UNDERSTANDING EPISTEMIC DEVELOPMENT: PARSING KNOWLEDGE BY EPISTEMIC CONTENT

by

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ABSTRACT

Over the past three decades, research into the developmental course by means of which persons come to an increasingly mature conception of the knowing process has yielded a partially converging picture. What is generally agreed is that this epistemic course typically begins with something like a naïve realism, according to which knowledge is understood as simply absorbed through the senses, or simply a matter of getting the facts straight. Gradually, people come to question this black-and-white view of the world, sometimes qualifying their belief in right and wrong, sometimes purporting that one cannot be certain about anything. Eventually, though, many or most move toward a more rationalistic stand where, while absolute certainty is seen to be an impossibility, some things can be reasonably thought to be true and some arguments can be said to be better supported than others. Despite broad agreement about this general bill of particulars, what nevertheless remains deeply confusing is just how much radical disagreement actually exists regarding the ages at which this course of epistemic development is said to occur. Some describe this development as an accomplishment of university undergraduates or even older adults while others have found evidence for these same developmental accomplishments during adolescence and even the middle school years. Furthermore, abilities ascribed to 4- or 7-year-old children by certain investigators of children's "theory of mind" bear a striking resemblance to abilities described by classic research in epistemic development. In order to make sense of this confusion, it is proposed that epistemic development is not a 'one-miracle' affair in which individuals simultaneously come to grips with the prospect of relativity in all possible domains of knowledge. Instead, it is argued to be a process that applies itself progressively to knowledge located further and further along a proposed 'fact of the matter' continuum. By conceiving of different types of knowledge as lying along this continuum, I hypothesize that people will begin to think relativistically about 'institutional' facts (which lie in the middle of the continuum) before they do so for 'brute' facts (seen as at the extreme end of the continuum). The Epistemic Doubt Questionnaire was administered to 242 participants ranging from high school students to 4th year undergraduates. Hierarchical and K-means cluster analyses result in theoretically consistent clusters and ANOVA's show development from high school to late university, demonstrating good construct validity for the EDQ. Results strongly support the hypothesis that knowledge of different epistemic content are treated differently, with matters of 'brute' fact evidencing later epistemic development than matters of 'institutional' fact. These results suggest several potentially promising avenues for future research.

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Introduction

Tracing the developmental course by means of which we ordinarily come to an increasingly mature understanding of the process of knowledge acquisition - some "folk" or common-sense epistemology – has a long, but not particularly distinguished history. A stagnant picture that is due, in no small part, to the fact that people rarely wear their best thoughts about the knowing process on their sleeves. Despite such difficulties, research in the area of epistemological development has, of late, begun to make better progress in coming to some understanding of how people come to conceive their own and others' beliefs about belief. On this emerging account, the standard epistemic course is typically said to begin with some version of "naïve realism", according to which knowledge is understood to be something that is merely absorbed through the senses, and right and wrong is simply taken to be a matter of getting the facts straight. Gradually, as the story goes, people routinely begin to question this automated black-and-white view, sometimes by qualifying their belief in the absolute nature of right and wrong, sometimes by raising doubts as to whether it is ever legitimate to be absolutely certain about anything at all. In short, epistemic doubts commonly creep in (Chandler, 1987) and some form of skepticism ordinarily comes to replace unguarded conviction. Eventually, though, if everything goes right, some, although by no means all, move to a more rationalistic or post-skeptical stance – an epistemic view that rejects the possibility of absolute certainty while still holding out the prospect that some beliefs about reality can be judged to be "truer" or better supported than others.

The broad outlines of this recurrent account of the course of epistemic development were first detailed more than three decades ago by William Perry (1970), and later extended by

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researchers who have followed more or less in his footsteps (see, for example, Benack & Basseches, 1989; Broughton, 1978; Chandler, Boyes, & Ball, 1990; Kitchener & King, 1981; Kitchener, King, Wood, & Davidson, 1989; Kuhn, Amsel, & O'Laughlin, 1988; Mansfield & Clinchy, 1997; Reich, Oser, & Valentin, 1994; Sinnot, 1989). Much of this subsequent work has served primarily to qualify, but not basically alter, the general outlines of the broad picture originally sketched by Perry.

Despite this growing consensus, what nevertheless remains deeply confusing is just how much radical disagreement actually exists regarding the ages at which these milestones of epistemic development are said to occur. The original work by Perry (1970) characterized epistemic development as the natural outgrowth of a liberal arts education, and, consequently, such changes were imagined to be a feature of early adult development. Later research carried out within the close confines of the Perry tradition (e.g. Benack & Basseches, 1989; Kitchener & King, 1981; Kitchener, King, Wood, & Davidson, 1989; Kuhn, Amsel, & O'Laughlin, 1988; Sinnot, 1989) has typically replicated his earlier findings. Where differences have arisen among Perry's closest followers, they have tended to take the form of pushing back the final stages of epistemic development to still later ages, with the final stages of development sometimes reserved for those few adults otherwise marked by some measure of so-called 'post-formal operations' (Commons, Armon, Richards, Schrader, Farrell, Tappan, & Bauer, 1989; Benack & Basseches, 1989; Sinnot, 1989), or those who have completed higher degrees in philosophy (Kitchener & King, 1981). At the same time, however, others have found evidence for much the same course of epistemic development during the teenage years (Broughton, 1978; Chandler, Boyes, & Ball, 1990; Boyes & Chandler, 1992; Reich, Oser, & Valentin, 1994), and even among

middle school children (Mansfield & Clinchy, 1997; Walton, in press). Furthermore, certain 'theory-theorists' (e.g. Gopnik & Wellman, 1992; Perner, 1991; Wellman, 1992; Wellman & Hickling, 1994), who study young children's developing theories of mind, ascribe many interpretive abilities to children as young as 4 – abilities that seem to imply many of the features of relativistic thinking proposed by Perry and his colleagues to characterize only those people nearing the completion of their post-secondary education. Clearly, not all of these competing claims can be true at once, and there is much to sort out (Chandler, Hallett, & Sokol, in press).

In this thesis, I aim to make some initial sense of this confusion. To accomplish this, I mean to offer an alternative account of epistemic development intended to make more comprehensible how it could be that what is typically described as the same developmental course apparently occurs and reoccurs at so many different points in the lifespan. In considering different possible explanations, I will end up proposing that epistemological development is not a singular, one-time accomplishment that applies equally across all possible "domains" or "types" of knowledge simultaneously. That is, the fact that the spectre of relativism arises in one area of epistemic content need not necessarily imply that all knowledge claims automatically becomes equally subject to doubt. Instead, when we extend our relativistic thoughts across a broader range of subject matters than that contained within the narrow horizon of our own personal experience, it may well prove that certain types of knowledge turn out to be better insulated from such doubts than others. In other words, epistemically different sorts of knowledge may each undergo their own distinctive, and more or less early occurring, developmental course. As such, the "same" advances in epistemic growth may prove to occur

at different ages because we are seeing this "same" development in differing epistemic domains. Given these expectations, an important part of what must necessarily follow is some defensible way of defining and distinguishing between alternative accounts of what constitutes relevant "domains" or "types" of knowledge.

Were it already the case that there existed some generally agreed upon way of measuring or otherwise documenting the epistemic stances that individuals adopt, then the whole of this thesis and the larger program of research of which it is a part could be given over to a direct test of the account of contrastive knowledge domains to be developed here. As it is, no such generally accepted measure is available. Consequently, much of what follows is necessarily concerned with solving these prior measurement problems. Methodologically, I employ a written measure of epistemic development referred to as the Epistemic Doubt Questionnaire (EDQ) - a measure originally introduced by Chandler and his colleagues. The EDQ has already demonstrated some construct validity (Krettenauer & Hallett, 1999), but its main contribution for the purposes of this thesis is to provide a different and more psychometrically detailed account of epistemic development. To date, almost all attempts to measure epistemic stance have used labour-intensive interview procedures of some sort, utilizing global and often highly subjective coding schemes (for a short list of exceptions to this general rule, see Hofer & Pintrich, 1997). While this type of data has been valuable, an instrument like the EDQ, which relies on rating procedures, can potentially provide a measure of each subject's relative commitment to each of several different epistemic stances. This multiplication of data points can potentially provide additional insight into epistemological development by allowing comparisons not only between, but also within, subjects.

In what follows, I will first review the existing literature in order to back my claim that there actually is as much confusion over the age at which epistemological growth is held to occur as I have alleged. Second, after exploring alternative ways of potentially resolving these contradictory claims, I will then go on to further detail the central hypothesis of this thesis – that differing so-called domains of knowledge can be seen to fall along a continuum defined by the degree to which the "facts" in questions are personally or socially constructed. Finally, with this in mind, and after having discussed the relative merits of using a measure such as the EDQ, I will go on to present data that support the notion that knowledge of differing epistemic content domains is indeed open to epistemic doubt at different points of the life course.

