

Evaluating moral reasoning outcomes in physical therapy ethics education: stage, schema, phase, and type

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Background: Physical therapists must have skills in moral reasoning (the ability to analyze ethical situations in order to determine a right action). The cognitive developmental perspective initiated by Kohlberg and developed by James Rest and associates proposes that moral reasoning progresses in stages or schemas (default frameworks for determining a right course of action) with periods of transition or consolidation between schemas. The purpose of this research was to evaluate changes among physical therapy students in moral reasoning and organization of ethical knowledge following an intensive 6-week ethics course focused on transformative learning, self-knowledge/reflection, relationships between ethical and clinical knowledge, and responding to ethical disequilibrium. This paper focuses on evaluating changes in moral reasoning from the cognitive developmental perspective using the Defining Issue Test (DIT2). The DIT2 evaluates the proportion of moral reasoning that an individual uses in three schemas (personal interest, maintaining norms, post-conventional) with a focus on the shift to post-conventional reasoning.

Methods: A pre-test–post-test design was used to evaluate changes in moral reasoning schema.

Results: Of the 54 final year physiotherapy students invited to participate, 37 students completed all portions of the research, a usable response rate of 68.5%. The resulting sample was predominantly female (59.5%, $n=22$) with a mean age of 24.2 years. Paired *t*-tests were not significant for changes in personal interest or maintaining norms, but were significant for changes in post-conventional reasoning.

Discussion: Results indicate that an intensive ethics course can be successful in producing changes in post-conventional moral reasoning among physical therapy students.

Keywords: Physical therapy, Ethics, Education, Moral reasoning, Moral judgment

Background

Although there are numerous codes of ethics to provide ethical guidance for physical therapists, professional ethical behavior involves far more than simply abiding by a code of ethics or conduct.¹ Physical therapists confront situations in which they must determine what ‘doing the right thing’ means. For example, some situations may involve competing ethical obligations or values, and in other situations the physical therapist may believe that he/she lacks the authority to implement the morally required action. For all of these reasons, physical therapists must have the ability to critically analyze ethical situations in order to determine a right course of action. This ability

to critically analyze ethical situations is called moral reasoning. Walker² has described moral reasoning as the psychological process which ‘entails deliberation regarding the various considerations relevant to different courses of action and making a judgement regarding which of the available actions would be most morally justifiable. The process of justification involves determining what the moral ideal is and integrating shared moral norms and individual moral principles.’²

The four component model of moral behavior^{3–5} provides a useful theoretical foundation for appreciating the specific role of moral reasoning in ethical behavior. This model proposes that ethical behavior involves four overlapping psychological processes: moral sensitivity, moral judgment or reasoning, moral motivation (and identity formation), and moral courage (see Table 1). Moral reasoning or judgment

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is the second component process of moral behavior. From the standpoint of the four component model, moral behavior is a complex psychological process.

Most physical therapist educational program curricula include learning objectives directed toward enhancing moral reasoning. However, there is no agreement on which didactic methods, content, and activities are most effective in producing sound moral reasoning. Likewise, there is no consensus among physical therapy educators about the optimal ways to evaluate the effectiveness of education in the area of moral reasoning.

Purpose, aims, and theoretical foundation

The purpose of this research was to evaluate changes among physical therapy students in moral reasoning and organization of ethical knowledge following an intensive 6-week ethics course focused on transformative learning, self-knowledge/reflection, relationships between ethical and clinical knowledge, and responding to ethical disequilibrium. While Edwards *et al.* report elsewhere in this volume on the results of this research related to organization of ethical knowledge through concept mapping, this paper focuses on the changes in moral reasoning from the cognitive developmental perspective using the Defining Issue Test® (version 2) (DIT2).^{4,6-8}

In contrast to the philosophical orientation of much of the ethics literature, cognitive developmental theory (CDT) assumes a psychological developmental perspective on ethical behavior. Initiated by Kohlberg and developed by James Rest and associates, CDT proposes that moral reasoning progresses in stages or schemas (default frameworks for determining a right course of action) with periods of transition or consolidation between schemas. Table 2 delineates basic concepts and theories within CDT.

The specific aims of the moral reasoning aspect of this research study were to evaluate changes among physical therapy students in moral reasoning schema, phase, and type following a 6-week intensive ethics educational intervention; and to analyze individual factors (age, gender, and education) that may influence

changes in moral reasoning. Following a discussion of the historical and theoretical background of the Defining Issues Test (DIT) and current research of moral reasoning concepts (phase, schema, and type) utilized in DIT research, we describe the methods and sample; present schema, phase, and type indicator results from the study, and discuss the implications of the findings for physical therapy education.

