Changes in Dental Student Empathy During Training


Abstract: Because empathic patient interactions by dentists are associated with improved patient outcomes, self-reported declines in empathy during dental student training are a concern. This study examined differences in empathy in 178 dental students at the University of Toronto and the University of Western Ontario from years one through four using an anonymous self-report web-based survey in a cross-sectional design. To localize the effects of training on empathy, an instrument that separately evaluated emotive (Emo) and cognitive (Cog) types of empathy in both personal (Per) and professional (Pro) contexts was developed, using items modified from previously validated scales and resulting in an empathy scale with four thirteen-item subscales (Per-Emo, Per-Cog, Pro-Emo, Pro-Cog). The response rate was 36.5 percent, and all subscales showed good reliability and validity. A 2x2x4 mixed design ANOVA tested differences in mean scores among the four subscales across the four years of training. Following a significant three-way interaction, subanalyses demonstrated no significant effects in the Per-context, but a significant year by empathy-type interaction in the Pro-context. Post hoc analyses of Pro measures indicated year three emotive empathy scores were significantly lower than earlier years, whereas years three and four cognitive empathy scores were significantly higher. This isolated decrease in Pro-Emo empathy with an increase in Pro-Cog empathy is consistent with the development of “professional empathy,” described elsewhere as detached concern.

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The concept of empathy in health care fields is diverse, but most likened to ideas of compassion, thoughtfulness, attentiveness, and caring, all of which culminate in a desirable type of “chairsid manner” that generates understanding and produces positive rapport with patients. It is considered essential to the notion of patient-centered care: to what degree can a patient’s best interests be served if the caregivers know relatively little about the patient’s world, values, or interests?1

Medical research has shown that the use of a “warm, empathic style” by physicians during communications with patients is associated with improved treatment outcomes2 such as increased compliance with medical recommendations,3,4 decreased pain,5 and reduced recovery time,6,7 as well as increased patient satisfaction8,9 and decreased medical litigation.10,11 The literature in dentistry reflects similar trends as those noted in medical practice. Specifically, the demonstration of empathy by dentists has been correlated with decreased dental fear,12-14 increased compliance with orthodontic treatment,15 improved treatment success and cooperation in pediatric patients,16,17 improved treatment outcomes in myofacial pain,18 and increased patient satisfaction.13,18,19

Considering the evidence relating empathy to desired therapeutic and patient outcomes, it is a potential concern that empathy may be declining in medical and dental students. Authors have lamented the “erosion” of empathy20-23 in anecdotal reports that describe the presence of cynicism and lack of compassion in medical students, residents, and practicing physicians.24,25 More recently, empirical studies that directly address the question of changing physician empathy suggest that empathy declines among medical students during training.26-28 Researchers
have similarly found that first-year dental students have significantly higher empathy scores than students in any of the subsequent three years of dental school.29

One of the challenges in measuring empathy among health care professionals is the abundant descriptions of empathy from the various domains of psychology30-33 and neuroscience.34 Although many formal descriptions of empathy exist, a concise agreed-upon definition of empathy is still lacking. A common or vernacular definition describes empathy as “the vicarious experience of the thoughts, feelings, and attitudes of another.”35 In the health care setting, empathy is further defined as “perceiving the internal frame of reference of another with accuracy as if one were the other person without ever losing the ‘as if’ condition.”36 Most experts agree that empathy is a multidimensional construct, comprised of both emotive (reflexive feeling) and cognitive (imaginative thought) processes.37 According to Davis’s social-psychological definition of empathy,37 emotive processes reflect a person’s overall “emotional reactivity.” In other words, emotive empathy involves the intuitive awareness of another’s feelings without directly joining in the patient’s full emotional experience. In comparison, Davis describes cognitive processes as an ability to take on another person’s mental “point of view.” This involves stepping outside one’s own perspective to consider another person’s thoughts or attitudes given that person’s individual circumstances. Together, these emotive and cognitive processes reflect a person’s overall willingness to suppress his or her own emotions and thoughts in order to feel and imagine what it is like to be “in another person’s shoes.”