A Question of Ages: A Review of the Relevant Literature

As previously outlined, the empirical origins of this line of enquiry can be traced back to the seminal work of William Perry (1970). Beginning in the 1950s, Perry followed a group of undergraduates at Harvard throughout their university careers, involving them in free-form interviews at the end of each academic year. By examining the transcripts of these interviews, Perry noticed important age-graded differences in the ways in which these students understood the processes of knowledge formation and belief entitlement. As a result, he ended up detailing nine distinctive stages along this proposed developmental trajectory. In the first stage, the youngest of the students he interviewed saw the world as black and white, with clear right and wrong answers. Right answers were always understood to be at least potentially available to and provided by "experts". In Stage 2, this original either-or scheme was qualified by concluding that some so-called "experts" are sometimes misguided or, at worst, charlatans who do not know truth from falsity. Here the search for true knowledge devolved into the process of deciding who is and who is not a "real" expert. In Stage 3, Perry's students described areas of lingering uncertainty and confusion, but typically thought that it was only a matter of time before the real truth came to light. At Stage 4, Perry described a more qualitative shift, according to which certain knowledge claims came to be seen as simple matters of opinion, where everybody is thought to be equally expert, or at least equally entitled to their own views. At Stage 5 - a stage of unbridled skepticism – resolvable issues of right and wrong came to be seen as exceptions to the rule, with everything else seen as personally relative. Stages 6 through 9 are described as sequential steps toward commitment in an uncertain world, where at least some students come to realize that they must make some kind of reasoned commitment despite inherent subjectivity and the inevitability of lingering doubt. Not all of Perry's students began at Stage 1 or ended at Stage 9. In fact, he found that the modal starting point of college freshmen was Stage 4. Still, regardless of their starting point, his own line of evidence was taken to show that most students ordinarily experience some degree of epistemic development during the four years of their undergraduate training.

Perry's work triggered a great deal of subsequent work by several different groups of researchers. Although many qualifications have been offered, most of this research complements rather than challenges the broad outline of Perry's original claims. However, while these numerous research efforts lay out roughly the same developmental trajectory, the age groups to which these accomplishments are attributed differs, and differs radically (for a more thorough review, see Chandler, Hallett, & Sokol, in press). Some (e.g., Benack & Basseches, 1989; Sinnot, 1989) have posited that Perry's scheme actually describes the next step in Piaget's developmental framework – a period of post-formal operations -- where the shift from realism to relativism is regarded as the decisive change in cognitive structure that sets off the next new stage of operations (Benack & Basseches, 1989; Sinnot, 1989). However, like Perry, these researchers saw this shift as an exclusively adult accomplishment, open to a select few MENSA members and university faculty.

Kitchener, King and colleagues (King, 1977; King & Kitchener, 1994; King, Kitchener, Davidson, Parker, & Wood, 1983; Kitchener & King, 1981; Kitchener, King, Wood, & Davidson, 1989; Kitchener, Lynch, Fischer, & Wood, 1993; Kitchener & Wood, 1987) have similarly worked to expand and clarify Perry's original account. Their efforts have included the development of a more structured instrument, the "Reflective Judgement Interview", that relies on ill-structured epistemic problems, and employs a seven stage scoring model that roughly parallels Perry's scheme. These investigators have examined a broad range of age groups from high school students to those in late adulthood, and, though they concede that development begins before the college years, they generally agree with Basseches and others that the most highly developed stages are reached by only a very few people – typically people who hold a Ph.D. in philosophy.

In a related effort, Kuhn and her colleagues (Kuhn, 1991; Kuhn, Amsel, & O'Laughlin, 1988; Kuhn, Weinstock, & Flaton, 1994) have researched people's differing abilities in argumentative reasoning, and, in the process, have also examined epistemic understanding. In one study, Kuhn (1991) classified 20-, 40- and 60-year-olds as either Absolutist, Multiplist, or Evaluative (paralleling Perry's stages of absolutism, relativism and commitment). While she did not report any age differences, she did find a relationship between educational level and epistemic stance. Even still, very few people were consistently Evaluative. Kuhn and her colleagues (1988) also examined the epistemic stance of sixth-, ninth- and twelfth-graders, as well as non-student adults, using a different classification system. In general, they found that the sixth and ninth graders only scored at the lowest levels (0, 1 or 2) of their 6-stage scheme. The take-home message from all of this research is that while some epistemic development may happen in the teenage years, real change is reserved for adulthood, and then typically occurs only among especially well-educated adults.

While many researchers have been heavily influenced by Perry's original conception of this development, the fact that his sample consisted almost entirely Harvard University males has led a number of investigators to call into question the external validity of Perry's research. Accordingly, Belenky and her colleagues (1986) administered semi-structured interviews similar to Perry's to an exclusively female sample. From these transcripts, Belenky et al. proposed a series of stages through which women come to see knowledge. While their data closely parallel that of Perry, their findings importantly qualify his account by pointing to the significance of the metaphor of voice (Gilligan, 1982). On this view, women (like their male counterparts) not only come to conceive of knowledge as more subjective and constructed, but they also come to see their relative authority over such relativised knowledge claims differently. For example, the first stage of Belenky et al.'s scheme, *silence*, is as absolutist as Perry's first stage, but it carries the added connotation of passiveness and deference to external authority. As, at least, some progress further up this scheme, such women see their voice (i.e., their personal contribution to knowledge and their ability to question and qualify the assertions of authorities) as becoming

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stronger, such that, by the time they have reached the later stages of development, they are able to see themselves as authorities over their own knowing process.

More recently, Baxter Magolda (1992) followed up on Belenky et al.'s research by using a large sample that included both men and women. While she found that there seemed to be two different ways one can develop epistemically, and that one of these ways matched Belenky et al.'s model while the other matched Perry's, these patterns seemed to be gender-related rather than gender-segregated. In other words, both of these ways of knowing can occur in both genders, but the one described by Belenky et al. tends to be found more often in women while the one described by Perry tends to be found with greater frequency in men. While Baxter Magolda's qualification of Perry's model is important, it is also true that both her research and that of Belenky et al. generally agree with Perry's account, and, like his work and that of many others, focuses exclusively on adults.

Despite the often-repeated claim that epistemic development is a feature of early adulthood, other researchers have worked to explore the possibility of real epistemic growth during the teenage years. For example, Chandler and his colleagues (Boyes, 1987; Boyes & Chandler, 1992; Chandler, 1987; 1988; Chandler & Ball, 1989; Chandler, Boyes, & Ball, 1990) have maintained that the lack of evidence of early epistemic development reported by Perry and others is an artifact of not probing young respondents about issues with which they are familiar. By asking them questions about familiar situations (e.g. a debate over whether 16-year-olds are responsible enough to drive), Boyes and Chandler (1992) found that even some eighth-graders were starting to show signs of relativistic understanding, and that by the 12th grade, many evidenced epistemic stances consistent with Perry's later stages of commitment. In a closely related program of research, Oser and Reich (1987; Reich, 1998; Reich, Oser, & Valentine, 1994), in their study of Swiss youth aged 9 to 22, noted that the recognition that each person plays an active role in construing their own knowledge begins to appear in, and perhaps even before, adolescence. Similarly, Broughton (1978) reports the existence of "nascent skepticism" even among his 12-year-old respondents.

All of the above stands potentially corrected by certain more recent findings emerging from the so-called "theory-of-mind" literature - findings that are purported to show that even 4- or 7-years-olds already possess certain insights about the subjective nature of knowledge thought by most classic epistemic researchers to characterize only much older individuals. Theory-of-mind competence is usually tested by something like Wimmer and Perner's (1983) now classic procedure involving Maxi and his missing chocolate. Standardly, Maxi is a young boy puppet who witnesses his mother putting a bag of chocolate in Cupboard A. Maxi then leaves the room and his mother, for one reason or another, moves the chocolate from Cupboard A to Cupboard B. The mother then leaves the room and Maxi reenters. Young subjects, who are privy to all of these happenings, are then asked the pivotal question: "Where will Maxi look for the chocolate." Usually only 4- or 5-year-old children will correctly answer "Cupboard A", while still younger children confuse what they know with what Maxi knows, and mistakenly answer "Cupboard B." That is, they wrongly ascribe to Maxi knowledge of a "true" state of affairs about which he is objectively ignorant. The responses of such young preschoolers are said to demonstrate a failure to understand the possibility of false belief. On the other hand, children who can pass this task are said to understand that Maxi can hold a belief that is false, and, just as importantly, a belief that is different from their own.

