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# Development of emotional intelligence in a team-based learning internal medicine clerkship

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## Abstract

**Background:** Although increasing number of articles have been published on team-based learning (TBL), none has explored team emotional intelligence.

**Aim:** We extend the literature by examining changes in team emotional intelligence during a third year clerkship where TBL is a primary instructional strategy. We hypothesized that team emotional intelligence will change in a positive direction (i.e., increase) during the clerkship.

**Method:** With IRB approval, during the 2009–2010 academic year third-year students in their internal medicine clerkship ( $N=105$ , 100% response rate) completed the Workgroup Emotional Intelligence Profile – Short Version (WEIP-S) at the beginning and at the end of their 12-week clerkship. TBL is an instructional strategy utilized during the internal medicine clerkship.

**Results:** Paired t-tests showed that team emotional intelligence increased significantly pre to post clerkship for three of the four areas: awareness of own emotions ( $p=0.018$ ), recognizing emotions in others ( $p=0.031$ ), and ability to manage other's emotions ( $p=0.013$ ). There was no change for ability to control own emotions ( $p=0.570$ ).

**Conclusion:** In an internal medicine clerkship, where TBL is utilized as an instructional strategy, team emotional intelligence increases. This supports TBL as an adjunctive tool to traditional medical education pedagogy.

## Introduction

Business schools have long recognized that students skilled in establishing, leading, and working in teams will become more successful and productive employees. The armed forces as well as the aviation industry and numerous emergency management systems use team training to reduce errors and ensure safe working conditions. Since the initial call for teamwork to enhance patient safety (Kohn et al. 2000), several compelling arguments have been made for team training in medical education (Salas et al. 2009; Morrison et al. 2010; Johnson et al. 2011). As the United States continues to cope with rising health care costs, as advanced interventions necessitate specialty training, and as primary care givers are increasingly burdened by shortened patient contact time, physicians must learn to solve complex patient problems as members of effective inter- and intra-disciplinary healthcare teams. The traditional pedagogy of medical education prevailed by didactic, instructor-centered information delivery, however, does not promote the team skills necessary to practice medicine effectively in the twenty-first century (Morrison et al. 2010). Team training is, as a result, being increasingly integrated into formal undergraduate and graduate medical curricula.

Team-based learning (TBL) is a well-defined instructional strategy first developed for large business school classes, which is currently employed to promote active learning in

## Practice points

- Teaching medical students to recognize and manage the emotions in others has proven a difficult undertaking.
- TBL in conjunction with an internal medicine clerkship appears to positively impact team emotional intelligence.
- TBL as an adjunctive tool to traditional medical education pedagogy for clerkship teaching should be considered in terms of its ability to develop students' team emotional intelligence.

medical schools in the United States (Thompson et al. 2007; Michaelsen et al. 2008; Parmelee & Michaelsen 2010, 2012; Haidet et al. 2012) and across the globe (Chung et al. 2009; Davidson 2011; Puthuchery et al. 2011). In TBL, students are required to work as cohesive teams in order to solve a complex set of problems. The development of efficient and collaborative teamwork is, thus, inherent to this active learning process, and the ability of team members to establish roles/responsibilities, understand strengths/weaknesses, manage conflict, and trust one another in the pursuit of a common goal is critical to team performance.

The aforementioned characteristics rely heavily on effective interpersonal communication. Teams must be capable of extracting and integrating the unique knowledge and skills

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of each team member to be successful problem-solving units (Rentsch et al. 2010). Individual members must therefore be able to effectively transfer relevant knowledge to the group as a whole. Indeed, Cooke et al. (2008) contend that externalizing cognition to make unique information useable by all team members improves both team knowledge building and team problem solving. Effective interpersonal communication processes that promote sharing and discussing information is essential for high-level team performance and sound decision making (Salas et al. 2008).

