Examining Change in Emotional-Social Intelligence, Caring, and Leadership in Health Professions Students

Hélène M. Larin, PT, PhD
Gerry Benson, RN, MSc
Lynn Martin, RN, MScN, EdD
Jean Wessel, PhD
Renee Williams, PT, PhD
Jenny Ploeg, RN, PhD

Purpose: To describe and compare the development of emotional-social intelligence (ESI), caring, and leadership of nursing and physical therapy students from the beginning of their professional education until after their first clinical experiences. Methods: At the beginning of their first professional year, 73 nursing students and 60 physical therapy students completed three self-report questionnaires: the BarOn Emotional Quotient Inventory Short (EQ-i:S) for ESI, the Caring Ability Inventory, and the Self-Assessment Leadership Instrument (SALI). For each instrument, higher scores represent higher levels of ESI, caring, or leadership, respectively. The students completed the questionnaires again after finishing their first clinical experiences. Results: A two-way ANOVA with repeated measures (group vs time) revealed a significant interaction for the total score of the EQ-i:S. At both time periods, scores on the SALI were lower for the nursing students compared to the physical therapy students. There were no other significant time or group effects. Conclusion: Nursing and physical therapy students had little change in ESI, leadership, and caring between the start of their academic programs and completion of their first clinical affiliations. J Allied Health 2011; 40(2):96–102.

EMOTIONAL INTELLIGENCE (EI) or emotional-social intelligence (ESI) is an attribute just recently being studied for its significance in health science professions. Bar-On defines ESI as “a multi-factorial array of emotional and social competencies that determine how effectively we relate with ourselves and others and cope with daily demands and pressures.” Moreover, ESI is considered necessary for individual and workplace success. There is also some evidence that ESI can improve with life experiences and training.

Both the nursing and physical therapy professions have shown an interest in the ESI concept, but most of the work in the literature remains theoretical. Ramsden and Taylor have argued that to be effective, practitioners must see the world through the eyes of the patient. Gard and Gyllensten further maintained that better treatment outcomes are obtained when the physical therapist and patient better understand and express emotion. Their opinion was supported by a qualitative study where expert physical therapists indicated the need for both themselves and their patients to identify and express their emotions.

Only a few publications have reported on the relationship of ESI to other attributes in nurses or physical therapists or students of these professions. Farmer suggested that higher ESI may help prevent burnout in nurses but found no relationship between ESI and job satisfaction in this group. Grace found that some aspects of ESI of nursing students predicted satisfaction with their educational program but reported no association between ESI and grade point average (GPA). Cross-sectional studies on physical therapy students have revealed positive correlations between ESI and cognitive/academic ability and between ESI and 2 out of 24 items on a clinical performance measure. None of these studies investigated the development of ESI in nursing or physical therapy students during their academic or clinical education.

“Caring” is an important concept in the health professions and one that has been linked, at least in theory, to ESI. Definitions of caring vary but include reference to both the physical actions and emotional concern of the “caregiver” as he/she supports and responds to the needs of others. Caring has also been described as a relationship that involves receptivity, engrossment, and reciprocity of the one caring and the person being cared for. Akerjordet and Severinson call caring the “essence of health care” and suggest that emotional intelligence is one of the skills required for appropriate caring.
Rego and colleagues\textsuperscript{20} reported that some aspects of self-report EI of nurses were significantly correlated with patients’ ratings of their caring behaviors. The EI dimensions with higher predictive power were “self-control against criticism” and “self encouragement.” Some dimensions, particularly “self encouragement” interacted with other aspects of EI to predict patients’ ratings of caring. In a previous cross-sectional study of nursing and physical therapy students,\textsuperscript{21} a positive correlation was found between a measure of caring and a measure of ESI. However, our group could find no literature examining whether these attributes change in parallel during health professional education programs.