Empathy in health care has been further characterized variously as an interpersonal process, individual ability, trait, or state.38 Most information on the nature and course of empathy in health care professionals comes from its assessment as a trait-like construct, with data derived from self-reported pen and pencil tests in which a subject responds to a series of questions. Two such measures dominate the educational literature in detailing empathy changes through health professional training: the Interpersonal Reactivity Index (IRI)39 and the Jefferson Scale of Physician Empathy, Healthcare Professional (JSPE-HP).40 Unfortunately, these validated measures are framed in specific contexts: either the generic (personal) context, as in the IRI, or the clinical (professional) context, as in the JSPE-HP. No measure exists that examines both of these contexts concurrently, and it is therefore unknown if the observed decline in empathy overlaps all contexts, both personal and professional, or if it is directed specifically towards interactions with patients. Additionally, it is unclear from existing studies exactly what types of empathy are in decline: although the JSPE-HP examines empathy predominantly in a clinical context, it does not explicitly define cognitive and emotive types of empathy. Measuring the emotive and cognitive dimensions in a clear, balanced method is likely to be of importance in understanding the nature of the reported declines. To address these deficits in our understanding of student empathy, our study was conducted to determine if the observed decline in empathy in dental students is localized to 1) patient encounters and 2) specific types of empathy. We hypothesized that changes in dental student empathy would be localized to the emotive type of empathy in the professional context. We believed this may be true based on previous reports of a phenomenon described as “detached concern,” by which medical students show attenuation of emotional responsiveness towards patients during physician training.41

**Methods**

Since no existing empathy scale simultaneously measures emotive and cognitive dimensions of empathy in both professional and personal contexts, a new empathy scale was required to meet the study objectives. A composite empathy scale was therefore constructed from a series of validated items from scales reported in the literature. To identify scales used to measure empathy, an exploratory search through the online database Web of Science was conducted using the key words “empathy” and “scale,” with subsequent hand-searching of relevant references. Web of Science is a major multidisciplinary publication database published by the Institute for Scientific Information (ISI) that consists of the Science Citation Index, Social Sciences Citation Index, and Arts & Humanities Citation Index. Items were obtained from the IRI,39 the JSPE-HP,40 the E-scale,42 and the Empathy Quotient-Short.43 The original items from these self-reported empathy scales were subsequently pooled and coded based on the IRI subscale definitions of perspective taking (PT), fantasy scale (FS), empathic concern (EC), and personal distress (PD).

Item exclusion consisted of those with 1) poor compatibility with IRI subscale constructs; 2) predictive or outcome-oriented statements; 3) introspective
statements implying accuracy or effectiveness of empathic understanding; 4) intrapersonal rather than interpersonal item scenarios; 5) poor adaptability to hypothetical situational constructs of both personal and professional empathy; 6) statements relating to judgment of or attitude toward the role of empathy in health care; 7) ambiguous wording; 8) socially desirable wording; and 9) affect-free emotive items. All items coded as FS were excluded, being introspective and intrapersonal and therefore less adaptable to the construct of professional empathy in patient-centered care scenarios, a predominantly introspective and interpersonal activity. PT items were retained for consideration in the cognitive subscale, while EC and PD items were retained for consideration in the emotive subscale.

Following the exclusion process, thirteen items on the cognitive subscale and thirteen items on the emotive subscale were combined and randomized to create a single twenty-six-item empathy scale. As the intent was to develop two parallel forms of an empathy scale for the measurement of personal and professional empathy separately, question transformation was necessary. To complete the “personal context” version of the new twenty-six-item scale, JSPE-HP parent items containing the word “patient” were replaced with the words “friend,” “other,” or “stranger” to reflect personal (generic) scenarios. Similarly, to create the “professional context” version of the empathy scale, parent item phraseology from the IRI, EQ-Short, and E-scale representing generic scenarios utilizing the words “friend,” “other,” or “stranger” were altered to reflect the doctor-patient professional scenario by replacing these words with the word “patient.” These contextual transformations produced two scales (personal and professional context) that together evaluated four dimensions of empathy in students and dentists: personal-emotive (Per-Emo), personal cognitive (Per-Cog), professional-emotive (Pro-Emo), and professional-cognitive (Pro-Cog) (Table 1). Respondents were asked to report on a six-point Likert scale considering frequency of occurrence of thoughts and behaviors from the choices “all of the time,” “most of the time,” “slightly more than half the time,” “slightly less than half the time,” “some of the time,” and “at no time.”

