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RESEARCH REPORT

“Methodological concerns in the study of personal epistemology: The effect of the directness, domain, and open versus closed-ended formats of questions eliciting epistemological assumptions”

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DECLARATION

A research project submitted in partial fulfilment of the requirements for the degree of MA by coursework and Research Report in the field of Psychology in the Faculty of Humanities, University of the Witwatersrand, Johannesburg, December 2008.

I declare that this research report is my own, unaided work. It has not been submitted before for any other degree or examination at this or any other university.

Kathryn Pope Date

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ABSTRACT

The study of personal epistemology is concerned with people's beliefs or assumptions about the nature of knowledge and knowing, otherwise referred to as epistemological assumptions. As a relatively new field of enquiry, questions about the nature and scope of the construct and how best to investigate it have been tackled by many researchers although fundamental questions still remain. The current study explored the possible effects of three characterisations of questions aimed at eliciting epistemological assumptions on conclusions drawn about such assumptions in terms of their level of sophistication. The three characterisations explored were the level of directness with which questions targeted epistemological assumptions, the domain-specificity of the question, and whether the questions were open or closed-ended. A paper-and-pencil measure was designed to manipulate these variables, and the conclusions drawn about the assumptions of a sample of 30 postgraduate Psychology students were compared across the conditions to determine if there was any evidence for their influence. Comparison of results suggested that the characterisations do exert an influence and caution is raised regarding the validity of methodologies that have been, and continue to be, employed in the study of personal epistemology. The findings further lend support to particular conceptualisations of the construct, but at the same time also unearth additional questions about how epistemological beliefs are best construed and studied.

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1. Chapter One: Introduction

Personal epistemology, loosely defined as an individual's assumptions or beliefs about knowledge, represents an individual-level variable that can provide insight into an individual's cognitive engagement with the world. While it has only recently begun to appear in more mainstream research, its potential value, particularly in the education sector, is hard to ignore. Understanding a student's predisposition to the nature of knowledge and knowing presents a new avenue to explore in developing our understanding of the way students interpret information, what strategies they use to learn new information, what kind of conclusions they draw when faced with differing perspectives, and where they look for assistance and validation. Such an increased understanding can facilitate better teaching and learning practices as educators are aware of, and thus in a better position to account for or negotiate, a factor that plays a significant role in students' approach to knowledge, and consequently knowledge creation and knowledge acquisition.

As the study of personal epistemology advances and begins to offer insight into these issues, however, there remain both conceptual and methodological concerns, arguably characteristic of 'new' fields of study, that threaten to undermine the research. One such concern is the manner in which epistemological assumptions or beliefs are elicited. The concern here is whether the manner in which assumptions are elicited influences the resultant conclusions drawn about an individual's assumptions. Should this be the case then the validity of the results of studies into personal epistemology that have not accounted for or controlled for this influence are vulnerable to a host of threats. This research reports on an investigation into three components of this concern which have repeatedly emerged as potential threats to the study of personal epistemology in a review of the literature. The three components include the directness with which the questions target epistemological beliefs, the level of domain-specificity of the question, and whether the question is open-ended yielding qualitative data, or closed-ended yielding quantitative data.

By ‘directness’ is meant how explicitly or blatantly the question addresses what participants reportedly believe about knowledge, with indirect questions being more obscure and less obvious regarding their purpose or target. The level of domain-specificity refers to the degree to which the questions are embedded in content of a particular domain where domain is understood to correlate roughly with a discipline of study. The variable of open versus closed-ended question, straightforwardly, refers to whether respondents are free to generate their own responses or whether they are asked to choose their answer from a given set of options determined by the researcher. The research thus asks whether there is any evidence to suggest that such characterisations or features of questions eliciting epistemological beliefs influence the conclusions drawn about an individual’s assumptions.

2. Chapter Two: Literature Review

The field of personal epistemology is relatively young and although research completed in the 1970s is included in most reviews of the field, the terms 'epistemological beliefs' and 'personal epistemology' appeared only towards the turn of the 21st century. Still today, the field remains somewhat on the boundaries of mainstream psychological research and practice. It is surprising that the construct has not received greater attention, especially within the educational setting, as the construct has the potential to help answer questions of why and how students respond differently to their learning environment. Hofer (2001, 2004; Hofer & Pintrich, 1997) correctly argues that this omission is in part because the various researchers tackling the topic have presented noticeably different models of the construct resulting in the absence of a clear and uniform conception of personal epistemology. Indeed, over the last 35 years different authors have reported findings and made assertions about the nature of personal epistemology and its role in education, and frequently these contributions have highlighted variations in the way it is conceived, how it is understood to function, and the conditions under which it varies.

The most central and most obvious contention in the study of personal epistemology pertains to what personal epistemology actually is. This is an ontological question and incorporates philosophical and conceptual issues of what 'personal epistemology' means. Should we be talking of beliefs, or assumptions, or metacognitive processes? The question also includes concerns about the scope of personal epistemology. Is it about the certainty and source of knowledge? Does it include assumptions about learning and one's relation to knowledge? This theme shall be referred to in this research as the nature and scope of personal epistemology.

A related debate concerns the characteristics of personal epistemology. Under this broad heading fall questions about the generality or domain and context-specificity

of personal epistemology. Do we have the same beliefs about scientific knowledge as we do social science knowledge as we do knowledge about current events? Do we have the same beliefs about ill-structured problems as we do well-structured problems, or about moral knowledge and academic knowledge? Another debated characteristic of personal epistemology is the degree to which it operates and/or is accessible to conscious awareness and control. Do we know what we believe about knowledge? If so, do we act according to what we say we believe about knowledge? If and how one's personal epistemology changes is another point that has been debated in the field.

Variables that influence or predict epistemological assumptions have been investigated with varying results. Researchers have differed regarding the degree and extent to which personal epistemology varies as a function of gender (for example Belenky, Clinchy, Goldberger & Tarule, 1986), culture (for example Chen & Elliot, 2004), age and level of education (for example King & Kitchener, 1994). These questions will collectively be categorised under the theme of determinants of personal epistemology.

The relation between personal epistemology and other constructs such as critical thinking and reflective thinking presents another theme for debate and such issues will be addressed under the heading of personal epistemology and social science. This theme also addresses questions about the role that personal epistemology is seen to play in education and more specifically its relation to self-regulated learning, learning strategies and comprehension.

Finally, issues and debates pertinent to the act of investigating personal epistemology will be discussed under the theme of methodological considerations. Questions about what methodologies have been used successfully, what their limitations have been, and what methods offer the most appropriate way forward will be addressed under this theme.

2.1 Nature and Scope of Personal Epistemology

2.1.1 Philosophical Roots

'Epistemology' is a term most commonly associated with philosophical enquiry. In this domain epistemology refers to the study of knowledge, and philosophers concerned with epistemology typically engage in arguments about if knowledge exits, what form it takes, and on what basis, if any, humans can rightfully claim to know something (Sober, 1995). To know something, pragmatically speaking, is to trust and rely on the truth and accuracy of something. Although some authors of personal epistemology (for example Schommer, 1994) take time to differentiate philosophers' and psychologists' use of the term, it seems quite reasonable to insist that the term 'epistemology' in Psychology should not present something too dissimilar from its use in Philosophy. Personal epistemology indeed involves consideration of whether, and if so how, knowledge exists, and how one can acquire it. That the epistemology is personal refines the concept to an individual level and limits the sense of deliberate study that is implied when philosophers speak of epistemology. Not everyone studies knowledge, but the assumption of this research is that everyone has some perspective about knowledge, whether an individual is conscious of it or not, or whether the perspective is logical or not, and it is this perspective of 'personal epistemology' that is adopted in this research.

An immediate concern regarding this field of enquiry, is that if personal epistemology is about the beliefs individuals have about knowledge, which may then vary from person to person, then how do we continue to talk about 'knowledge' with a common understanding? Attempting to provide an accurate and complete definition of knowledge is beyond at least the scope of this research, but at the same time a position must be taken in order to continue. For the purposes of the present research, to have knowledge is defined simply as a state wherein an individual relies on the truth of some declaration. It is particularly declarative knowledge that is of interest, which can be defined as knowledge *that* some claim is true, as opposed to knowledge about *how* to do something,

commonly referred to as procedural knowledge (Sober, 1995). To have knowledge, then, is to have belief about a claim or assertion of fact that one holds as a true or accurate. The assumptions about this state of having a belief that one holds as true, epistemological assumptions, include such assumptions as whether the truth is certain and definite, how complex or simple such truths are, and how the truth can be acquired. Further explanation and elaboration of such assumptions arise as existing literature on personal epistemology is reviewed.

2.1.2 Initial Conceptions of Personal Epistemology

The primary studies that put personal epistemology on the psychologist's map were those by Perry (1970), Belenky et al. (1986), Baxter Magolda (1992), Kuhn (1991, 2000) and King and Kitchener (1994). While there are numerous other authors who have worked on constructs closely resembling personal epistemology, for instance Perkins and Simmons' (1988) theory on epistemic frames, these authors are included in this review for several reasons. Firstly, they make explicit reference to individual's epistemologies in the sense that they refer to students' views about knowledge. Secondly, if one traces the various publications on personal epistemology, one finds that there have been several prominent moves towards synthesising and integrating the various works in the spirit of progression. In 2002, for instance, Hofer and Pintrich co-edited a book on personal epistemology, and in 2004 the Educational Psychologist dedicated a volume to personal epistemology. In these publications, as well as in the comprehensive and regularly cited literature review by Hofer and Pintrich in 1997, the authors accredited for being the key initial contributors to the field of personal epistemology are those considered in this review.

Despite the point above that the researchers all make explicit reference to students' views about knowledge, they did not all employ the term 'personal epistemology[1]. Perry (1970) speaks of students' assumptions about the nature and

[1] The paper aims to describe and critique the contributions of previous researchers through an appraisal of the progress of the field, but readers are referred to Appendix A for more detailed expositions of the existing models.

origins of knowledge. Belenky et al. (1986) and Baxter Magolda (1992) both use the phrase ‘ways of knowing’. Kuhn (1991) suggests that people have epistemological theories regarding the process of knowing, and King and Kitchener (1994) refer to epistemological assumptions in their explanation of reflective thinking. The different models of the researchers are thus couched in different terms and an immediate concern is that the researchers did not, in fact, study the same thing.

The weight of this concern increases when one considers that the objectives or goals at the outset of their respective works were not common or shared. Their methods of enquiry, too, were not uniform. Perry (1970), who is regularly described as the pioneer of personal epistemology, set out to “illustrate the variety of responses to the impact of intellectual and moral relativism" (p. 7) that permeates the university atmosphere. His goal was therefore not to study students’ views about knowledge but rather, and more generally, to determine students’ experience of university. His approach was highly open and exploratory, and individual interviews were used to tap into students’ experiences. Perry (1970) piloted the opening question for the interview, noting that the study could potentially be invalidated by students’ preconceptions and expectations of the purpose of the interview, and consequently elected to ask the students in a casual way, ‘What stood out for you most this year?’.

