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The development and psychometric validation of a Critical Thinking Disposition Scale

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ABSTRACT

This article describes the development and psychometric evaluation of a Critical Thinking Disposition Scale (CTDS). Items for the scale were generated using taxonomies of important thinking dispositions discussed in the literature. Participants comprised of two cohorts of first year undergraduate and graduate students enrolled on a programme in education. Psychometric evaluation was carried out using two studies. In Study 1, an exploratory factor analysis ($n = 467$) revealed a two-factor model for the scale: Critical Openness and Reflective Scepticism. In Study 2 ($n = 371$), a multigroup confirmatory factor analysis (MGCFA) supported the two-factor model across both undergraduate and graduate groups. Results from the MGCFA showed that both groups understood the items in a similar way, and the CTDS successfully discriminated between these theoretically different groups. Educators, psychologists and researchers may find the CTDS a useful tool for measuring individuals' disposition to critical thinking. Immediate future research should focus on establishing the strength of relationship between the CTDS and other cognitive measures of critical thinking.

1. Introduction

Critical thinking has become an educational ideal with most policy makers and educationists calling for the development of critical attitudes in students (Ennis, 2008; McBride, Xiang, & Wittenburg, 2002; Stapleton, 2010). Most definitions of critical thinking acknowledge the importance of both cognitive (i.e. skills) and dispositional (i.e. propensity) dimensions in the thinking process (Facione, Sanchez, Facione, & Gainen, 1995; Fasko, 2003; Ku, 2009; Lawrence, Serdikoff, Zinn, & Baker, 2009). For instance, McPeck (1981) defined critical thinking as "the propensity and skill to engage in an activity with reflective scepticism" (p. 8). A more recent perspective which combines elements from other definitions proposes that critical thinking is "the propensity and skills to engage in activity and 'mental activity' with reflective skepticism focused on deciding what to believe or do. . ." (Fasko, 2003, p. 8).

The cognitive dimension of critical thinking has a long tradition and generally emphasises reasoning and logical thinking, skills closely associated with intellectual ability. It focuses on an individual's ability to comprehend a problem and to come up with reasonable solutions for the identified problem. This dimension has been the most researched and there are numerous instruments dedicated to its measurement (see e.g., Ku, 2009). Key cognitive skills usually include ability to make inference, recognise assumptions, deductions, interpretations, analysis, and evaluation of arguments (e.g., American Philosophical Association [APA], 1990; Halpern, 1998; Watson & Glaser, 1980). Dispositions on the other hand examine the tendency to do something (Ennis, 1996), or the manner in which individuals approach a task (Ku & Ho, 2010). In the literature, critical

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thinking dispositions have been defined as a constellation of attitudes, intellectual virtues or habits of mind, thus describing the way an individual reasons, argues and make decisions (Facione et al., 1995; Perkins, Jay, & Tishman, 1993). According to some theorists, having a disposition to think critically implies having the ability to do so. These theorists argue that critical thinking ability can exist without disposition to use it, but having a disposition implies having the associated ability (Facione et al., 1995; Norris, 2003). This latter view is not entirely supported by the available evidence. However, there is consistent support for the existence of both a dispositional and a cognitive dimension (e.g., Ku & Ho, 2010; Macpherson & Stanovich, 2007; Taube, 1997; West, Toplak, & Stanovich, 2008).

In contrast to the cognitive domain, interest in the dispositional dimension is a more recent phenomenon. Several empirical studies linking critical thinking dispositions to performance in differing domains as well as wider psychological characteristics have emerged over the past two decades. For instance, the disposition to think critically has been linked with improved academic performance, deep learning, good professional practice, professional expertise, anxiety, ego-resilience and overcoming cognitive bias in reasoning (El-sayed, Sleem, El-sayed, & Ramada, 2011; Facione et al., 1995; Fahim, Bagherkazemi, & Alemi, 2010; Kwon, Onwuegbuzie, & Alexander, 2007; Macpherson & Stanovich, 2007; West et al., 2008). Significant relationships have also been found between disposition to critical thinking and some personality characteristics (e.g., Clifford, Boufal, & Kurtz, 2004). To this end, there has been suggestion that personality characteristics such as openness to experience are conceptually related to critical thinking (Clifford et al., 2004).

This emergent interest in thinking dispositions has however not extended to issues around its measurement. A review of the extant literature shows a paucity of instruments for measuring thinking dispositions. Theorists within the field have lamented this limited attention given to the measurement of thinking dispositions (Edman, 2009; Ennis, 2003; Halpern, 2003; Ku, 2009; Norris, 2003). This is despite the fact that the availability of suitable dispositional measures is crucial in determining whether programmes have been successful in nurturing critical thinking attitudes in participants (Ku, 2009). The absence of valid and reliable dispositional instruments also calls into question the claims that thinking dispositions are associated with improved performance in various domains of life. The main objective of the current study was therefore to develop a Critical Thinking Disposition Scale and to evaluate its psychometric properties.

2. Taxonomies of important thinking dispositions

Several taxonomies of important thinking dispositions have been described in the literature (Table 1). These taxonomies generally range from broad characteristics that are empirically derived to specific theoretical propositions. The first systematic approach to defining thinking dispositions was taken in 1987 by the American Philosophical Association (APA) who commissioned a study to explore the notion of critical thinking and its operationalisation for purposes of assessment. Findings from this study, known as the Delphi Report (APA, 1990), proposed 19 broad dispositions which critical thinkers are expected to posses. Facione and Facione (1992) drawing on the Delphi report argued for seven instead of the original 19 dispositional dimensions of critical thinking following an exploratory factor analysis (cf Table 1). Both the Delphi report

Table 1
Taxonomies of important thinking dispositions.

Author	Year	No. of dispositions	Examples
APA Delphi Report	1990	19	Inquisitiveness; well-informed; alertness to use CT; trust in reasoned inquiry; self-confidence in one's own ability to reason; open-mindedness; flexibility in considering alternatives; understand opinions of others; fair-mindedness; honesty in facing own biases; prudence in making judgments; revise views where change is warranted; clarity in stating concern; working with complexity; diligence in seeking relevant information; reasonableness in selecting and applying criteria; focusing attention on the concern at hand; persistence in face of difficulties; precision
Facione and Facione	1992	7	Inquisitiveness; open-mindedness; systematicity; analyticity; truth-seeking; critical thinking self-confidence; maturity
Perkins, Jay, and Tishman	1993	7	Broad and adventurous; sustain intellectual curiosity; clarify and seek understanding; planful and strategic; intellectually careful; seek and evaluate reasons; metacognitive
Halonen	1995	5	Tentativeness, scepticism; tolerance of ambiguity; appreciation of individual differences; regard for ethical practices
Ennis	1996	12	Seek alternatives and be open to them; endorse a position when it is justified to do so; well-informed; consider other points of view; clear about intended meaning; determine, and *maintain focus* on, the conclusion or question; seek and offer reasons; take into account the total situation; reflectively aware of own beliefs; discover and listen to others' view and reasons; take into account others' feelings and level of understanding; be concerned about others' welfare
Halpern	1998	5	Willingness to engage in and persist at a complex task; habitual use of plans and the suppression of impulsive activity; flexibility or open-mindedness; willingness to abandon non productive strategies in an attempt to self-correct; awareness of social realities so that thoughts can become actions.