The cognitive developmental model of moral reasoning: Kohlberg, Rest, and the DIT

The work of Kohlberg⁹⁻¹¹ has played an important role in moral reasoning research. Building on the insights of Piaget about intellectual development, Kohlberg had proposed a theory of cognitive moral development that included six stages. Kohlberg had also developed the Moral Judgment Interview (MJI) to evaluate stage of development. During the 1970s, James Rest, a student of Kohlberg, created the DIT as a written alternative to the time-consuming MJI process used by Kohlberg (see Table 3 for a comparison of the moral developmental theories and evaluative instruments developed by Kohlberg and Rest).

The DIT presents six ethical vignettes to the subject. Following each story, the subject is asked to rate for importance 12 separate ethical issues, each of which represents a different stage in Kohlberg's sequence. After rating each issue, the subject is asked to rank the top four issues. These rankings produce the P score which indicates the percent of post-conventional moral reasoning used in ranking the top four issues. (In this paper we will refer to the P score as the P% score in order to eliminate possible confusion with the p score which is used in to represent level of significance). In subsequent years, Rest *et al.*⁷ created the N2 index which includes consideration of both rating and ranking of the issues, and also developed a new version (DIT2)¹² of the DIT containing fewer and more contemporary vignettes.

As a result of the existing databank created through a computerized scoring service, Rest and associates had access to the results of well over 40 000 subjects who had taken the DIT between 1989 and

Table 1 The four component model of moral behavior (based on Rest *et al.*^{3,4} and Bebeau⁵)

Component	Definition of process
Moral sensitivity	Recognizing, framing, and contextualizing an ethical situation.
Moral judgment or reasoning	Analyzing ethical issues, identifying options, consideration of stakeholder interests, weighing consequences, balancing competing values and duties, determining right and wrong courses of action, and developing a sound rationale for action. The DIT is a measure of moral judgment or reasoning.
Moral motivation and identity formation	Prioritizing ethical values and making a commitment to ethical action. Developing a professional identity grounded in codes of ethics and professional values.
Moral courage or character	Implementing ethical action, having the courage of one's convictions, persevering against barriers and obstacles, demonstrating courage in the face of opposition.

Table 2 Theoretical models and related concepts within the cognitive developmental model**Stage theory**(Lawrence Kohlberg using the Moral Judgment Interview)⁹⁻¹¹

Kohlberg proposed that individuals progressed through six stages of moral reasoning in a rigid step-wise order. A person's moral reasoning could be classified in one single stage of reasoning. For Kohlberg, development in moral reasoning was moving from one stage to a higher stage.

Schema theory(Rest *et al.*, the 'neo-Kohlbergian' or Minnesota perspective using the Defining Issues Test)^{2-4,12}

Schema: Rest *et al.* modified Kohlberg's theory, referring to schemas rather than stages. Research with the DIT supported three basic schemas (see below) rather than Kohlberg's six stages. In contrast to Kohlberg, Rest and associates do not seek to classify a person's moral reasoning within a single schema but refer to the 'predominant' schema in relation to the proportions of the other two schema. Development in moral reasoning is using a greater proportion of advanced moral reasoning schemas. Since personal interest moral reasoning typically declines as one matures, the focus for adults is on post-conventional moral reasoning.

Schema: 'Default' moral reasoning framework for determining a right course of action.

Personal interest (PI) schema: Moral reasoning framework that relies on one's self-interest and well-being.

Maintaining norms (MN) schema: Moral reasoning framework that relies on laws, rules, societal norms, religious traditions, cultural conventions, and traditional sources of authority.

Post-conventional (PC) schema: Moral reasoning framework that relies on ethical ideals, societal cooperation, and principles of fairness.

P% score: Measure of the importance or priority given to post-conventional reasoning on the DIT. The P% score is the percentage of post-conventional issues that are ranked as most important on the DIT.

N2 score: Measure of discriminative priority given to post-conventional reasoning. The N2 score is computed by adding the ranking score (P% score) to the weighted difference between the average ratings of personal interest items and post-conventional items. The N2 score is considered the gold standard DIT index.

Schema profile: The schema profile indicates (often as a bar chart) the relative proportion of moral reasoning schemas and predominant schema that an individual uses to prioritize ethical issues on the DIT.