The study sample consisted of 488 dental students throughout the four years of study at the University of Toronto and University of Western Ontario. Following Institutional Review Board approval at the two research sites, students completed an anonymous self-report web-based questionnaire measuring cognitive and emotive empathy types in both personal and professional contexts in a cross-sectional experimental design. Student recruitment followed the Tailored Design Method consisting of five main contacts over a twelve-week period from September to December 2007. Contact consisted of an in-class visit by the principal investigator utilizing a standardized script, followed by six electronic notices spaced two to three weeks apart. Students were invited to a website via a customized URL link to complete the online electronic questionnaire using the application Survey Monkey. In addition to empathy measurement, students were asked to provide demographic information. Dental students with prior experience providing dental services (international dentists qualifying for practice) were excluded to prevent the use of data from students with advanced experience.

Based on the prediction that the observed changes in empathy would be localized to professional contexts and emotive dimensions, inferential statistical comparisons utilized a 2x2x4 mixed design analysis of variance (ANOVA) to test differences between mean scores on the four subscales (Per-Emo, Per-Cog, Pro-Emo, Pro-Cog) across the four years of student training. Type (emotive versus cognitive) and context (personal versus professional) were the within-subjects variables, and training year (one to

<table>
<thead>
<tr>
<th>Personal Context</th>
<th>Professional Context</th>
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<tbody>
<tr>
<td><strong>Emotive Type</strong></td>
<td>I find it hard to feel sorry for other people when they are having problems.†</td>
</tr>
<tr>
<td><strong>Cognitive Type</strong></td>
<td>I find it hard to feel sorry for my patients when they are having problems.‡</td>
</tr>
<tr>
<td><strong>Cognitive Type</strong></td>
<td>I try to understand people better by imagining how things look from their perspective.††</td>
</tr>
<tr>
<td><strong>Cognitive Type</strong></td>
<td>I try to understand my patients better by imagining how things look from their perspective.§</td>
</tr>
</tbody>
</table>

†Per-Emo, ‡Per-Cog, §Pro-Emo, ¶Pro-Cog

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four) was the between-subjects variable. Interactions between empathy context and type and year of training were subsequently explored using two separate 2x4 ANOVAs utilizing type as a within-subjects variable and training as a between-subjects variable. The presence of significant interaction within an isolated context merited further exploration using one-way ANOVA to examine for differences within each empathy type by year of training (between-subjects variable). This was followed by post hoc analysis using Least Squares Difference (LSD) to localize these differences in order to ascertain the direction and magnitude of changes in empathy among training years. All data analysis for this survey was conducted using the statistical software package SPSS version 15.0 for Windows.

Results

Of the 488 students recruited, 178 completed surveys with sufficient for data analysis, for a response rate of 36.5 percent. The number of responses by student per year of training were the following: year one (forty), year two (thirty-six), year three (forty-two), and year four (sixty) (Table 2). Responses were generally equal from the University of Toronto and University of Western Ontario. Proportions of respondents by gender appear reflective of the overall student population, with the following exceptions: more male respondents (52.8 percent) compared to total males in the student population (46 percent) in year two, and more female respondents (63.3 percent) compared to the total number of females in the student population (50.7 percent) in year three. Most students reported undergraduate university completion in the field of mathematics and science and health sciences. Year three students had the greatest frequency of previous studies in the area of social science, humanities, and fine arts compared to other student years.

All four empathy subscales demonstrated good internal consistency (Cronbach’s alpha .759 to .814). The composite empathy scale demonstrated good convergent validity, with high positive correlations between the two cognitive subscales (r=.65, p<.01) and between the two emotive subscales (r=.69, p<.01). Additionally, low positive correlations were found between the various cognitive and emotive subscales (r=.07, ns to r=.19, p<.01), suggesting good discriminant validity between the cognitive and emotive dimensions. These results suggest the composite empathy scale used in this study has adequate reliability and validity (Table 3).

