05 [f] vs. 1.72 [m], $p \leq .05$). Female participants' mean item scores at follow-up (T2) on the Empathic Concern IRI subscale also differed significantly from those of male participants (4.19 [f] vs. 3.78 [m], $p \leq .001$).

Within-subjects analysis of item means revealed statistically significant declines on the Attention to Feelings (4.12 [T1], 3.97 [T2], $p \leq .05$) and Mood Repair (4.19 [T1], 3.90 [T2], $p \leq .001$) subscales of the TMMS, and the Empathic Concern dimension of the IRI (4.25 [T1], 3.97 [T2], $p \leq .001$). On the Personal Distress component of the IRI, significant *increases* in mean scores were noted between baseline and follow-up (1.87 [T1], 2.13 [T2], $p \leq .01$). No statistically significant interactions by sex were noted (see Table 2).

TABLE 1
Male and Female Medical Students' Mean Emotional Intelligence and Empathy at Baseline and Follow-Up

Variable (No. Items)	Baseline (T1)[a] Item M (SD)				Follow-Up (T2)[b] Item M (SD)			
	Male[c]	Female[d]	α	p[e]	Male[c]	Female[d]	α	p[e]
TMMS[f]								
Attention to Feelings (13)	4.00 (0.47)	4.28 (0.38)	.80	$\leq$ .01	3.84 (0.68)	4.13 (0.45)	.90	ns
Clarity of Feelings (11)	3.72 (0.59)	3.83 (0.45)	.78	ns	3.75 (0.68)	3.73 (0.50)	.86	ns
Mood Repair (6)	4.10 (0.56)	4.30 (0.43)	.68	ns	3.95 (0.72)	3.84 (0.65)	.82	ns
IRI[g]								
Perspective Taking (7)	4.03 (0.43)	4.00 (0.47)	.60	ns	3.98 (0.66)	3.86 (0.63)	.79	ns
Empathic Concern (7)	4.14 (0.47)	4.39 (0.37)	.59	$\leq$ .05	3.78 (0.61)	4.19 (0.51)	.73	$\leq$ .001
Personal Distress (7)	1.72 (0.50)	2.05 (0.53)	.71	$\leq$ .05	2.08 (0.73)	2.20 (0.54)	.84	ns

Note: TMMS = Trait Meta-Mood Scale; IRI = Interpersonal Reactivity Index.
[a]Baseline (T1) data collected during 1st-year orientation. [b]Female ($n = 29$). [c]Between-subjects (M–F) differences based on t tests for independent samples. [d]Follow-up (T2) data collected immediately following completion of 3rd year. [e]Male ($n = 35$). [f]Emotional intelligence based on students' responses to emotion-related statements, from 1 (*strongly disagree*) to 5 (*strongly agree*). [g]Empathy based on students' responses to self-assessments of related attributes, from 1 (*not at all like me*) to 5 (*very much like me*).

DISCUSSION

Although most medical students embark on their professional education with idealism, enthusiasm, and humanism, they find themselves pulled in different directions. For many, the challenge of balancing personal happiness, social responsibility, and professional (or clinical) training can be overwhelming. Further, many of the positive attributes deemed important by admissions committees and society are not always reinforced in medical training. Understanding all aspects of clinical training may provide insight into how better to improve the education of future physicians.

In this study, significant changes were noted in various aspects of students' emotional intelligence and empathy across their medical education—although the effect sizes tended to be unimpressive. The degrees to which students notice and think about their feelings (Attention to Feelings) and regulate their moods in moderating unpleasant moods and maintaining pleasant ones (Mood Repair) both showed small but statistically significant declines between T1 and T2. Clarity of Feelings— the ability of students to understand their own moods—was unchanged. The Attention to Feelings subscale, which assesses the extent to which one attends to the verbal and nonverbal

TABLE 2
Changes in Medical Students' Emotional Intelligence and Empathy

Variable (No. Items)	**Baseline (T1)[a]** Item M (SD)	**Follow-up[b] (T2)** Item M (SD)	p[c]
TMMS[d]			
Attention to Feelings (13)	4.12 (0.44)	3.97 (0.60)	$\leq$ .05
Clarity of Feelings (11)	3.77 (0.53)	3.74 (0.60)	ns
Mood Repair (6)	4.19 (0.51)	3.90 (0.69)	$\leq$ .001
IRI[e]			
Perspective Taking (7)	4.02 (0.45)	3.91 (0.65)	ns
Empathic Concern (7)	4.25 (0.44)	3.97 (0.60)	$\leq$ .001
Personal Distress (7)	1.87 (0.54)	2.13 (0.65)	$\leq$ .01