Phase theory - Consolidation/Transition model (CTM)(Snyder and Feldman;¹³ Walker *et al.*;¹⁴ Rest *et al.*;¹⁵ Thoma and Rest;¹⁶ Derryberry and Thoma¹⁷)

The consolidation/transition model notes that development is not a constant process of progressing through stages or schemas.¹⁴ Rather, individuals experience alternating phases of equilibrium (consolidation) and disequilibrium (transition). During consolidation, individuals rely on predominant schema. In contrast, periods of transition may be marked by confusion with the schema profile demonstrating less consistency in schema use, no clear predominant schema, or use of schema both above and below the modal schema. The CTM builds on Piaget's insight that disequilibrium is fundamental to the process of development, and is consistent with both stage and schema models as it focuses on what occurs between periods.

Type: Derryberry and Thoma¹⁷ have combined schema and phases to identify seven different types. For example, Type 1 is consolidated phase and PI schema. Type 2 is transitional between PI and MN with a preference for PI.

1993. Utilizing this data, the researchers undertook an evaluation of the validity, reliability, and theoretical basis of the DIT.^{4,7,8} Their analysis provided support for the validity, reliability, and theoretical underpinnings for the DIT, as well as revisions to some aspects of Kohlberg's original framework. For example, DIT results supported three developmental 'schema' (personal interest, maintaining norms, and

Table 3 Comparison of Kohlberg and Rest's instruments for evaluating moral reasoning

	Lawrence Kohlberg	James Rest
Instrument	Moral judgment interview	Defining issues test
Stages or schemas?	6 Stages	3 Schemas
Basis for decisions	1. Obedience 2. Instrumental egoism 3. Interpersonal concordance 4. Law and duty 5. Consensus-building 6. Social cooperation	1. Personal interest (self-interest) 2. Maintaining norms (Laws, rules, norms, and tradition) 3. Post-conventional (Ethical ideals for fair social cooperation)
Development process	Hard staircase model. Classifies each subject in one (and only one) stage.	Evaluates changes in the distribution of moral reasoning between schemas – not a staircase.
Progress	Progress in moral reasoning is moving to the next stage.	Progress in moral reasoning is using a greater amount of higher schemas in cycles of transition and consolidation.
Role of moral reasoning	Moral reasoning is primary in moral behavior	Moral reasoning is one of four components of moral behavior (Four component model).

post-conventional) rather than the six stages delineated by Kohlberg (Tables 2 and 3). A schema is a default mental framework that provides a structure for responding to individual ethical situations to provide a basis to decide a course of action. Each schema provides a 'skeletal' framework that specifies the relationship of elements within the schema and provides 'slots' to be filled by a particular case.⁴ In contrast to Kohlberg's 'hard staircase' stage theory whereby each individual is categorized within one and only one specific stage, Rest *et al.* conceptualized development as shifting patterns of distribution across the schemas as one progresses toward post-conventional thinking. In adult populations, one logically anticipates that there should be more maintaining norms and post-conventional thinking and less personal interest. Rest *et al.*^{7,8,12} have confirmed these developmental shifts in their mega-sample of over 40 000. This developmental process accounts for the importance given to P% and N2 scores (measures of post-conventional moral reasoning) in the literature.

Consideration of stage or schema does not account for all of the factors that contribute to moral reasoning. The Consolidation/Transition Model (CTM)¹³⁻¹⁵ of moral reasoning examines the 'phases' by which one progress through stages or schema. According to this theory, moral reasoning development progresses in alternating phases of consolidation and transition. During consolidation moral reasoning is consistent with the predominant (modal) schema and there is limited use of other schemas. In periods of transition, moral reasoning is distributed across the schemas and there is high use of the other schemas.¹⁶ Walker *et al.*¹⁴ note that the CTM recognizes that moral development is not constant and linear, and reinforces Piaget's observation that internal and external disequilibrium are important to the process of development. With regard to the DIT, this model suggests that subjects may be more likely

to utilize the predominant stage or schema during periods of consolidation than during transition. The result is that individuals may also be more likely to progress on moral reasoning scores during periods of consolidation than during transition. Thoma and Rest¹⁶ found strong evidence for these patterns in DIT results.

By combining schema and phase, Derryberry and Thoma¹⁷ identified seven different Types of moral reasoning (see Table 4). The type variable suggests not only one's dominant or modal schema, but also the likelihood that one will utilize the schema in resolving ethical dilemmas.

The DIT has been used extensively to evaluate the moral reasoning of health care professionals and students. Previous research has investigated moral reasoning within medicine,^{18,19} nursing,^{20,21} dentistry,²² pharmacy,^{23,24} and physical therapy.²⁵⁻²⁸ This literature generally suggests that education is a strong predictor of development in moral reasoning, and college education appears to be an especially important stimulus for gains in post-conventional thinking.^{29,30} Females often score slightly higher on the DIT, a finding somewhat ironic in light of Gilligan's³¹ critique that 'justice-based' measures like Kohlberg's MJI and the DIT systematically disadvantaged females using care-based thinking.