It was hypothesized that changes in student empathy would be limited primarily to the professional context: empathy in personal situations that do not involve patient interactions should show no

| Table 2. Characteristics of the study population: relative frequencies |
|-------------------|--------|--------|--------|--------|
|                   | 1      | 2      | 3      | 4      |
| Total number completed surveys | 40     | 36     | 42     | 60     |
| Gender: total population |        |        |        |        |
| M                  | 46.2%  | 46.0%  | 49.3%  | 44.2%  |
| F                  | 53.8%  | 54.0%  | 50.7%  | 55.8%  |
| Gender: survey respondents |        |        |        |        |
| M                  | 42.5%  | 52.8%  | 33.3%  | 40.4%  |
| F                  | 57.5%  | 47.2%  | 63.3%  | 59.6%  |
| Home university    |        |        |        |        |
| U of T             | 52.5%  | 61.1%  | 52.4%  | 55.0%  |
| UWO                | 47.5%  | 38.9%  | 47.6%  | 45.0%  |
| Highest degree obtained |        |        |        |        |
| B.Sc.              | 70.0%  | 86.1%  | 92.9%  | 90.0%  |
| M.Sc.              | 30.0%  | 11.1%  | 7.1%   | 8.3%   |
| Ph.D.              | 0      | 2.8%   | 0      | 1.7%   |
| Educational background |      |        |        |        |
| Math and science/health sciences | 97.4%  | 89.7%  | 87.2%  | 91.2%  |
| Social science/humanities/fine arts | 0     | 0      | 5.1%   | 1.8%   |
| Other              | 2.6%   | 10.3%  | 7.7%   | 7.0%   |
difference by training year, while empathy in clinical contexts should show group differences. Additionally, these differences should be localized to the emotive dimensions, for which scores are expected to be lower in later years of training, whereas cognitive empathy is unlikely to be similarly affected. Empathy characteristics from student years one to four (n=178) were analyzed by training group with mean scores for total empathy, Per-Emo, Per-Cog, Pro-Emo, and Pro-Cog subscales per group (Figure 1).

A significant three-way interaction among empathy context, empathy type, and training year was found in the primary ANOVA ($F_{3,174}=2.80$, $p<.05$). This result suggested that training affected cognitive and emotive dimensions of empathy differently, but that this difference in effect between emotive and cognitive was different for the personal and professional contexts. To further explore this interaction, subsequent two-way ANOVA analyses of empathy type and year of training were performed separately for the personal and professional contexts.

In the personal context, there was a main effect of empathy type ($F_{1,174}=212$, $p<.001$), with emotive empathy scores being higher than cognitive empathy scores. However, there was no main effect of training ($F_{3,174}=1.43$, ns) and no interaction ($F_{3,174}=2.47$, ns), suggesting that experience in dental school was not affecting reported empathy in personal contexts.

In the professional context, there was a main effect of training ($F_{3,174}=518$, $p<.001$), with emotive empathy scores being higher than cognitive empathy scores. However, there was no main effect of training ($F_{3,174}=1.43$, ns) and no interaction ($F_{3,174}=2.47$, ns), suggesting that experience in dental school was not affecting reported empathy in personal contexts.

In the professional context, there was a similar main effect of training ($F_{3,174}=3.17$, $p<.05$) and significant training by type interaction ($F_{3,174}=6.49$, $p<.001$), suggesting that training was affecting professional types of empathy but that the effect of training was different for emotive and cognitive empathy in this professional context.

Since changes in empathy in dental students during training appeared to be restricted to professional contexts, effects within the Pro-Emo and Pro-Cog dimensions were separately analyzed using one-way ANOVAs. There was a significant effect of training in professional emotive measure ($F_{3,174}=4.00$, $p<.01$), and post hoc analyses further showed that year three scores in the Pro-Emo dimension were significantly lower than in year one, year two, and year four ($p<.05$). Professional emotive empathy therefore appeared to be lowest in this later year of training, although it is interesting to note that professional emotive empathy in year four was similar to years one and two levels. Professional cognitive measures also showed a significant main effect ($F_{3,174}=5.38$, $p<.001$), indicating training also affected this cognitive dimension. Further post hoc analyses showed years three and four Pro-Cog scores were significantly greater than year one ($p<.05$), indicating that professional cognitive empathy is higher in these later years of training.

