Critical Thinking Disposition as a Measure of Competent Clinical Judgment: The Development of the California Critical Thinking Disposition Inventory

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ABSTRACT

Assessing critical thinking skills and disposition is crucial in nursing education and research. The California Critical Thinking Disposition Inventory (CCTDI) uses the Delphi Report's consensus definition of critical thinking as the theoretical basis to measure critical thinking disposition. Item analysis and factor analysis techniques were used to create seven disposition scales, which grouped the Delphi dispositional descriptions into larger, more unified constructs: open-mindedness, analyticity, cognitive maturity, truth-seeking, systematicity, inquisitiveness, and self-confidence. Cronbach's alpha for the overall instrument, the disposition toward critical thinking, is .92. The 75-item instrument was administered to an additional sample of college students ($N = 1019$). The alpha levels in the second sample remained relatively stable, ranging from .60 to .78 on the subscales and .90 overall. The instrument has subsequently been used to assess critical thinking disposition in high school through the graduate level but is targeted primarily for the college undergraduate. Administration time is 20 minutes. Correlation with its companion instrument, the California Critical Thinking Skills Test, also based on the Delphi critical thinking construct, was measured at .66 and .67 in two pilot sample groups.

Critical Thinking Defined for Nursing

With the publication of the Delphi Research project on critical thinking (American Philosophical Association, 1990), there now exists a cross-disciplinary conceptual definition of critical thinking that proves quite useful to nursing research and education. This consensus definition of critical thinking (CT) allows nursing to move beyond narrow, linear models of CT currently operative in many nursing education settings, according to the survey of nursing school administrators conducted by Jones and Brown (1991). The use of the Delphi Report's broader, richer definition of CT has the potential to advance our understanding and assessment of the cognitively complex clinical judgment process inherent in nursing practice.

The following Delphi description of the attributes of an ideal critical thinker, upon scrutiny, also describes the attributes of a nurse with ideal clinical judgment:

- The ideal critical thinker is habitually inquisitive, well-informed, trustworthy, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit (American Philosophical Association, 1990, p. 3).

This expert consensus with regard to the dispositional dimension of critical thinking was announced in 1990, after two years of work by a panel of 46 theoreticians drawn from throughout the United States and Canada and representing several academic fields. The expert consensus cited above captures what some have called "the critical spirit"—a style, a set of attitudes that define a personal disposition to prize and to use critical thinking in one's personal, professional, and civic affairs.

The Delphi participants identified the core CT cognitive skills as interpretation, analysis, inference, evaluation, and explanation. The experts characterized critical thinking, per se, as the process of purposeful, self-regulatory judgment; an interactive, reflective, reasoning process. This definition of CT is not unlike that used by nurse researcher Joan Thiel (1993) in her descriptions of...
teaching clinical decision making. In critical thinking, a person gives reasoned consideration to evidence, context, theories, methods, and criteria in order to form a purposeful judgment and, at the same time, monitors, corrects, and improves the process through meta-cognitive self-regulation.

The California Critical Thinking Disposition Inventory (CCTDI)

Educating good critical thinkers is more than developing CT skills. A complete approach to developing good critical thinkers includes nurturing the disposition toward CT, an effort the Delphi participants saw as integral to ensuring the use of CT skills outside the narrow instructional setting. Motivational theory (Lewin, 1935) provides the theoretical grounds for the assumption that the disposition to value and use critical thinking would impel an individual to achieve mastery over CT skills, being motivated to close the gap between what is valued and what is attained.

Measurement of the relationship between the disposition to value and use CT and the attainment of CT skills has been constrained by a lack of measurement instruments designed to measure CT disposition. The California Critical Thinking Disposition Inventory (CCTDI) (Facione & Facione, 1992) is the first such instrument designed to measure seven aspects of CT disposition whose initial delineation stems from the Delphi Report.

Few other instruments have benefited from prior research efforts to first achieve conceptual clarity. Building on the power of this relatively rare occurrence in social behavioral research—cross-disciplinary consensus on an attitudinal construct—development of the CCTDI began with this theoretical clarity and proceeded to derive a measure of the construct through iterative empirical methods. Seven CT dispositional subscales were created: inquisitiveness, systematicity, analyticity, truth-seeking, open-mindedness, CT self-confidence, and maturity.

Conceptual Descriptions of the Seven CCTDI Subscales and their Application to Nursing and Nursing Education

The seven CCTDI dispositional subscales are discipline neutral, yet each can be readily interpreted within professional disciplines. Here the features of each disposition are discussed as they pertain to the practice of nursing.