With respect to professional education, higher post-conventional scores have been linked to clinical performance in medicine,³² nursing,³³ and physical therapy.²⁵ Schlaefli *et al.*'s³⁴ meta-analysis of 55 educational intervention studies with the DIT found that educational interventions of 3-12 weeks were more effective than interventions of shorter duration, that the 'dilemma discussion' was more effective than lecture or other types of approaches in producing increases in moral reasoning, and that interventions with adults (24 years or older) were more effective than with younger students. The effect size of dilemma discussion method of 0.41 contrasted to the effect size of 0.09 for other types of intervention.⁴

Research within physical therapy using the DIT has been somewhat limited when compared to other disciplines. Swisher²⁸ found that practicing physical therapists scored lower on post-conventional reasoning than physicians or nurses, female physical therapists scored significantly higher than males, and physical therapy experts in ethics had post-conventional scores comparable to the scores of philosophers in previous DIT research. An early study of physical therapy students³⁵ reported that few entered with high post-conventional scores. Sisola's²⁵ study of physical therapy students determined that higher DIT moral reasoning scores were associated with clinical performance. In a 6-year longitudinal study, Geddes *et al.*²⁷ reported that the DIT N2

Table 4 Moral reasoning type indicators (based on description of Derryberry and Thoma)¹⁷

Type	Characteristics
Type 1	Consolidated – personal interest
Type 2	Transitional Personal interest–maintaining norms Preference=personal interest
Type 3	Transitional Personal interest–maintaining norms Preference=maintaining norms
Type 4	Consolidated – maintaining norms
Type 5	Transitional Maintaining norms–post-conventional Preference=maintaining norms
Type 6	Transitional Maintaining norms–post-conventional Preference=post-conventional
Type 7	Consolidated – post-conventional

scores of physical ($n=133$) and occupational ($n=155$) therapy students in a problem-based curriculum in a Canadian university increased significantly by the time of graduation. In contrast to these findings, Dieruf²⁶ found no significant difference in entry and exit DIT P% scores among physical and occupational therapy students ($n=94$). While Dieruf speculated that the lack of increase may have been due to the age of the students and the fact that most already had a baccalaureate degree, she also noted that neither the PT nor OT curriculum included a 3–12 week ethics module as supported by previous DIT research. To our knowledge, no study to date has reported on the effectiveness of a specific intensive ethics educational intervention among physical therapy students using the DIT2, nor has any study addressed changes in phase and type following ethics education.

Methods

This research utilized a pre-test–post-test design to evaluate changes in moral reasoning schema, phase, and type among physical therapy students. Prior to initiation of the study, the researchers sought and received approval from their respective institutional review boards. (Human Research Ethics Committee of the University of South Australia (protocol no. P155/09; USF letter of review). During the summer of 2009, 54 final year students in the Bachelor of Physiotherapy program at the University of South Australia were invited to be voluntary participants in the study by completing an informed consent document following an information session held by one of the researchers (MAJ). All students were informed that participation in the study was voluntary and would not affect grading for the class. Participants were asked to complete the DIT2 and a concept map on their ethics knowledge before and after the 6-week ethics curriculum. As part of the DIT2, participants provide age, gender, education, and political orientation. Completed DIT2 instruments were scored by the Center for Ethical Development, and concept maps were scored by members of the research team (MAJ and LLS). Inclusion criteria for the study were completion of both DITs and both concept maps.

The DIT is a paper and pencil test that utilizes subjects' rating and ranking responses to brief ethical vignettes to evaluate moral reasoning. The DIT2 has five rather than six stories, asks subjects for demographic information and political orientation, and purges fewer subjects. Rest *et al.*¹² report that Cronbach's alpha for test–retest reliability of the DIT1 P% score is 0.76 and 0.81 for the N2 score. The correlation of N2 scores on DIT1 and DIT2 is 0.79.¹² On-going research with the N2 score has provided normative data for this index, and suggests the N2 score provides similar, or superior results to the P%

score.³⁶ Since N2 scores include consideration of both ratings and rankings, Rest *et al.* have considered N2 scores to also serve as indicators of subjects' abilities to discriminate between lower and upper schema items. Given that one important dimension of ethics education is directed toward rationales for ethical decisions, the N2 score is potentially an important outcome measure.

Data collected from the DIT2 were entered into an Excel spreadsheet and analyzed with IBM SPSS 18.0.³⁷ Descriptive statistics, paired *t*-tests, and correlations were calculated to analyze differences and associations in moral reasoning schemas, phases, and types.