What all of this can be taken to mean in terms of children's understanding of the knowing process is, however, a matter of much debate. Many theory-of-mind researchers (e.g. Gopnik & Wellman, 1992; Perner & Davies, 1991; Wellman, 1992) hold that children achieve an understanding of false belief by first developing a "representational theory of mind" – a "theory" that is, by its very nature, necessarily "interpretive" in character. On this view, 4- or 5-year-olds who pass false belief tests demonstrate an understanding of the fact that their representation of the chocolate and its whereabouts can be different from that of Maxi, and so necessarily "understand the mind's active role in evaluating the truth of verbal information" (Perner & Davies, 1991, p. 51). On this account, then, knowledge is said to be seen by these 4- and 5-year-old children as an *interpretive* achievement, relative to the person who is constructing it. If this is so, they hardly need wait until their high school or college or post-graduate years before coming to a first appreciation of the fact that knowledge is an active human construction, relative to the viewing stances of the observer.

By contrast, others (e.g. Carpendale & Chandler, 1996; Chandler & Carpendale, 1998; Chandler & Lalonde, 1996; Chandler & Sokol, 1999; Pillow, 1991, 1995) have argued that children's understanding of the interpretive nature of knowing is a more complicated and laterarriving accomplishment than that implied by a simple understanding of false belief. In the case of standard false-belief tasks, it is argued, children can understand that others could come to hold a belief that is different from their own as a simple function of the fact that one of the story protagonists has been kept ignorant of certain crucial facts. Such attributions of simple ignorance are different, on this view, from the realization that two people with the exact same information can, and regularly do, come up with different *interpretations* of a common event. Advocates of this second view have used various procedures meant to make the case that, while 4-year-old children may well correctly solve false-belief problems, they do not typically understand that people with the same information can also come up with different interpretations of one and the same thing (i.e., what "interpretations" are ordinarily taken to be) until they are at least 7 or 8 years old. As such, only middle-school children are said to have a real, if fledgling, understanding of the interpretive process, while those who simply pass false belief tasks do not. That is, preschool children are said to pass false belief tasks simply by viewing the process of knowledge construction as involving a more simple act of 'copying' external stimuli onto the recording equipment of their mind.

The merits of this debate aside, the important point here is that the difference between a so-called "copy theory-of-mind" and an "interpretive theory-of-mind" sounds remarkably similar to the critical objectivism-relativism juncture in the course of "later" epistemic development that Perry argued did not come on-line until the college years. In short, then, one could read selectively from the available literature concerned with the early course of epistemic development and, with good reason, conclude that such abilities put in their first appearance at either 4 or 8 or 12 or 16 or 20, or in receipt of a Ph.D.

Possible Ways out of the Fog

Stipulating to the possibility that all the data from all these different research enterprises is precisely as reported, and given the number of times the same pattern of evidence concerning the retreat of realism and the emergence of skeptical doubt has been found in such different age groups, some explanation is clearly called for. Two such possibilities particularly suggest themselves. The first is that epistemic development is not a monolith, but rather a multidimensional phenomenon, with different and independent components of epistemic understanding coming "on line" at different developmental moments. In other words, talk of epistemic development might well be a cover story for a variety of distinctive conceptual pieces (e.g. the relativity of knowledge, what is considered to be a valid source of authority, etc.) each of which develop independently. More succinctly, on this account epistemic development is not a coherent process in and of itself, but rather stands as a summary term that serves to collect several different abilities under a common conceptual umbrella. On this view, there is no overarching or unified understanding of the knowing process, and what is reported in the literature is actually the development of different dimensions of epistemic understanding, some of which first come "on-line" later in life than do others.

The work of Marlene Schommer (1990, 1993) exemplifies this dimensional approach. Schommer describes four main dimensions of epistemic growth that are said to be relatively independent: 1) the extent to which intellectual ability is thought to be innate; 2) the degree to which knowledge is considered simple; 3) assumptions about whether learning occurs quickly or more slowly; and, 4) beliefs about the relative certainty of knowledge. Schommer found evidence for the independence of these dimensions in both a university sample (1990) and a sample of high school students (1993). Interestingly, although she reports development across these dimensions within each sample, no comparison across these samples is attempted. Consequently, it is difficult to tell if these factors could help to explain how epistemic growth could happen and rehappen at different points in development. Furthermore, on closer analysis, it would seem that at least two dimensions of her scheme (Fixed Ability and Quick Learning) are not coherently related to epistemic development as it is usually conceptualized,

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and that a third (Source of Knowledge) has yet to be empirically validated by her research (Hofer & Pintrich, 1997).

Similarly, Pillow (1999) responded directly to the evident confusion over the question of when epistemic development first occurs by also proposing a dimensional explanation. He identified nine dimensions, including: how the knowledge acquisition process is viewed, level of certainty, the systematicity of knowledge, and source of authority for knowledge. However, to date there are no empirical data to support his claim that these dimensions could be developing at different ages, or to otherwise explain the problem in question.

An alternative to such multi-dimensional explanations (an alternative that gains some support from the research outlined in this thesis) is that it is not the existence of different dimensions of epistemological development which best explains the pattern of recurrent developmental changes, but rather the fact that relativistic thinking is a coherent accomplishment that occurs in certain domains of understanding before others. On this account, people do not come to a more or less mature understanding of all "facts of the matter" simultaneously. Rather, some types of knowledge are held to be relatively immune to the uncertainty and relativism that characterizes others. In contrast to the multi-dimensional approach, which views epistemic development as fractured into several abilities, this second view conceives epistemic development as a more or less unified process, but one which is applied to different content domains at different moments in development. To give an example, it seems reasonable that someone might simultaneously think relativistically about journalistic reports without also questioning the certainty of Newton's laws. As intuitive as this

distinction may seem, it is important to carefully explore what could be meant by "epistemic content".

Epistemic Content

To help better conceptualize what is meant here by epistemic "content", or, at least, in an effort to provide a definition of it suited to this thesis, I mean to begin by first elaborating on a distinction between "institutional" and "brute" fact made by John Searle (1969). On this account, an "institutional" fact is something that, while held to be true, concerns a type of human meaning which is entirely structured by context and social rules. Institutional facts are, in essence, matters that depend largely upon social convention. A classic example of an institutional fact is something like the 'fact' that John and Jane were married. This 'fact' is something that only has meaning in the context of the social institution of marriage. Getting married connotes more than two people simply standing at the altar, in front of spectators, while a person of authority speaks certain words. If a hypothetical alien observer were to describe the marriage ceremony as such, it would seem nonsensical. Stripped of its proper "institutional" context – that is, all the conventions surrounding what it means to be married – the 'fact' that John and Jane merring.

Questions of "brute" fact, on Searle's account, concern those parts of knowledge that have a basis in a world largely set apart from human convention. The physical sciences probably provide the best examples of such matters of brute fact. However, certain aspects of the social sciences and history would also qualify as matters of brute fact. That is, even though they involve human action and behaviour, such matters often focus on phenomenon beyond those based on human convention. Though it could be argued, and regularly is, that all human action and conceptions are coloured by cognitive pre-conceptions and cultural backgrounds (i.e., are in some limited sense matters of convention), the context provided by these influences is not always the sole, or even major, provider of meaning. This can be said to be true of certain brute facts belonging to the physical sciences as well. As Searle (1969) explains:

the fact that I weigh 160 pounds, of course requires certain conventions of measuring weight and also require certain linguistic institutions in order to be stated in a language, but the fact stated is nonetheless a brute fact, as opposed to the fact that it was stated, which is an institutional fact (p. 51).

On this account, certain disciplines can be said to be dealing primarily with questions of brute fact, even if they require institutional facts in order to explain them.

While Searle's distinction between brute facts and institutional facts seems to be an important one, it is far from accepted doctrine. Many (e.g., Rorty, 1991) argue that all facts are necessarily contextually-based. Others who distinguish related types of knowledge often do so in different ways (e.g., Putnam, 1981). A full accounting of this philosophical debate is beyond the scope of this thesis. Indeed, it may turn out that Searle's distinction is not philosophically defensible. Nevertheless, for the purpose of this thesis, the point is not that Searle's institutional/brute fact dichotomy is itself a necessarily true distinction. Rather, I mean only to propose this distinction as a reasonable reflection of how ordinary laypersons commonly proceed in their everyday talk of knowledge.