Leadership ability is another attribute studied in the health professions, particularly nursing.\textsuperscript{3,22} Emotional intelligence is considered to be important to leadership,\textsuperscript{19,23} although most of the quantitative studies have not been conducted with health science professionals or students. Bar-On\textsuperscript{4} reported correlations between ESI and work performance of soldiers and recruiters (0.51-0.55), academic ability of high school (0.41) and university (0.45) students, and leadership as judged by peers (0.39), criterion-rated by coworkers (0.49), and determined by acceptance to officer training (0.82). McQueen\textsuperscript{18} referred to studies that indicate those with higher ESI have better interactive skills, are more cooperative, and develop closer relations. Herbert and Edgar summarized data from several studies and concluded that those with higher ESI are seen by their subordinates as having greater leadership skills.\textsuperscript{24} In the health science literature, nurses identified as “high early career performers” felt they were successful because they could empathize, work with a variety of people, and learn from their errors.\textsuperscript{25} These are characteristics that might be considered part of ESI.

Specific methods of learning may be more effective in instilling changes in ESI. Since problem-based learning (PBL) emphasizes self-direction, self and peer evaluation, communication and team work, students from such a program may have greater or earlier changes in some aspects of ESI compared to students in a conventional program.\textsuperscript{26,27} However, there is also evidence to suggest that differences between students from conventional and PBL programs tend to decrease after clinical experience.\textsuperscript{28} The effect of education and/or clinical experience on ESI has not been described in nursing or physical therapy students. In fact, Hurley\textsuperscript{29} suggested that it is important to study what aspects of EI respond to educational input, and which educational strategies are successful in effecting this change. She considered EI essential to good mental health nursing and therefore a necessary target of education.

In a previous study, we found that there was little difference in ESI between nursing students and physical therapy students entering problem-based programs and physical therapy students entering a conventional program.\textsuperscript{21} The purpose of the present study was to determine if ESI, caring, and leadership qualities of nursing and physical therapy students change during their professional education. It was hypothesized that these qualities would increase over the professional programs, but that the changes would not be different between nursing and physical therapy students, nor between students trained in PBL or conventional education programs.

**Methods**

**DESIGN AND PROCEDURES**

This study followed a group comparison, repeated measures design. Nursing students from McMaster University and physical therapy students from McMaster University and Ithaca College completed the BarOn Emotional Quotient Inventory Short (EQ-i:S), the Caring Abilities Inventory (CAI), and the Self-Assessment Leadership Inventory (SALI) at the beginning of their professional programs (baseline) and again after completing their first full-time clinical placements (post-clinical). The post-clinical measures were collected at the completion of the second year of study for nursing students following their first full year of exposure to patients. McMaster physical therapy students were tested after one full academic year which included two clinical affiliations, and Ithaca physical therapy students were tested in the second semester of their second professional year after two clinical affiliations.

**SUBJECTS**

Subjects were 73 nursing students and 21 physical therapy students from McMaster University, Ontario, and 39 physical therapy students from Ithaca College, New York. Sample size calculations indicated that 25 students per group were required to detect a between-group difference of 1 SD, with alpha = 0.05, and power = 0.80. A total of 84 subjects were required to detect a significant correlation of 0.3 between EQ and comparison measures (alpha = 0.05, power = 0.80).

Students in both institutions were informed of the study by e-mail or through announcements in classes/tutorials. They were offered a pizza lunch or a $5.00 food voucher for their participation. They contacted the research assistant if they were interested in participating in the study. The groups of students and their characteristics at the beginning of the study are shown in Table 1. The nursing students were in the first year of an undergraduate nursing program. The McMaster physical therapy students had completed an undergraduate degree and were enrolled in the first year of an entry-level master’s program in physical therapy. Students in the Ithaca program were in the third year of an undergraduate program but in the first year of their professional studies which would lead to a master’s degree in physical therapy. The study received ethical approval from the ethics review boards of both institutions involved in the study, and all subjects provided written informed consent.
Caring Ability Inventory (CAI)

The CAI is a self-report questionnaire designed to measure the degree of a person’s ability to care for others. Although the development of the CAI was based on eight indicators of caring as identified by Mayeroff, factor analysis of the original 80 questions reduced the items to 37 and the subscales to three. Respondents rate each item on a Likert scale from 1 to 7, with 1 being “strongly disagree” to 7 being “strongly agree.” Higher scores indicate a greater degree of caring. The subscale scores are calculated by summing the items in that subscale. The Knowing subscale [CAI_K] (14 items) includes items on understanding self and others. Courage [CAI_C] (13 items) captures ability to cope with the unknown, and Patience [CAI_P] refers to tolerance and persistence (10 items). Therefore the possible ranges of scores are 14 to 98, 13 to 91 and 10 to 70 for CAI_K, CAI_C, and CAI_P, respectively. Nkoncho reported internal consistency of 0.79 to 0.84, a test retest coefficient of 0.75, and a content validity index of 0.80. Validity of the CAI was further supported by its ability to discriminate between students and nurses and between females and males, by factor analysis, and by results supporting hypotheses consistent with theory.