Note: $n = 64$; no statistically significant interactions by sex were noted. TMMS = Trait Meta-Mood Scale; IRI = Interpersonal Reactivity Index.
[a]Baseline (T1) data collected during 1st-year orientation. [b]Follow-up (T2) data collected immediately following completion of 3rd year. [c]2 (pre–post) × 2 (sex) repeated measures analysis of variance. [d]Emotional intelligence based on students' responses to emotion-related statements, from 1 (*strongly disagree*) to 5 (*strongly agree*). [e]Empathy based on students' responses to self-assessments of related attributes, from 1 (*not at all like me*) to 5 (*very much like me*).

appraisal and expression of emotion, may be especially pertinent, as such skills appear to be heavily implicated in patient satisfaction.[7–10]

Regarding empathy, a significant decline in students' Empathic Concern—that is, their feelings of concern, warmth, and sympathy toward others—was also noted. However, the Personal Distress subscale of the IRI, which measures an individual's fear, apprehension, and discomfort when witnessing the negative experiences of others,[28] reflected a significant *increase* from the beginning of the M1 year to completion of the M3 year. Again, both of these observed changes corresponded to only small effect sizes. No changes in students' self-assessed abilities to "step outside" their own perspectives when dealing with others (Perspective Taking) were found.

The seemingly disparate changes in the Empathic Concern and Personal Distress domains of the IRI are not unprecedented. Indeed, Davis's own work[25] showed the Personal Distress subscale to be negatively correlated with both Empathic Concern and Perspective Taking. More recently, one study[29] examining the concurrent validity of the IRI indicated that the Personal Distress subscale appeared to be associated with neuroticism, which the authors concluded was consistent with more recent factor analytic and validity findings for the IRI. Moreover, according to Hatcher and her associates,[30] the negative correlation of Personal Distress with "the more advanced" Empathic Concern and Perspective Taking subscales are consistent with the theoretical literature suggesting that empathy follows a developmental path not unlike that of cognitive and moral development.

Key factors in understanding these apparent declines in certain aspects of learners' EI and empathy may be the nature and quality of personal and professional relationships during medical training. In this vein, Hojat and his associates[23] cited "transient social relationships, hurried and fragmented patient–caregiver relationships, and avoidance of intimacy during medical training" (p. 939) as potential causes for the decline in empathy. Once in the clinical years, students are often separated from their peer-support group as they rotate through new and diverse work environments—necessitating an almost continual adaptation to new personalities and variable expectations. Furthermore, the unstructured learning environment, lack of time for recreation, concerns about mounting financial issues, long on-duty assignments away from family, student mistreatment, and exposure to human suffering can be additional sources of distress during this period.[20,31,32]

Responsibilities of medical educators include teaching content as well as modeling appropriate professional and ethical behavior. However, in one study of 3rd- and 4th-year students, 98% of respondents reported observing physicians refer to patients in a derogatory fashion, 61% reported witnessing unethical behavior toward a patient, and 54% felt like accomplices.[33] Approximately 40% of these students experienced guilt about their personal role in these episodes but felt forced to participate in order to "fit in" and receive favorable evaluations.[35] More seriously, students themselves

are often the victims of various types of abuse, including gender discrimination and sexual harassment.[34,35] This challenge of participating in a stressful environment under feelings of inadequacy with teachers who may not always model respectful patient care may cause tension for students as they struggle to balance responsibilities with ideals.

At the same time, medical students are also confronted by new experiences with illness and patient suffering. Rosenfield and Jones[36] identify four basic anxiety-producing dilemmas faced by students in these arenas, all of which have the potential to emphasize scientific detachment and objectivity over humanism: (a) focusing on pathology rather than health, (b) "not knowing" versus "knowing too much," (c) vulnerability versus denial, and (d) reaction versus inaction. Failure to properly manage these anxieties, the authors argue, may lead to the development of maladaptive responses, with an associated decrease in empathy.[36]

These same authors conclude that knowing when to act, when to talk and when to listen, and when to do something and when to tolerate a patient's distress are all important developmental milestones in medical training. This ability to appropriately perceive and interact within an environment aptly describes emotional intelligence, which Salovey and Mayer defined as "the subset of social intelligence that involves the ability to monitor one's own and other's emotions, to discriminate among them, and to use the information to guide one's thinking and actions"[17] (p. 189).