Unsurprisingly, this very broad and indirect question elicited data reflecting a wide range of content including challenges to academic, social and extra-curricular activities. Nonetheless, Perry (1970) argues in his book that through analysis the team was able to arrive at a valid scheme that reflects an “evolving sequence of challenges” students face. The scheme is said to reveal the changing “structural aspects of knowing and valuing” (Perry, 1970. p. 16), or, more elaborately, the “formal properties of the assumptions and expectancies a person holds at a given time in regard to the nature and origins of knowledge and value” (Perry, 1970, p. 17).

It can be argued that Perry (1970) uncovered the existence the students' epistemological assumptions. By analysing responses to a highly indirect and open question, Perry (1970) found that it was students' views on knowledge that provided an organising theme for the data. Furthermore, the students' views on knowledge, in addition to providing a theme by which to interpret and reduce the data, were sufficiently reliable to arrive at a scheme or model. The model consists of nine positions or stages which describe a students' transition from a dualistic view of knowledge where something is either right or wrong, through a recognition of the existence of multiple truths, and finally to the ability to commit to knowledge despite an acceptance of relativity (refer to Annexure A for more detail).

In summary, the field of personal epistemology began almost incidentally with Perry's (1970) investigation into student development. Responses to a broad and indirect question yielded data which was best explained by students' views on knowledge, and these views were sufficiently reliable to arrive at a developmental model of epistemological assumptions.

Belenky et al. (1986) and Baxter Magolda (1992) continued with research that took its lead directly from Perry's (1970) findings. Belenky et al. (1986) sought to test Perry's (1970) model, which was developed based on the responses of a predominantly white, male university student sample, on a sample of female students. Although their sample was restricted to women, it was otherwise heterogeneous in that the 135 women varied in age, class, race, and education level. Belenky et al.'s (1986) methodology paralleled that of Perry (1970), and they likewise adopted a phenomenological approach and used individual interviews to probe participants' views. However, although the interviews began with the generic question of "Looking back, what stands out for you over the past few years?", they also incorporated more specific questions for various sections of the interview which included direct questions about knowledge such as "How do you know what is right/true?" and "How do you know someone is an expert?" (Belenky et al., 1986, p. 234).

Perry's (1970) scheme provided the theoretical framework for analysis. However the researchers found that "the women's thinking did not fit so neatly into his categories" (Belenky et al., 1986, p. 14) and further analysis was conducted to better represent the data. Clinchy (2002) points out that while there was only a specific section of the interview targeting ways of knowing explicitly, the analysis revealed the centrality of the women's epistemological assumptions to their perspectives of themselves and the world that it became the organising principle for the full data analysis. The result is a model of five "epistemological perspectives from which women know and view the world" (Belenky et al., 1986, p. 15) which is detailed in Appendix A. The epistemological perspectives are defined largely by the relationship of the woman to knowledge, for example as recipient versus creator of knowledge.

In a similar vein, Baxter Magolda (1992) sought to resolve the questions about possible gender differences that Belenky et al. (1986) had raised. Much like her predecessors, Baxter Magolda (1992) sought to investigate students 'ways of knowing' through annual individual interviews with students. The first phase of her research focused on investigating stories of 101 university students in a 5-year longitudinal study. This phase of research was extended by an additional 8 years where the sample included 39 adults aged 18 to 30 years old. In both samples genders were equitably represented. For the university sample, participants were asked about their views on the role of the learner, role of peers, role of instructor, evaluation and nature of knowledge in the interviews. As an example, the question posed for the nature of knowledge was "Have you ever encountered a situation in which you have heard two explanations for the same idea" (Baxter Magolda, 2002, p. 92). Students were asked to describe such an encounter, their reaction to it, and why they decided what to believe. For the post-university sample, interviews were more conversational and participants were asked to reflect on any important learning experiences they had had.

Analysis in the form of grounded theory yielded four 'ways of knowing', applying to both genders, which included absolute, transitional, independent and contextual knowing (refer to Appendix A for further detail). For the aspect of the 'nature of

knowledge' specifically, the four ways of knowing show a shift from an acceptance of certainty, through an acceptance of relativity of knowledge, and finally to knowledge being understood as contextual yet based on evidence.

The contributions by Kuhn (1991) and Kitchener and King (1990) reveal a stronger difference in the objective and methodology guiding the enquiry. Neither Kuhn (1991) nor King and Kitchener (1994) sought to investigate perceptions of knowledge directly. Instead, Kuhn (1991) was interested in people's ability to engage in reasoned argument, and King and Kitchener (1994) focused on reflective thinking. Both researchers, however, employed the methodology of presenting participants with an ill-structured problem and then asking follow-up questions to assess participants' cognitive abilities.

Kuhn's (1991) sample consisted of 160 participants ranging in age from adolescent to sixty years old, male and female, with and without university-level education. In order to study 'real-world' thinking, Kuhn (1991) argues, she selected topics of discussion that people would be likely to have opinions about, and used individual interviews to examine people's argumentation skills. In brief, participants were asked for their views on the reasons why children fail at school, why criminals return to crime, and what causes unemployment. The interviews also included questions about how one might prove the truth of their argument, what other alternative arguments might be put forward, how one might evaluate the arguments, and how one felt about the validity and certainty of arguments. The main focus of the study was to analyse the complexity of arguments, evidence used, counterarguments and rebuttals employed. Her categorisation differentiates between 'Absolutists', 'Multiplists' and 'Evaluativists' where the defining feature is whether an individual holds that a single truth exists and how truths can be judged or evaluated. Appendix A elaborates more on her categorisations.

In their quest to investigate the processes involved in making reasonable arguments and arriving at judgements, the measure that King and Kitchener (1994) developed to assess an individual's reflective judgement is the Reflective Judgement Interview. The interview is semi-structured, and much like Kuhn's

method in 1991, presents ill-structured problems followed up by probe questions regarding how individuals come to hold their views and why, if one can know for sure, how a view may be better than another, and how it is possible for experts to have different opinions.

Based on the responses to such questions, King and Kitchener (1994) concluded that participants exhibited epistemological theories or epistemic assumptions respectively, that underpin and account for participants' ability to argue and make reasoned judgements. King and Kitchener (1994) arrived at a seven stage model that traces a development across absolutist views, to recognition of context and finally to the view that knowledge is constructed.

Returning to the concern of whether the initial contributors to the field of personal epistemology were in fact studying the same thing, it would appear that despite difference in some of the original objectives guiding the research (i.e. from investigations in student intellectual development, to ways of knowing, to reflective thinking abilities), it would appear that the researchers were tapping into the same construct. The strongest support for this conclusion comes from the similarity of models on a generic level. The various studies gave rise to models of epistemological assumptions which, at least on a macro scale, are largely consistent with one another. As alluded to earlier, all models refer to perceptions about knowledge incorporating positions where knowledge is absolutely certain as well as positions where knowledge is uncertain, contextual and constructed. The variation in the detail of the model should not however be ignored, and it is still significant that the researchers use different terminology (i.e. epistemological assumptions or epistemological theories) as different properties can be ascribed to different concepts. The view taken in this research is that the overarching similarity supports the validity of the construct, and the finer variation points to the further refinement and development that is required as the field progresses.

Additional support for the validity of the earlier studies comes from a closer look at the facets of, or kinds of assumptions related to, knowledge. Many of the studies did not directly interrogate the facets of personal epistemology but these are

nonetheless discernable from the description of their stages, positions or perspectives. For instance, an examination of Perry's (1970) positions shows that he includes reference to assumptions about the complexity, certainty, objectivity, relativity, and source of knowledge. With their focus more on the woman in relation to knowledge, Belenky et al. (1986) refer to assumptions or beliefs about the origin, objectivity, and communication or sharing of knowledge. Baxter Magolda (1992) stipulates facets of epistemology which include the role of learner, role of peers, role of instructor, evaluation and nature of knowledge which focuses largely on certainty but also includes reference to relativity. Kuhn's (1991) differentiation between Absolutists, Multiplists and Evaluativists draws on assumptions of certainty, objectivity, and justification of knowledge. Similarly, King and Kitchener's (1994) model makes reference to certainty, objectivity, source and justification of knowledge. The models have thus identified largely the same facets or assumptions about knowledge which include certainty, objectivity, relativity, source or justification of knowledge. The essential questions about knowledge that all the models engage with is whether knowledge is constituted by certain and objective truths or whether the truth is relative to its audience, and how the truth of knowledge can be substantiated and the role of authority figures in this process of substantiation.

While the validity of the initial studies into personal epistemology is supported by the general consistency across models, it is still important to highlight the limitations of the studies. Firstly, all research discussed thus far collected data via interviews. Interviews are useful tools for exploratory research and were used appropriately for the emerging field of personal epistemology. It must still be recognised, however, that interviews rely on self-report and tap into ideas that people hold consciously. The data generated in the earlier studies is thus restricted to ideas people hold consciously, can articulate, and believe reflects their true orientation and perspective. Social desirability presents an additional threat as participants may have answered according to values they imagined the interviewer to hold about the nature of knowledge. For example, participants may have felt that the view that each culture has a right to maintain their own belief systems is a

better or more worthy attitude, and then argued for relativity of knowledge to impress the interviewer.

Data that were not elicited through the interview questions and that have the potential to weaken the validity of the field relate to assumptions or dispositions that people have of which they are unaware and which may well be in contrast to beliefs that they hold consciously. To elaborate, a person may respond to questions about their beliefs about knowledge as an abstract concept in one way, and yet demonstrate an entirely different set of beliefs in their behaviour. A person may, for example, state that they believe knowledge is complex, and yet offer definitive and simplistic explanations for the causes of crime.

This issue is to some degree addressed in the studies in that different levels of directness, and accordingly different levels of inference, were used to arrive at descriptions of participants' epistemologies. Khun (1991) and King and Kitchener (1994) inferred beliefs about knowledge based on participants' responses to questions about possible explanations for ill-structured problems. Likewise Perry (1970) inferred views on knowledge from students' general reflections about their experiences at university. Such questions are less direct and target assumptions more through application. Also included, however, were more direct and abstract questions such as if, and how, one can know something for sure. It would seem, then, that the models were drawn from data elicited by both direct and indirect questions, and if the data were sufficiently consistent to arrive at a description of a participant's epistemological assumptions, then it would seem safe to presume that the levels of directness of the questions asked did not introduce any bias. The argument of this review is that this presumption should not be taken for granted but should instead be tested.

2.1.3 Re-conceptualisation of Personal Epistemology

Current literature divides the models of personal epistemology into developmental and belief-based models. The authors mentioned thus far, with the possible exception of Belenky et al. (1986) who desist from addressing the development of

epistemological assumptions, are all considered developmental as their models suggest a natural progression in people's overall assumptions about knowledge. Marlene Schommer (now Marlene Schommer-Aikins) is accredited for launching the multi-dimensional belief-based system and in so doing is arguably a revolutionist in the study of personal epistemology[2]. Schommer (1990) reflects that epistemological beliefs may be too complex to be captured, and then studied consistently and reliably, in a unidimensional model such as Perry's. "A more plausible conception is that personal epistemology is a belief system that is composed of several more or less independent dimensions" (Schommer, 1990, p. 498).