Several studies suggest that emotional intelligence is an important factor in effective interpersonal communication (Kelly & Barsade 2001; Jordan & Lawrence 2009). Mayer & Salovey (1997) describe four abilities that underlie emotional intelligence: The perception of emotion in oneself and others (emotional awareness), the appraisal of these complex emotions (emotional understanding), the organization and regulation of emotions in oneself and others (emotional management), and the integration of these emotions to facilitate thought and performance (emotional facilitation). Such abilities are critical for effective relationships among team members (Jordan & Troth 2004), appropriate conflict resolution (Jehn & Mannix 2001; Jordan & Troth 2004), high quality information exchange/decision-making (Pelled et al. 1999), and, ultimately, improved team performance (Jordan & Lawrence 2009) (see also Table 1). Emotional intelligence has also proven to be important in the physician–patient relationship, with a positive association between emotional intelligence score and patient trust and satisfaction (Weng et al. 2008). In light of this growing body of research, a recent systematic review explored the relationship of emotional intelligence and the competencies set forth for medical education by the Accreditation Council for Graduate Medical Education (ACGME) (Arora et al. 2010). The authors concluded that emotional intelligence correlated with the ACGME competencies and suggested that the fostering of emotional

intelligence-related skills should be incorporated in medical training curricula in order to improve educational and clinical outcomes.

Team-based learning is a potentially powerful active learning tool by which emotional intelligence can be cultivated in medical education. Previous studies on TBL demonstrate improved learner engagement (Haidet et al. 2004; Kelly et al. 2005; Chung et al. 2009), improved learner satisfaction (Vasan et al. 2009; Deardorff et al. 2010), and similar overall knowledge gains with particular benefit for lower-performing students (Nieder et al. 2005; Koles et al. 2005, 2010) when compared to other education modalities. While many studies examining the efficacy of TBL exist, educational researchers are yet to explore the relationship of TBL and emotional intelligence. Recently, the short version of the Workgroup Emotional Intelligence Profile (WEIP-S) was developed and validated as a measure for examining emotional intelligence in teams (Jordan & Lawrence 2009). Here, we used this measure to examine the relationship of TBL and team emotional intelligence in a third year internal medicine clerkship. We hypothesized that team emotional intelligence will change in a positive direction (i.e., increase) during the clerkship.

## Method

### Procedures

TBL has been utilized as an instructional strategy in the Internal Medicine Clerkship at the Wright State University Boonshoft School of Medicine (WSU BSOM), a required 12-week clerkship offered four times per year. The clinical experiences for this clerkship include 4 weeks of outpatient service in community-based primary care offices and 8 weeks of inpatient service in community-based hospitals. Pertaining to the current study, students in the clerkship convened weekly on selected afternoons for “Academic Half Days,” in which clinical experiences are supplemented by TBL modules that address concepts from various internal medicine subspecialties (e.g., cardiology, pulmonology, rheumatology, etc.).

Team assignments were made in random fashion at the start of the clerkship by the clerkship coordinator and maintained until the end of the 12-week rotation. Each TBL module can be divided into four separate components: (1) *advanced preparation*: Required readings are assigned prior to the academic half day; (2) *individual readiness assurance*: Students are administered a test composed of 10 multiple choice questions (MCQs) covering advanced preparation assignment; (3) *group readiness assurance*: All teams are administered the same 10 MCQ test, a group score is generated, and correct answers are discussed; (4) *application exercise*: All teams work through challenging cases with whole class discussion and debate on team choices. The TBL strategy ensures that students receive immediate feedback on the readiness assurance tests, are forced to reach team consensus on application exercises, and simultaneously report and defend their team decisions. Individual and team scores are incorporated into each student’s clerkship grade, and a high level of team functioning as well as effective interpersonal

**Table 1.** The four general domains of emotional intelligence and their relation to team performance.

Domain	Contribution to team performance
<i>Awareness of own emotions</i>	Abilities subserve appropriate emotional responses to intense emotional triggers and thereby allow for more effective communication with team members (Lane et al. 1998; Wolff et al. 2002).
<i>Recognizing emotions in others</i>	Abilities are fundamental to accurately assess other’s emotions and are important in overcoming one’s own negative responses to other’s emotions such that one deals effectively with other team members effectively (Mayer & Salovey 1997; Mischel & DeSmet 2000; Jordan et al. 2006).
<i>Managing others’ emotions</i>	Abilities allow one to encourage positive emotions in teams, and thereby promote positive interaction among team members (Barsade 2002).
<i>Control of Emotions</i>	Abilities underlying self-regulation and are important for conflict resolution as well as for maintaining high cognitive function during emotion evoking situation (Jordan & Troth 2004; Drevets & Raichle 1998).

Adapted from Jordan and Lawrence (2009)

communication by all individuals is critical to strong performance in TBL modules.

With institutional review board approval, as part of the study institution's continuing evaluation process of TBL, students in the internal medicine clerkship ( $N=105$ ; 100% response rate) provided consent and were given the WEIP-S at the beginning and end of the 12-week clerkship during the 2009–2010 academic year.