BarOn Emotional Quotient Inventory Short (EQ-i:S)

The EQ-i:S is a self-report measure of emotional and social intelligent behaviors. This tool comprises 51 items in the form of short sentences. Respondents rate each statement from 1 (very seldom or not true of me) to 5 (very often or true of me). Items are added to produce a total score and five subscale scores (intrapersonal, interpersonal, stress management, adaptability, and general mood). These scores are presented as standard scores, with a mean of 100, based on age and gender. Persons who score between 85 and 115 (1 SD) are said to be functioning effectively. Those who score above 115 are considered to have enhanced ESI, and those with scores below 85, to be in need of improvement. The maximum standard score for all scales is 130. Internal consistency was confirmed by an alpha of 0.97. Intraclass correlation coefficients (ICCs) for test-retest reliability were 0.72 for males and 0.80 for females.

MEASURES

EDUCATIONAL PROGRAMS

The two McMaster programs (nursing and physical therapy) follow problem-based curricula with learning based on clinical cases/scenarios and emphasis on self-directed learning. Students define their learning needs in their tutorial groups, conduct their research individually, and then reconvene to discuss their learning and its application to the scenario. Students practice group skills and perform self, peer, and tutor evaluations. The Ithaca College physical therapy program follows a more conventional curriculum with knowledge being transmitted primarily through lectures. All programs include clinical laboratories where students learn and practice clinical skills, including interviewing clients and developing working partnerships with them. At the time of the second data collection, the nursing students had completed 260 hours of clinical experience, and the physical therapy students had completed approximately 450 to 500 hours of clinical practice.

The nursing curriculum at McMaster is built upon the “Caring Curriculum” of Bevis and Watson. There is much discussion at various levels about both the scientific and humanistic aspects of caring. By the completion of their second year, it is expected that nursing students have been implementing professional caring (empathy, acceptance, advocacy, and client-centered care) in their experiences with clients. In the McMaster physical therapy program, caring is not addressed in a specific course or as a specific topic. However, client-centered care is emphasized throughout the program, and cultural, psychosocial and ethical issues are intertwined in the problems (case scenarios) discussed in the tutorials. At Ithaca College, the students had studied the professional code of ethics and core values which include caring expectations of the physical therapy professional.

Leadership had not yet been covered as a specific topic in the McMaster programs at the time of the second data collection. Leadership was addressed primarily through the practice of group skills in tutorial sessions where students are encouraged to take on different roles, including facilitating the participation of others, leading discussion on a topic, and assisting in the generation of learning objectives. At Ithaca College, leadership had been addressed in a clinical administration course. Topics included characteristics of leadership, management and supervision, and motivation.