Schommer (1990) hypothesised five dimensions of personal epistemology based on previous research. From Perry (1970) and King and Kitchener (1994) she continued with the dimensions of the structure, source and stability of knowledge. From Schoenfield's (cited in Schommer-Aikins, 2004) studies into students' perception that Mathematics is learnt quickly or not at all, Schommer hypothesised beliefs about the speed of learning as a fourth dimension. From Dweck and Legget's (cited in Schommer-Aikins, 2004) finding that children's perception of their ability influenced their learning strategy, Schommer included the dimension of ability to learn. Each dimension is viewed as a continuum with more naive beliefs on one hand and more sophisticated beliefs on the other. In her current account, Schommer-Aikins (2004) explains that an individual's epistemological beliefs are best described in terms of frequencies, for example how much knowledge an individual believes is uncertain, as opposed to a single point on a continuum. Her model can be tabularised and appears in Appendix A.

[2] As a matter of interest, it can be argued that Schommer's revolution lies not in the introduction of a *multidimensional* account of epistemological assumptions as it is clear from a review of the developmental models that different kinds or facets of epistemological assumptions were acknowledged. The primary revolution proposed by Schommer is rather that the kinds of beliefs can develop 'asynchronously' (Schommer, 2004). Schommer introduced the possibility that there is no internal organising principle that requires the kinds of beliefs to develop in unison.

Hofer and Pintrich (1997) take exception to the inclusion of dimensions about learning on the basis that it is conceptually a different subject matter. Questions about whether certain knowledge can exist would indeed appear to constitute a different matter than questions about how fast one can learn something. One may retort that within the context of education, beliefs about learning and knowledge are intricately linked and so any meaningful study about personal epistemology should include consideration of beliefs about knowledge and learning. While this may be the case, it is important to keep distinctions between concepts that are conceptually different, and research projects should rather then study *both* belief systems instead of collapsing them.

Hofer and Pintrich's (1997) exception stems from the problems arising when the nature and scope of a construct are based exclusively on hypotheses. While there is arguably no other way to begin a full enquiry into a construct without first hypothesising about its nature, care should be taken to test the validity of the hypotheses. Validation of Schommer's (1990) hypothesis of the five dimensions of epistemological beliefs has been sought through validation of her instrument via factor analysis, and predictive validity via correlation with other related variables. However, as elaborated below, the results have not been convincing.

Based on her multi-dimensional conception of personal epistemology, Schommer (1990) set out to advance the measure of epistemological beliefs by developing a quantitative instrument[3]. She refers to Ryan's (1984) work linking Perry's concepts of dualism and relativism to learning comprehension as support for a quantitative approach to assessing epistemological beliefs. Individual interviews, as used by previous researchers, are time-consuming and produce data that is also time-consuming to analyse. Quantitative measures, by contrast, tend to be easier and faster to administer. With the aim of facilitating more efficient testing of

[3] Also recognising the need for more user-friendly measures, other authors have developed other quantitative measures. For example, Wood, Kitchener and Jensen (2002), building on the work of King and Kitchener (1990), are developing a short paper-and-pencil measure of reflective thinking called the Reasoning about Current Issues Test.

epistemological beliefs, Schommer (1990) developed the Schommer Epistemological Questionnaire (Schommer, 1998). The questionnaire consists of 63 items representing statements embodying sophisticated or naive views for each of the five dimensions noted above, that students rate on a Likert-type scale of 1 to 5 the extent of their agreement. For each dimension, Schommer (1990) posited subsets to reflect the range of the dimension. The subsets for structure of knowledge, for example, are 'seek single answers' and 'avoid integration' (refer to Appendix A for further detail).

Use of the questionnaire and subsequent revisions to it (for example by Jehng, Johnson and Anderson, 1993) facilitated a 'growth spurt' in the study of personal epistemology. With the availability of a more convenient measure yielding quantitative data, researchers were able to begin testing the links between epistemological beliefs and other variables. In Schommer's first study (1990), epistemological beliefs were linked to comprehension such that belief in quick learning predicted overconfidence in understanding a text. Schommer continued with studies similar to this and, over the years, has demonstrated the influence of epistemological beliefs in comprehension, metacomprehension and study strategies (Schommer, Crouse & Rhodes, 1992), and academic performance (Schommer, 1993). Other authors have likewise used, and at times revised, the questionnaire and linked epistemological beliefs to test comprehension and learning strategy (Dahl, Bals & Turi, 2005; Paulsen & Feldman, 2007), achievement goals (Bråten & Stromso, 2004), need for cognition (Kardash & Scholes, 1996), learned helplessness and conceptual change (Qian & Alvermann, 1995). Schommer and other authors have also used the questionnaire to assess whether epistemological beliefs vary as a function of culture (Chan & Elliot, 2002; Chan & Elliot, 2004; Youn, 2000), level and course of study (Schommer, 1993; Buehl & Alexander, 2001).

Studies aimed at validating Schommer's Epistemological Questionnaire have yielded variable results. In Schommer's own study in 1990, using principal factor analysis with orthogonal matrix variation and an eigen value cut-off at 1, only four of her five factors were identified and Source of knowledge (define by Schommer

as Omniscient Authority) was not evidenced. Schommer claims that her factor structure was replicated in her 1992 and 1993 studies. While the results were consistent on a general level, in 1992 Innate Ability and Quick Learning merged into one factor, and in 1993, the factors again separated but because some of the items for Innate Ability loaded onto Quick Learning, Innate Ability was renamed to Fixed Ability. Other research shows other relatively minor variations. Jehng, Johnson and Anderson (1993) arrived at five factors which included Schommer's Certain Knowledge, Innate Ability and Quick Learning, and surprisingly her hypothesised Omniscient Authority. Simple Knowledge was not evidenced and instead a factor of Orderly Process was identified. This referred to students' beliefs about how orderly the process of learning is. Hofer (2000) found that Certain and Simple Knowledge loaded together, and Qian and Alvermann (1995) similarly identified three factors including Simple-Certain Knowledge, Innate Ability and Quick Learning. Chan and Elliot (2002, 2004) report that their results based on Chinese samples yielded the following four factors: Innate/fixed ability, Learning effort/process, Authority/expert knowledge, and Certain Knowledge. Youn's (2000) study however yielded only two factors which he named Knowledge and Learning.

The studies that revealed the most dissimilar results are those where factor analysis was performed on individual items and not on the subsets of each dimension. Wood and Kardash (2002) found five factors, namely Speed of learning, Structure of Knowledge, Knowledge Construction and Modification, Characteristics of Successful Students, and Attainability of Truth. Schraw, Bendixen and Dunkle (2002) report factors of Innate Ability, Certain Knowledge 1, Incremental Learning, Certain Knowledge 2, and Integrative Thinking. Certain knowledge 1 pertained to likelihood of certain knowledge being identified, whereas Certain Knowledge 2 pertained to the likelihood of certain knowledge existing. Interestingly, however, the results of factor analysis performed on their own Epistemic Beliefs Inventory yielded the five factors that Schommer (1990) originally hypothesised.

In the absence of clear replication of the factor structure of the Schommer Epistemological Questionnaire, the validity of this measure is brought into question.

Given that the questionnaire was developed based on a hypothesis of what epistemology should cover, and that these hypothesised dimensions are not consistently revealed in the factor analysis, one would have good reason, it seems, to doubt the dimensions.

Re-iterating an earlier argument, one possible source of error that may have influenced the results is the type of questions included in questionnaire. The items on the questionnaire vary in directness from very obscure (for example “self help books are not much help” and “people who challenge authority are overconfident”) to quite direct (for example, “scientists can ultimately get to the truth” and “the only thing that is certain is uncertainty itself”) (Schommer et al., 1992; Schommer, Calvert, Gariglietti & Bajaj, 1997). As was argued previously, it is conceivable that people respond to such questions differently because they target epistemological beliefs at different levels of awareness and conscious control.

2.1.4 Current Conceptions of Personal Epistemology

Notwithstanding the significant threats to the validity of the study of personal epistemology, the array of research already conducted must be considered in order to determine what the most reliable conception of personal epistemology is upon which to proceed. Regarding the scope of personal epistemology, belief about the certainty of knowledge is reported in both the qualitative development models as well as the quantitative belief-based model. Furthermore, it is the least contested factor throughout the applications of Schommer’s Epistemological Questionnaire (1998). Conceptually and empirically beliefs about the certainty of knowledge constitute a core aspect of personal epistemology.

The structure of knowledge in terms of it being complex and integrated versus simple and discrete is likewise evident in both types of research. Source and justification of knowledge also appears in both types of research although evidence for it is more erratic in the quantitative studies. That is, most of the qualitative studies point to the constructed nature of knowledge, and several of the

quantitative studies identify factors pertaining to the role of authority as a source of knowledge.

The objectivity and subjectivity of knowledge appears frequently in the qualitative data but rarely, if at all, in the quantitative studies. Relativity as well, which is paramount in the qualitative studies, is not readily apparent in the quantitative data. One possible explanation for this is that beliefs about relativity and objectivity are not distinguished from beliefs about certainty in the quantitative studies, and hence are subsumed by certainty.

Factors relating to the ability and speed of learning are apparent only in the quantitative data. Interestingly, such factors have been identified most consistently in studies using Schommer's Epistemological Questionnaire and have also been found to have predictive validity in the studies linking epistemological beliefs to other learning variables.

In short, the scope and boundaries of personal epistemology are unclear and would seem to be influenced by the purpose and design of the studies. Beliefs about the certainty of knowledge are arguably the most fundamental. Beliefs about the complexity or structure of knowledge, as well as beliefs about the source and justification of knowledge are likewise important. Beliefs about objectivity and relativity should also be taken into consideration, all be this through beliefs about the certainty of knowledge. The inclusion of beliefs about learning would seem to depend on the purpose of the research and inclination of the researcher, and while there are conceptual problems with this, it does appear that beliefs about learning are accessible and do have predictive validity. In the midst of such ambiguity, researchers should declare the assumptions they make about the scope of personal epistemology upon which their research proceeds.

Regarding the nature of personal epistemology, this paper prefers the terminology of epistemological assumptions. While there are other researchers that prefer the terminology of views, beliefs, theories or cognitions, it seems reasonable to conclude that the essential subject matter is what an individual assumes (i.e. holds

without necessarily deliberating) knowledge to be. While the term ‘belief ‘may be said to imply more conscious awareness than assumption, the paper will employ both terms interchangeably.

Lastly, given the complexity of belief systems coupled with the huge array of topics or content to which epistemological assumptions apply, personal epistemology is best described by frequency as opposed to a single and static point along a continuum. Particularly considering the normative nature of personal epistemology, namely that the theory assumes there are better epistemological assumptions to have, using extreme statements to describe orientations seems unlikely and unreasonable. That is, it is unlikely and unreasonable that a sophisticated view of the structure of knowledge entails believing that all knowledge is complicated. Rather, a more realistic view is that an individual with a sophisticated orientation would demonstrate sensitivity to the complexity of knowledge and would hold that a significant amount knowledge is complex.