The inquisitiveness subscale on the CCTDI measures one's intellectual curiosity and one's desire for learning, even when the application of the knowledge is not readily apparent. Considering that the knowledge base for competent nursing practice continues to expand, a deficit in inquisitiveness would signal a fundamental limitation of one's potential to develop expert knowledge and clinical practice ability.

The systematicity subscale measures the tendency toward organized, orderly, focused, and diligent inquiry. No particular kind of organization (e.g., linear or non-linear) is given priority on the CCTDI. Organized approaches are an indispensable part of competent clinical practice, and deficits in systematicity might particularly predispose a nurse to the possibility of negligence in practice.

The analyticity subscale targets prizing the application of reasoning and the use of evidence to resolve problems, anticipating potential conceptual or practical difficulties, and consistently being alert to the need to intervene. Analyticity is a core disposition for the nurse as researcher, but is no less important to the nurse as clinician. Being analytical allows the nurse to connect clinical observations with her or his theoretical knowledge base, and to anticipate events likely to threaten the safety or limit health potential of a given individual.

The truth-seeking subscale targets the disposition of being eager to seek the best knowledge in a given context, courageous about asking questions, and honest and objective about pursuing inquiry even if the findings do not support one’s self-interests or one’s preconceived opinions. The truth-seeking nurse continually reevaluates new information and evidence. In contrast, not being attuned to counterevidence perpetuates a nursing practice based on habit and not on tested theory. On the personal level, a deficit in truth-seeking may subject individual patients to malpractice due to inattention to evidence of missed diagnosis or changing status.

The open-mindedness subscale addresses being tolerant of divergent views with sensitivitv to the possibility of one’s own bias. Open-mindedness is central to the goal of culturally competent care advanced by the American Academy of Nursing (1992). Conversely, dispositional intolerance of divergent views might preclude effective nursing interventions in such varied patient populations as those with substance abuse problems, those in the criminal justice system, and those enmeshed in urban violence.

The CT self-confidence subscale measures the trust one places in one's own reasoning processes. CT self-confidence allows one to trust the soundness of one's judgments and to lead others in the resolution of problems. An appropriate level of CT self-confidence, increasing in relation to mastered CT skills, would be the desired developmental trajectory in the nursing student and the nurse clinician. Whether an individual's level of CT self-confidence is warranted is another matter, however. Some underemphasize their ability to think critically, while others overrate their CT ability. Nurses who overrate their CT abilities may act with inadequate caution, while those whose CT self-confidence is lower than their actual CT skills level might be expected to demonstrate a lack of leadership in both intimate patient–nurse dyads and larger group settings.

The maturity subscale targets the disposition to be judicious in one's decision making. The CT-mature person can be characterized as one who approaches problems, inquiry, and decision making with a sense that some...
problems are necessarily ill-structured, some situations admit of more than one plausible option, and many times judgments must be made based on standards, contexts, and evidence that preclude certainty. This disposition has particular implications for ethical decision making, particularly in time-pressured environments. Cognitive maturity in CT would appear to be critical to the development of expertise as a clinician, an administrator, an educator, or a policy maker.

Development and Validation of the CCTDI

The development of the CCTDI began with the Delphi research reporting a listing of 19 dispositional phrases that were intended to be collectively exhaustive but not individually discrete. These dispositional phrases are synthesized in the description of the ideal critical thinker quoted above. From 10 to 15 pilot items were written for each of the Delphi dispositional phrases (250 item prompts). Scored on a six-point Likert scale, these items were worded to elicit a balance of positive and negative responses. The resulting prompts were screened by college-level CT educators for ambiguities of interpretation.

Retaining the 150 items with the strongest face validity, the experimental instrument was originally piloted at two comprehensive universities in the United States and one in Canada. This pilot sample included 164 diverse college students, included among them a group of midwestern United States baccalaureate nursing students. Statement prompts were written to express familiar opinions, beliefs, values, expectations, and perceptions and were phrased in ordinary English, using no technical vocabulary. Although the instrument was aimed at the baccalaureate-level college student, no college-level content knowledge was presumed.

Item-total correlations were used to identify and eliminate any questionable or ambiguous items from the pool of 150 pilot prompts. In subsequent empirical screenings, items were chosen for retention based on both their internal consistency and their ability to discriminate between respondents. Factor analysis of the remaining items resulted in the retention of 75 items loading highest on seven factors, which were subsequently retained as seven subscales described above (Table 1). When items clustering in each of these seven factors were examined for their content, it was discovered that whereas some factors grouped several of the Delphi dispositional phrases into larger, more unified constructs, others revealed distinct factors somewhat submerged in the original Delphi research. For instance, confidence in one's own CT ability emerged as a more prominent disposition than was suggested by the Delphi participants. A conceptual distinction emerged between valuing open-mindedness and valuing honesty of inquiry.

