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1. Thinking critically about critical thinking approaches: Comment on Yancher, Slife, and Warne (2008)........ 1

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Abstract (English): Yanchar, Slife, and Warne (see record 2008-11592-004) recently contrasted core assumptions of the method-centered, scientific analytic reasoning approach to critical thinking that is dominant in psychology with their own alternative approach emphasizing integration of information from multiple perspectives. They contended that emphasis on the scientific analytic approach is associated with justification and neglects other strategies such as more open-minded and respectful dialogue that could promote innovation and theory development. This commentary on their article examines these claims in light of research on critical-thinking dispositions and scientific discovery. Their claims received mixed support, prompting recommendations for additional research and using the research evidence to revise the psychological claims of their alternative approach. (PsycINFO Database Record (c) 2013 APA, all rights reserved)

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Full text: Review of General Psychology 1089-2680 1939-1552 Educational Publishing Foundation

Yanchar, Slife, and Warne (2008) recently contrasted core assumptions of the method-centered, scientific analytic reasoning approach to critical thinking that is dominant in psychology with their own alternative approach emphasizing integration of information from multiple perspectives. They contended that emphasis on the scientific analytic approach is associated with justification and neglects other strategies such as more open-minded and respectful dialogue that could promote innovation and theory development. This commentary on their article examines these claims in light of research on critical-thinking dispositions and scientific discovery. Their claims received mixed support, prompting recommendations for additional research and using the research evidence to revise the psychological claims of their alternative approach.

critical thinking critical thinking dispositions scientific creativity

In their recent, thought-provoking article, Yanchar, Slife, and Warne (2008) called for increased awareness of the assumptions and limitations of what has been called the scientific analytic reasoning approach to critical thinking dominant in psychology (Dick, 1991). The scientific analytic approach is a rule-based approach emphasizing technical, statistical, measurement, and methodological considerations commonly found in textbooks such as Benjafield (1994); Bensley (1998), and Stanovich (2004). Yanchar et al. proposed an alternative approach to critical thinking (CT) emphasizing consideration of information from other perspectives and questioning of assumptions. They further claimed that their alternative approach could lead to greater innovation and improvement in theory because it provided strategic resources not available through the scientific analytic approach. However, I argue that the parts of their proposal concerning how dispositions and scientific discovery are related to the scientific analytic approach are inconsistent with some research and psychological theory.

Comprehensive approaches to CT including the alternative approach have diverse assumptions and components because CT has its roots in education, philosophy, and psychology (Sternberg, 1985). For
example, Halpern (1998) proposed a psychological approach emphasizing cognitive skills, meta-cognition, and dispositions that is also concerned with the educational problem of how best to improve CT. In contrast, the alternative approach with its focus on examining assumptions, consideration of information from different perspectives, and prescriptions for improving practice seems to be primarily a philosophical approach with educational implications. Indeed, Yanchar et al. recommended the use of strategies from philosophy and education often neglected by those taking a scientific analytic approach. At the same time, their alternative approach makes some psychological claims such as the statement that certain dispositions like open-mindedness and being respectful of other views enhance intellectual productivity. Elsewhere, they predicted that using their alternative approach should promote innovative thinking. Because such statements could be construed as psychological hypotheses about CT dispositions and scientific discovery, the following discussion examines how consistent are the alternative approach’s claims with research in these areas.

The Scientific Analytic Approach and CT Dispositions

Yanchar et al. (2008) argued that a “relational atmosphere that allows for productive dialogue— including the open and nondefensive exchange of ideas—can best facilitate the fair consideration of one another’s viewpoint and contributions” (p. 269). Connecting their recommendation with CT theory, they seemed to be referring to open-mindedness and fair-mindedness, two CT dispositions. Many CT theorists and researchers now agree that critical thinkers need dispositions, such as open-mindedness and fair-mindedness, in addition to the appropriate CT skills and strategies, (e.g., Ennis, 1987; Halpern, 1998; Perkins et al., 2000).