Turiel and Wainryb (1994), in a research enterprise that parallels my efforts here, make the same point. Their work suggests that, in judging issues of right and wrong, people differently treat violations of 'convention' compared to violations of 'morality'. While acknowledging that it is philosophically difficult, if not impossible, to draw a distinction

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between matters of convention and matters of morality, the point made by their research is that laypersons do seem to actually make this distinction. As such, it is not important for the purpose of this thesis whether or not there are truly such things as institutional and brute facts. What does matter is whether or not people, in general, routinely divide up knowledge in this way.

To this end, I would like to use Searle's institutional facts and brute facts as possible points along a proposed continuum that reflects, at least, different folk conceptions of different types of knowledge. On this account, the further one moves along the continuum in the direction of brute fact, the more knowledge is seen to refer to some 'fact of the matter' that lies outside the orbit of human affairs. Conversely, as you move away from outlier instances of brute facts, the matters at issue are ordinarily understood to be more deeply related to matters of human convention. At the extreme, such humanized or institutional facts are reduced to matters of simple personal preference. That is, on this account, matters of personal taste are often thought to possess no epistemic content and refer to no "fact of the matter" at all.

On the picture that I have painted, usual matters of institutional fact are perhaps best understood as occupying a place somewhat near the center of the proposed continuum. Institutional facts do imply some 'fact of the matter' (i.e., it is a decidable matter of some importance whether John and Jane are or are not married), but they are taken to be empty of meaning outside of usual social contexts. At the extreme "left" of this proposed continuum are arbitrary matters of taste that are commonly understood to be devoid of epistemic content, and can hardly be said to be either "true" or "false". You may claim that chocolate tastes better than vanilla, but few would argue that such claims could possibly be "wrong". Put another way, matters of taste are commonly thought to represent arbitrary personal preferences that do not rely on reasons for their justification (Lalonde, 1996). As such, they are not seen as truth conditional, and it is fully acceptable for one person to prefer chocolate over vanilla without further justification. Brute facts on this account, fall to the extreme "right" and include such "universally" agreed upon matters as the fact that the atomic weight of lead is more than that of, say, hydrogen.

The continuum envisioned here would start at one extreme with matters of taste, where no 'facts of the matter' are under dispute, move to some midpoint having to do with questions of institutional fact, and end at the opposite extreme concerning questions of brute fact. Many different conventional domains of knowledge could be located along this proposed continuum, and while it is almost certainly true that there are examples of knowledge claims that blur the distinctions between brute fact, institutional fact, and matters of taste (or do not reliably occupy a single place on this continuum [e.g. "moral" claims]), there are also many other "conventional" knowledge claims that could be said to clearly refer to familiar junctures along this continuum. Reference to such exemplars will help to shed light on whether people do indeed begin to think relativistically about matters of taste, institutional fact and brute fact at different points in their lives. Before proceeding, however, it is best to consider how this proposed dimension already maps onto current research in epistemological development

Reconciling the 'Fact of the Matter' Dimension with Current Evidence

Children seem to grasp the concept of taste from a very early age. By the age of 3, children can, for example, understand that while cat food tastes bad to them, it apparently tastes good to cats (Flavell, Flavell, Green & Moses, 1990). Likewise, preschool children (i.e. children

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who can ordinarily pass false-belief tasks) also can understand that the same soup can taste differently to different people (Carpendale & Chandler, 1996). While this realization could seem to be a recognition of interpretive diversity, it is, perhaps, best understood as something more akin to the epistemic stance of realism, at least in so far as, in either case, there is no room left for doubt. Matters of taste are simply what they are. As in the case of false belief, truth arrives pre-packaged for any who have eyes to see and the opportunity to learn.

Such preschool thoughts are, however, importantly different from those maintained by young people who have come to a more interpretive theory of mind. As mentioned previously, middle-school children who already evidence at least a fledgling grasp of the interpretive character of mental life not only understand that someone can hold a different belief because they have been denied crucial information (false-belief), but also that two people with access to the same information can still come away with two warrantable but different interpretations. This later-arriving achievement is a more relativised version of belief entitlement that shows much in common with the late developing stages of Perry's epistemic scheme. In other words, the distinction between false-belief understanding and an interpretive theory of mind has certain of the ear marks of an earlier-arriving version of the much later shift from naïve realism to skepticism attributed by Perry and others to your usual university student. Still, as Lalonde (1996) points out, while 7-year-olds may well comprehend that, given ambiguous information, people could reasonably come up with different interpretations, this fact does not preclude them from also believing that, given all of the relevant information, there might not still be one, and only one, "true" interpretation. Though middle-school children may very well start to think relativistically about matters of taste (and, later, other ambiguous matters), the relativised nature of 'truth' might well be taken up only at a much later age.

Chandler (1987) argues that adolescents, as they continue to come to terms with more and more examples of uncertainty in the world around them, come to a point of critical mass where all of these "retail" or "case-specific" doubts conspire to trigger a more "generic" or "wholesale" form of doubt, a "crisis" where all "objective" truth is called into deep question. Put in terms of our proposed continuum, adolescents, it is argued, begin for the first time to demonstrate more epistemically mature thinking, at least regarding matters of institutional fact – a style of thought they had achieved many years earlier with regards to epistemically empty matters of taste or personal preference. Accordingly, questions about whether 16 should be the legal driving age – one of the scenarios used by Boyes and Chandler (1992) to measure epistemological development in high school students – clearly involve questions of institutional fact. Arguments about politics, and other societal structures, would also be considered matters of institutional fact and thus, it may be no accident that political consciousness seems to be an emerging characteristic of adolescence (Erikson, 1968; Marcia, 1980). It would seem, then, at least possible that the epistemic development that is ordinarily witnessed during the teenage years commonly involves wrestling with issues of institutional fact, but not with those of brute fact.

By contrast, Perry's interview procedure, by its very nature, would have tended to draw out discussions about those questions of brute fact that so often dominate university curricula. That is, although his interview was free form, the initial question – "Would you like to say what has stood out for you during the year" – conspired to insure that most of the conversations

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would revolve around respondents' classroom learning experiences. While college courses can be about almost anything, it is uncommon for them to revolve around matters about which there is no room for reasoned debate, including debates about which facts are brute facts and which are not. As such, although many college courses are explicitly about institutional facts, most, nevertheless, turn upon attempts to sort out the institutional from the brute fact of the matter. Given the 'lowest common denominator' scoring scheme employed by Perry and many of those that followed in his footsteps, much of their effort to code such data appears to be have focused on those elicited statements having to do with brute fact. On this account, it could be argued, as I propose, that the late-arriving epistemic achievements that have been reported so often in university students and young adults are, more specifically, signs of epistemic development as it emerges with regard to matters of brute fact.

Given the various points along the continuum on which different types of knowledge can fall, and given the variability in experiences and interests among young people, epistemic development is bound to be a more complex phenomenon than that just described. It is quite conceivable, for example, that a person could be more epistemically sophisticated with regards to certain topics about which they have, in a manner of speaking, more expertise, while still being at roughly the same point of general epistemic development as their age-mates with regards to matters taken more generally. Indeed, Paulsen and Wells (1998) have found that university students enrolled in different areas of study do have different patterns of scores on Schommer's epistemological dimensions. Furthermore, Conway, Schaller, Tweed, and Hallett (in press) found differences between Asian and Caucasian university students on the EDQ. It is quite plausible that these results reflect the fact that different cultural environments, or different patterns of interests, inspire more specialized knowledge that will be reflected in their epistemological understanding. However, it is my broad contention that these kinds of contentspecific pattern differences continue to be governed and overridden by variations dictated primarily by the more basic distinctions between what are being called here matters of taste, matters of institutional fact and matters of brute fact. On this account, one might well predict that interest and experience drive differences of epistemic competence among different types of institutional facts while still anticipating more overarching differences between respondents' epistemic understanding of institutional and brute facts. The broader pattern, with which my hypothesis is concerned, is that while epistemic development in middle school children is seen to revolve around matters of taste, adolescent epistemic development is mainly concerned with institutional facts, and university students' increasing relativism is seen to be largely about matters of brute fact.

Because the measure that I am using (the EDQ) is not appropriate for use with middleschool children, I have chosen to focus my efforts in this thesis only on those hypothesized differences in epistemic development that are said to occur between matters of institutional fact and matters of brute fact, as they differently express themselves in high school and university students.

Using a Written Measure

In his original research, Perry probed for students' epistemic thoughts using very openended interviews that lasted for more than a hour. Given that this was the first real examination of 'folk' conceptions of knowledge, and that Perry was interested in many aspects of students' perception beyond that of epistemology, this seemed to be an entirely appropriate procedure. Indeed, Perry began his research endeavour under the assumption prevalent at the time that differences in epistemic viewpoint were tied to inherent personality differences; it was only after the data were analyzed that he noticed a developmental pattern (Hofer & Pintrich, 1997; Perry 1970). For the most part, those who have followed Perry in studying epistemic development have also used interview procedures, though they tend to be more structured – asking for responses to given dilemmas. Since it seems clear that people's assumptions about the nature of the knowing process are not on the forefront of their thoughts, an interview procedure would appear to be a good means to access these underlying conceptions.