TABLE 1. Characteristics of Subjects at Baseline

<table>
<thead>
<tr>
<th>Program</th>
<th>No.</th>
<th>Class Size</th>
<th>% of Class</th>
<th>Male/Female</th>
<th>Mean Age (SD)</th>
<th>Education Level</th>
<th>Education Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>McMaster</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nursing</td>
<td>73</td>
<td>385</td>
<td>19</td>
<td>5/68</td>
<td>20 (3.5)</td>
<td>Undergraduate</td>
<td>Problem-based</td>
</tr>
<tr>
<td>McMaster PT</td>
<td>21</td>
<td>59</td>
<td>36</td>
<td>1/20</td>
<td>24 (4.0)</td>
<td>Graduate</td>
<td>Problem-based</td>
</tr>
<tr>
<td>Ithaca PT</td>
<td>39</td>
<td>67</td>
<td>58</td>
<td>7/32</td>
<td>20 (2.1)</td>
<td>Undergraduate-Graduate</td>
<td>Conventional</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>13/120</td>
<td></td>
<td></td>
<td>21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The CAI is a self-report questionnaire designed to measure the degree of a person’s ability to care for others. Although the development of the CAI was based on eight indicators of caring as identified by Mayeroff, factor analysis of the original 80 questions reduced the items to 37 and the subscales to three. Respondents rate each item on a Likert scale from 1 to 7, with 1 being “strongly disagree” to 7 being “strongly agree.” Higher scores indicate a greater degree of caring. The subscale scores are calculated by summing the items in that subscale. The Knowing subscale [CAI_K] (14 items) includes items on understanding self and others. Courage [CAI_C] (13 items) captures ability to cope with the unknown, and Patience [CAI_P] refers to tolerance and persistence (10 items). Therefore the possible ranges of scores are 14 to 98, 13 to 91 and 10 to 70 for CAI_K, CAI_C, and CAI_P, respectively. Nkoncho reported internal consistency of 0.79 to 0.84, a test retest coefficient of 0.75, and a content validity index of 0.80. Validity of the CAI was further supported by its ability to discriminate between students and nurses and between females and males, by factor analysis, and by results supporting hypotheses consistent with theory.
SELF-ASSESSMENT LEADERSHIP INSTRUMENT (SALI)

The SALI is a measure of leadership characteristics, where leadership is defined as the process of influencing the behaviors of other persons in their efforts towards goal setting and achievement. This instrument was originally developed in 1970 by Yura and incorporated various leadership theories. Respondents are asked to consider 40 behaviors as they relate to their leadership. A 5-point Likert scale is used indicating “usually not behave in this manner” (0) to “almost always behave in this manner” (4). A higher total score (possible range 0 to 160) indicates high self-assessment of leadership characteristics. Testing for reliability produced a Cohen’s coefficient K of 0.54. In relation to the construct validity of the tool, nurses identified as leaders by their peers have been found to have significantly higher scores on the SALI compared to those identified as non-leaders.

ANALYSIS

The data were evaluated for fit with a normal distribution by means of the Kolmogorov-Smirnov statistic, with a Lilliefors significance level. As the p values for this test were >0.05 for all data, the EQ-i:S, SALI and CAI scores of the three groups at baseline and post-clinical were compared by means of a two-way analysis of variance (ANOVA) with repeated measures. The significance level was set at p <0.05. Significant program effects were further evaluated with a Tukey test. Differences between the Ithaca College program and both McMaster programs would indicate a difference between conventional and PBL curriculum, respectively. Differences between nursing and the two physical therapy programs would suggest a discipline effect, possibly due to the greater emphasis on leadership and caring in the nursing curriculum.

Results

There were 120 subjects (nursing 61, MacMaster PT 21, Ithaca PT 38) who completed testing at baseline and post-clinical. Out of the original 133 students, 7 students had dropped out of their programs and 6 failed to respond to requests for the repeat testing.

The means and SDs of the EQ-i:S scores for baseline and post-clinical are presented in Figure 1. The means of the total and subscale scores of the EQ-i:S were within the effective functioning range for all student groups. The results for the EQ Total, SALI, and CAI are in Table 2. The ANOVA revealed no significant group effects for any of the EQ-i:S scales (Table 3). Only the total EQ-i:S score showed a significant group by time interaction effect. This interaction was due to a slight decrease in score from baseline to post-clinical for Ithaca students compared to slight increases for the other two groups. The group effect for Courage and Patience subscales of the CAI approached significance with nursing having slightly lower scores than the physical therapy students. There was a significant group effect for the SALI. Post hoc analysis revealed that the SALI scores were higher for the Ithaca PT students than for the nursing students.

Discussion

Study results demonstrated that there were no significant changes in ESI, caring, and leadership qualities of nursing
and physical therapy students during their early professional education. Although the group-time interaction for the total EQ-i:S score suggested that PBL may have a slightly more positive effect on ESI than conventional education, the changes were small, and all groups had similar scores post-clinical. The type of educational program or discipline had no effect on the change in leadership or caring.

The lack of change in ESI, caring, and leadership scores may be due to the students' high baseline scores. The students in this study had “normal” EQ-i:S values. Figure 1 demonstrates that the means for groups and subscales were all approximately 100 with a SD of 15, average values for standard scores and within an effective functioning range for ESI. Likewise the mean CAI values for all student groups fell within the range for “medium norms” for college students in a large university in metropolitan New York. No normative values were found for the SALI. Although the scores for ESI, caring, and leadership were normal to high, there was still room for improvement in all scales. No student approached the maximum score on any of the measures.

