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## Empathy, self-reflection, and curriculum choice

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## Empathy, Self-Reflection, and Curriculum Choice

### Cover Page Footnote

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# THE INTERDISCIPLINARY JOURNAL OF PROBLEM-BASED LEARNING

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## ARTICLE

### Empathy, Self-Reflection, and Curriculum Choice

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We administered the Jefferson Scale of Empathy and the Groningen Reflection Ability Scale to 61 of 64 entering medical students who self-selected a problem-based learning curricular track and to 163 of 198 who self-selected a lecture-based track (response rates of 95.3% and 82.3%, respectively, with no statistically significant differences in mean age or sex). Mean empathy and self-reflection ability scores were significantly higher among students who chose problem-based learning. Women scored higher than men in empathy. Women choosing problem-based learning had the highest empathy scores. Studies comparing students' performance and achievements in different curricular tracks should consider differences in personal characteristics such as capability for empathy and self-reflection that may cause students to prefer one pedagogic approach over another and affect their outcomes.

Keywords: empathy, self-reflection, problem-based learning, curricular choice, students, medical

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Problem-based learning has captivated medical educators for decades, resulting in a global body of literature that researchers can explore. These studies made possible systematic reviews, meta-analyses, and meta-syntheses of meta-analyses (Albanese & Mitchell, 1993; Berkson, 1993; Colliver, 2000; Dochy, Segers, Van den Bossche, & Gijbels, 2003; Gijbels, Dochy, Van den Bossche, & Segers, 2005; Hartling, Spooner, Tjosvold, & Oswald, 2010; Kalaian, Mullan, & Kasim, 1999; Newman, 2003; Strobel & van Barneveld, 2009; Vernon & Blake, 1993; Walker & Leary, 2009). Findings show that students enrolled in traditional curricula tend to perform better on basic science assessments, and students enrolled in problem-based learning curricula tend to perform better in clinical and communication skills. However, in a recent systematic review of problem-based learning in undergraduate, preclinical medical education, Hartling et al. (2010) could not find unequivocal support for the effects of problem-based learning on knowledge acquisition or other outcomes regarding enhanced learning.

Studies investigating whether problem-based learning fosters students' deep learning have been inconclusive, partly owing to the complexity of elements that can influence students' learning, such as individual personality characteristics. Dolmans and Gijbels (2013, p. 216) point out the need for further investigations of "the interaction between varia-

tions in the implementation of PBL and the variation in students' personality profiles." They argue that understanding students' profiles "could give insight into how we can support students to become deep and intrinsically motivated, self-regulating learners" (Dolmans & Gijbels, 2013, p. 216). They even challenge researchers to study "how the different elements of a PBL environment can be optimized for what kind of student, under which conditions and why" (Dolmans & Gijbels, 2013, p. 217).

This study focused on the "kind of student" variables suggested by Dolmans and Gijbels (2013). Entering medical students are expected to be capable of empathy and self-reflection and to develop those abilities further during their education and practice. These are essential ingredients for developing self-awareness and sustaining therapeutic physician-patient relationships (Hojat, 2007; Inui, 2003; Novack, 1987; Rogers, 1946; Rogers, 1975; Rogers, 1979) and are interdependent qualities of a competent physician (ABIM Foundation, 2002; Association of American Medical Colleges & Howard Hughes Medical Institute Committee, 2009; Coulehan, 2005; Epstein, 1999; Epstein, 2003; Epstein & Hundert, 2002; General Medical Council, 2009; Inui, 2003; Novack et al., 1997). We searched the literature and found no published studies associating choice of curricular format and medical student capability for empathy and self-reflection. We hypothesized

that empathy and self-reflection are among the personal characteristics that affect medical students' achievements in different curricular tracks and that problem-based learning, by its interactive nature, attracts students who are more capable of empathic engagement and understanding self and others, as measured by self-reflection. These qualities are necessary to successfully interact in groups that require a high level of interpersonal skills, collaboration and peer feedback. If there were differences in empathic and self-reflective abilities between students who choose a problem-based learning curriculum and those who choose a lecture-based curriculum, these differences might help explain the variations in outcomes of problem-based learning and refute the "one size fits all" notion of problem-based learning.

Students entering Drexel University College of Medicine are free to choose between two different, preclinical curricular tracks. One is lecture based and organized around symptom complexes. The other is a problem-based, small group track organized around a series of patient case histories (Schindler, Landau, Novack, Russo, & Smith, 2010).