However, written measures can also provide useful information about epistemic thinking. In the field of moral development, an area of study that can also be said to deal with reasoning that is not immediately accessible, James Rest and colleagues (Rest, 1986; Rest, Narvaez, Bebeau, & Thoma, 1999) compare their written measure, the Defining Issues Test (DIT) to the traditional interview method of assessing moral development, Kohlberg's Moral Judgement Interview (MJI) (Colby & Kohlberg, 1987). In doing so, they acknowledge that written measures tend to elicit higher classifications, partly because recognition tasks are easier than production tasks, and partly because participants can indicate higher agreement with items than what would truly reflect their sentiments due to the item's linguistic sophistication or social appeal. They go on to argue that written measures can, nevertheless, tap different types of information about people's cognitions than interviews. More specifically, 'knee-jerk' reactions to items can reflect an implicit level of thinking that may not be evident in people's conscious reflections about problems. In the case of the DIT, numerous studies have demonstrated overall validity with the MJI, as well as providing a different perspective on moral reasoning.

For these reasons, and because of ease of use, there have been a few recent attempts to develop measures of epistemic development. Aside from Marlene Schommer's measure, the shortfalls of which are discussed above, there are three other distinctive measures of epistemic beliefs: the Measure of Intellectual Development (MID), the Measure of Epistemological Reflection (MER) and the Learning Environment Preferences (LEP) (Hofer & Pintrich, 1997). The MID asks for essay responses from participants, which are then coded by trained raters; as such, aside from a lack of probing, it is not much different than an interview measure. The MER, developed by Baxter Magolda (1992; Baxter Magolda & Porterfield, 1985), is very similar to the MID, as it also asks for essay responses, but even Baxter Magolda eventually decided to rely on interview data to develop her model (Hofer & Pintrich, 1997). Finally, like the EDQ elaborated upon here, the LEP also uses forced-choice items and does not require trained raters to score. However, it does not allow for classification above Perry's Level 5 (i.e., stages of commitment), which limits its usefulness as a measure of epistemic development.

Given the lack of any other established written measure, and the psychometric benefits that such a measure could provide, I have chosen to use the EDQ for this thesis. Aside from its previously demonstrated construct validity (Krettenauer & Hallett, 1999), and the type of data that would allow comparisons both between and within subjects, the EDQ can also be easily adapted to reflect the institutional/brute fact distinction made above. As such, it is well-suited to test my contention that young persons come to treat knowledge of different epistemic types differently as they progress along the path of epistemic development.

Method

Participants

Participants in this research were university undergraduates and high school students from a suburban Christian secondary school. For the purpose of design and analyses, they were split into three groups: High School Students (N = 47, Mean Age = 16.60 years, 23 males, 24 females); Junior Undergraduates (1st and 2nd year students, N = 79, Mean Age = 18.74 years, 29 males, 50 females); and, Senior Undergraduates (3rd and 4th year students, N = 116, Mean Age = 22.23 years, 34 males, 82 females). In total, there were 242 respondents (86 males, 156 females) with a mean age of 20.00 years.

Measure

Each respondent completed the Epistemic Doubt Questionnaire (EDQ) (Krettenauer & Hallett, 1999). Chandler and his colleagues (Boyes, 1987; Boyes & Chandler, 1992; Chandler, 1987; 1988; Chandler, Boyes, & Ball, 1990) reconceptualized Perry's nine stages into four basic epistemic stances: Realism, Dogmatism, Skepticism and Rationalism. Like Perry, Chandler viewed Realism as the entry point in epistemic development and Rationalism (paralleling Perry's stages of commitment) as an optimal end-point. Between these two extremes, Dogmatism and Skepticism form a bracketed pair of reactions to an emerging sense of wholesale uncertainty, or "Cartesian Anxiety" (Bernstein, 1983) triggered by a growing concern that all knowledge is inherently subjective and thereby open to unremitting doubt. Individuals who adopt a Dogmatic stance attempt to deal with such uncertainties by making something akin to a leap of faith, asserting that ordinary human knowledge may well be unavoidably person-relative, some larger-than-life somebody or something out there actually knows the right answers.

Skeptics, by contrast, take the opposite approach and embrace uncertainty, maintaining that one cannot be certain about anything and that every opinion is just as good as any other.

The EDQ is composed of 12 items and was originally intended as a way of documenting respondents' degree of commitment to Realism, Dogmatism, Skepticism and Rationalism. Each item presents a pair of disputed knowledge claims, relying upon two different assumptions about the warrantibility of knowledge. For each dilemma, there are four randomly ordered response options, each of which is meant to be prototypical of one of the four epistemic stances outlined above. Respondents are asked to state their degree of agreement with each of the four responses on a scale from 1 to 5. (See Table 1 for examples of 2 items. See the Appendix for the EDQ in full.) By averaging the levels of agreement for the respective prototypical responses across the 12 items, the EDQ generates, for each subject, four subscale scores representing their general agreement with each epistemic stance.

Institutional vs. Brute Fact

Although the available items of the EDQ were not originally constructed with this dichotomy in mind, for the purpose of this research, these items can also be sorted into those having to do with institutional facts and others having to do with brute facts (for the full EDQ, see the Appendix). Three original items, which did not easily lend themselves to being sorted in this fashion, were excluded for the purpose of this second calculation (items 2, 7 & 8). The remaining items were divided into Brute Fact (items 5, 6, 11 & 12) and an Institutional Fact (items 1, 3, 4, 9, & 10) subscales, and subscores for each of these item types were calculated. To validate the division of the items in such a way, three blind raters were asked to sort the

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items between institutional and brute fact. There was 100% agreement between the raters and

the author as to the classification of seven of the items and 85% agreement overall.

Table	1:	Examples	of	EDQ-items
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1	Some people say that parents should be very permissive with their children, and others say that they should be very strict. It appears to me that:	
(a)	Both of these views amount to little more than personal preference for one style of raising children over another, and neither can be said to be better than the other.	<u>ske</u>
(b)	Experts who study these things ought to determine which of these approaches is best for raising children	REA
(c)	When people discuss questions like this they mess things up. There is clearly one style of raising children which is superior to the other.	DOG
(d)	The fact that there are many different ways of raising children is not a good reason to assume that all are equally good.	<u>RAT</u>
5	Some people argue that the universe was created suddenly. Other people say that it evolved over a long period of time. I think that:	
(a)	We'll never know what happened a million years ago. So whichever of these viewpoints you choose is arbitrary.	<u>ske</u>
(b)	A careful analysis of what really happened will make the answer clear.	<u>REA</u>
(c)	When people argue about things like this they don't have the facts straight. It is quite clear which point of view is right.	DOG
(d)	It is possible for both theories to explain many of the facts about the origin of the universe.	<u>RAT</u>

Results

Construct Validity

The data were first tested for gender effects by running a MANCOVA with each of the subscale scores as a dependent variable, gender as the between factor, and controlling for educational level (i.e., High School Student, Junior Undergrad, and Senior Undergrad). The educational level was controlled for because the sample has an unequal distribution of gender

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across the groups, with a higher proportion of women among the undergraduates than among the high school students. Results indicate no effects for gender for the Realism, Skepticism and Rationalism subscales (F(1, 239) = 0.063, $\underline{p} = 0.802$; F(1, 239) = 1.190, $\underline{p} = 0.276$; F(1, 239) = 1.296, $\underline{p} = 0.256$, respectively). However, there was a gender effect on the Dogmatism subscale (F(1, 239) = 14.324, $\underline{p} < 0.0005$), where men tend have higher dogmatic scores than women. This gender difference could be explained by the research findings of Belenky et al. (1986) and



Baxter Magolda (1992). On an examination of many of the dogmatic items, it could be argued that they are worded in ways emphasizing *voice*. In other words, not only do these items express a dogmatic stance regarding matters of truth, they also do so by implicitly putting unbridled faith in one's own (as opposed to some external authority's) conviction about right and wrong. Given this slant to the items, the gender effect found in this data set are interpretable in light of the research of Belenky et al. (1986) and Baxter Magolda (1992).

