



## Collegiate faculty expectations regarding students' epistemic and ontological cognition and the likelihood of academic success

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### ABSTRACT

Personal epistemology researchers assert that collegiate faculty expect their students to have sophisticated beliefs about the nature of knowledge and knowing, and are likely to give low grades to students whose work reflects naïve beliefs. To test whether these assertions were accurate, 282 college faculty completed an online survey where they read descriptions of hypothetical students who displayed differing kinds of epistemic and ontological cognition. Faculty were asked to rank these students in terms of their likelihood of being successful in the faculty member's class, and were also asked to give each hypothetical student a predicted grade. Results showed that, on average, faculty do believe that students with sophisticated beliefs about knowledge and knowing are more likely to receive higher grades than those with naïve beliefs. These findings provide support for continued investigation into students' personal epistemologies and how they can be fostered to align with collegiate faculty's expectations.

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### 1. Introduction

One of the metaphors used to frame theory and research in educational psychology is that students construct knowledge rather than simply receive it (Mayer, 1996). Many educators posit that students' academic success is related to their ability to (a) think critically about what they learn, and (b) construct their knowledge such that it accurately elaborates upon or appropriately modifies their existing understanding (Schraw, 2007). In addition, beliefs about learning, knowing, and knowledge all influence the manner in which students construct new understandings. Students' beliefs about the nature of knowledge and knowing, also called their personal epistemology (Hofer & Pintrich, 1997), include mostly tacit assumptions about knowledge's structure (e.g., is it unchanging or evolving; is it a set of discrete facts or an integrated web of ideas) as well as the kinds of evidence or justifications that are required to consider a knowledge claim *qua* (i.e., as) knowledge (Murphy, Alexander, Greene, & Edwards, 2007). Students' personal epistemologies are presumed to have an influence upon what information gets selected for integration into long term memory, and how that information gets constructed into knowledge (Alexander, Murphy, Guan, & Murphy, 1998). Personal epistemology research concerns whether there are certain beliefs about knowledge and knowing that are more likely than others to (a) lead to the accurate construction and use of knowledge, and (b) facilitate stu-

dent academic success in both formal and informal learning environments (Hofer, 2004).

Most personal epistemology researchers assert that certain "sophisticated" (Schommer, 1990) or "availing" (Muis, 2004) beliefs (e.g., beliefs that knowledge is complex and dynamic, and knowing is contextualized and subject to scrutiny) are required for accurate knowledge construction and subsequent student academic success, particularly in collegiate settings where students are expected to think critically without large amounts of guidance. Unfortunately, empirical investigations into these claims have been fraught with problems regarding predictive and psychometric validity (Hofer & Pintrich, 1997; Wood & Kardash, 2002). At this point, it is difficult to say that there is convincing and valid empirical evidence that students' personal epistemologies influence their academic success.

Nonetheless, personal epistemology researchers presuppose that college faculty have the expectation that their students think about knowledge and knowing in sophisticated ways (Chandler, Hallett, & Sokol, 2002; King & Kitchener, 2002; Perry, 1970), suggesting that faculty would give low grades to those whose work lacks this level of sophistication. The assumption seems to be that students with naïve personal epistemologies most likely lack the skills necessary to think in critical and complex ways, and that faculty would give poor grades to these indiscriminate consumers of knowledge claims (Alexander, 2005). Empirical research regarding this assumption is lacking. Although teacher characteristics have been shown to interact with student characteristics, subsequently influencing teachers' predictions of student success (Tournaki &

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Podell, 2005), this line of research has not included personal epistemology. Likewise, despite research investigating teachers' own personal epistemologies (e.g., Gregoire Gill, Ashton, & Algina, 2004; Ravindran, Greene, & DeBacker, 2005; Schraw & Olafson, 2002), to date there are no empirical studies regarding educators' expectations about their students' beliefs about the nature of knowledge and knowing. Whether teachers expect sophisticated thinking because of its perceived inherent value, its utility in producing valued work in academic domains, or because the teachers respond most positively to ways of thinking similar to their own, is also not known.<sup>1</sup>

Given the lack of compelling evidence showing a relation between students' personal epistemologies and academic outcomes, and the concerns regarding the psychometric qualities of measures of these phenomena, I chose to take a step back and examine one of the untested assertions underlying the field. Specifically, I wished to examine collegiate faculty's expectations regarding their students' personal epistemologies, or what I call students' epistemic and ontological cognition (Greene, Azevedo, & Torney-Purta, 2008). In this study, I empirically investigated whether faculty, when presented with descriptions of students who differed only in their epistemic and ontological cognition, would reliably vary in their predictions of those students' likelihood of academic success in college classes. As such, this study was designed to make a specific contribution to the literature on personal epistemology by demonstrating that college faculty truly do expect students to display sophisticated beliefs about the nature of knowledge and knowing, and would grade student work reflecting naïve beliefs more harshly than work reflective of sophisticated beliefs. Such evidence would help bolster the argument that students' epistemic and ontological cognition are worthy of research, and that interventions are needed to bring students' beliefs in line with their faculty's expectations.