Before beginning their medical studies, all students receive materials and presentations thoroughly describing both curricular tracks, and they choose the track that best suits their learning styles. The lecture/organ system-based Interdisciplinary Foundations of Medicine curriculum (IFM) is chosen by the majority of medical students (usually about 200 students). Clinical symptoms, symptom groups and cases provide the framework for an interdisciplinary presentation of curriculum content using symptom-based modules of varying length. Basic science and clinical faculty present information from the biomedical, psychosocial and clinical sciences in a lecture-based format. Discipline-specific and integrated lectures, laboratory sessions, small group sessions with both basic science and clinical faculty, and community-based clinical experiences are an integral part of the curriculum. The first-year clinical skills course, which meets 20 times throughout the entire first year, provides teaching in small groups of 9 or 10 students led by faculty and fourth-year student co-facilitators. This course focuses on learning the skills of medical interviewing, psychosocial aspects of patient care, professionalism, and self-awareness in the service of enhancing patient care.

The Program for Integrated Learning (PIL), established in 1992, provides an alternative to a lecture-based curriculum. It is a smaller curricular track that on average is usually chosen by about 60 students. The PBL curriculum focuses on Barrows and Tamblyn's (1980) writings using a small group of about eight students, in which students study clinical cases using a classic problem-based format (Donner & Bickley, 1993). Guided by a faculty facilitator, students create questions framed as learning issues then present the discussion

around these issues to each other. In this style they create concept maps integrating basic, behavioral, and clinical sciences. The case material and faculty facilitator guides ensure through a series of cases that all of the basic sciences are mastered in an integrative manner, including behavioral sciences, community and preventive medicine, women's health, medical ethics, communication, history taking and physical diagnosis. Small group material is supported with resource sessions by faculty in a lecture format and self-study modules and labs. To further support self-directed learning, students spend three afternoons a week for the last six weeks of the course in a clinician's office developing their own cases. They present their own learning issues and concept maps to clinical and basic science faculty members. PIL students learn teamwork and begin to develop the professional skills required to interact with patients and colleagues, including the ability to give and receive feedback. The curriculum is structured to provide a context for students to develop life-long, independent learning skills.

This unusual arrangement of dual curricular tracks provided us the opportunity to compare student characteristics. We conducted this study to assess whether choice of curricular track is associated with empathy and self-reflection among first-year medical students.

## Methods

### Study Design and Participants

We conducted a cross-sectional, descriptive study of first-year medical students during the first week of classes in August 2011 at Drexel University College of Medicine. A total of 224 of 262 entering first-year students (85%) participated in the study, including 61 of 64 students who self-selected the problem-based track (95.3% response rate) and 163 of 198 who self-selected the lecture-based track (82.3% response rate).

### Data Collection

We collected data using a self-administered questionnaire. Identifying information included age, sex, last four numbers of social security number, and curricular track (lecture- versus problem-based learning).

### The Jefferson Scale of Empathy

The Jefferson Scale of Empathy was developed to measure empathy among medical students, physicians, and health professionals (Hojat, Gonnella, & Maxwell, 2009a; Hojat et al., 2002b; Hojat et al., 2001; Hojat, Mangione, Nasca, Gonnella, & Magee, 2005a) and has been translated into 42 languages and used in more than 60 countries (Hojat et al., 2009a). The scale

comprises 20 items, rated by the students on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Scores can range from 20 to 140, and persons with a more empathic orientation obtain higher scores (Hojat et al., 2005b). Extensive data in support of the psychometrics of the Jefferson Scale have been reported (Hojat, 2007).

### The Groningen Reflection Ability Scale

The Groningen Reflection Ability Scale is a one-dimensional scale to measure personal reflection (Aukes, Geertsma, Cohen-Schotanus, Zwierstra, & Slaets, 2007). It has 23 items rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Scores on the Groningen can range from 23 to 115, and persons with greater abilities for personal reflection have higher scores on the scale.

### Ethical Approval and Procedures

During introductory sessions of the lecture- and problem-based communication courses, we explained the purpose of the study (to assess students' empathy and ability for personal reflection) and invited students to participate in the study. Those who agreed to participate signed an informed consent form and completed the questionnaires. Drexel University's Institutional Review Board for Human Experimentation (University Protocol #1109000192) approved this study.