Studies suggest that psychosocial characteristics (anxiety, depression, loneliness, neuroticism, self-esteem, and stressful life events) are just as accurate as Medical College Admissions Test scores in predicting grades in the preclinical years as well as during the clerkship years; furthermore, psychosocial characteristics were better predictors of clinical competency than the admissions test scores.[37] Understanding emotional intelligence may provide a context for success under the stresses of medical education while offering an explanation for the decline in humanitarianism, enthusiasm, and idealism experienced by medical students.

The study is limited by several factors. First, the validity of standard questionnaire methods of measuring EI has been criticized,[38] leading to the recent development of instruments that ask participants to respond in the context of emotional stimuli (e.g., Mayer–Salovey–Caruso Emotional Intelligence Test, or MSCEIT). Because the instruments used constitute self-report (rather than performance-based) measures, students' assessments likely reflect a lack of perceived efficacy rather than a lack of demonstrated ability. Replicating this study using an ability-based measure of EI (e.g., MSCEIT) would help determine whether these observed declines are real or artifactual and if they translate into diminished intra- or interpersonal skills.

Second, the sample size and response rate necessarily restrict the generalizability of the results. As a result, whether the observed changes are typical of medical training in general or merely an isolated cohort effect cannot be discerned. However,

Wagner and her associates, using the Bar-On Emotional Quotient Inventory, documented similar declines in students' intrapersonal, interpersonal, and general mood domains.[24] Nonetheless, a more rigorous research design that incorporates numerous assessments of EI and empathy throughout clinical training may help pinpoint what types of behaviors or critical incidents exert the most impact on students' abilities to recognize and manage affective states.

Third, although overlap with existing measures of cognitive intelligence remains a point of contention,[35] findings from psychological[39,40] and neurological studies[41] indicate that EI is discernibly distinct—and that some combination of both intelligences is probably crucial to "some forms of emotional problem solving."[42] So, despite criticisms that EI is not amenable to traditional, direct measurement,[43] compelling empirical evidence does support the discriminant validity of some EI measures.[44–46]

Last, and perhaps most important, the corresponding effect sizes for statistically significant differences were, at best, quite modest—challenging the practical importance of some findings. That is, although fluctuations between the two time points were large enough not to be attributed solely to chance, they were not large enough to warrant a more forceful conclusion. As a result, exactly how substantive these observed changes might be—or what they might represent—remains unclear. Moreover, given the small sample, the potential for these findings to be an artifact of measurement error must be acknowledged. However, in exploring the possibility that mean substitutions for missing data may have contributed to this, no notable differences in the magnitudes or patterns of differences was found when such cases were excluded from the analysis.

Measurement issues aside, some uncertainty also remains regarding the underlying nature of the construct—with measures of EI developing along two parallel lines. "Ability models" view EI as a form of intelligence involving emotional perception, expression, understanding, and regulation. "Mixed trait-ability models," in contrast, supplement individual abilities with social–psychological traits related to emotion, such as empathy, sociability, or temperament.[47] Examining results from multiple, complementary measures may help resolve the debate over competing models.

For potential applications in medical education, implications center on the mutability of EI. Although these questions remain unresolved, neither ability nor mixed trait-ability models suggest that EI is inherently resistant to change. Indeed, our findings suggest that EI—as measured here—may be subject to some modest but perhaps inconsequential variation over time. If, like empathy,[48] EI can be instilled, nurtured, or taught—via mindfulness exercises, reflective writing, professional mentoring, or role modeling—then facilitating formal and informal opportunities to do so across key stages of medical training may be useful. Conversely, if specific behaviors or training experiences are shown to diminish or blunt learners' attention to emotional aspects of medical care, these may also be subject to some focused intervention. However, only by addressing such issues

at both the individual (teacher–learner) and structural (learning environment) levels are such efforts likely to be effective and sustainable.

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