### Discussion

Based on existing literature demonstrating that empathy declines in medical students and dental students throughout the training experience, the expectation of this study was that some decline in empathy would be observed. This study, however, differed from the previous studies in medical and dental students as it investigated not only professional contexts but personal contexts as well and it separated emotive from cognitive dimensions of empathy.

Consistent with our hypothesis, the findings of this study indicate that changes in empathy appear
localized to professional encounters. There were no significant differences in mean empathy levels for either cognitive or emotive empathy types among students in the personal context. This suggests that in our sample the personal type of empathy utilized in interactions with strangers, family, and friends is largely unaffected by increased training experience. This finding supports the concept of "clinical empathy" that has been previously suggested, although this is the first study in which an attempt was made to explicitly describe and empirically show this distinction. This distinction between personal and professional empathy is important because the isolation of changes within a professional framework suggests that there are one or more mechanisms occurring during the health care training experience that mediate empathic orientation towards patients, and this may have implications for the content or delivery of dental training programs.

These self-reported changes in empathy in the professional dimension can be divided into two separate types of empathy: processes involving emotive reactivity and processes that engage cognitive imagining. The findings of this study are consistent with the hypothesis that lower empathy scores among dental students are localized to the emotive dimension. Theoretically, this observed attenuation of emotional empathy in a professional context may be linked to the formation of "detached concern," which refers to the ability of a health care worker to apply objectivity to clinical practice in order to facilitate the execution of duties that would otherwise be hindered by inter-

Figure 1. Student empathy subscale mean scores ± standard deviation by year of dental school training

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
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<tr>
<td>Per-Cog</td>
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<td>Per-Emo</td>
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<td>Pro-Cog</td>
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<td>Pro-Emo</td>
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nal or external emotional reactivity. This concept, also reported as “emotional distance,” “emotional detachment,” and “objective compassion,” was first observed in medical students during cadaver work. It is postulated that this distancing of one’s emotions provides students with psychological protection from distress that may be encountered during interactions with patients who are suffering.

In the dental setting, the concept of detached concern can be illustrated by the scenario of local anesthetic administration for an anxious patient. Rather than a simple “lack of caring,” in order to avoid experiencing and showing the same distress as a patient who is anxious or in pain, dental students may evolve a form of detached concern that reflects the development of a professional self that is separate from the personal self. This is important because a student who identifies too strongly with a patient undergoing a painful procedure and externally manifests those parallel thoughts and emotions, such as grimacing or crying, rather than displaying helpful behaviors by reassuring or comforting the patient, would be against current practice norms and likely deemed unprofessional. Thus, the observed declines in emotive empathy may be the inevitable result of the acquisition of a professional persona, as part of a specific acculturization process that occurs as students are socialized into the health care community.

Among the students who participated in this study, the lowest emotive empathy scores occurred in year three, with statistically significant higher scores in year four. Interestingly, the only similar study in dental students noted a nonsignificant trend of higher total empathy scores in year four compared to year three, which parallels the findings of our study. Our findings contrast with the literature on reported declines in medical student empathy, as most medical student studies report a continued decline in empathy throughout the training period, including year four.

The seeming “recovery” in professional emotive empathy shown by dental students in our study may further fit into the established theoretical framework of detached concern.

During the exploration of detached concern during the medical student experience, Fox described a period of “hyperdetachment” articulated by students as “emotional numbness” that is an overshoot of formed objectivity. This period of hyperdetachment was noted to occur in year three of a four-year medical student program, at a time when students are experiencing major transitions into a clinical setting that require the integration of didactic and clinical skills. Similarly, in the dental schools we studied, students begin their training with a predominantly didactic program, with increasing amounts of patient exposure throughout their four years, placing added demands on them in terms of the integration of academic knowledge with clinical practice. However, Fox further says that, having accomplished the task of learning to manage their emotions, students in their senior year of medical school become troubled about the disappearance of their former capacity to show emotion and seek ways to respond feelingly to patients and their predicaments. The results derived from our student sample, which showed higher emotive empathy in year four compared to year three, may reflect such a process, with senior year dental students self-correcting overzealous emotional regulation of empathic responses, as reflected by the “recovery” in emotive empathic scores.