### Data Analysis

We calculated the standard error of percentages to verify whether there were differences in the percentages of students by sex in the two curricular tracks. We used the Student *t*-test to verify whether there was any significant difference in ages between students in the two curricular tracks. We calculated means and standard deviations of scores on the Jefferson Scale of Empathy and the Groningen Reflection Ability Scale by curricular track choice and by age and sex and determined the standard error of the difference between means to examine whether there was a significant difference between them (Swinscow, 1997). To measure the effect size we used Cohen's *d* [calculated by subtracting mean<sub>group1</sub> from mean<sub>group2</sub> divided by pooled Standard Deviation (SD)]. We calculated the Cronbach alpha coefficient to verify the reliability of the scales. We investigated the correlation between the Jefferson Scale of Empathy and the Groningen Reflection Ability Scale. Finally, we calculated the Pearson product-moment correlation coefficient and the coefficient of determination to examine how much variance they shared.

## Results

Seventy-nine women (48.5%) and 84 men (51.5%) were in the lecture-based student group and 30 women and 30 men

(50% each) were in the problem-based group. There were no sex differences between the groups ( $p > .05$ ). One student in each of the two groups did not specify sex. The mean age of all participants was 24.1 years (standard deviation 2.6). The mean ages and standard deviations were 23.9 years (2.5) and 24.5 years (2.6) among students in the lecture- and problem-based tracks, respectively, with no statistically significant difference between groups ( $p > .05$ ).

Mean scores on the Jefferson Scale of Empathy were higher in students in the problem-based curricular track than in those in the lecture track; were higher in women than in men in the problem-based track; and were higher in women than in men overall, regardless of curricular track (Table 1). Mean scores on the Groningen Reflection Ability Scale were higher in students in the problem-based track (Table 2).

Cronbach alpha values for the Groningen and Jefferson scales were 0.80 and 0.84, respectively; the Groningen and the Jefferson scales were moderately correlated ( $\rho = 0.498$ ,  $p < .01$ , with a shared variance of 24.8%).

## Discussion and Conclusions

We found significant differences in empathy and self-reflection ability scores in favor of students who chose the prob-

*Table 1.* Jefferson Scale of Empathy scores of 223 incoming students by choice of curriculum track (lecture- or problem-based) and sex (Drexel University College of Medicine, 2011).

Sex	Number	Mean score (SD)
<b>Lecture based</b>		
Men	84	112.4 (11.9)
Women	79	115.7* (10.0)
Total	163 <sup>†</sup>	114.0 <sup>‡</sup> (11.1)
<b>Problem based</b>		
Men	30	116.0 (10.0)
Women	30	120.0* (7.3)
Total	60	118.0 <sup>‡</sup> (8.9)
<b>Total</b>		
Men	114	113.3 <sup>§</sup> (11.5)
Women	109	116.9 <sup>§</sup> (9.5)
Total	223	115.1 <sup>‡</sup> (10.7)

SD = standard deviation.

\*Significant difference between women's scores in lecture- and problem-based tracks,  $p < .05$ , Cohen's *d* (d) = 0.5.

<sup>†</sup>One student did not complete the Jefferson Scale of Empathy.

<sup>‡</sup>Significant difference between scores of students who chose lecture- or problem-based tracks,  $p < .05$ ,  $d = 0.3$ .

<sup>§</sup>Significant sex differences in total scores,  $p < .05$ ,  $d = 0.3$ .



Table 2. Groningen Reflection Ability Scale scores of 219 incoming students by choice of curriculum track (lecture- or problem-based) and sex (Drexel University College of Medicine, 2011).

Sex	Number	Mean score (SD)
<b>Lecture based</b>		
Men	83	91.8 (8.0)
Women	77	92.2* (8.5)
Total	160 <sup>†</sup>	92.0 <sup>‡</sup> (8.2)
<b>Problem based</b>		
Men	30	93.0 (8.1)
Women	29	96.3* (6.5)
Total	59 <sup>§</sup>	94.6 <sup>‡</sup> (7.5)
<b>Total</b>		
Men	113	92.1 (8.0)
Women	106	93.3 (8.2)
Total	219	92.7 (8.1)

SD = standard deviation.

\*Significant difference between women's scores in lecture- and problem-based curriculum tracks,  $p < .01$ , Cohen's  $d$  ( $d$ ) = 0.5.

<sup>†</sup>Three students did not complete the Groningen Reflection Ability Scale.