Results

Of the 54 students eligible for the study, 40 agreed to participate in the research. Accounting for subjects who did not complete all four portions of the research and missing data on the DIT2 and the concept maps, there were 37 students in the final sample, a usable response rate of 68.5%. Of the resulting sample 40.5% ($n=15$) were males and 59.5% ($n=22$) were females. The mean age of the sample was 24.2 and the majority of respondents (90.9%, $n=30$) reported their educational level as 'senior' in an undergraduate program. Three students (9.1%) reported having a masters or professional degree, and two students reported different degrees on the pre- and post-course survey and were coded as missing with regard to educational data.

Moral reasoning schema

Given the developmental framework for the DIT, the general expectation is that personal interest scores and maintaining norms will decline and post-conventional scores will increase among young adults. Figure 1 provides pre- and post-course means for each schema, and indicates that the sample generally increased in post-conventional thinking and decreased in thinking from the personal interest and maintaining norms schema. As indicated by Fig. 2, paired *t*-tests for differences between and post-course measures were not significant for changes in personal interest, maintaining norms, and P% scores, and were significant for changes in the N2 post-conventional score (paired $t[36]=-2.937$, $P=0.006$).

As previously discussed, college education has been shown to be a powerful stimulus to development in moral reasoning. The schema profile in Fig. 2 provides the post-course 'moral reasoning schema profile', as it compares to the moral reasoning schema profile based on normative means by educational level for undergraduate students published by the Center for the Study of Ethical Development³⁶ and based on a large sample of US citizens with English as a primary language tested between 2005 and 2009.

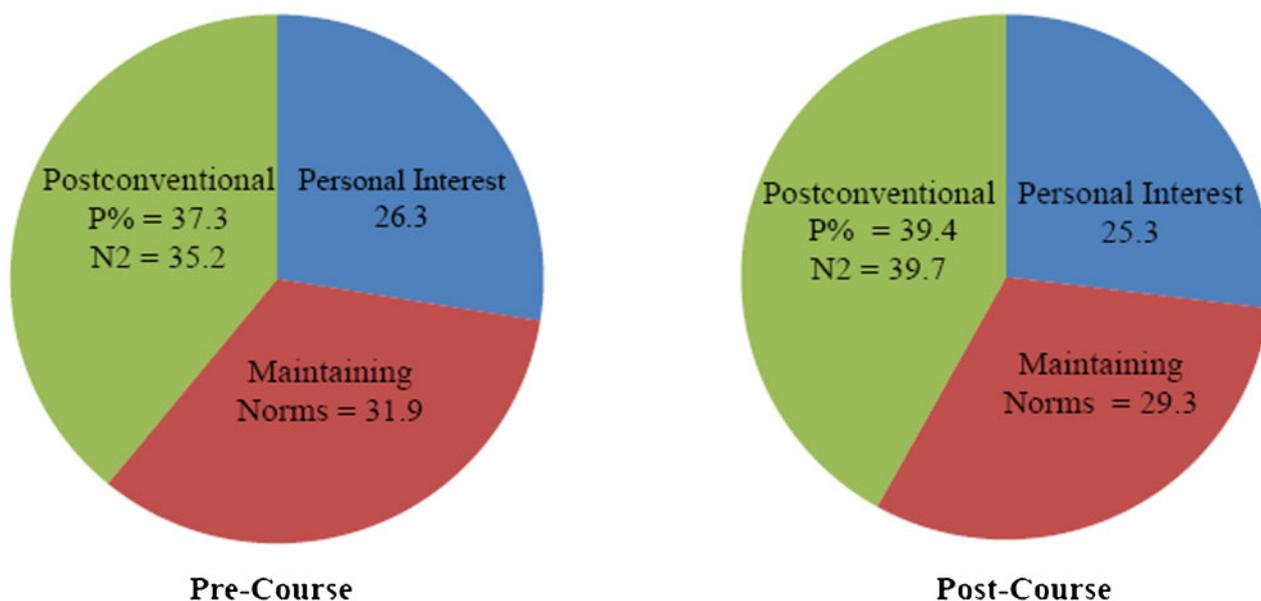


Figure 1 Pre- and post-course schema mix.

Females in this study had higher post-conventional scores than males and the increases in P% scores (paired $t[21]=-2.242$, $P=0.036$) and N2 scores (paired $t[21]=-3.260$, $P=0.004$) for females was significant. Changes in post-conventional scores for males were not significant. Table 5 provides means, high and low scores, and standard deviations for the entire sample, male students, and female students.