This process of instrument development allowed the theoretically generated instrument to evolve with the empirical analysis process. The 19 Delphi dispositional phrases were grouped into seven scales, providing parsimony while maintaining scope. The resulting reduction and clarification of dispositional concepts will benefit future CT theory development, simplify theory testing, and facilitate the location of CT disposition in the larger arena of characterological attributes as studied by personality psychologists.

The CCTDI reports eight scores: a score on each of seven subscales and an overall score derived from mathematically equal contributions from each subscale. A score of 30 or below indicates consistent opposition or weakness in relation to the given disposition; a score of 40 indicates minimal endorsement of the disposition on average; and scores above 50 indicate consistent endorsement and strength of the given disposition (Facione & Facione, 1992).

The Validity and Reliability of the CCTDI

With the exception of the CCTDI, the remaining available CT instruments measure CT skills, such as one's ability to draw correct inferences, properly analyze statements, and accurately evaluate reasons. In general, these instruments predate the Delphi Research Project (Ennis, Millman, & Tomko, 1985; Ennis & Weir, 1985; Watson & Glaser, 1980) and thus use less robust theoretical definitions of the CT construct. One instrument, the California Critical Thinking Skills Test (CCTST) (Facione, 1990, 1992) is based on the Delphi construct. It has been available for the past two years and is being used increasingly to assess CT skills in student samples (Carter-Wells, 1992; Love, 1993). Research reports on its utility in nursing samples are now becoming available (O'ura, 1992).

Because the CCTDI is the first objective means to measure the dispositional dimension of CT, convergent validity studies between various CT disposition measures are not yet possible. However, significant correlations supporting the concurrent validity between individual CCTDI scales and established psychological scales targeting close constructs have been observed (Sanchez, 1993).

Two investigations (N=20, N=180) of the overall relationship between scores on the CCTDI (CT disposition) and the CCTST (CT skills) demonstrate highly significant correlations (r=.66, .67, p<.001) (Facione & Facione,
TABLE 2
Internal Consistency Reliability

<table>
<thead>
<tr>
<th>Scale Name</th>
<th>Cronbach’s Alpha</th>
<th>Homogeneity Ratio</th>
<th>Item-to-Total Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truth-seeking</td>
<td>.71</td>
<td>.170</td>
<td>.167- .467</td>
</tr>
<tr>
<td>Open-mindedness</td>
<td>.79</td>
<td>.191</td>
<td>.205- .579</td>
</tr>
<tr>
<td>Analyticity</td>
<td>.72</td>
<td>.197</td>
<td>.272- .510</td>
</tr>
<tr>
<td>Systematicity</td>
<td>.74</td>
<td>.211</td>
<td>.269- .568</td>
</tr>
<tr>
<td>CT Confidence</td>
<td>.78</td>
<td>.284</td>
<td>.393- .569</td>
</tr>
<tr>
<td>Inquisitiveness</td>
<td>.80</td>
<td>.297</td>
<td>.317- .627</td>
</tr>
<tr>
<td>Maturity</td>
<td>.75</td>
<td>.233</td>
<td>.175- .597</td>
</tr>
</tbody>
</table>

Figure 1. Scale scores of "Jeff." Key to subscales: T = truth-seeking, O = open-mindedness, A = analyticity, S = systematicity, C = CT self-confidence, I = inquisitiveness, M = maturity.

Figure 2. Profile of "Teresa." Key to subscales: T = truth-seeking, O = open-mindedness, A = analyticity, S = systematicity, C = CT self-confidence, I = inquisitiveness, M = maturity.

Figure 3. Means and ranges of CCTDI scale scores for a group of students. Key to subscales: T = truth-seeking, O = open-mindedness, A = analyticity, S = systematicity, C = CT self-confidence, I = inquisitiveness, M = maturity.

1992; Sanchez, 1993) supporting the overall construct validity of the CCTDI. Additional research studies continue to examine the convergent and divergent validity of the CCTDI and to locate the construct of CT disposition within the existing knowledge base regarding cognitive decision making and meta-cognition.

Face validity in attitudinal measures is not always desirable as it introduces the potential for socially desirable response sets. Although socially desirable response sets might lead to the CCTDI reporting higher than "true" scores, items on the CCTDI discriminate well between respondents, attracting endorsements from those individuals who oppose the value of various aspects of CT disposition. Those who score low on the truth-seeking subscale, for instance, typically agree with the statements: "I look for facts that support my views, not facts that disagree," and "I know what I think, so why should I pretend to ponder my choices." Those who score low on the open-mindedness subscale typically agree with the statements: "Others are entitled to their opinions, but I don’t need to hear them," and "You are not entitled to your opinion if you are obviously mistaken."