2.2 Characteristics of Personal Epistemology

Grouped under this heading of the literature review are debates and questions evident in the literature about the features and traits of personal epistemology. These include questions about how stable they are, the degree to which individuals are aware of and can control them, and how they change.

2.2.1 How stable are one’s assumptions about knowledge?

A question that is traceable all through the history of the study of personal epistemology is the degree to which assumptions about knowledge are domain, problem, or context-specific. Developmental models which posit stages tend to support a more domain general approach as this is more consistent with the notion of stages as having a cohesive structure (King & Kitchener, 2004; Reber, 1985). That is, a stage theory assumes some commonality in the behaviours, or in this case beliefs, constituting a stage. In the context of personal epistemology, this translates into stable and consistent beliefs about knowledge across domains.

Schommer (1990; Schommer-Aikins, 2002, 2004) too, however, would argue that individuals have both specific assumptions as well as a core set of general beliefs. Others hold that assumptions shift according to the domain. Earlier studies into the variability of domains include that by Jehng et al. (1993) who reported differences in beliefs of students from hard and soft sciences, with students in hard sciences believing more strongly in the certainty and attainability of knowledge. Youn (2000) similarly reported a significant effect of academic major on epistemological beliefs for both American and Korean samples.

Still others, particularly Hammer and Elby (2002), insist the assumptions are much more fine-grained and that the particularities of contexts invoke different epistemological 'resources' with which people frame and understand their world, and that these are fine-grained and context specific. Hammer and Elby (2002) are not clear, however, on what the shared or commons aspects of contexts might be that facilitate particular resources being activated, and so it becomes difficult to grasp the scope of a resource or the conditions under which is it activated.

Kitchener and King (1990) approach the issue of domain-specificity rather differently. Instead of focusing on the domain of study or more generally on the context, in their model of reflective judgement they emphasize the nature of the problem. Reflective thinking, they argue, is not required and is not invoked in cases of well-structured problems. According to their model, if a problem is perceived as a well-structured problem (meaning that they perceive there to be one answer to the problem) reflective thinking will not be engaged. This should not be taken to mean the epistemological assumptions are not applied to simpler problems, but rather that the simpler and more naive assumptions characteristic of pre-reflective thinking will prevail. In essence, King and Kitchener (1994) argue that epistemological beliefs will vary, but because of the nature of the problem and not the domain of study or context.

The issue of domain-specificity has been the focus of more recent research in the field of personal epistemology and several articles in the 2006 issue of the International Journal of Educational Research are concerned with the question.

While Hofer (2006) remarks that the issue of whether people have general or specific beliefs has been put to rest through the 2006 contributions, consideration will be paid to the importance of the theme of domain-specificity for the field of personal epistemology before outlining what consensus appears to have been reached.

A first complication that domain-specificity introduces can be described as an epistemological one in that it has manifested in the way personal epistemology has been investigated and what results have been reported. Limon (2006), Muis, Bendixen and Haerle (2006), Buehl and Alexander (2006), and Hofer (2006) have noted that previous researchers have not shared a common understanding of the term ‘domain’. For many it has been taken to be synonymous with discipline of study (Muis et al., 2006), although by Kuhn’s (1991) work it refers to different domains of judgement such as moral or aesthetic judgements. Even if one accepts domain to mean academic discipline, Muis et al. (2006) raise the issue that domains can be described along various classification systems, such as being ill or well-structured and as a hard or soft science. The problem that is highlighted is that the term is malleable and may offer little in terms of an independent variable. When variables in studies take on different meanings, comparability is limited and so having different meanings of ‘domain’ hampers the progress of the study of personal epistemology. The problem is compounded when the issue is extended to beliefs being considered content and context-specific as there is likewise no clear and accepted demarcation between these concepts. Thus, contributions to the study of personal epistemology have been moderated as researchers have assumed different definitions of ‘domain’.

A second and closely-related complication is the question about which beliefs to focus on and for what reason. If people have different beliefs at different levels of specificity, one must ask which beliefs are in fact most influential and productive and under which conditions. Little empirical investigation has been conducted to date to determine which level is most appropriate, although the sensible suggestion made by Muis et al. (2006) is that the choice of specificity should match the purpose of the research. While the relative explanatory power of domain-

general or domain-specific beliefs continues to be explored, the designs of research studies are becoming more sensitive to the relevance of domain-specificity and more refined methods and instruments are beginning to emerge. Historically measures of personal epistemology have been domain-general but, more recently, more domain-specific measures are being used. In terms of the particular methods used to tap into domain-specific beliefs, some researchers have used domain-general measures and asked participants to keep a particular domain in mind while answering the question, for example Hofer (2000).

Measures designed specifically for a given domain are however more difficult to locate. Buehl, Alexander and Murphy (2002) developed the Domain-Specific Beliefs Questionnaire (DSBQ) which is specific to Mathematics and History, and Edler (2002) developed another measure for Science. However, in both cases the items are generally adaptations of items from Schommer's Epistemological Questionnaire (Schommer, 1998) where an item that was initially framed as domain-general is slightly amended to make reference to a specific domain. As an illustration, one item in Elder's (2002) reads 'After scientists find the answer to a problem, the answer could change' which bares strong resemblance to the item in Schommer's Epistemological Questionnaire that reads 'Truth is unchanging' (Schommer, 1998). The DBSQ is also reported to be based on items from the domain-general Schommer Epistemological Questionnaire (1998), and the resemblance between the item from the DBSQ that 'Students who are good at history have to work hard' (Murphy, Edwards, Buehl and Zeruth, 2007) and Schommer's (1998) item that 'The really smart students don't have to work hard to do well in school' is obvious. It appears that within the field of personal epistemology, there is a scarcity of measures designed specifically for a given domain and characteristics of knowledge associated with that domain. This means that domain-specificity has not yet been adequately addressed.

Returning to the more recent consensus surrounding questions about whether epistemological beliefs are domain-general or domain-specific, Muis et al. (2006) offer a thorough review of an examination into 19 studies that have targeted the question, and as a way forward offer the TIDE model that accommodates both

generality and specificity. In brief, their argument is that most studies have found support for domain-specificity, some of these including marginal support for concurrent domain-generality, with a few supporting domain-generality. The model they present based on their findings, the TIDE model, accordingly includes reference to general beliefs, defined as beliefs "that develop in non-academic contexts" (p. 33), academic-beliefs that develop as students enter higher education, and domain-specific beliefs which result from exposure to education in that domain. The academic beliefs develop from the more general beliefs, although they remain in a reciprocal relationship with the socio-cultural and academic contexts influencing such interaction. Domain-specific beliefs develop from the academic beliefs in a similar fashion with the instructional context having additional influence. Muis et al. (2006) further assert that with time and education, it is the domain-specific beliefs more than the general beliefs that are influential. Other authors, for example Buehl and Alexander (2006, 2005, 2001) and Hofer (2006), support the notion of multilayered model where individual possess beliefs about knowledge at different levels of generality and specificity. Under Buehl and Alexander's (2006) model, general beliefs are beliefs about "knowledge as a general construct" (p. 32). Along a similar vein, Schommer-Aikins (2002) concludes that while there are context and domain-specific beliefs, domain-general beliefs make up a person's core personal epistemology, and more domain-specific beliefs 'spring forth' from this core (Schommer-Aikins, 2002).

2.2.2 Are we aware of and in control of our epistemologies?

Schommer-Aikins states that "epistemological beliefs are often unconscious, except for individuals who work or study with epistemological issues directly" (2004, p. 22). Her stance is hence that epistemological assumptions operate largely on an unconscious level, but that people can become aware of them, and perhaps even control them, if they focus their attention directly on them. Kuhn's (1991) view is similar. She suggests that personal epistemology operates as a metacognitive process that becomes increasingly under one's awareness and control as it matures. These views thus both suggest a development of control over epistemological assumptions.

How researchers have assessed personal epistemology provides further insight into questions about the extent to which individuals are aware of their epistemologies. Questions with varying levels of directness have been used within and across previous studies. That consistent models of epistemological assumptions have been drawn from data elicited through such an array of questions suggests that epistemological assumptions are operating at some level and are manifested or enacted even when an individual is not consciously attending to them. In Perry's (1970) study, epistemological assumptions could be inferred from the way they were applied in participants' thoughts about their studies and career paths. In addition, it suggests that epistemological assumptions can be reflected on consciously and in the abstract. In Belenky et al.'s (1986) study, participants could report on their opinion about the abstract idea of experts being certain about knowledge.

Likewise in the quantitative studies, epistemological assumptions have been inferred from indirect questions where participants are not necessarily cognisant of their assumptions but were likely to be applying them (for example their response to the statement "Science is easy to understand because it contains so many facts"); as well as drawn from responses to overt and direct statements such as "Absolute moral truth does not exist" (Schraw et al., 2002).

Other task-orientated measures have also been applied. Hofer (2004) has made use of talk-aloud protocols, and Schommer (1990) and Kardash and Scholes (1996) have asked students to write concluding paragraphs to ambiguous passages. Both these measures are based again on the supposition that epistemological assumptions can be inferred from their application and that this need not entail direct attention and awareness.

Useful terminology that Limon (2006) has introduced to describe the varying ways in which epistemological assumptions have been investigated is that of enacted versus professed beliefs. Briefly, enacted beliefs are those beliefs inferred through their actual application whereas professed beliefs are those people report to hold.

Enacted beliefs would accordingly be beliefs of which people may not be aware even though they inform behaviour, and professed beliefs would be those an individual can consciously report on. It would seem, then, that epistemological assumptions may operate outside of conscious control and in application, but can also be reflected on consciously and in the abstract. Issues of the degree to which people are typically aware of their epistemological assumptions; if, when and how this changes; and if assumptions reported by people are the same as assumptions upon which they operate; have not been fully explored in the literature. These are important questions particularly for educational concerns, as understanding if and how conscious control of epistemological assumptions can be facilitated is paramount to the development of more sophisticated beliefs. In addition, while a review of the questions asked would suggest that epistemological assumptions can be elicited via various forms of questions, this issue has not been expressly interrogated in the research. It would seem instead that researchers have assumed this to be a 'non-issue'. It could be argued that there is a marked difference between such forms of questioning and that research would be better supported if this assumption is tested.

2.2.3 How does personal epistemology change and develop?

A key concern for any model of personal epistemology is its ability to account for change. In an area where the substance or form of a construct is still undecided this is a particularly poignant question as the stronger model will be one that can adequately explain change and development. Developmental models have typically turned to cognitive development, and more particularly Piaget's theory of disequilibrium, accommodation and assimilation to explain the progression from relativist to multiplist and finally to constructivist orientations (Hofer, 2001). The argument is essentially that as people encounter or experience situations that appear to refute their assumptions, they are forced to alter such assumptions. For example, as individuals encounter more people with different views or explanations from theirs, they are forced to acknowledge diversity of opinion. King and Kitchener (2004) also refer to 'skill theory', framing the development in terms of the transition from functional to optimal level of capacity that is facilitated by contextual support.