In order to test the construct validity of the measure, a Hierarchical Cluster Analysis was performed. The data best suited a six cluster solution, with three clusters (composed of a total of 10 cases) consisting of outliers (where outlier here means simply that it emcompasses very few people). The remaining three clusters roughly match three epistemic stances: Realism ($\underline{N} = 25$), Dogmatism ($\underline{N} = 53$), and an amalgamated Skepticism/Rationalism ($\underline{N} = 154$). Their z-scores on each of the subscales is shown in Figure 1.

There are, however, some problems with these data. It turns out that, contrary to expectations, the mean age of those classified as dogmatists was actually lower than the mean age of those classified as realists. In fact, the majority of the high-school students were in the dogmatic, and not the realist, cluster. While possibly an indication that we should rethink our theory, it is more likely that this is a problem with the measure. Considering the nature of the dogmatic and realist stances, it seems plausible that a measure such as the EDQ would have difficulty drawing out the differences between a dogmatic and a realist point of view. After all, both Dogmatists and Realists purport to be able to clearly identify, and be absolutely certain about, "truth". Realists, however, take 'truth' to be self-evident (the result of simply opening your eyes to the facts), while Dogmatics appreciate the unavoidable subjectivity inherent in all ordinary knowledge claims and respond by dogmatically committing themselves to the conclusions of specialized others who are assumed to be immune to the biases that characterize ordinary persons. In short, it is likely the case that items such as those on the EDQ – ones that ask for levels of agreement without further probing – are ill-equipped to make the distinction necessary to differentiate between Dogmatists and Realists. For these reasons, the Dogmatic and Realist scales were combined into one scale for the purpose of this research, yielding a

summary score (called Objectivism) expressive of an early stage in the course of epistemic development.

Repeating the cluster analysis utilizing three subscales rather than four yields two main clusters (representing Objectivism (N = 65) and an amalgamated Skepticism/Rationalism (N = 167)) and three outlier clusters. The subscale z-scores of the Objectivism and



Skepticism/Rationalism clusters are shown in Figure 2. As before, these clusters appear to be conceptually consistent, with a subset of respondents high on Objectivism while having low Skepticism and Rationalism scores, and a second group defined by the Skeptics/Rationalists Cluster showing the opposite pattern. A t-test between these two clusters demonstrates that the Skeptics/Rationalists are significantly older than the Objectivists (t(230) = 5.078, p < 0.0005, Mean Age = 20.76 & 18.34 for Skeptics/Rationalists and Objectivists respectively).

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The three outlier clusters also have interesting properties even though together these clusters include only 10 cases. The pattern of subscale scores of these outlier groups is, in general, also consistent with the epistemic stances represented in the EDQ. What appears to justify their each being grouped together is that they seem to be extreme examples of these distinctive epistemic positions. Figure 3 below gives a graphical representation of these clusters. One of the clusters has an extreme Rationalist pattern (N = 3) while the other two



seem to be different types of extreme Objectivists ($\underline{N} = 4$ and $\underline{N} = 3$). Normally, clusters that represented such a small part of the sample would be considered outliers and excluded from further analyses. However, since these patterns are theoretically consistent with the model of epistemic development that underlies the theoretically underpinnings of this thesis, a case can be made for their retention. Given that the Hierarchical Cluster Analyses resulted in clusters that were, by and large, conceptually consistent with an account that assigns respondents to one of these epistemic stances (i.e., Objectivism, Skepticism and Rationalism), a K-Means Cluster Analysis was undertaken in which a three-cluster solution was specified. As predicted, the resulting clusters elegantly map onto the three proposed epistemic stances (see Figure 4 below). An ANOVA indicates that the Objectivist cluster (Mean Age = 18.03) is significantly younger than the



Skeptical and Rationalist clusters. The Skeptical cluster (Mean Age = 20.35) is younger than the Rationalist cluster (Mean Age = 21.19), although this difference fails to reach statistical significance.

Epistemic Development

In order to test for the presence of developmental changes in epistemic understanding, a MANOVA was run with each of the three subscales as a dependent variable and Educational Group (High School Student, Junior Undergrad and Senior Undergrad) as the between subjects

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factor. Table 2 summarizes the results of the ANOVAs. The post-hoc Tukey's HSD test is summarized in Table 3. As can be seen from an examination of these tables, High School

Table 2: Tests of Between-Subjects Effects by Group						
	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
	Objectivism	13.019	2	6.509	31.620	.000
GROUP	Skepticism	16.955	2	8.477	24.710	.000
	Rationalism	19.787	2	9.893	67.668	.000
ERROR	Objectivism	49.201	239	0.206		
	Skepticism	81.997	239	0.343		
	Rationalism	34.943	239	0.146		

Table	Table 3: Post-Hoc Tests of Mean Subscale scores					
Dependent Variable	High School	Junior	Soniar Undarg	mada		
Dependent variable	Students	Undergrads	Senior Undergrad			
Objectivism	3.02					
		2.48	[2.41		
Skepticism	2.74					
		3.46		3.36		
Rationalism	3.13					
		3.82		3.87		

* Note: Those means that are listed in different rows are significantly different from each other. Those in the same row are not significantly different from each other ($\alpha = 0.05$).

students are significantly different from Undergrads on every subscale, being more objectivist and less skeptical and rationalistic than university students. These results support the hypothesis that as students become older, they apparently put less stock in objectivist explanations and instead increasingly favour rationalist ones. The skepticism subscale scores are also suggestive, since Junior Undergrads have shown a trend towards higher skeptical scores than Senior Undergrads (though this difference is not significant). This is consistent with the idea that Skepticism is a intermediary stage between rejecting realistic explanations and accepting rationalistic ones. However, there are no significant differences between Senior and Junior Undergrads on any of the subscales, as would be expected given previous research in the field. Nevertheless, the differences that do exist, though not significant, are all in the predicted direction.

Institutional Fact vs. Brute Fact:

To test the distinction between institutional and brute fact, a between-within ANOVA was run for each epistemic stance, with Group as the between factor and Institutional Fact vs. Brute Fact as the within factor. (The results are summarized in Table 4.) Both the Skepticism and the Rationalism ANOVAs reported above have significant interactions, which require further analysis. The Skepticism interaction was broken down by running three separate Repeated Measures ANOVAs for each Educational Group. Results demonstrate that while all the groups view institutional facts more skeptically than brute facts, the difference between institutional fact and brute fact is much greater for high school students than for Junior and Senior Undergrads (High School Students: F(1, 46) = 0.282, p = 0.598; Junior Undergrads: F(1, 78) =13.007, p = 0.001; Senior Undergrads: F(1, 115) = 5.590, p = 0.020). The means on these subscales for each Educational Group is shown in Table 5 and graphically in Figure 5.

Breaking down the interaction in a different way, two One-Way ANOVAs were run at each level of fact with Educational Group as the between factor. Results indicate that while the difference between the groups on the Institutional Fact subscale is not quite significant with a bonferronied alpha ($\underline{F}(2, 239) = 3.328$, $\underline{p} = 0.038$, $\underline{\alpha} = 0.025$), the difference on the Brute Fact subscale is very significant ($\underline{F}(2, 239) = 16.254$, $\underline{p} < 0.0005$). Tukey's HSD shows High School Students were significantly less skeptical about Brute Fact Items than Junior and Senior

	Table 4: Tests of Institutional vs. Brute Fact Subscales between						
	Educational Groups						
	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.	
	Group (Between)	8.719	2	4.360	10.739	< 0.0005*	
	Error Between	97.020	239	0.406			
Objectivism	Level of Fact (Within)	0.663	1	0.663	5.168	0.024*	
	Group by Level of Fact Interaction	0.310	2	0.155	1.210	0.300	
	Error Within	30.648	239	0.128			
	Group (Between)	15.883	2	7.942	11.936	< 0.0005*	
	Error Between	159.016	239	0.665			
Skepticism	Level of Fact (Within)	55.511	1	55.511	119.751	< 0.0005*	
	Group by Level of Fact Interaction	4.619	2	2.309	8.310	< 0.0005*	
	Error Within	55.075	239	0.241			
	Group (Between)	31.235	2	15.617	46.385	< 0.0005*	
	Error Between	80.469	239	.337	10.929		
Rationalism	Level of Fact (Within)	38.901	1	38.901	159.879	< 0.0005*	
	Group by Level of Fact Interaction	7.610	2	3.805	15.637	< 0.0005*	
	Error Within	58.153	239	0.243			

Undergrads, who did not significantly differ from each other.