### Measures

The Workgroup Emotional Intelligence Profile (WEIP-S) (Jordan & Lawrence 2009) inventory was selected for this study as it provides a short, easy to use, public domain, self-report, and workplace-based measure of emotional intelligence specifically designed to assess team-based behaviors. Reliability statistics demonstrate high construct validity for each of the four subscales (Cronbach's  $\alpha = 0.77-0.86$ ) through a series of tests: Scale evaluation, discriminate validity, construct replication across samples, reliability, and test-retest stability (Jordan & Lawrence 2009). The inventory consists of 16 questions with Likert-type responses ranging from strongly disagree to strongly agree on a 1–7 scale, organized into four distinct constructs that approximate the Mayer and Salovey (1997) model of emotional intelligence: (1) *awareness of own emotions*: Examines respondents ability to disclose their own emotions; (2) *control of own emotions*: Examines respondents' ability to control their emotional responses; (3) *recognize emotions in others*: Examines respondents' ability to read non-verbal messages in their team members; (4) *manage others' emotions*: Examines respondents' ability to positively influence others. WEIP-S is therefore based on abilities that are vital to team interaction and assesses the ability of individuals to work with others in a team in an interpersonally effective way (Jordan & Lawrence 2009). Scoring the WEIP-S requires calculating domain scores for each of the four emotional intelligence constructs. Domain scores are calculated by averaging the four individual survey items on the WEIP-S that comprise the specific domains. For example, to calculate the domain score for construct of *Awareness of Own Emotions*, items 2, 4, 10, and 13 are averaged yielding a domain score for that construct.

### Results

Paired t-tests ( $p < 0.05$ ) using domain scores for each emotional intelligence construct showed that team emotional intelligence increased significantly pre to post clerkship for three of the four areas: Awareness of own emotions ( $p=0.018$ ), recognizing emotions in others ( $p=0.031$ ), and ability to manage other's emotions ( $p=0.013$ ). There was no change for ability to control own emotions ( $p=0.570$ ). See Table 2.

### Discussion

A variety of conceptualizations and measures of emotional intelligence exist in psychological and business literature, making it difficult to provide an operational definition

(Van Rooy & Viswesvaran 2004; Arora et al. 2010). The concept is typically credited to Salovey and Mayer (1990), who set forth a framework defining emotional intelligence as a "subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions." While some researchers have maintained emotional intelligence is a cognitive ability, hence the word "intelligence", others have treated it as a personality trait encompassing various social and emotional competencies. Conceptual disparities aside, emotional intelligence is fundamentally a multidimensional, psychological construct clustered within a small number of organizing domains that links affect with cognition and socialization. More important, emotional intelligence has been correlated with personal growth and improved social interactions (Jordan & Lawrence 2009; Clarke 2010).

We describe here, using an ability conceptualization of emotional intelligence paired with a newly developed self-report measure (WEIP-S), the relationship of TBL and emotional intelligence in a third year internal medicine clerkship. The WEIP-S inventory collects responses to 16 items, organized around the Mayer and Salovey (1997) four-domain construct, measuring behaviorally based emotional awareness and emotional management abilities in team settings. Our study indicates that emotional intelligence increases significantly from pre- to post-clerkship for three of the four domains: *Awareness of own emotions*, *recognize emotions in others*, and *manage others' emotions*. The fourth domain, *control of own emotions*, did not change significantly.

To successfully recognize and manage others' emotions is an aptitude of particular importance in medical practice, as it plays a large role in the notion of empathy. Medical schools have long recognized the importance of empathy in improving patient care through increased professionalism and enhanced communication. However, teaching students to recognize and manage the emotions in others has proven a difficult undertaking. In fact, numerous studies have shown a generalized decline in empathy throughout medical school (Spencer 2004; Chen et al. 2007; Newton et al. 2008). The results of the current study suggest that TBL in adjunct to a traditional internal medicine clerkship may foster the development and growth of empathetic skills, potentially leading to improved physician-patient relationships and superior care.

**Table 2.** Results of t-test for WEIP-S scales.

Domain	Mean	N	SD	$p$
Pre-aware	17.36	105	7.120	0.018*
Post-aware	18.54	105	7.307	
Pre-control	21.43	105	7.846	0.570
Post-control	21.69	105	7.970	
Pre-recognize	17.89	105	6.821	0.031*
Post-recognize	18.84	105	5.741	
Pre-manage	17.70	105	6.870	0.013*
Post-manage	18.85	105	7.277	

Note: \*significant at  $p < 0.05$ .