Moral reasoning phase

As indicated by Table 6, the majority of students in the sample (59.5%, $n=22$) were in the transitional phase before the course. Following the course, more students (54.1%, $n=20$) were in the consolidated phase than in the transitional phase. Paired t -tests demonstrated that the change in moral phase from time 1-2 was not significant (paired $t[36]=-1.535$, $P=0.134$).

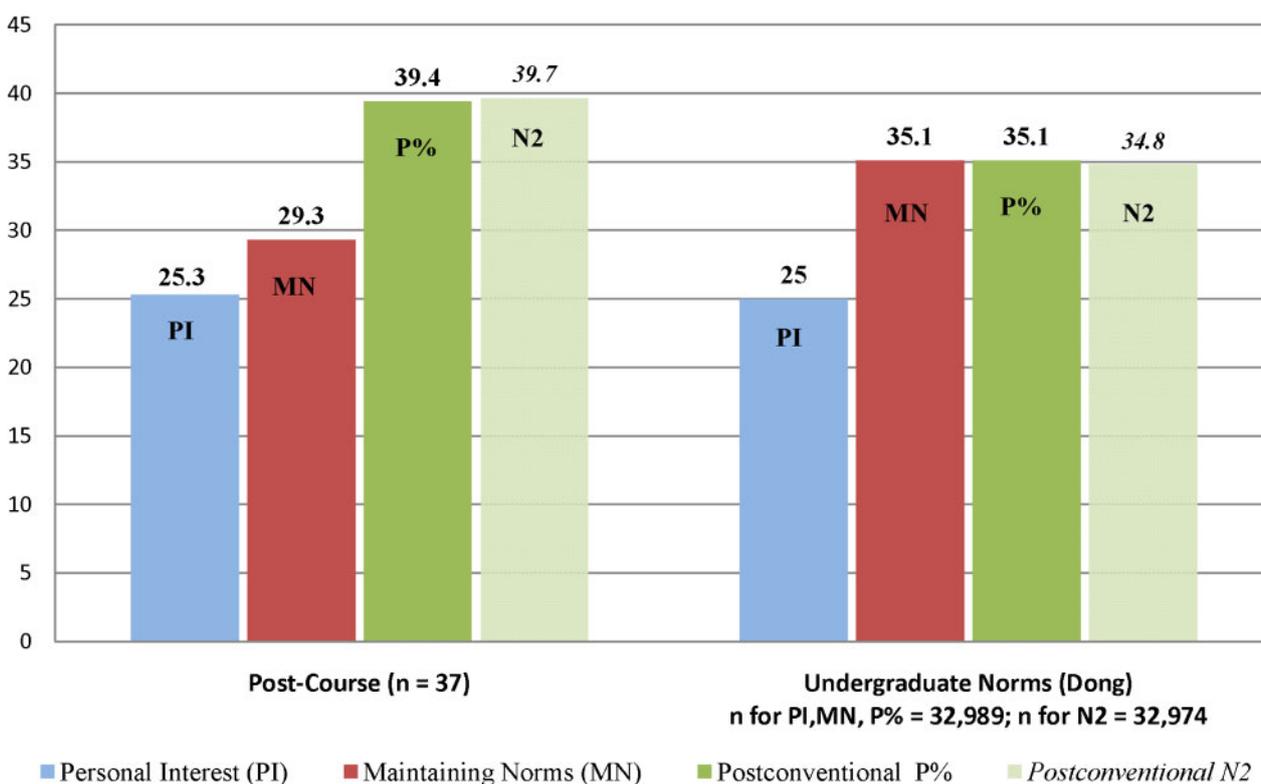


Figure 2 Mean post-course moral reasoning schema scores compared to undergraduate norms.