Alpha reliabilities for the seven individual subscales in the initial pilot sample ranged from .71 to .80 (Table 2). The alpha reliability for the overall instrument, measuring the overall disposition toward critical thinking, was .91. The developed 75-item instrument was later administered to two additional samples totaling 1019 freshman college students. The alpha levels in the later samples remained relatively stable (ranging from .60 to .78 on the subscales and .90 overall), thus empirically supporting the internal reliability of the subscales.

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Two Sample CCTDI Profiles

CCTDI scores can be displayed in a profile grid such as the ones in Figures 1, 2, and 3. Figure 1 displays the scale scores of an individual student whom we shall name “Jeff.” He demonstrates consistency in open-mindedness about divergent views and intellectual curiosity and at least minimal endorsement of approaching problems in a systematic and diligent way. Jeff reports a consistent and considerable lack of self-confidence when it comes to critical thinking. His low maturity score may indicate difficulty in deciding between competing points of view and an inability to determine when it is necessary to come to closure on an issue.

Figure 2 is the profile of a student we shall name “Teresa.” Her CCTDI profile suggests that she is very confident of her critical thinking ability and looks for opportunities to debate an issue. But Teresa shows definite deficiencies in five of the seven CT disposition scales. She might have endorsed the CCTDI items “College is generally a waste of time,” and “To get people to agree with me, I’d give any reason that worked.” Scoring low on the truth-seeking and systematicity scales, she is unlikely to reconsider decisions in light of new evidence or to approach problems with some systematic plan for analysis.

In fact, the profiles of both Jeff and Teresa are profiles of actual nursing students in the initial pilot study. Using Jeff’s CCTDI profile, his clinical professors and academic advisers might better understand Jeff as a college-level learner. They might better select clinical opportunities to build on his strengths, and guide and support him in achieving a more true appraisal of his CT ability. Teresa’s CCTDI profile provides an objective measure of Teresa’s deficiencies, separating these from the faculty’s possible affective response to her behavioral style. With the CCTDI as a starting point, Teresa and her adviser can have a straightforward discussion about her weaknesses in relation to critical thinking and how these might limit her ability to make sound clinical judgments.

Figure 3 displays the means and ranges of CCTDI scale scores for a group of students. These data are from one of the later validation samples, an entering freshmen cohort at a private comprehensive university (N = 587). This student group had a mean SAT verbal score of 511, SAT math score of 584, and an average high school grade point average of 3.47. Faculty at this university used these data to discuss implications for possible curriculum and pedagogy change in the critical thinking component of the English composition course, and will reexamine CT disposition in this cohort later in their college experience.

Conclusion

Nursing education is not merely a fact-loading process. It is the acquisition of the ability to identify health and illness problems. It is the learning of skills and strategies needed to make rigorous and honest inquiry into the unique circumstances of such problems. It is the mastering of sound methods to select the optimal choice among potential interventions to solve such problems. It is the ability to evaluate the effectiveness of interventions to achieve intended outcomes.

This perspective on nursing education and practice reflects the evolution of nursing as an autonomous discipline with the responsibility of upholding the standards of professional practice. No longer is it sufficient to provide nursing students with facts drawn from physiology, pharmacology, psychology, etc., and to augment these facts with practical knowledge of the art of bedside care. These ways of knowing remain valuable, but the knowing must be examined within a process framework that demands theoretical connections between believed facts and practice observations (Meleis, 1988; Tanner, 1987).

The Delphi Report provides a robust definition of the construct of critical thinking, encompassing both cognitive skills and personality attributes. A number of instruments have been developed to measure the skills component of critical thinking. The CCTDI has been developed to assess the dispositional component of critical thinking. Defined as purposive, self-regulatory judgment, critical thinking is a construct that greatly overlaps the conceptual boundaries of the process nurses call “clinical judgment.”

The measurement of clinical judgment in nursing students and practicing nurses should best be approached through multiple measures. To the traditional assessment of clinical judgment through (1) expert ratings of clinical performance by clinical professors and (2) evaluations of written patient assessments and intervention plans can now be added the objective measures of (3) critical thinking skill and (4) critical thinking disposition as measured by the CCTDI. With this multimodal assessment, program educators and advisers can be better equipped to nurture critical thinking in decision making in their students as well as the long-range outcome of expert clinical judgment in the professional nurses they educate.

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