Emotional self-awareness refers to the ability to reflect on the emotions experienced and understanding strengths and weaknesses. It may be argued that underlying the ability to interpret and manage others' emotions in a team setting, one must accurately self-assess one's own values, beliefs, and preconceived notions. In this sense, emotional awareness is the cornerstone of emotional intelligence. While this study demonstrated an increase in the awareness of one's own emotions, there was not a parallel increase in the ability to control these emotions. It is difficult to interpret the meaning behind this dichotomy. It may be that the study population, while able to increase awareness of emotions as well as recognize and manage them during the internal medicine clerkship, remained unable to increase their ability to control or self-regulate emotions. This perhaps is an advanced level skill of which the internal medicine clerkship TBL activities did not challenge or foster. Or it may be that the study population, which had two years of TBL curriculum by the time of data collection, was already advanced in controlling one's impulsive responses. Normative data suggests that the WEIP-S domain of ability to *control one's own emotions* are higher on average than the remaining three domains: *Awareness of own emotions*, *recognizing emotions in others*, and *managing emotions in others*.

The ability model of emotional intelligence implies that individual variation in affective information processing reflect differences in specific learned competencies (Lewis et al. 2005; Grewal & Davidson 2008; Arora et al. 2010). Indeed, there is strong consensus in the literature that emotional intelligence is a developable and, therefore, teachable skill set (Goleman 1995; Cooper 1997; Steiner 1997; Dulewicz & Higgs 2000). Our results support this general notion and extend them to team training in undergraduate medical education. Combining this ability model with the theoretical framework of Mayer and Salovey (1997), Grewal and Davidson (2008) speculate, as we suggest, emotional intelligence underpins the learned ACGME competency *interpersonal and communication skills*. Similarly, in their systematic review of emotional intelligence in the context of ACGME competencies, Arora et al. (2010) provide evidence that "higher emotional intelligence is positively associated with more compassionate and empathic patient care (*patient care*), higher scoring assessments of knowledge (*medical knowledge*), and effective coping with organizational leadership (*practice-based learning and improvement* and *systems-based practice*). . . . [emotional intelligence] also contributed to improved teamwork and doctor-patient communication (*interpersonal and communication skills* and *professionalism*)." Thus, there is a clear linkage between emotional intelligence and the ACGME competencies, particularly those underlying success in teams (i.e.: *Interpersonal and Communication Skills*).

Fundamental to much of the research on emotional intelligence in the field of business and organizational management is the proposition that there exists differential achievement in organizational settings unaccounted for by traditional measures such as IQ tests (Dulewicz & Higgs 2000). This posit can be extended to medical practice in which emotional intelligence underlies differing levels of success in acquiring ACGME competencies relating to team skills.

The challenge in medical education, therefore, is to identify those factors which help or hinder the development effective clinical skills. Team training that strengthens specific emotional intelligence aptitudes may provide a foundation upon which medical students can learn to practice as effective members of patient care teams. Here we provide evidence that a clerkship supplemented by TBL is an effective way in which to offer such training.

Limitations for this study include that data are from a single class of medical students and future studies should further examine this relationship across other institutions to increase generalizability. TBL is used extensively in the WSU BSOM preclinical curriculum as well as in other required clerkships. Students in this study, therefore, have extensive participatory experience in TBL. Additionally, an ability conceptualization of emotional intelligence when paired with a self-report measure can be inherently problematic as data objectivity can be reduced by social desirability and ego protection. However, because the WEIP-S uses a format in which respondents reflect upon their specific *behavior* while working in teams, rather than abstract behavioral preferences, we believe it is a useful measure indicative of emotional intelligence in a team setting (for further validation of the WEIP-S, see Jordan & Lawrence, 2009). It is difficult to separate the differing affects of the TBL course and the internal medicine clerkship experiences as a whole on emotional intelligence; therefore, future studies may study and compare these variables separately.

In conclusion, this study suggests that TBL in conjunction with an internal medicine clerkship positively impacts emotional intelligence. This further potentiates the application of TBL as an adjunctive tool to traditional medical education pedagogy.

**Declaration of interest:** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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JEREMY A. MOORE, MD, was a fourth-year medical student at the Wright State University Boonshoft School of Medicine at this time of this project. He graduated in May 2012.

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