Table 5: Mean Institutional and Brute Fact Subscale

		scores		
Enistemic Stan	ce Subscale	Subseele High School		Senior
	subscale	Students	Undergrads	Undergrads
Objectivism	Institutional Fact	2.883	2.513	2.490
	Brute Fact	2.890	2.663	2.570
Skepticism	Institutional Fact	3.540	3.820	3.644
	Brute Fact	2.489	3.244	3.098
Rationalism	Institutional Fact	3.796	4.129	4.120
	Brute Fact	2.777	3.687	3.761



The Rationalism interaction also demonstrated the same pattern as was found for Skepticism. Broken down first as three Repeated Measures ANOVA's, results indicate that while High School Students ($\underline{F}(1, 46) = 18.683$, p < 0.0005, $\underline{M} = 2.950$ & 2.490 institutional fact and



brute fact respectively), Junior Undergrads ($\underline{F}(1, 78) = 13.007$, $\underline{p} > 0.0005$, $\underline{M} = 3.151$ & 2.812) and Senior Undergrads ($\underline{F}(1, 115) = 5.590$, $\underline{p} = 0.020$, $\underline{M} = 3.143$ & 2.953) all see institutional facts more rationalistically than brute facts, the gap narrows considerably as students progress through their educational career (See Table 5 and Figure 6).

Broken down as 2 One-Way ANOVA comparing Educational Groups, the data adds one suggestive element to this picture. Both the Institutional and Brute Fact Subscales demonstrate significant mean differences among the Educational Groups. (F(2, 239) = 5.578, p = 0.001 and E(2, 239) = 55.828, p < 0.0005 for Institutional Fact and Brute Fact respectively). However, it is noticeable that, while not significant, only the Brute Fact subscale demonstrates a difference between Junior and Senior Undergrads (in the predicted direction) while the scores for the Institutional Fact subscale between these two groups is virtually identical. (See Table 5). In other words, while there are always significant differences between the High School students and the Undergrads, it is only the Brute Fact subscale that goes some way in detecting a difference between Junior and Senior Undergrads.

The between-within ANOVA for the Objectivism subscales did not have a significant interaction. Instead, as indicated in Table 2, there are very significant main effects for the between factor of Educational Group and the within factor of Level of Fact. Post Hoc Analyses for the between factor (Tukey's HSD) indicates High School Students are significantly more objectivist than Junior and Senior Undergrads, who do not differ from each other (consistent with what was found in the Objectivism ANOVA reported in the previous section). As for Level of Fact, Brute Fact items were rated more objectivistically than Institutional Fact items (Means = 2.708 & 2.629, Brute Fact and Institutional Fact respectively).

Although there was no significant interaction for the Objectivism scale, inspection of the means (see Table 5 and Figure 7) suggests a definite trend in that direction. Indeed, if Paired T-

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tests are computed between the Institutional Fact subscale versus the Brute Fact subscale for each Educational Group, the test is highly insignificant for High School Students (t(46) = -0.81, p = 0.936), but quite significant for Junior Undergrads (t(78) = -2.588, p = 0.012) and almost significant for Senior Undergrads (t(115) = -1.906, p = 0.059). It should be noted that, even in High School Students, Objectivism tended not to be rated as highly as Skepticism or Rationalism. This could indicate that the Objectivism is suffering from a floor effect, and this reduction in variance is minimizing the interaction that the data currently suggests as a trend.



Discussion

What the Data Suggest

In general, the data offer good validation of the EDQ as a written measure. The subscales generated consistently demonstrate either trends or significant differences theoretically consistent with what has been repeatedly found by investigators of epistemological development. That is, as they grow older, young persons come to view

knowledge claims less objectivistically and more relativistically. Furthermore, all of the clusters generated in cluster analyses (including the outlier ones) consistently demonstrated a pattern of subscales that was conceptually consistent with standard accounts of epistemic development. In other words, those who were high on one subscale also tended to be low on the other scales, adding psychometric support to the theoretical contention that one cannot be objectivist and relativist about a topic at the same time.

More to the point of this thesis, the data also offer excellent validation of the institutional/brute fact distinction. In almost every instance, agreement with Institutional Fact items differed from agreement with Brute Fact items in predictable ways. Specifically, participants saw Brute Facts items more objectively and Institutional Fact items more relativistically. Moreover, the interactions between the Level of Fact and Educational Group offer even more support for the theoretical model of epistemic development proposed here. The point of making the distinction between institutional and brute fact is to put forward the possibility that these two different types of knowledge undergo development at different times. Indeed, what the interactions seem to suggest is exactly that - development across matters of institutional fact is not equivalent to development across matters of brute fact. Furthermore, given that this sample encompasses the transition from late high school to senior undergraduate, it is telling that, in general, the Brute Fact subscales demonstrate more development than the Institutional Fact subscales. This suggests, as one would predict, that these participants already think fairly relativistically about matters of institutional fact and it is matters of brute fact that they begin to come to terms with during this point of their lives.

Problems with the Data and Suggestions for Future Research

The major failing of the EDQ, at least in the context of its use as a measure of epistemic stances, is its inability to distinguish between Realism and Dogmatism. While combining them into an objectivism score works for the purpose of this thesis, doing so does damage to the theory that underpins this work. According to Chandler's model (Boyes, 1987; Boyes & Chandler, 1992; Chandler, 1987; 1988; Chandler, Boyes, & Ball, 1990), Dogmatism is a stance that is an alternative to, but structurally equivalent to, Skepticism. By conflating Dogmatism and Realism, an important distinction is lost. If this shortfall of the EDQ can be addressed in the future, it could add to its already substantial construct validity.

It is also true that the EDQ was not designed to distinguish between institutional and brute fact. Rather, this was a post hoc dichotomy imposed on the pre-existing items of the EDQ. While it is encouraging that such significant results, in predicted directions, were found, a more direct test of the institutional/brute fact distinction requires generating items with this dichotomy in mind.

Revising the EDQ in such a manner may go some distance in addressing another problem found in this data set. While there is almost always a significant difference between the High School students and Junior and Senior Undergraduates on the various subscales of the EDQ, there is very little light between the responses of Junior and Senior Undergraduates on any of these scales. This is troubling considering the fact that the study of epistemic development was originally prompted by apparent differences between college freshman and college seniors. However, the Brute Fact subscales do offer some hope. Since these subscales demonstrate the largest (though not significant) differences between Junior and Senior Undergrads, and in the predicted directions, it is possible that epistemic development during the university years has to do primarily with changing views about matters of brute fact. Consequently, a scale with more, and perhaps better-composed, Brute Fact items may be needed to illustrate the development that occurs during the college years. If such a scale were devised, it may be possible to further differentiate younger undergraduates from their more senior counterparts in a statistically significant way.

In closing, the data reported in this thesis suggests the need for future research in two different ways. First, since the EDQ is a very young measure, it is necessary to continue to refine, retest and validate this assessment tool to ensure that it consistently and reliably reflects a person's epistemic stance. Second, as this thesis proposes a new conceptual way to think about epistemic development, it is imperative to retest and develop a better understanding of this 'fact of the matter' dimension using different procedures and techniques. Furthermore, younger subjects need to be tested, to see if they experience epistemic growth in matters of institutional fact while remaining stoic about matters of brute fact. Procedures aimed at comparing matters of taste to other matters further down the proposed continuum also could be generated and, if the theory proposed here is sound, tested on children as young as four. In short, there are many different avenues for future research to pursue.

Conclusions and Final Thoughts

Ordinarily in the field of developmental psychology, conceptual development is seen as the child's success in making a vital cognitive distinction that helps to better explain the world around them. Whether children come to see how someone else's knowledge can be construed separately from their own (i.e., the theory of mind literature), or come to see the difference

between causes and reasons (Chandler, Lalonde & Sokol, 1999), their progress is perceived as a marker of the extent to which they correctly carve up the world. By contrast, the developmental process proposed in this thesis for epistemic development stands this general rule of thumb on its head, and suggests how one might differently conceive of the tail end of conceptual development. On this view, and like the examples cited above, children first approach epistemic doubt by carving off matters of taste from matters of truth, a process they later repeat for institutional facts. As one begins to question brute facts in the same manner, however, the distinctions that once worked so well begin to blur. Development, at this point, is not about further refining more and more cognitive distinctions. Rather, it involves a partial deconstruction of distinctions that had previously been made. What all this is meant to say is that, as much as there is something to how the institutional/brute fact distinction laid out in this thesis can better qualify epistemic growth, thinking about development in this way suggests that while early cognitive development could be said to be about making distinctions, later cognitive development could be said to be about integrating them.

This thesis set out to make some headway in explaining how what seems to be the same epistemic development could occur and then reoccur at many different points of development. To do so, I proposed that epistemic development was not a 'one miracle' phenomenon, but instead was a process that related to knowledge located further and further along a proposed 'fact of the matter' continuum. This research provides solid support for this hypothesis, or, at least, the part of the continuum to do with institutional and brute facts. This question is by no means settled, however, and future research will need to explore and elaborate on the emerging conception laid out above. Still, the data analyzed in this thesis offers a good first step down the path of better understanding epistemic development, and suggests that the road ahead is a promising one.