Schommer-Aikins (2002) too refers to general cognitive development, and further alludes to the fact that the transition from naivety to sophistication makes little sense without notions of growth and development framing changes in belief systems.

2.3 Determinants of Personal Epistemology

Factors that may influence or account for variability in epistemological assumptions have been reviewed in previous literature, with the most common factors being that of gender, age, education and culture. Each of these is discussed below.

2.3.1 Role of Gender

From the earliest studies of personal epistemology the role of gender has been contested. Perry's (1970) sample was primarily male, and Belenky et al.'s (1986) completely female. Numerous studies have incorporated the influence of gender in their designs and results have been conflicting. Some have reported differences in the kind of assumptions across genders (for example Belenky et al., 1986) while others, such as Baxter Magolda (1992), report similarities across both the kind of assumption and pace of progression. Baxter Magolda (1992) suggests that the influence of gender lies not so much in the kind of assumptions people have but rather in the patterns of thought and behaviour through which those assumptions play out.

2.3.2 Role of Education and Age

That more sophisticated assumptions are more likely to be evidenced in more educated samples has been steadily supported across most research (for example Schommer et al., 1997; Schommer, 1993; Jehng et al., 1993, Youn, 2000). Higher education appears to play a definite role in the development of more sophisticated epistemological assumptions. This is a comforting finding given that the aim of most higher education strategies is to cultivate in students a more critical and

constructivist approach to knowledge. It is also widely accepted that epistemological assumptions mature or develop with age. Fitting with the social cognitive development model and Piaget's notion of disequilibrium, increase in age is likely to correlate with a wider exposure to experiences that may challenge people's epistemological assumptions.

2.3.3 Role of Culture

Numerous studies have pointed to the possible differences that culture may bring, however few cross-cultural studies have been undertaken. Of those which have, the majority have relied on quantitative measures, usually variations of Schommer's Epistemological Questionnaire (Schommer, 1998). Such studies have reported cultural-based differences. Youn's (2000) study based on a Korean sample, for instance, introduced the aspect of hard work in learning which had not arisen as an important facet to epistemological assumptions in other studies based in the United States of America. Chan and Elliot (2002) found that their sample of Chinese students believed more strongly in the role of authority and suggested that this stemmed from the cultural preference for acceptance of traditional knowledge and values. Although it is not interrogated or explored in detail, Schommer (1990) collected data related to family background to test its predictive power for epistemological beliefs. The variables included strict rules at home and encouragement towards independence, which are undoubtedly expressions of a particular culture, and were found to have some influence over Simple Knowledge and Quick Learning respectively.

Consideration of the role of culture emphasises the normative approach to epistemology adopted by researchers and arguably as well society in general. A normative approach to personal epistemology means that value judgements are made about people's epistemological assumptions. There are good and bad, appropriate and inappropriate, naive and sophisticated epistemological assumptions. Culture is likely to play a substantial role in defining what constitutes 'good 'and 'bad' and Chan and Elliot's (2002) suggestion that the Chinese sample showed a preference for acceptance of traditional knowledge supports this

assertion. While full exploration into this feature of personal epistemology is important, it goes beyond the scope of this research and is merely noted as an item for further investigation.

2.4 Personal Epistemology and Social Science

One of the criteria which offer support for the adoption of a new construct is the degree to which it 'fits' with other well established theories and has explanatory power. Personal epistemology can be located in the broad camp of cognitive and educational Psychology, and therefore relates most directly to thinking and learning.

2.4.1 How does personal epistemology relate to thinking and cognition?

How one conceives of knowledge and knowing are clearly likely to be involved in how one thinks. The exact relationship between epistemological assumptions and thinking is not however very clear, and while several authors imply connections and others are more explicit about how the two relate, the question remains far from resolved.

King and Kitchener (1994) are among those authors that define the relationship between epistemological assumptions and thinking. Epistemological assumptions are a manifestation of reflective thinking skills, and reflective thinking skills develop as epistemological assumptions develop. In her earlier work, Kuhn (1991) implies that the ability to engage in reasoned argument is influenced by both epistemological theories and the ability to think reflectively. The relation between epistemological theories and reflective thinking is thus delineated. In her later works, Kuhn (2000) refers more to the role of metacognition and King and Kitchener (1994) likewise refer to Epistemic Cognition to link epistemological assumptions to cognition. Despite these two cases where attention has been paid directly to the relation between thinking or cognition and epistemological assumptions, the connection is not yet clear and there is no established conception of how the two stand in relation to each other.

2.4.2 What do we know about the influence of personal epistemology on learning?

Several studies have linked epistemological beliefs to other learning variables. While the detail of the findings goes beyond the scope of this paper, dimensions of epistemological beliefs have been linked to test comprehension and learning strategy (Dahl, Bals & Turi, 2005; Paulsen & Feldman, 2007), achievement goals (Bråten & Stromso, 2004), need for cognition (Kardash & Scholes, 1996), learned helplessness and conceptual change (Qian & Alvermann, 1995). These studies collectively suggest that an individual's epistemological assumptions will influence how they comprehend and interpret information and what strategies they use to learn.

2.5 Methodological Considerations

Although not unique to the study of personal epistemology as compared to any other study of a psychological phenomenon, there are serious methodological considerations, that is, considerations about the way in which epistemological assumptions have been investigated, that threaten to undermine the field. Beginning with the most easily overcome methodological concern, attention is drawn to the observation that almost all of the studies have been conducted in the United States of America on predominantly white samples. The applicability of the current concept of personal epistemology on other cultures with different belief and value systems has not been determined.

More significantly, the study of personal epistemology provides a useful example of how practices of investigation, instead of being separate and objective lenses through which to view something, are dynamic and influence the very thing they seek to merely observe. Several of the key methodological considerations have already come to light through previous discussions but will be reflected on again in this section.

It was noted that the earlier, qualitative, open-ended studies were limited by relying on self-report data, or professed epistemological beliefs according to Limon's (2006) terminology. The potential risk to such methods is that people may in fact not be able to accurately report on their beliefs about knowledge, possibly due to the fact that they are unaware of them, unable to articulate them, or compelled to provide particular answers based on their expectancies. However, the alternative of using other methodologies aimed at 'side stepping' self-report methodologies rely on inference and inference is susceptible to such threats as misinterpretation of data as well as a failure to appreciate complexities of multiple factors. The present study hoped to provide some insight into the most likely of these threats in the study of personal epistemology by pitting one kind of methodology against the other, namely ones requiring more inference and those requiring no inference.

Practically, the qualitative-based methodologies also demanded more time and smaller samples. Another concern is that different questions and tasks were used and so the comparability of results is weakened. In addition, the 'third variable' threat is particularly significant since participants' responses could easily have been influenced by such things as prior knowledge, verbal reasoning skills and language competency. The strength of these studies came from their exploratory nature which allowed for the detection and elaboration of personal epistemologies which were rigorous enough to support developmental models.

The more recent, quantitative, closed-ended methodologies have been prone to other weaknesses. Firstly, the data yielded is restricted to the questions included by the researcher and the emergence of new dimensions is not catered for. The introduction of the quantitative measures also saw the disappearance of some dimensions such as relativity and objectivity which were prominent in the qualitative-based studies. While these dimensions are often referred to in the general development of an individuals' personal epistemology, the measures spawning from Schommer Epistemological Questionnaire (1998) do not measure this specifically and the methodology in effect reframed the subsequent conceptualisations of the construct.

It is also arguably the case that responses to discrete questions, as evident in the rating scale measures, may not adequately capture belief systems that may be complex and irregular, multilayered and multidimensional. The absence of clear replication of the factor structure also brings into question the validity of Schommer's five-dimensional model as well as the multitude of other models that have been reported in the literature based on this or similar measures (Clarebout, Elen, Luyten & Bamps, 2001).

DeBacker, Crowson, Beesley, Thoma and Hestevold (2008) have added to the criticisms of the quantitative scale-based measures. In their study they investigated the psychometric properties of three commonly used quantitative measures, namely the Schommer Epistemological Questionnaire (Schommer, 1998), the Epistemic Belief Inventory developed by Schraw et al. (2002), and the Epistemic Belief Survey developed by Wood and Kardash (2002). For all measures they were unable to replicate the intended factor structures and report low internal consistency coefficients. They conclude that, "because of our findings that these measurement instruments contain large amounts of error variation and offer dubious operationalisations of the constructs that they purportedly measure, researchers should seriously reconsider the state of knowledge in the area of epistemic beliefs and their relationships with learning processes and outcomes" (p. 304).

Additional methodological problems that researchers have raised emphasise how the lack of theoretical or conceptual clarity hampers the field of enquiry. Firstly, difference regarding perspectives on the level of domain-specificity characterising epistemological beliefs, and more recently what level of specificity has more explanatory power, brings into the question what the most appropriate level of specificity should be for the measures. The most recent consensus is that the level of specificity of the measure should mirror the research goals or questions (Muis et al., 2006). It remains unclear what defines a specific or a general research question, and with the exception of only a few pieces of research such as that by Op 't Eynde, De Corte and Verschaffel (2006) and Murphy et al. (2007), there have been few studies to date that have yet put this strategy in practice and

specified and rationalised the alignment between the specificity of their measure and research topic. Also, lack of clarity about what constitutes a domain further hampers the construction of well defined and domain-specific measures.

In summary, it is argued here is that there remain several fundamental questions about the nature of the construct which, until they are resolved and agreed on, will serve to threaten the validity of any measure of personal epistemology. In part because the construct is relatively new, and in part because of the nature of the construct, the challenges facing the study to personal epistemology include arriving at clear and refined conceptions of the full nature of the construct, and then the development of measures sufficiently sensitive and comprehensive to assess them. These reflections point strongly to how both the lack of conceptual clarity about a construct, as well as the power and influence of epistemology and methodology, can influence what conclusions are drawn and how a field of study progresses.