In fact, some evidence suggests that the scientific analytic approach’s focus on methodological reasoning may not be sufficient for good scientific thinking because scientists sometimes are not disposed to use their scientific analytic abilities to reason effectively. For example, Mahoney (1977) found that journal reviewers, presumably highly trained in the scientific analytic approach, evaluated manuscript submissions that agreed with their own theoretical position more favorably than others of equal quality that did not. This shows that despite their methodological expertise, reviewers succumbed to confirmation bias and were not fair-minded in comparing manuscript submissions. Another example comes from the life and work of Alfred Russel Wallace, credited with discovering natural selection independently from Charles Darwin. Despite his considerable critical thinking and scientific reasoning skills, Wallace continued to believe in spiritualistic contact with the dead in the face of considerable evidence to the contrary showing he was not disposed to fairly evaluate the evidence in this specific situation (Bensley, 2006).

The importance of CT dispositions in scientific thinking raises questions about how endorsing a scientific, evidence-based approach and the scientist role are related to CT dispositions like open-mindedness. In a recent study of 152 psychology students, Rowan and Bensley (2007) examined correlations between a new instrument called the Inventory of Thinking Dispositions in Psychology (ITDP) of Bensley and Bates (2005) and other measures of CT dispositions such as the Need for Cognition Scale by Cacioppo and Petty (1982), the Objectivism Scale by Leary, Sheppard, McNeil, Jenkins, and Barnes (1986), the Scientist–Practitioner Inventory by Leong and Zachar (1993), and the California Critical Thinking Dispositions Inventory by Facione and Facione (1994). Rowan and Bensley (2007) found that scores on the ITDP scale for endorsing a reasonable, scientific approach to psychology showed significant positive correlations with the Need for Cognition measuring CT and intellectual engagement, the Objectivism Scale measuring the tendency to base belief on empirical information and reasoning, endorsement of the scientist role on the Scientist–Practitioner Inventory, and with scores on the open-mindedness scale of the California Critical Thinking Dispositions Inventory, rs(111) = .55, p < .001. To the extent that the ITDP measured commitment to the scientific analytic approach, this suggests that college students endorsing this approach tended to be more open-minded. This is contrary to the alternative approach’s claim that taking a scientific analytic approach tends to limit consideration of other views. Although some research has been done on open-mindedness and CT (e.g., Leshowitz, DiCerbo, &Okun, 2002; Stanovich &West, 1998), few studies have investigated how CT is related to other dispositions mentioned in Yanchar et al.
such as care, respect, and empathy. Clearly, more research is needed on the relationship between the scientific analytic approach, the alternative approach, and CT dispositions.

The Scientific Analytic Approach and Discovery
Yanchar et al. (2008) claimed that scientific analytic reasoning facilitates work within the context of justification where ideas are formally tested according to certain protocol, but offers little if any support to the innovation and cultivation of ideas within the context of discovery (see McPeck, 1981, for more on this argument). (p. 269)

Their argument relies on the distinction between discovery and justification. By associating the scientific analytic approach with justification, their proposal coincides with traditional views of creativity as involving an initial generative, divergent stage followed by an evaluative or convergent stage.

Much evidence, however, contradicts the traditional view of creativity and that taking a scientific analytic approach does little to cultivate ideas leading to discovery. First, Bailin (1992) challenged McPeck's (1981) distinction between a nonlogical generative stage associated with discovery and a logical, evaluative stage associated with justification. She argued that, if as McPeck admitted, generated ideas are ones worth checking further, then they are likely to already have been evaluated to some extent by criteria similar to ones used in a later evaluation stage. Many philosophers expert in CT now have agreed that creative thinking and critical thinking are related (e.g., Bailin, 1987; Ennis, 1987; Paul, 1993). Likewise, research on the two has convinced many psychologists that evaluative processes are involved in idea generation and that generative processes are involved in evaluation and CT (e.g., Baer, 2003; Halpern, 2003; Runco & Chand, 1994).