Health professional programs may, by their nature, attract students with high ESI, caring, and leadership, or the admission process may lead to selection of students with these characteristics. None of the programs in this study specifically evaluated these qualities, but they may have been assessed indirectly through other means such as interviews, preferred prior relevant experiences, and academic achievement.

The timing of the measurements may also have contributed to the lack of change in ESI, caring, and leadership. We chose to evaluate students at baseline and after they had some clinical experience, but it may be that changes only occur after longer periods in the programs. Benson et al., in a cross-sectional study, found differences in EQ-i:S only between students in the first and fourth years of a nursing program. These differences were in the total score and the scores for the Interpersonal and Stress Management subscales. In view of these findings, the students in the present study will be followed until the end of their academic programs.

In order to change ESI, caring, and leadership in nursing and physical students, it may be necessary to specifically target these qualities in the curricula. Boyatzis and Saatcioglu reported in their review that students in a management program improved in self-report and/or behavioral measures of ESI, inspirational leadership, and empathy when the program included a specific leadership course and emphasis on ESI. The authors, however, noted that educational programs must be constantly reviewed and renewed in order to be effective in changing these qualities in students.

There has been little evaluative research conducted on ESI, caring, and leadership in the health care field. Dental employees participating in a 1-day team-building workshop did not have any changes in ESI as measured by the ability-based Mayer-Salovey-Caruso EI test. Because it was an exploratory study with a small sample size, the authors reported effect sizes which included values of 0.36 for overall EI and 0.65 for branch 3 of the test (understanding emotions). A qualitative study described the response of undergraduate pharmaceutical students to a communications course that included knowledge and skills on counseling and EI instruction. Students indicated that they appreciated the understanding of the concept of EI and felt that the gained skills would be important in interacting with patients. Several students described their application of EI competencies in their clinical affiliations and their receiving positive feedback from their supervisors.

Some studies on students outside the health professions have revealed changes in ESI with specific training. Students enrolled in a graduate management course that included knowledge, case studies, and group projects involving EI had increases in their scores on the original long form of EQ-i:S. These changes were greater than for the group that did not receive the EI curriculum. Psychology students receiving 10 hours of EI training had increases in identification and management of emotions compared to a control group that received no training.

### Table 2. Emotional-Social Intelligence, Leadership, and Caring Scores at Baseline and Post-Clinical for Students in Three Programs

<table>
<thead>
<tr>
<th></th>
<th>McMaster Nursing (n = 61)</th>
<th>McMaster Physical Therapy (n = 21)</th>
<th>Ithaca Physical Therapy (n = 38)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Post-Clinical</td>
<td>Baseline</td>
</tr>
<tr>
<td>EQ total*</td>
<td>98.9 (13.9)</td>
<td>102.5 (13.2)</td>
<td>98.3 (11.5)</td>
</tr>
<tr>
<td>CAL_K †</td>
<td>76.8 (9.3)</td>
<td>78.3 (8.6)</td>
<td>78.0 (5.7)</td>
</tr>
<tr>
<td>CAL_C ‡‡</td>
<td>63.7 (9.3)</td>
<td>66.2 (9.1)</td>
<td>67.1 (8.9)</td>
</tr>
<tr>
<td>CAL_P ‡‡</td>
<td>59.7 (5.2)</td>
<td>60.4 (4.9)</td>
<td>62.3 (5.6)</td>
</tr>
<tr>
<td>SALI §</td>
<td>113.3 (18.0)</td>
<td>115.5 (17.2)</td>
<td>118.7 (13.8)</td>
</tr>
</tbody>
</table>

Scores expressed as Mean (SD).
* Significant interaction effect.
† No significant main or interaction effects.
‡ Program effect approached significance [CAL_C, p = 0.077; CAL_P, p = 0.060].
§ Significant program effect [SALI, p = 0.009].
A more generic measure of caring was required in this study because both nursing and physical therapy students were being evaluated. The CAI was one of the few that met this criterion.\textsuperscript{32} In order to measure leadership, we required a scale that was appropriate for health profession students but not specific to a discipline. Although Smola\textsuperscript{33} evaluated the properties of the SALI on nursing students, the questions did not refer to behaviors particular to the nursing profession. Instead, the SALI refers generally to how individuals work with groups, take the initiative to solve problems and influence others, and self-evaluate their leadership behaviors. A performance measure was not considered because it would be difficult to administer on students of varied experiences and educational backgrounds, particularly at the beginning of their professional programs.