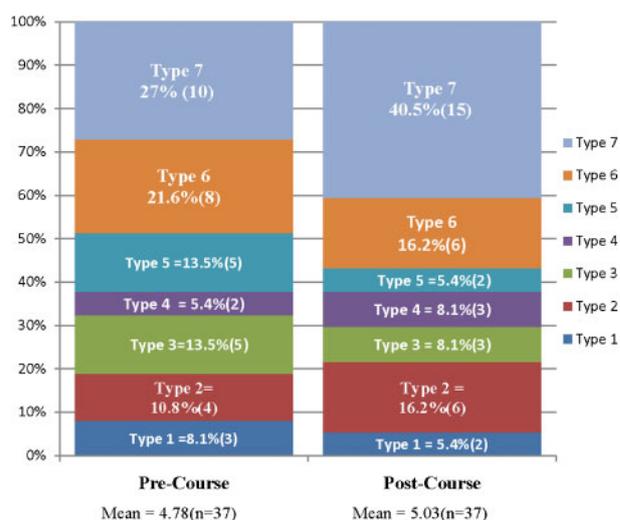
Moral reasoning type indicator

Type is a moral reasoning measure derived from the schema and phase that provides an indication not only of the schema used in resolving dilemmas but the subject's consistency¹⁵⁻¹⁷ in using that predominant schema. Results of this study demonstrate that most students were classified in the highest type, Type 7 (27%, *n*=10) before the course, and this percentage was even higher after the course with 40.5% or 15 of the 37 students falling into Type 7. The 10 students who began the course as Type 7 did not change significantly on mean P% (54.3 to 54.7) or N2 (53.5–53.9) moral reasoning scores after the course. On the other hand, students who began as Type 1–6 significantly increased their N2 (28.4–34.4, paired *t*(26) = -3.159, *P*=0.004) scores. The post-course mean for Moral Reasoning Type was 5.0. Published norms established for undergraduates³⁶ indicate a mean Type score of 4.69 (*n*=32 970). Figure 3 compares pre- and post-course distribution across the types.

Discussion

In this study, students' mean post-conventional moral reasoning score (N2) increased significantly following ethics education. These results indicate that a 6-week intensive ethics educational module focused on transformative learning, self-knowledge/reflection, relationships between ethical and clinical knowledge, and responding to ethical disequilibrium can be effective in producing gains in moral reasoning. In addition, results suggest that the DIT2 may be successfully utilized to evaluate the overall effectiveness of an ethics curriculum on moral reasoning for physical therapy students.

It is noteworthy that the ethics curriculum used in this study included elements that have been consistently tied to increases identified by Schlaefli and



(Difference (time 1-2) in Type for entire sample is not significant (paired *t*[36] = -.776, *p* = .443)

Figure 3 Pre- and post-course moral reasoning type indicators* [*Figures represent percentages (numbers)].

others³⁴ in previous studies: dilemma discussion rather than traditional lecture and length of 3 weeks or greater. While previous studies have focused on type of learning activities (dilemma discussion) and length of educational intervention, there has been limited discussion in the literature of how pedagogical philosophy or strategy may affect outcomes. The transformative learning strategy used in this curriculum may have been a primary factor in increasing post-conventional reasoning. The goals of transformative learning of challenging perspectives and assumptions are strikingly similar to the characteristics of post-conventional reasoning. Future research could further explore the impact of specific pedagogical strategies on moral reasoning.

In this study, female students improved significantly on both P% and N2 post-conventional schema scores. These differences are consistent with previous

Table 5 Summary of preference for post-conventional moral reasoning schema

	Time	P% results				N2 results		
		<i>n</i>	Range	Mean	SD	Range	Mean	SD
Entire sample	Pre	37	8.0–68.0	37.3	14.4	2.98–65.3	35.2	15.3
	Post	37	4.0–68.0	39.4 ^a	16.0	3.06–64.8	39.7 ^b	16.0
Males	Pre	15	8.0–60.0	32.0	13.7	2.98–55.7	30.3	14.1
	Post	15	6.0–52.0	31.2 ^c	12.2	3.6–53.4	32.0 ^d	14.4
Females	Pre	22	14.0–68.0	40.9	14.1	3.1–65.3	38.6	15.5
	Post	22	4.0–68.0	45.0 ^e	16.1	3.1–64.8	44.9 ^f	15.2

Note: ^aDifference (time 1–2) P% for the entire sample is not significant (paired *t*[36] = -1.384, *P*=0.175).

^bDifference (time 1–2) N2 for the entire sample is significant (paired *t*[36] = -2.937, *P*=0.006).

^cDifference (time 1–2) P% score for males is not significant (paired *t*[14] = 0.310, *P*=0.761).

^dDifference (time 1–2) N2 score for males is not significant (paired *t*[14] = -7.32, *P*=0.476).

^eDifference (time 1–2) P% score for females is significant (paired *t*[21] = -2.242, *P*=0.036).

^fDifference (time 1–2) N2 score for females is significant (paired *t*[21] = -3.260, *P*=0.004).

