



Review

Noncognitive proponents' conflation of “cognitive skills” and “cognition” and its implications[☆]

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ABSTRACT

Noncognitive skills have drawn the interest of psychologists, educators, economists and policymakers over the past 30 years. Despite dissatisfaction with the label “noncognitive skills” that term is still commonly used to describe the construct domain. One reason cited for objecting to the label “noncognitive” is that it implies that the constructs and measures do not entail cognition, a virtual impossibility. I argue this seemingly innocent conflation of “cognition” and “cognitive skills” unknowingly glosses over a fundamental divide in how the subject of psychology is conceptualized and psychological research conducted: The differential and experimental traditions. Where “cognitive skills” originate in the differential tradition and are usually treated as synonymous with psychometric intelligence, “cognition” originates in the experimental tradition and encompasses seemingly all human mental activity. While cognitive skills constitute a variety of cognition not all cognition entails the higher-order, complex mental activity that defines cognitive skills. This seemingly minor conflation suggests that many working in the noncognitive domain do not possess a strong understanding of what cognitive skills are. I provide additional evidence for this assertion and discuss the potentially serious practical consequences of creating and using noncognitive skills assessments without possessing a thorough understanding of cognitive skills.

Noncognitive skills have been studied in educational and occupational settings for nearly a century (e.g., Pressey, 1920) but interest in, and demand for, them has increased rapidly over the past 30 years (Schanzenbach, Nunn, Bauer, Mumford, & Breitwieser, 2016). This interest is justified: Noncognitive skills are related to a host of important variables, including grades, educational attainment, job performance, labor market outcomes, crime, health, and mortality (Almlund, Duckworth, Heckman, & Kautz, 2011; Poropat, 2009; Richardson, Abraham, & Bond, 2012; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Schneider & Preckel, 2017). Given their widespread relevance, noncognitive skills have been the object of research and discussion by a very broad constituency, including psychologists, economists, educators, sociologists, policymakers, popular book authors, reporters, columnists, and bloggers.

There is long-standing and widespread dissatisfaction with the label “noncognitive skills” (e.g., Duckworth & Yeager, 2015; Messick, 1979) and it has even been noted that “Everybody hates this term” (Easton, 2013, p. 8). Mostly simply, the term indicates that noncognitive skills are whatever cognitive skills are not. Nonetheless, it is also frequently noted that the term “noncognitive” is problematic because it implies

that noncognitive skills, and the measures that assess them, do not involve cognition – a near-impossibility, as practically all human behavior involves cognition (e.g., Borghans, Duckworth, Heckman, & ter Weel, 2008; Duckworth & Yeager, 2015; Farrington et al., 2012; Schanzenbach et al., 2016; West et al., 2016). In the course of making this objection writers implicitly equate cognition and cognitive skills; others have explicitly treated the two terms synonymously (e.g. Almlund et al., 2011; Heckman, Humphries, & Kautz, 2014).

In this paper I define and differentiate “cognitive skills” and “cognition” and make the case they are not interchangeable concepts. I explain how the conflation of cognition and cognitive skills elides the difference between levels of analyses rooted in differential and experimental psychology – domains so separate their division has been lamented for over 50 years. I argue that the tendency of some proponents of noncognitive skills to equate cognitive skills and cognition may be indicative of the larger phenomenon of those proponents being unfamiliar with what cognitive skills actually constitute. I discuss the practical consequences of this ignorance and propose remedies for the problems described throughout the paper.

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1. Cognitive skills

In the past and present, researchers studying cognitive skills (e.g., Ackerman & Lohman, 2006; Blair, 2006; Carroll, 1993; Cattell, 1940; H. J. Eysenck, 1940; Gustafsson & Undheim, 1996; McGrew, 2009; Spearman, 1934; Washburn, 1929) and noncognitive skills (e.g., Borghans et al., 2008; Duckworth & Yeager, 2015; Heckman et al., 2014; Kautz, Heckman, Diris, ter Weel, & Borghans, 2014) have explicitly and implicitly equated the terms “cognitive skills”, “cognitive abilities”, and (psychometric) “intelligence”. The publication resulting from an American Psychological Association (APA) Task Force review of the intelligence literature (Neisser et al., 1996), and its update (Nisbett et al., 2012), treated the terms as synonyms. Labeling psychometric intelligence tests “cognitive tests” is also a practice that has been in use for decades (e.g., Cattell, 1937, 1963; Ekstrom, French, Harman, & Dermen, 1976; Lord, 1950; Neisser, 1997; Spearman, 1927). Consequently, definitions of psychometric intelligence are broadly transferrable to cognitive skills. Realizing that the term “intelligence”, along with concepts in the social sciences more generally (Cartwright & Bradburn, 2011), is itself difficult to define (Sternberg & Detterman, 1986; Thorndike, 1921) and carries substantial historical baggage (Anastasi, 1975; Bartholomew, 2004; Gardner, 1983), two well-regarded definitions of psychometric intelligence are:

[The] ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought

(Neisser et al., 1996, p. 77)

Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings – “catching on,” “making sense” of things, or “figuring out” what to do.