2.6 Conclusions

The literature review served to expose the current core debates in the study of epistemology. These range in topic from concerns about the ontological status of personal epistemology, to its variation across individual and contextual variables, through to its role in learning. In summary, the study of personal epistemology is barely past its infancy and many fundamental questions remain unresolved. With such a tremulous grounding, future research should be mindful of the assumptions upon which it proceeds and take care to design studies that will be sensitive to the relevant issues. The assumptions upon which the current paper proceeds, in light of the discussions above, include the following:

a) Personal epistemology has to do with assumptions and beliefs people have about the nature of knowledge, where to know is understood as having a belief about something one feels is true and accurate
b) The fundamental dimensions or kinds of assumptions include assumptions about the certainty, complexity and source of knowledge. While related,

beliefs about learning and innate ability to learn are not strictly epistemological in nature. Thus, Schommer's (1994) multidimensional model is accepted, however the dimensions related to learning are excluded.

c) A normative approach to knowledge is accepted such that some assumptions are considered better than others. Based on previous research, in particular the work by Schommer (1994; Schommer-Aikins, 2004), this paper adopts the model that 'naive' beliefs are those where knowledge is seen as certain, simple and received from authority, and 'sophisticated' beliefs are those where knowledge is seen as uncertain, complex and justified by evidence and reason.
d) However, personal epistemology is best described in terms of frequencies as opposed to a single point along a continuum between naive and sophisticated beliefs. People with sophisticated orientations, for example, hold that most knowledge is tentative but that some knowledge is certain.
e) Epistemological assumptions operate mostly below conscious level but can be elicited and brought into conscious awareness through probing. It is not clear the degree to which bringing assumptions into conscious awareness changes the assumptions.
f) People are likely to have global assumptions about the idea of knowledge and knowing which primes their approach to particular contexts. However, people also have more context-specific assumptions, although the demarcation of this is unclear. It is furthermore not clear which level of specificity offers the most explanatory power.
g) Culture is likely to have a significant influence on the development of epistemological assumptions.
h) Education is likewise likely to play a significant influence on personal epistemology but particularly in later development. Education is likely to challenge people's assumptions more openly and forcefully, and to facilitate the conscious control and manipulation of such assumptions. Education, formal as well as informal, is considered key to the development of content-specific beliefs.

3. Chapter Three: Rational, Research Aims and Questions

3.1 Rationale

A review of existing literature on the field reveals that the challenge to the study of personal epistemology is the construction of a clear and definite characterisation of the construct and the development of corresponding measures. In other words, in order to progress the field requires more studies testing specifically the assumptions inherent in the conceptualisation of the construct as well as possible sources of error in the measurement of it. The rationale for the current study is informed by this reasoning and seeks to test specifically three variables which have not yet been fully interrogated, but which may have contributed to the lack of clarity regarding the nature and measure of epistemological assumptions. These variables include the level of directness of the questions eliciting assumptions, the domain of the question, and whether the question is open or closed-ended.

Historically, some researchers have elicited epistemological beliefs via very direct and explicit questions in open-ended formats such as “How do you know what is right/true” (Belenky, Clinchy, Golderberger & Tarule, 1986). Others, such as Perry (1970), drew conclusions about participant’s epistemological assumptions based on the very broad and indirect question of “What stood out for you this year”. Over the decades of the field’s progression, studies have also tended to shift from open-ended and qualitative styles of questioning (for example Perry, 1970) to closed-ended and quantitative (for example Schommer, 1990). In addition, more recent research has suggested that distinctions need to be drawn between domain-general and domain-specific beliefs, and subsequently also between beliefs about different domains. However, the relation between domain-generality and domain-specificity is far from resolved and more studies that actively focus on or control for the effect of domain and domain-specificity are needed. Based on the history of the study of personal epistemology, it is possible that these three variables have constituted sources of bias or error, and the motivation of the present study is to determine whether there is empirical evidence to support such a conjecture.

3.2 Research Aims

The research was aimed at investigating methodological threats to the study of personal epistemology. Three features characterising the question via which epistemological assumptions are elicited were hypothesized to influence the kind of data yielded and conclusions made. The study aimed to explore this possibility by comparing results (in the form of descriptions about the level of sophistication of an individual's beliefs about the certainty, complexity and source of knowledge) obtained from questions posed under different conditions, where the conditions were defined by different levels of directness, different levels of domain-specificity and whether open or closed-ended questions were used. In simpler terms, the aim was to determine if one can legitimately arrive at the same description of an individual's level of sophistication of their epistemological assumptions if the phrasing of the question eliciting such assumptions varies according to the aforementioned features.

3.3 Research Questions

The central research questions guiding the study were as follows:

1) Does the level of directness characterising a question intended to elicit an individual's epistemological assumptions influence the conclusions drawn about the level of sophistication of the individual's epistemological assumptions?

2) Does the level of domain-specificity characterising a question intended to elicit an individual's epistemological assumptions influence the conclusions drawn about the level of sophistication of the individual's epistemological assumptions?

3) Do open-ended questions and closed-ended questions intended to elicit an individual's epistemological assumptions

lead to the same conclusions about the level of sophistication of the individual's epistemological assumptions?

4. Chapter Four: Method

4.1 Research Design

The design of the research took the form of a one-group, within-subjects design (Rosenthal & Rosnow, 1991). Conclusions were drawn about the sample's epistemological assumptions under different conditions or types of questioning, and these conclusions were then compared to determine if there was a difference. The study employed both quantitative and qualitative methodologies.

The dependent variable for the study was a description of an individual's personal epistemology, operationalised as a rating of the level of sophistication. Based on Schommer (1994) as well as earlier qualitative studies, the dimensions of personal epistemology considered are certainty of knowledge (Certainty), complexity of knowledge (Complexity) and source of knowledge (Source). As explained in the literature review, sophistication was taken to mean views of knowledge as uncertain, complex and derived from evaluation of evidence and reason, as opposed to naive views of knowledge as certain, simple and received from authority. In sum, the dependent variable for this study was a rating of the sophistication of beliefs or assumptions about the certainty, complexity and source of knowledge.

The independent variables for the study were the characterisations of the question eliciting assumptions including the level of directness of the question, the domain-specificity and domain-type of the question, and whether the question was open or closed-ended. These different factors were operationalised in different items and/or sections across a pen-and-paper based measure. The items making up the measure and hence the full measure were developed specifically for the study to reflect variations in the independent variables. These variations gave rise to different conditions, and the ratings of levels of sophistication based on the different conditions were compared in order to respond to the research questions.

4.2 Participants

The full cohort of Honours-level Psychology students at a public South African university was approached to participate in the study. The sample was selected based on suggestions from the literature that the development of personal epistemology is best located within adult cognitive development and that level of education is a factor that aids such development. Honours students, currently completing their fourth year at university, were accordingly considered to have more developed epistemological assumptions that would then be more likely to be demonstrated. In addition, because entry into Honours requires a certain degree of success in higher education, selecting Honours students was thought to reduce the effect of level of education. In a similar vein, in order to reduce the effects of prior and domain-specific knowledge, Honours students from only one course were selected which, for convenience, was the Psychology course. The full cohort of 45 students was approached in order to maximise the power of the study. Sampling was thus non-probability, purposive and convenient.

The final sample consisted of 35 participants. The highest level of qualification for all participants was a first degree (three year degree). Participants ranged in age from 20 to 44 years old with the average age being 24 years and the mode 22 years. In terms of racial classification, 27 of the participants described their racial group as White, 3 as Black, 2 as Indian, 2 as Asian, and 1 as Coloured. There was 1 male participant and the rest were female.

4.3 Materials

A new measure was designed to test the given hypotheses of the study. It is acknowledged that there is a move towards synthesis and consensus in the field of personal epistemology and that many authors would accordingly argue in favour of the use and improvement of existing measures. However, the use of a new self-developed measure was deemed necessary primarily for the following reason.

The aim of the study was to test specific hypotheses, namely that different characterisations of questions eliciting epistemological assumptions would affect the conclusions drawn about such epistemological assumptions. In order to isolate the three specified characterisations of the questions and to manipulate them across different conditions, questions required careful design in terms of content and wording. Had existing items been used instead that were not developed in line with these conditions, the study would be vulnerable to the threat that the independent variables were not appropriately operationalised. A related reason for the new measure is that many of the existing measures, such as Schommer's Epistemological Questionnaire (1998) and the subsequent versions or revisions of this such as the Epistemic Belief Inventory (Schraw et al., 2002), are largely 'works in progress'. Because the measures cannot yet be considered highly robust, the potential benefits of using them are less compelling. Moreover, cross-cultural applicability has not been ascertained and given that to date no studies have been conducted on South African students, the applicability of current measures cannot be affirmed. Again, this makes the argument for using existing measures less compelling.

Because of the numerous concerns regarding the methodologies used to investigate personal epistemology in the past, considerable attention is paid to the explanation of the new measure. Before continuing with a detailed description of the measure and its structure, an overview of how each independent variable was conceived is first necessary.

The first independent variable, level of directness, was conceptualised as the degree to which questions were explicit and blatant about the fact that they asked participants to report on their assumptions or beliefs about knowledge. Thus, the most direct questions asked participants what they believe about knowledge and in order to respond to these questions, participants were required to consciously and actively deliberate on their beliefs about knowledge. The indirect questions were designed to be more obscure and to target beliefs or assumptions without requiring such deliberation on knowledge. This conceptualisation shares much in common with Limon's (2006) distinction between professed and enacted beliefs, as indirect

measures would be most appropriate when targeting enacted beliefs while direct measures may adequately capture professed beliefs, although the concepts are different and distinct. To avoid further possible confusion, it is emphasised that directness is not to taken to mean, as Limon (2006) has used the term in the context of a different discussion, a necessary connection between beliefs and their measurement, such as mercury being necessarily connected to temperature.

The second independent variable, domain, was defined as an academic discipline or field of study. It was addressed by framing some questions as domain-general, and some as domain-specific. For the domain-specific question, three specific domains were included, namely Psychology, Human Biology and History. Domain-specific questions accordingly referred to knowledge claims within these disciplines, and domain-general questions referred to knowledge as a general and abstract concept. The choice of which domains to include in the study was motivated for as follows. The particular themes of Human Biology and History were selected on the supposition that the sample were likely to have had prior reflections on the topics and therefore feel capable of offering a viewpoint regarding the statements from which epistemological assumptions could be inferred. In addition, Biology and History reflect both a hard and a soft science, which is a distinction that previous research has highlighted and which, by inclusion in the study, could be investigated. Also included as a domain was the discipline with which the sample has received post-graduate education, namely Psychology. This inclusion was based on previous findings that education influences the development of sophisticated beliefs and this was similarly tested for in the study.

Lastly, and quite simply, the measure included both an open-ended item and closed-ended items. The former allowed participants to generate their own responses, and the latter asked participants to select from a given list the answer they felt was most true for them and which reflected the theorised dimensions of personal epistemology.

In most instances, two or more variables coincided. For example, the measure included one open-ended question which was at the same time an indirect

question couched within a particular domain. Instead of then presenting the variables as isolated units, the measure is best explained in terms of the sections comprising it, where the sections are defined by the particular combination of levels of the independent variables. To guide the following explanation, Table 1 below summarises the combination of variables contributing to each section of the measure. The full measure appears as Appendix B.

Table 1: Structure of measure and outline of sections

Section One	**Section Two**	**Section Three**	**Section Four**
Open-ended	Closed-ended	Closed-ended	Closed-ended
Indirect	Indirect	Direct	Direct
Domain specific	Domain specific	Domain specific	Domain general

4.3.1 Section One

The first section of the measure asked participants to write a critique, not more than a few paragraphs in length, on their field of study (i.e. Psychology) for a textbook aimed at postgraduate students. It was suggested that they make reference to debates in the field, and draw a conclusion that reflected their own perspectives on the issues they raised. The data produced from this item was textual.

The first section thus included one item that was open-ended, phrased indirectly and framed within the domain of Psychology. The open-ended nature of the question allowed for participants to determine what content to discuss and how to discuss it, which could be analysed to determine how they portrayed knowledge and consequently what epistemological assumptions could be inferred (Section 4.5 describes what analysis was conducted). It is also worth noting that because it was open-ended, theorised dimensions of personal epistemology were not specified in the question allowing for any and unexpected portrayals of knowledge to emerge.