In contrast to the finding of low mean scores in the professional emotive empathy in year three of training, professional cognitive empathy, which was measured separately in this study, was found to be significantly greater in the last two years of training. A potential theoretical explanation is that this higher cognitive empathy reflects a compensatory increase in cognitive processing in response to decreases in emotive processing. One strength of this study was the formation of two very distinct subscales in the composite empathy measures, with very weak, nonsignificant correlation between emotive and cognitive subscales (r=.066, p>.05). Greater correlations among cognitive and emotive subscales in the IRI and JSPE-HP used in other studies may have artificially masked this upward cognitive trend due to the stronger downward effect in the emotive dimension. Although causation cannot be inferred due to the study design, this type of thinking fits into what may be expected from students who are learning increasing objectivity or “detachment” while still attempting to participate in effective doctor-patient interactions.

There are several limitations to the study design that must be considered when interpreting the results. Due to the cross-sectional nature of this study, cohort effects may account for the observed differences among dental students. Although these are generally homogeneous populations, there are slightly more females than males in year three and a greater difference in educational background in this group, and it may be that cohort-specific factors contributed to the observed empathy scores. Replicating these findings
in a prospective longitudinal study, tracking scores in a single cohort throughout dental school with further psychometric analysis of the empathy scale, would provide improved evidence of the suggested phenomena. However, cross-sectional reports of declines in student empathy\textsuperscript{29,49} tend to corroborate findings of decline in longitudinal studies,\textsuperscript{28,46,50} suggesting that trends in empathy may be relatively consistent and overt among student populations. The nature of the accuracy of self-report evaluations in the context of empathy can also be debated. Empathy is a complex process involving a series of events including internal processes such as capacity (emotive and cognitive processes) and motivation, as well as external behavioral processes such as communication skills, to create an accurate rapport that can be perceived by the patient as “empathic.” Self-report indices of clinical performance may overestimate or underestimate based on student characteristics,\textsuperscript{51} so the results of this study are subject to any erroneous perceptions of students regarding their own orientations towards empathy. The addition of behavioral observations and patient report is a potential goal for further assessment of clinical empathy as a humanistic attribute of dental students.

The response rate of completed surveys in this study (36.5 percent, n=178) may be considered low overall,\textsuperscript{52} given that Sherman and Cramer\textsuperscript{29} at the University of Washington School of Dentistry were able to obtain a higher response rate (61 percent, n=130) using a paper mail-in survey and two electronic reminders. Our lower response rate may be in part due to the high rate of incomplete surveys (30 percent) in our study. Although it would be speculative to hypothesize why this high completion rate occurred, the potential for nonresponse bias does provide an important caveat for interpretation of the results. For example, it is possible that, due to the content of our study, students with greater empathetic tendencies may have been more motivated to complete the questionnaire, whereas those with less interest or capacity in empathy may have been less inclined to participate or complete the survey. It is important to note, however, that although this may have affected mean scores among groups, it remains unclear how responder bias could have systematically affected the core pattern of empathy changes across years of training.

In conclusion, this cross-sectional study explored differences in empathy among dental student groups in the context of existing evidence that empathy declines as students progress through dental school. These data support the hypothesis that the observed decline in empathy reported in the literature is localized to professional encounters and emotive empathy (as opposed to cognitive empathy). This concept of “clinical empathy” can be situated within the theoretical framework of detached concern, which implies expectation of attenuation of emotional reactivity as part of a socialization process that professionals undergo during health care training. Our additional finding of high student cognitive empathy concomitant with low emotive empathy in later years of training is also consistent with this theory. Therefore, rather than negative, permanent global changes in “caring” that have been asserted in the literature, the differences in empathy observed in this study may reflect the development of clinical empathy as a facet of the professional persona.

REFERENCES