<sup>‡</sup>Significant difference between scores of students who chose lecture- and problem-based curriculum tracks,  $p < .05$ ,  $d = 0.3$ .

<sup>§</sup>One student did not complete the Groningen Reflection Ability Scale.

lem-based learning track. Women in this group had higher scores on the Jefferson Scale of Empathy. Higher empathy scores among women are consistent with results published in the literature (Berg, Majdan, Berg, Veloski, & Hojat, 2011; Chen, Lew, Hershman, & Orlander, 2007; Hojat, 2007; Hojat et al., 2002a; Hojat et al., 2002c; Hojat et al., 2009b; Kataoka, Koide, Ochi, Hojat, & Gonnella, 2009; Magalhães, Salgueira, Costa, & Costa, 2011; Neumann et al., 2011; Rosenthal et al., 2011; Rueckert & Naybar, 2008).

These findings show that previously unrecognized differences must be considered when the efficacy of lecture- and problem-based tracks in medical curricula is evaluated. If a student does not have the opportunity to choose the curricular track that best suits his or her personal characteristics, the student may not perform as well as he or she might in the other curricular track. In other words, the success of a student in a problem-based learning track may rely on certain personal attributes, among them greater empathy and self-reflection. In addition, interpretation of students' performance may be biased because, for example, one might erroneously conclude that problem-based learning produces students who are more empathic and self-reflective, when in fact they may come to the program with baseline differences.

Mean scores on the Jefferson Scale of Empathy were high among all first-year students in the present study, in the range reported among first-year medical students from other medical schools in the United States and in other countries (Chen et al., 2007; Hojat, 2007; Hojat et al., 2009b; Kataoka et al., 2009; Magalhães et al., 2011). The shared variance (25%) between the Groningen and Jefferson scales was not high enough to indicate that the two measures are redundant but at the same time it was not so low as to indicate that the two measures are independent. We would expect to find some relationship between them, because they share elements in the definitions of empathy (i.e., understanding another person's experiences, concerns, and suffering) (Hojat et al., 2002c) and self-reflection (i.e., appraisal of one's own and other people's experiences) (Aukes et al., 2007).

Limitations of this study include the fact that it is a single-institution study, which limits the external validity (generalization) of the findings. This limitation can be mitigated by the fact that Drexel University College of Medicine is typical of most 4-year allopathic medical schools in the United States with regard to geographic distribution of students. Also, in any self-reported survey, social desirability bias is possible. However, this is not highly likely in this study because of the nonpenalizing testing situation. Although we did not achieve a perfect response rate, our relatively high rate of 85.5% is in an acceptable range for survey research. Despite the aforementioned limitations, our preliminary findings are interesting in suggesting that empathy and self-reflection are associated with the choice of educational curriculum even if the effect size estimates were moderate.

More studies are needed to strengthen the external validity (generalizability) of these findings. Complementary qualitative studies could also be undertaken to better understand the underlying reasons students select a particular curricular track. Also, more studies are needed to clarify the importance of incremental differences in the Jefferson Scale of Empathy and the Groningen Reflection Ability Scale and the interactions between these two constructs. Of course, empathy and self-reflection are critical abilities for all clinicians, and medical curriculum planners should work to develop these abilities in their trainees.

In future research, it is also desirable to examine pretest-posttest differences on empathy and self-reflection in students who choose to pursue different curriculum tracks to see which curriculum is more beneficial to students in enhancing, or decreasing their scores on empathy and self-reflection. This is important in light of the findings that empathy tends to erode during medical school (Hojat, et al., 2009b).

In conclusion, students have differences in empathy and self-reflective abilities, and differing personal characteristics may influence them to prefer one pedagogic approach over



another and may affect their outcomes. Studies comparing students' performance and achievements in different curricular tracks should take these findings into consideration, as there is no "one size fits all" pedagogy.

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The authors would like to thank all students who participated in this study by completing the Jefferson Scale of Empathy and the Groningen Reflection Ability Scale; Tony LaDuca, PhD; Diana Winters, Drexel University College of Medicine, Academic Publishing Services, for editorial assistance; and the Medical Sciences Postgraduate Program and Department of Pediatrics of the Universidade Federal de Santa Catarina (Federal University of Santa Catarina, Brazil) for their support to the first author. Funding/support was provided by REUNI project, Universidade Federal de Santa Catarina, Brazil, postdoctoral scholarship (SG). Ethical approval was provided by the Institutional Review Board of Drexel University College of Medicine approved this study.

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