The question was also phrased indirectly so that participants were not told explicitly what information the researcher was interested in (namely their beliefs about

knowledge). Thus, although the item expressly asked participants to be critical, it did not ask participants to reflect on their assumptions about knowledge. Instead, participants were asked to engage in a cognitive activity that was likely to draw on their epistemological assumptions. That is, it was assumed that a participant's epistemological assumptions would affect how they made sense of and reflected on their field of study and the kinds of conclusions they drew. Even if other variables played a role, such as writing skills, the assumption was that the text produced would not portray knowledge in a way that would be inconsistent with their assumptions.

A last consideration was that the question was framed in terms of psychological knowledge. One obvious reason for framing the question as domain-specific, is that it could not at the same time be indirect if it targeted knowledge as an abstract concept. That is, if the manifest content of the question was framed in terms of knowledge as domain-general, then it would be focussing on knowledge as a generalised concept, which would require participants to deliberate on knowledge as a generalised concept, which means it would be direct as participants would have to deliberate on their beliefs about knowledge. The particular domain of Psychology was selected because of its familiarity to the sample, thus enabling the sample to engage more readily and critically with the subject matter.

Apart from the logical connection between domain-specific and indirect questioning illustrated above, the coincidence of these as well as an open-ended question format was selected on the basis that the item could more readily tap into epistemological assumptions as these exist and operate in the given context with minimal interference from the researcher. By asking indirectly and obscuring the point of the question, by allowing participants the freedom to generate their own responses, and by selecting a discipline that they were currently studying at higher education level and hence hopefully cultivating critical thought about, the question targeted epistemological assumptions in the setting and at the level of operation at which educationalists and psychologists are interested. In short, the item was designed to increase ecological validity by investigating the phenomenon of interest and minimising the possible influence of the question. This is not to say

that the item is the best way to investigate epistemological assumptions in their natural setting. For instance, some may argue that ethnographic research would be better suited, but the argument here is that of the various levels of independent variables within the scope of the present study, this particular combination offered the best ecological validity.

4.3.2 Section Two

The second section was based on closed-ended question formats. Participants were asked to select from 4 possible options, the extent of their agreement to 18 statements, where the statements reflected either a naive or sophisticated view about a specific topic. Examples of such statements include: “The History of Cape Town is best described as a straightforward chain of events” and “There is no good reason to doubt the diagnosis my doctor makes when I get sick”.

As the assertions contained in the items of section two represent either a naive or sophisticated view of knowledge, the degree of agreement with the statement indicated by the participant was accordingly understood to reflect that participant’s own assumption. For example, if a participant agreed with the naive view that “The causes of road rage are plain and simple”, the inference was then that the participant had naive views about the complexity of (Psychological) knowledge. Thus, participants were classified as demonstrating ‘high sophistication’ if they agreed with a statement embodying a sophisticated view, and as demonstrating ‘mild sophistication’ when a participant ‘agreed for the most part’ with a statement embodying a sophisticated view. Similarly, participants were classified as demonstrating ‘high naivety’ or ‘mild naivety’ if participants ‘disagreed’ or ‘disagreed for the most part’ with a statement embodying a sophisticated view. Several items were reversed to discourage habitual or repetitive responses from participants. Participants were then rated as demonstrating ‘high sophistication’ when they ‘disagreed’ with a statement that embodied a naive epistemological assumption.

The statements were designed to reflect the specified dimensions of personal epistemology, namely Certainty, Complexity and Source. Consequently, 6 of the 18 items pertained to beliefs about the certainty, 6 to beliefs about the complexity, and 6 the source of knowledge. In addition, the items were also designed to be domain-specific and indirect, which was operationalised in terms of the items consisting of highly content-specific knowledge claims within the fields of Psychology, Biology and History. To elaborate, the items could not refer to knowledge per se as this would characterise them as direct. Instead, the items were framed in terms of particular knowledge claims, thereby offering participants content about which to demonstrate their assumptions about knowledge without expressly asking about knowledge. The content was then confined to three disciplines, resulting in the items reflecting knowledge claims regarding psychological, biological or historical knowledge. Accordingly, of the 6 items for each dimension, 2 were framed as instances of declarative knowledge about History, 2 about the human body or Biology, and 2 about human behaviour or Psychology. Continuing with a previous example, the statement “The History of Cape Town is best described as a straightforward chain of events” addressed the dimension of complexity framed as a particular knowledge claim within the discipline of History. The statement “There is no good reason to doubt the diagnosis my doctor makes when I get sick” addressed the dimension of source of knowledge framed as a particular knowledge claim within the area of the Biology.

One concern regarding other existing quantitative measures is that the statements can be somewhat vague, and introduce the threat of confounding variables. For example, the following two items appearing in the Epistemic Belief Inventory (Schraw et al., 2002) and the Schommer Epistemological Questionnaire (Schommer, 1998) respectively: “The most important part of scientific work is original thinking”; and “When someone in authority tells me what to do, I usually do it”. The face validity of these items is poor and one can easily imagine how factors other than beliefs about the nature of knowledge could influence responses. In an attempt to maintain precision in section two, the items were all written according to the same logical structure. The object or manifest content of the statement is linked to a description that embodies an epistemological orientation. For example, the

item “It is possible to know for sure what the reasons for the political changes in South Africa’s history were” links the content of South Africa’s political history, to a naive epistemological assumption about certainty, namely that “it is possible to know for sure”. Even a more complex item, such as “Understanding how the Greek civilisation changed over time requires consideration of multiple and interlinked factors” links the content of Greek civilisation to the more sophisticated assumption about complexity, namely that knowledge entails “consideration of multiple and interlinked factors”.

Final points regarding section two refer to its presentation as a scale in that participants selected their level of agreement from four options of varying degrees agreement. Likert-type scales, which have traditionally been used in the quantitative studies of personal epistemology, typically include a middle point allowing for people to assert the lack of preference or opinion (Coolican, 2004). This was excluded in the present research in order to force participants to select an orientation they most agreed with. Many Likert-type scales also describe only the extreme poles verbally in terms of ‘strongly agree’ and ‘strongly disagree’. This approach was avoided on the grounds that to ask people to ‘strongly agree’, particularly in relation to ‘agree’, with a statement is at worst nonsensical and at best lacking in ecological validity. In addition, the middle options were verbalised in order to provide clear statements with which participants could select their closest alignment, and to remove the guesswork that often accompanies unexplained points or options in a rating scale.

4.3.3 Section Three

The third section was again closed-ended and was formatted much like the second section, including 18 items where participants responded by selecting one of four options. Of the 18 items, 6 items again targeted each dimension. In section three the level of directness was increased so that the questions were ‘more direct’. ‘More direct’ was operationalised as targeting beliefs about a particular *body* of knowledge, such as Psychology or History. Participants were thus asked to deliberate on features of knowledge, often phrased as ‘what is understood’ or

explicitly as ‘knowledge’, but only about particular disciplines or bodies of knowledge, namely psychological, biological or historical knowledge, and not particular knowledge claims. Because the questions were still embedded in examples related to a discipline (for example knowledge about History) they were considered domain-specific. Accordingly, 2 of the 6 items for each dimension targeted the domain or discipline of Psychology, 2 the domain of Biology, and 2 the domain of History.

In section three, instead of rating their agreement with a statement as in section two, participants were asked to choose one of four descriptions about the nature of the body of knowledge or domain. For example, participants were asked to choose from the options ‘Straightforward’, ‘More straightforward than complex’, ‘More complex than straightforward’ and ‘Complex’, which best answered the question “Do you think knowledge about how the human body functions is generally:”. The four options encapsulated different degrees of sophistication. For example, the view that knowledge about how the human body generally functions is complex, embodies a sophisticated view, while the view that it is more complex than straightforward is also sophisticated but to a lesser degree. Likewise, the belief that it is straightforward can be described as naive, and the belief that it is more straightforward then complex is naive but to a lesser degree. Accordingly, if a participant selected the ‘sophisticated’ option they were rated as demonstrating ‘high sophistication’. If they selected the option which represented sophistication, but to a lesser degree, they were classified as demonstrating ‘mild sophistication’. Likewise ratings of ‘high naivety’ and ‘mild naivety’ were assigned if participants selected the naive answer, or the answer that was naive but to a lesser degree respectively.

The format of the question, namely multiple-choice with four possible answers, aligned with the other closed-ended sections. It similarly directed responses to the theorised dimensions of epistemological assumptions by integrating them into the question. In addition, by asking participants to describe the state of knowledge by selecting from given options, it also specified both the naive and sophisticated poles. That is, the question captured the theorised range of sophistication of beliefs

about complexity by including ‘Straightforward’ and ‘Complex’ in the options, as opposed to simply asking a participant whether they agreed or disagreed with a description of knowledge as complex. In this way the question captured the theoretical underpinnings of the construct and avoided the risk that participants had different understandings of what the opposite of complex is, for example.

The phrasing of the questions also accommodated the more recent trend, clearly expressed by Schommer-Aikins (2004), to view an individual’s personal epistemology in terms of frequencies as opposed to a single point on a continuum. By including in the item the word ‘generally’, it removed the extreme position, for example, that all knowledge about how the human body functions is either complex or straightforward and instead allowed for the position that most knowledge about the human body is complex.

4.3.4 Section Four

The final section again shared the format of the other closed-ended sections, except that the items were more general and abstract and subsequently domain-general. An exemplary item is “How much knowledge is best acquired by accepting what experts or authority figures say:” for which the possible answers were ‘Almost everything’, ‘Most of what we understand’, ‘Some of what we understand’ and ‘Almost nothing’. As is clearly indicated by the example, the questions asked participants directly about their views on knowledge. As epistemological assumptions have traditionally appeared in the literature as abstracted concepts about people’s approaches to knowledge, so do the questions focus on abstract conceptions of knowledge. Domains were no longer applicable, and participants were accordingly required to reflect consciously and deliberately on their portrayal of knowledge as a generalised, abstracted and domain-free concept. As no specific domains were included, only 2 items per dimension were included, resulting in a total of 6 items for the section.

The format of the question, namely multiple choice with four possible answers, aligned with the other sections and similarly directed responses to the identified

dimensions of epistemological assumptions. Again, the four options embodied different degrees of sophistication, and participants were classified on the basis of which option they selected. The questions were also constructed to allow for a 'frequencies' perspective of sophistication, making reference to the amount of knowledge that can be characterised as complex for example, as opposed to the more extreme position that all knowledge is complex.

4.3.5 Overview of the measure

To summarise, the measure consisted of four sections and in each section participants responded to different kinds of questions. The first section required participants to write a critique on Psychology. The item in this section was open-ended, indirect because the question did not require participants to consciously deliberate on their views of knowledge, and domain-specific because the content of the question was restricted to the discipline of Psychology. It also targeted the domain for which the sample had attained their highest level of education.