Table 6 Pre- and post-course moral reasoning phases

Phase	Pre-course percentage (Number)	Post-course percentage (Number)
Transitional	59.5 (22)	45.9 (17)
Consolidated	40.5 (15)	54.1 (20)

research indicating that females generally score slightly higher on DIT results. In a study of 537 physical therapy practitioners Swisher²⁸ found that females scored significantly higher than males on P% scores. Although education has generally proven to be a more important influence on DIT scores than gender,²⁹ differences in education did not appear to play a role in these results. The fact that students increased in post-conventional reasoning is very consistent with abundant evidence that undergraduate education is a strong stimulus to post-conventional reasoning. Sisola,²⁵ Dieruf,²⁶ and Geddes *et al.*²⁷ reported higher mean scores for physical therapy students than students in this study. However, it is not clear whether these samples were similar in age and educational background to the students in this study. The Australian students in this study were undergraduate students with a mean age of 24.2, most of whom did not have an undergraduate degree. In contrast to the older students in Dieruf's sample (mean age of 30.6 years), the mean age of students in the studies of Sisola (24.6 years) and Geddes (25.3 years) were similar to the sample in this research. While students in the Geddes *et al.* and Dieruf studies already had an undergraduate degree, educational levels were not reported in Sisola's study. Both Sisola and Dieruf reported P% scores, but Geddes used N2 scores and did not report P% scores. This is significant in light of the fact that P% scores are typically slightly lower than N2 scores. None of the studies reported on phase or type. These differences make it very difficult to compare the samples, and possible differences in outcomes.

The CTM of moral reasoning development asserts that increases in moral reasoning are not fully explained by changes in moral reasoning stage or schema. Results of this study support this perspective. Although there were no significant differences in moral reasoning scores based solely on phase alone, results of the study indicated that there were differences based on Type Indicator, which combines phase and schema. These differences may support the need for different educational strategies based on differences in Type. The overall implication may be that 'one size may not fit all' when it comes to educational strategies for teaching ethics in physical therapy. Thoma and Rest elaborated on how one might tailor ethics education to students in different phases:

A transitional individual...may not benefit from a traditional moral education program because the challenging nature of the intervention may serve to highlight the confusion and limited utility of moral concepts. By contrast, a consolidated... individual may respond in the intended manner to the intervention and focus on the shortcomings of their well-understood moral perspective. In short, one intriguing

*implication of this work is that moral education may achieve more powerful effects by targeting various components of the intervention to individuals at various locations on the transition and consolidation cycle. One could develop, for example, interventions that would include traditional procedures (e.g. dilemma discussion) and, in additional exercises, attend to the importance and utility of moral concepts in social decision making (highlighting application and the importance of moral definitions of concrete situations).*¹⁶

In this manuscript we have focused on mean changes in moral reasoning for the group rather than for individual students. However, information from the DIT could provide valuable information for both students and faculty about moral reasoning. For example, Bebeau⁵ provides schema and type data to every dental student at the University of Minnesota of the purposes of professional development. Further research could explore whether data from the DIT2 is helpful to students in appreciating and improving their moral reasoning.

Results of this research should be interpreted within an understanding of its limitations. As the Four Component Model of Moral Behavior indicates, moral behavior is complex and moral reasoning is simply one aspect of moral behavior. Results of this research cannot provide insight into the moral sensitivity, motivation and identity formation, or implementation of these students. In addition, there are many factors that influence moral reasoning, and the DIT does not measure every dimension of moral reasoning. For example, Bebeau and Thoma³⁸ have developed a test of 'intermediate ethical principles' to evaluate the ability of students to utilize mid-range ethical principles (autonomy, beneficence, non-maleficence, justice, informed consent, confidentiality, etc.) in approaching ethical situations. Additional limitations include the fact that this was a voluntary sample of students and those who agreed to participate may differ from those who did not.

While this research provides support for the idea that an intensive ethics module placed toward the end of the program can be effective in increasing moral reasoning, it is not possible based on this research to determine the specific factors responsible for these gains. For example, it is not possible to determine whether more or less improvement in moral reasoning would have resulted from placing the course earlier, or if there had been ethics instruction prior to this, or if the course had focused on different content. Indeed, as we have suggested, it is possible that the pedagogical strategy of transformative learning was more important than course length, number of hours, or placement within the curriculum. Similarly, while the results suggest that this relatively short course provided an adequate basis for increases in moral

reasoning, it does not indicate that a shorter intensive course is better than a longer course spread across a greater period of time. A final limitation of the research is that we do not know whether these increases in moral reasoning persist in clinical practice or whether they result in discernible differences in the practice of physical therapy.

Results of this research provide further insight into physical therapy ethics education. Further research is needed to determine the elements and characteristics of effective ethics education for physical therapy students and practitioners. Within nursing, Krawczyk³⁹ compared outcomes from the ethics curricula at three different nursing programs, each of which used a different pedagogical approach and number of hours of ethics instruction. She found significant differences in DIT scores for the programs, with higher scores for the program with a dedicated ethics course of 42 hours and lower scores for fewer hours and less dedicated times. Comparative research within physical therapy could assist in establishing preferred pedagogical approaches and outcomes measures. It is recommended that future research with the DIT report data for P%, N2, and Type Indicator in order to facilitate this type of comparison.

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