One of the limitations of this study is the sample. Firstly, all the participants were volunteers and may have been individuals particularly interested in the emotional and psychological aspects of their chosen profession. Secondly, the samples from each program were not equal, either in terms of total number of participants, proportion of the students participating in the study, and the male/female ratio. The sample size estimate was not reached for the McMaster physical therapy group. The under-representation of males in this study precluded analyses by gender.

In summary, the ESI, leadership, and caring of nursing and physical therapy students did not change significantly between the start of their academic programs and completion of their first clinical affiliations. The results were the same for the two professions and the two types of educational curricula. More longitudinal studies need to be conducted to examine changes over the entire curricula, determine the effects of interventions that specifically target ESI and related concepts, and examine the effects of educational programs in both the health sciences and other academic disciplines. Investigators should consider using both self-report and performance measures of ESI, caring, and leadership.

The authors wish to thank all the students who volunteered to participate in this study and nursing students who worked on this project as part of their Research Practicum.

**REFERENCES**


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**TABLE 3. ANOVA Summary Table for EQ-i:S Total and Subscale Scores**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Source</th>
<th>F Value</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>Group</td>
<td>1.1</td>
<td>0.327</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>3.0</td>
<td>0.085</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>3.8</td>
<td>0.026*</td>
</tr>
<tr>
<td>Intrapersonal</td>
<td>Group</td>
<td>0.1</td>
<td>0.946</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>0.9</td>
<td>0.358</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>2.5</td>
<td>0.089</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Group</td>
<td>0.4</td>
<td>0.641</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>0.4</td>
<td>0.553</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>0.9</td>
<td>0.408</td>
</tr>
<tr>
<td>Stress</td>
<td>Group</td>
<td>0.2</td>
<td>0.207</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>3.5</td>
<td>0.065</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>1.0</td>
<td>0.389</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Group</td>
<td>1.1</td>
<td>0.345</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>0.5</td>
<td>0.479</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>2.9</td>
<td>0.057</td>
</tr>
<tr>
<td>General Mood</td>
<td>Group</td>
<td>1.5</td>
<td>0.226</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>1.6</td>
<td>0.213</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>1.2</td>
<td>0.296</td>
</tr>
</tbody>
</table>

*Significant at p <0.05.

Organizations accrediting health professional education programs list desired competencies for students that include caring, empathy, inter- and intra-personal skills, teamwork, and leadership.\textsuperscript{40–43} Because the scope of ESI seems to encompass these desired attributes, some allied health education programs are now creating resources to enhance ESI skills of students in order to develop important but "intangible" aspects of professionalism.\textsuperscript{43–46} Whether effort placed on the development of ESI will lead to increased professional behavior has yet to be determined and remains difficult to measure.\textsuperscript{43} There has been little research on the best ways to develop ESI and related characteristics in health science students. The present study is the first to determine whether changes in ESI occur in nursing and physical therapy students during their educational programs. The inclusion of two disciplines and two geographically distinct programs in physical therapy increases our confidence in generalizing our results to other nursing and physical therapy programs.

The type of measures used in this study would have an effect on the results. Self-report measures do not necessarily reflect behaviors that demonstrate ESI, caring, and leadership skills. Conte et al.\textsuperscript{47} evaluated different measures of ESI and concluded that the EQ-i:S had adequate reliability, but there was still not enough evidence to support discriminant and predictive validity. Goldenberg et al.\textsuperscript{48} reviewed performance and self-report measures of ESI and found that generally there were low correlations between the two types of measures. The majority of caring instruments found in the literature measured nurse-patient interactions were self-report of nurses or solicited opinions of patients concerning the care they received.\textsuperscript{49}
34. Yura H: Faculty perceptions of behavior indicating leadership potential of baccalaureate nursing students [PhD thesis]. Washington, DC: Catholic University of America; 1970.