More specific evidence for how the scientific analytic approach contributes to creative discoveries comes from problem finding. When scientists encounter a discrepancy between what they expect and what they observe, this initiates CT and the recognition that a problem exists. Problem finding involves critical and evaluative thinking even though it is in the early stages of creative problem solving (Runco & Chand, 1994).

Pavlov's discovery of classical conditioning is an instance of problem finding in which scientific analytic reasoning contributed to his creative discovery. It began as part of Pavlov's physiological research on digestion in which he observed that dogs unexpectedly salivated even before they were fed (Clark, 2004). Pavlov used reasoning and his knowledge of physiology to recognize that this observation presented an important problem and began searching for a solution consistent with observation. This example contradicts the claim of Yanchar et al. that the scientific analytic approach does not cultivate development of ideas that diverge from its guidelines because Pavlov used his research protocol to discover a phenomenon not explained by his method or existing theory.

Dunbar (1995) obtained more direct evidence of the role of problem finding and methodological reasoning in discovery when he studied the discovery process of creative molecular biologists as they worked. He found that those who tended to make discoveries often stopped whatever they were doing when they encountered an experiment that produced unexpected data. After eliminating methodological problems as an explanation, they searched for other causes of the anomalous findings. Discussion of the unexpected results often occurred in laboratory meetings in which scientists on the research team asked questions and hypothesized about potential causes. This supports Yanchar et al.'s claim that dialogic, open-minded discourse facilitates discovery, but it also supports the importance of the scientific analytic, method-centered approach in discovery.

Support for their other proposal that scientific discovery is facilitated by consideration of ideas from alternative perspectives comes from Darwin's discovery of natural selection. Darwin was greatly influenced by other perspectives besides biology such as the geological work of Charles Lyell and the economic essay on the possibility of happiness by Thomas Malthus (Weisberg, 1993).

Conclusions
This brief review of the research found mixed support for the claims of the alternative approach and suggests
that the relationships between the scientific analytic approach and dispositions and discovery may be more complicated than Yanchar et al. assumed. For example, in some situations scientists with good methodological skills may not be disposed to think critically whereas other research shows that those more disposed to the scientific analytic approach may be more open-minded. Yet the alternative approach does not specify any trait or situational constraints on open-mindedness, viewing it more as a general strategy for how discourse should proceed. Additional research should examine CT dispositions in both trait and situational terms as well as inconsistencies between the claims of the alternative approach and previous research on discovery. However, the fact that parts of the alternative approach are inconsistent with some research does not discount potential positive contributions from other parts such as questioning assumptions and seeking information from other perspectives. These are essential to deeper understanding and analysis of theory and the products of method-centered practices; but likewise, the products of the scientific analytic approach, such as research on CT dispositions and scientific discovery, should inform the alternative approach.

References


Subject: Critical Thinking (major); Experimentation (major); Psychology (major); Creativity; Psychology Education;

Classification: 2100: General Psychology

Identifier (keyword): critical thinking critical thinking dispositions scientific creativity assumptions implications

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Publication title: Review of General Psychology

Volume: 13

Issue: 3

Pages: 275-277

Publication date: Sep 2009

Format covered: Electronic

Publisher: Educational Publishing Foundation

Country of publication: United States

ISSN: 1089-2680

eISSN: 1939-1552

Peer reviewed: Yes

Language: English

Document type: Journal, Peer Reviewed Journal, Comment/reply

Number of references: 29

Publication history:

Accepted date: 27 May 2009

Revised date: 27 Feb 2009

First submitted date: 15 Feb 2009

DOI: http://dx.doi.org/10.1037/a0015654

Release date: 31 Aug 2009 (PsycINFO);
31 Aug 2009 (PsycARTICLES);

Accession number: 2009-12731-009

ProQuest document ID: 614542213

Document URL:

12 June 2014