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Appendix: The EDQ

DEMOGRAPHIC INFORMATION

Please provide the following information.

•	Age:			
•	Gender:	female	male	(circle one)
•	Ethnicity (e.g. C Argentinean):	hinese, Japanese	; First Na	tions, Canadian-Irish, Canadian-Italian,
•	Faculty of study	r (e.g. Arts, Scier	nce):	
Þ	Area or departn	nent that you in	itend to n	najor in (e.g. Psychology, History, Chemistry):
				· · · · · · · · · · · · · · · · · · ·

• Year of study (i.e. are you a 1st year student, a 2nd year student, etc.?):

The following pages are about questions people tend to answer differently. For each question you find a set of four statements expressing divergent viewpoints. Please read each statement carefully and indicate to what degree it reflects your own viewpoint.

Place one of the following numbers on the line beside the statement according to what you think and feel:

1 = completely agree
2 = moderately agree
3 = equally agree and disagree
4 = moderately disagree
5 = completely disagree

After having filled in the numbers choose the one statement that expresses your own viewpoint best by circling the corresponding letter.

	This is an example:						
0.	People often disagree about whether dogs or cats make better pets. This state of affairs suggest that:						
(a)	A careful study could eventually come up with evidence that would settle this question once and for all.						
(b)	Whether you prefer dogs or cats depends almost entirely upon how you were raised.						
(c)	Dogs are clearly preferable to cats.						
(d)	People's preferences for dogs or cats are often based on sensible decisions about their lifestyles.						
	WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?						
	<u>CIRCLE ONE:</u> (a) (b) (c) (d)						

1 = completely agree
 2 = moderately agree
 3 = equally agree and disagree
 4 = moderately disagree
 5 = completely disagree

- 1. Some people say that parents should be very permissive with their children, and others say that they should be very strict. It appears to me that:
 - (a) Both of these views amount to little more than personal preference for one style of raising children over another, and neither can be said to be better than the other.
 - (b) Experts who study these things ought to determine which of these approaches is best for raising children.
 - (c) When people discuss questions like this they mess things up. There is clearly one style of raising children which is superior to the other.
 - (d) The fact that there are many different ways of raising children is not a good reason to assume that all are equally good.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

CIRCLE <u>ONE</u>: (a) (b) (c) (d)

2. In thinking about the various religions that exist, both those that have been around for centuries, and more recent ones, it seems to me that:

- (a) Many of those religions are just misleading people into believing doctrines that are not true. By carefully studying all the different religions, we can discover which one is right.
- (b) Some religions can be said to be better than others at meeting certain human needs. -----
- (c) No religion is any better or worse than any other, and a person's choice of religion depends on what he or she has been exposed to.
- (d) Though not everybody will acknowledge it, of all the different religions that exist in the world there is probably only one which is correct.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

1 = completely agree
2 = moderately agree
3 = equally agree and disagree
4 = moderately disagree
5 = completely disagree

3. The same activist groups are referred to by some journalists as terrorists, and are called freedom fighters by others. I think that:

- (a) These terms are completely subjective, and the term you prefer depends entirely on which side you are on. -----
- (b) Freedom has meant different things at different times, but some groups who call themselves freedom fighters do so in ways that can't be _____
- (c) Future will make it clear who are the terrorists and who are the freedom fighters.
- (d) Waiting for future is unnecessary, one can clearly tell who are the freedom fighters and who are the terrorists.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

CIRCLE ONE: (a) (b) (c) (d)

4. When I read reviews of movies in the newspaper, I think that:

- (a) If one carefully thinks about what a critic says, it soon becomes evident whether a movie is really good or not.
- (b) Although they are considered experts, movie critics simply voice their own opinions, which are not better or worse than anyone else's.
- (c) Two well-informed movie critics can completely disagree, and still both make points that help you think about the movie.
- (d) Since I know what kind of movie is really good I don't care what reviewers say.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

1 = completely agree
2 = moderately agree
3 = equally agree and disagree
4 = moderately disagree
5 = completely disagree

5. Some people argue that the universe was created suddenly. Other people say that it evolved over a long period of time. I think that:

(a) We'll never know what happened a million years ago. So whichever of these viewpoints you choose is arbitrary.

(b) A careful analysis of what really happened will make the answer clear.

- (c) When people argue about things like this they don't have the facts straight. It is quite clear which point of view is right.
- (d) It is possible for both theories to explain many of the facts about the origin of the universe.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

CIRCLE ONE: (a) (b) (c) (d)

6. Some scientists claim that you inherit intelligence from your parents, while others think that one's intelligence depends on the education one has. It seems to me that:

- (a) One group of scientists is obviously biased. -----
- (b) A genetics expert, given all the information and the right equipment, could settle this question once and for all.
- (c) Both of these views amount to little more than hunches because you can view intelligence in almost any way you want.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

1 = completely agree
2 = moderately agree
3 = equally agree and disagree
4 = moderately disagree
5 = completely disagree

- 7. Some people believe that a fetus is a person from the very beginning of inception and that would make abortion the same as murder. Others believe that a fetus does not attain the same status as a person until it is born and that, therefore, abortion can be justified under certain circumstances. I think:
 - (a) This question is useless because we will never know exactly when a fetus becomes a person.
 - (b) Because many people are emotionally charged over this issue they don't realize that there is one clear answer to this question.
 - (c) Personhood can be defined in many ways. Society will have to debate what we consider to be the essential qualities of personhood to make a reasonable decision.
 - (d) This question could be resolved if experts examined all of the evidence and discovered when a fetus actually becomes a person.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

CIRCLE ONE: (a) (b) (c) (d)

8. The fact that some passages from holy texts such as the Koran, or the Bible are often interpreted in very different ways suggests to me that:

- (a) There are basically two groups of people: those who get the true meaning of the text and those who miss it.
- (b) The person who best knows the text in its entirety is the person who will make the most accurate interpretation.
- (c) More than one reasonable interpretation is possible. -----
- (d) Holy texts are often written in such a way that you can find almost any meaning in them that you want.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

	· · · ·	 1 = completely agree 2 = moderately agree 3 = equally agree and disagree 4 = moderately disagree 5 = completely disagree 	• •
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9. Over the ages, different countries have had very different forms of government. I would say that:

- (a) While no single form of government is best, some forms serve the purposes for which governments are required better than others.
- (b) As time goes by, eventually a form of government which is clearly superior to the rest will evolve.
- (c) It is clear to me which form of government is the best possible one. ------
- (d) In the final analysis, almost all forms of government have their strengths and weaknesses and there is no way to tell which systems are better than others.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

CIRCLE ONE: (a) (b) (c) (d)

10. It is often the case that some reviewers think a particular novel is great, while other reviewers think that it is a disaster. I believe that:

- (a) Despite real disagreement, competent reviewers can offer us valuable insights that help us understand a book better.
- (b) This is an indication of the great diversity in talent among various reviewers: some clearly know how to do their jobs while others clearly do not.
- (c) All people, including those who review books for a living, have their own standards of taste, and it is generally better to ignore reviewers and form one's own opinion.
- (d) A careful examination of what the critics say will make clear whether the novel truly has value or not.

WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?

1 = completely agree
 2 = moderately agree
 3 = equally agree and disagree
 4 = moderately disagree
 5 = completely disagree

11.	There are some scientists who believe that White people are genetically superior to Black people while other scientists challenge this claim. I believe that:
(a)	It is necessary to examine exact claims of these scientists and to do further research to settle this question.
(b)	Further research is a waste of time and money. We know enough to tell which viewpoint is wrong.
(c)	Though this controversy might never be settled, some experts still might have better ideas than others about genetic differences.
(d)	There are too many confusing factors in this equation and we will never know what is true.
	WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?
	CIRCLE <u>ONE</u> : (a) (b) (c) (d)
12.	Most of the basic uncertainties of modern life:
<u>(a)</u>	Will always be with us, so many important choices must be made arbitrarily.
(b)	Become less uncertain once you look at them with a clear head
(c)	Could be eliminated if people had access to all the facts and the ability to carefully analyze these facts.
(d)	Are ever-present but do not prevent people from acting in a reasonable manner.
	WHICH STATEMENT EXPRESSES YOUR OWN VIEWPOINT BEST?
	CIRCLE <u>ONE</u> : (a) (b) (c) (d)
-	You have now completed the questionnaire. Please double check that you have answered every question on every page!
	MANY THANKS FOR YOUR PARTICIPATION!!