(Gottfredson, 1997, p. 13)

The first definition was provided in an APA Task Force report published in the wake of *The Bell Curve* (Herrnstein & Murray, 1994) controversy and was adopted as a definition of cognitive skills in two prominent reviews of noncognitive skills in the economics literature (Almlund et al., 2011, p. 37; Borghans et al., 2008, p. 979). The second definition was explicitly endorsed by 52 intelligence researchers (i.e., “experts”) and adopted by the follow-up to the original APA Task Force report (Nisbett et al., 2012). This definition was also adopted by the committee’s chairman in his book *Intelligence and How to Get It* (Nisbett, 2009), which has been regarded as antagonistic to “traditional” perspectives on psychometric intelligence (Hunt, 2009). The definition of cognitive skills given in a recent report from the Brookings Institution bears a great resemblance to these definitions: “For the purposes of this document, the term ‘cognitive skills’ encompasses intelligence; the ability to process, learn, think, and reason; and substantive knowledge as reflected in indicators of academic achievement” (Schanzenbach et al., 2016, p. i).

It is worth highlighting that the Brookings report’s inclusion of knowledge in its definition is consistent with even very early treatments of intelligence (e.g., Thurstone, 1924) and that, to the extent learning results in knowledge, is also implicit in the definitions provided above. Further, learning and its outcome (i.e., knowledge) are explicitly embodied in the classic distinction between fluid intelligence and crystallized intelligence (Hunt, 2010; Reeve & Bonaccio, 2011).

2. Cognition

Prior to the cognitive revolution in the late 1950s, the term “cognitive” was applied to very disparate areas (e.g., color perception,

musical ability, psychometric intelligence) and was, even when used by highly-regarded psychologists (e.g., Asch, Festinger, Heider), at best defined vaguely (Green, 1996). When the architects of the cognitive revolution were looking for a synonym for “mental” that would allow them to differentiate their approach to psychology from behaviorism, they chose the term “cognitive” (Green, 1996). Ambiguity remained even after its appropriation by cognitive psychologists, however, as indicated by the definition of “cognition” provided in Neisser (1967/2014)’s seminal text:

all the processes by which the sensory input is transformed, reduced, elaborated, stored, recovered, and used. It is concerned with these processes even when they operate in the absence of relevant stimulation... Given such a sweeping definition, it is apparent that cognition is involved in everything a human being might possibly do; that every psychological phenomenon is a cognitive phenomenon. (p. 4)

Five decades have not refined this definition, as evidenced by the *American Psychological Association Dictionary of Psychology* (VandenBos, 2015, p. 203): “all forms of knowing and awareness, such as perceiving, conceiving, remembering, reasoning, judging, imagining, and problem solving.” The *Cambridge Dictionary of Psychology* definition is similarly broad (Matsumoto, 2009, p. 114): “A general term for all forms of mental processes including conscious ones such as perception, thought, and memory, as well as nonconscious processes such as grammatical construction, parsing of sensory data into percepts, and the neural control of physiological processes.” The term “cognitive” has also been adopted by many social learning theorists, leading to an emphasis on, or the creation of, many “social-cognitive” constructs and approaches (e.g., goal-setting, mindsets, self-efficacy) (Messick, 1979). If cognition permeates all human activity, it implies that nearly anything related to human beings can be given the label “cognitive”. Cromwell and Panksepp (2011) have criticized this overbroad use of the term and provided examples of its application to constructs that might better be considered affective, behavioral, or motivational.

Clearly, the definitions of cognitive skills provided by intelligence researchers overlap with the definition of cognition provided by cognitive psychologists – but not entirely. In the case of the former definitions, cognitive skills are treated as being composed of higher-order, complex mental processes, not *all* mental processes and operations, including basic perceptual operations and every variety of thinking, knowing, and awareness.¹ All cognitive skills constitute types of cognition but not all types of cognition constitute cognitive skills.

The error of equating cognitive skills and cognition is widespread in the academic literature (e.g., Almlund et al., 2011; Borghans et al., 2008; Borghans, Golsteyn, Heckman, & Humphries, 2016; Duckworth & Yeager, 2015; Heckman et al., 2014; West et al., 2016). A striking example of this misunderstanding is the statement that “the rise of *cognitive psychology* [emphasis added] shifted the focus of American education toward cognitive training and measurement” (Heckman & Kautz, 2014, p. 7), made in a major recent book about the practical importance of noncognitive skills (Heckman et al., 2014). Perhaps even more importantly, conflation of cognition and cognitive skills occurs in noteworthy non-academic venues, including a review of noncognitive factors in school performance (Farrington et al., 2012), a recent report from the Brookings Institution (Schanzenbach et al., 2016), the best-seller *Helping Children Succeed* (Tough, 2016), and even a white paper delivered to the White House (Yeager, Paunesku, Walton, & Dweck, 2013).

¹ It is worthwhile to note that lower-order cognitive processes (e.g., digit span) are also amenable to development and training (i.e., they can be conceptualized as skills) and use of the term *cognitive skills* to refer solely to complex mental operations is somewhat misleading (Adams, 1987; Ericsson, 1987).

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