### 1.1. Defining epistemic and ontological cognition

Research into students' beliefs about knowledge and knowing goes by many names, including personal epistemology (Hofer & Pintrich, 1997), epistemological beliefs (Schommer, 1990), epistemological reflection (King & Kitchener, 2004), and epistemic cognition (Kitchener, 2002). Rather than using the term "epistemological beliefs," which literally means "beliefs about the study of knowledge," Kitchener has presented a strong argument for adopting the term "epistemic cognition" because its literal translation, "thinking about knowledge," seems to best capture the phenomena in question. I agree with this distinction and will use the term "epistemic" when referring to the phenomena involved in justifying knowledge qua knowledge. For clarity and consistency with the literature, however, I will refer to the field of research into how individuals justify knowledge qua knowledge as "personal epistemology," and use the term "epistemology" or "epistemological" when discussing the models within this field that use these terms. In addition, like Kitchener (2002), I believe the term "cognition" to be a more accurate description of the phenomena than the term "beliefs" because the former is a superordinate term that encompasses the latter, as well as other representations (e.g., knowledge) and processes (e.g., monitoring, judging) that occur when individuals think about knowledge and how it is justified.

Despite the strong argument for using the term "epistemic cognition", it does not sufficiently represent all of the phenomena under study. Personal epistemology research concerns at least two

separate phenomena: (a) beliefs about the nature of knowing and (b) beliefs about the nature of knowledge. Philosophical epistemology examines how knowledge can be justified qua knowledge, with most philosophers presenting the argument that knowledge is justified true belief (Plantinga, 1993; Pollock & Cruz, 1999; Williams, 2001). The focus of philosophical epistemology is knowing, or how knowledge can be justified, and not beliefs about whether knowledge is simple or certain. Therefore, it follows that the term "epistemic cognition" best captures beliefs about knowing, but is not appropriate for beliefs about knowledge (Alexander, 2006; Murphy & Alexander, 2004). Epistemic cognition can include beliefs such as "authority figures are the only ones who can determine whether a knowledge claim is true or not" as well as the cognitive and metacognitive processes used when evaluating knowledge claims.

Most personal epistemology researchers posit that individuals initially have naïve beliefs about the nature of knowing, i.e., that justification by either direct observation or appeal to authority is sufficient to warrant knowledge (Donald, 1990; Hofer & Pintrich, 1997; King & Kitchener, 2004; Kitchener, 2002; Perry, 1970; Schommer, 1990). These researchers suggest that over time, and often as a result of exposure to advanced education, epistemic cognition becomes more sophisticated. Individuals displaying sophisticated epistemic cognition understand that knowledge claims are contextual and must be justified through rationality and critical thinking. Within most models of personal epistemology it is assumed that collegiate faculty would have the most sophisticated beliefs, acquired through years of intense study and thoughtful reflection. Indeed, Donald (1990) has shown that, despite some variance across domains, college professors do have beliefs regarding what kinds of justification are most valid, and of those studied, none said justification by appeal to authority or personal experience alone was sufficient. Thus, although there are most likely numerous means by which individuals justify knowledge qua knowledge (see Murphy et al., 2007 for a discussion of various potential means), it is assumed that collegiate faculty hold sophisticated beliefs about justification that may be at odds with the epistemic cognition of their undergraduate students.

In terms of beliefs about the nature of knowledge, I agree with Alexander and Murphy (Alexander, 2006; Murphy & Alexander, 2004) who said that these beliefs are better described as ontological. In philosophy, ontology is the search for a sufficient and necessary set of mutually exclusive categories of reality (Chisholm, 1996; Murphy, 2005; Murphy et al., 2007; Pollock & Cruz, 1999). For example, an ontology of science might include, among other things, categories for living (e.g., animals, plants) and non-living things (e.g., tables, rocks) as well as processes (e.g., heat), and relations (e.g., causal, reflexive). Each of these categories can be defined in terms of attributes that are unique to that category (e.g., living things can reproduce, move, and process energy). This philosophical characterization aligns with how Slotta and Chi (2006) discuss ontologies. They study how to train students to correctly characterize science knowledge, often requiring what Slotta and Chi call an ontological shift (e.g., moving the concept of "heat" from the "substance" category to the "process" one). Therefore, when Hofer and Pintrich (1997) describe simple knowledge as a continuum from "discrete, concrete, and knowable facts" to "relative, contingent, and contextual" (p. 120) ones, and certain knowledge as a continuum from fixed to evolving, I believe they are referring to individuals' ontologies, and their ontological cognition. Those individuals characterized as believing in simple knowledge have relatively few ontological categories with limited or basic relations, and those who see their ontology as certain believe that some of the attributes of knowledge are that it is fixed and unchanging. More sophisticated ontologies include many categories that are related in complex ways, and with attributes such as "evolving" and

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