The remaining sections were all closed-ended. Section two continued with indirect questioning as it similarly did not require participants to consider 'knowledge' but rather to respond to particular knowledge claims or assertions. It was also domain-specific in that items were confined to statements about psychological, biological and historical knowledge.

The questions in section three were 'more direct' in that they required participants to reflect on knowledge, but knowledge of specific disciplines and not knowledge per se as an abstract concept. It was thus also domain-specific as it referred specifically to psychological knowledge, biological and historical knowledge. Finally section four targeted knowledge per se as a general concept and was accordingly domain-general.

The nature of the items was accordingly defined by the independent variables under investigation, namely directness, domain and open versus closed-ended formats. For each item, participants were rated according to the level of

sophistication they demonstrated. There were four possible ratings or classifications, namely ‘high sophistication, ‘mild sophistication’, ‘mild naivety’ and ‘high naivety’.

4.3.6 Piloting of the measure

The measure was piloted to assess clarity of items as well as to assess the kind of data yielded, particularly for section one. Piloting involved forwarding the sections to postgraduate students in the Faculty of Humanities, as well as people already in the world of work but with the same highest level of qualification (i.e. a three-year degree), to both complete the measure and provide commentary on it. The measure was piloted in phases with successive refinements being made to the measure. The postgraduate students were involved in the final phase and most closely resembled the final sample in that they were currently studying. Although over 30 postgraduate students were approached, only 5 students participated in the pilot study. Of these 5, 4 were female, 4 were currently completing a Masters degree, 4 were in their early twenties, and all were white. The feedback was provided was useful and included the following.

One significant issue was that any reference to vague concepts, such as ‘body of knowledge’ or ‘records’, was confusing and difficult to interpret. Items were accordingly written in definite terms referring to specific concepts in order to avoid such ambiguity. Two participants commented further that, in the final section, it was not clear what was meant by broad concepts such as ‘world’ and ‘knowledge’. No corrections were made to the section based on this preliminary finding as it pointed to the potential power of the section to answer the research question, namely the way that the question is phrased (in this case as abstract concepts) influences conclusions about an individual’s epistemology.

A positive finding from the pilot study was that responses to the closed-ended sections indicated that pilot participants did not avoid the more extreme options but instead selected answers across the full range of options. The appropriateness and usability of the options in the measure was thus supported. Three participants

commented that they were unsure what the sections were targeting. The effect of this was twofold. On the one hand it left the participant's feeling unsure about how to respond. To alleviate this anxiety, the instructions to the sections emphasised that the intention was to elicit perceptions and beliefs and that there were no right or wrong answers to the questions. The doubt expressed by the participants also lent support to the assertion that the initial sections were obscure and did not require participants to deliberate on their beliefs about knowledge. In fact, when pilot participants were debriefed about the purpose of the research, two participants reported that:

> "I believe the multiple choice questions were appropriate in determining perceptions and beliefs about knowledge"

> "Yes I do [think the questions are appropriate for the research aim], in hind sight I can see the relevance of all the questions, but as I was doing it I had no idea about the focus"

It is also noteworthy that the initial first section, being the open-ended section, underwent several revisions. The first strategy involved using a task previously employed by Schommer (1990) and Kardash and Scholes (1996), where participants were asked to write a concluding paragraph in relation to two passages arguing different positions for a topic. The wording used for this task was borrowed from the previous studies. The results of this task indicated that participants tended not to draw conclusions in their paragraph but rather to list points noted in the passages provided.

The task was revised to ask participants to write an introduction to their field of study. Results from the pilot study of this questions yielded similar results, namely that participants wrote 'matter of fact' introductions. The researcher concluded that it was not clear from the question that participants were being asked to reflect on or be critical about the topic, and the task was consequently revised. This led to the final version of the question which asked participants to write a critique on their field of study. Although this question may have asked participants expressly to be critical, it did not ask participants directly to reflect on their assumptions about

knowledge. Instead, participants were asked to engage in a cognitive activity that was likely to draw on their epistemological assumptions. In this way the question can be characterised as indirect. Finally, the pilot study also suggested re-ordering of some items that were similar, and confirmed that completion of all the sections took approximately 45 minutes.

4.4 Procedure

A proposal for the research was submitted to the Department of Psychology at the University of the Witwatersrand for ethical approval which was granted (ethical protocol number MPSYC 08/001 IH). With permission from the relevant university personnel, the participants were approached during a class at the university. The research was explained verbally in addition to being presented in an information letter, and the students were invited to participate on a voluntary basis (refer to Appendix C and D for the information letter and consent form). The study was described as focusing on students' beliefs and perceptions about 'a number of topics' and students were not told that the research intended to tap into beliefs about knowledge. Such deception was felt necessary in order to maintain the level of indirectness of sections one and two of the measure. In accordance with the Code of Ethics set out by the American Psychological Association (2002), full debriefing about the purpose of the research was done after the data collection and participants were invited to contact the researcher should they have had any questions or concerns about the research (refer to Appendix E for the debriefing letter).

In order to ensure that students were not aware of the focus on epistemological beliefs when completing the indirect sections of the measure, the researcher monitored the participants as they completed the tasks to ensure they completed the sections in sequence and did not 'look ahead' to the later sections of the measure. All students attending the class participated in the study and completed the measure during the class.

4.5 Analysis

The central issue underlying all research questions was whether variations in the questions posed to elicit epistemological assumptions influences the kinds of conclusions drawn about an individual's assumptions. In order to answer to such research questions, the conclusions drawn about epistemological assumptions based on the different conditions of the independent variables needed to be drawn and then compared to determine if there were differences and if so what kind of differences.

The primary analysis involved two kinds of comparative analysis. Firstly, comparisons were drawn between the ratings or classifications of levels of sophistication demonstrated by the sample under different conditions. Secondly, the ratings were then compared to the description of personal epistemology arrived at purely through qualitative analysis of the textual data. Both kinds of comparisons yielded insight into the influence of the directness, domain and open versus closed-ended format of the questions. The latter comparison, however, focused more on the role of the open or closed-ended format of the question, and in order to provide a fuller account of this, reflections on the actual process of the open and closed-ended methodologies were included.

Preliminary analysis of the data was first necessary in order to arrive at conclusions or descriptions of the sample's epistemological assumptions that could be compared. Such preliminary analysis included analysing the qualitative data via thematic content analysis, and arriving at frequency distributions of the ratings of sophistication based on varying conditions of the independent variables. Although the results of the thematic content analysis are highly relevant to the current research, the thematic content analysis is referred to as 'preliminary analysis' purely because it needed to be conducted prior to, because it was necessary in order to continue with, the comparative analysis that determined whether conclusions based on different conditions of questioning were different.

In short, the analysis involved comparing the frequency distributions (which first required analysis of the qualitative data and determining the frequency distribution for the ratings of sophistication under each condition), and comparing the kind of information yielded by the ratings versus the qualitative data from the open-ended question (which first required analysis of the qualitative data and also included reflecting on the processes of the open and closed-ended methodologies). Each form of analysis is described in detail in the remainder of the chapter.

4.5.1 Preliminary Analysis: Thematic Content Analysis of Responses to the Open-ended Question

Thematic content analysis, using a 'bottom-up' approach involving several steps, was conducted to analyse the textual data obtained from participants' responses to the open-ended question (Flick, 1998). The process of analysis began with the transcription and first readings of the text as the researcher familiarised herself with the material. In the first formal step of the analysis, the researcher reviewed each text to describe each instance of how knowledge was portrayed. An instance of how knowledge was portrayed was any piece of text, varying in length from one word to several sentences, wherein the latent content suggested something about the nature of knowledge and knowing. For example, the following phrases were considered portrayals of knowledge (refer to Appendix F for raw data and illustrations of the coding):

"psychology is a constantly expanding and changing field" – Participant 1

"the field remains fiercely divided" - Participant 2

"a critical debate in this study concerns the definition or standard of what bullying entails or involves" – Participant 3

In the second step of the analysis, the researcher developed themes that best explained the initial descriptions of the way knowledge was portrayed whilst allowing for a reduction in the data. Each theme was defined to clarify the specific meaning and scope of the theme. For example, given the actual text "Psychology is a constantly expanding and changing field", the initial description noted was "knowledge is not fixed or static". The theme identified in the second step of the

analysis was “knowledge is relative to time”, for which the definition was “Knowledge is not fixed and static but may change over time. Such relativity need not imply progress or advancement but may simply reflect difference across time”.

A third step of analysis involved coding of all the texts according to the themes developed. Thus, each response was reviewed and where an instance of a code was identified, it was documented. For example, on reviewing the phrase “the field remains fiercely divided” the code referring to the identification of multiple opinions or positions was noted. In cases where portrayals of knowledge, either explicit or implicit, were inconsistent with sophisticated views, this was analysed as showing some evidence for naivety. Thus, the lack of interrogation or problematisation was interpreted as an expression of naivety. The process of coding the qualitative data was iterative and lead to the refinement and extension of the set of themes.

The coding of the text also entailed the writing of profiles of each participant. Including this level of detail during the coding assisted in ensuring the specificity and applicability of themes, and also ensured that ‘thick descriptions’ of an individual’s personal epistemology were captured. The profiles included an outline of how the individual portrayed knowledge, culminating in a statement about what the most prominent features of their profile were.

The fourth activity in the analysis involved arriving at a description of the individual’s personal epistemology based on the theorised dimensions of epistemological assumptions, namely certainty, complexity and source of knowledge. The direction and strength of the individuals’ personal beliefs were noted, as well as if such beliefs could not be inferred or discerned from the text. Strength was expressed as highly sophisticated, mildly or slightly sophisticated, mildly naive, and highly naive. This classification allowed for comparisons with the ratings based on the closed-ended questions. A null value was recorded when inferences about the participant’s epistemological assumption could not be made because the text did not include portrayals of knowledge reflecting a given dimension. Thus, if there was no evidence in the text to suggest anything about a

participant's beliefs about complexity of knowledge, for example, the rating scored was 'null'.

Finally, a fifth step of the analyses involved reviewing all coding and profiling of the texts to ensure that the themes were appropriately and consistently applied to all texts. Thus, each response and the assigned themes and ratings were reviewed for any errors or inconsistencies. Throughout the various steps entailed in the thematic content analysis, the order in which each response was analysed was randomly changed. This was done to avoid possible order effects where, for example, the researcher's expectations were influenced due to familiarity with responses that followed a given response (according to prior order).

The central advantage of the bottom-up approach that was followed in the analysis of the qualitative data, is that it allows for the emergence of data that may not be adequately be captured by existing theory. Given that the dimensions of personal epistemology are still disputed, and that the study was conducted on a South African population for the first time and the question of cross-cultural applicability remains unanswered, allowing for this possibility was considered crucial. Thus, developing the codes based on the data collected allowed for the possibility that different dimensions applicable to the sample, or different articulations of the dimensions, could be brought to light.

4.5.2 Preliminary Analysis: Determination of Frequency Distributions

In addition to rating the level of sophistication demonstrated by the sample in response to the open-ended question, ratings based on all the remaining closed-ended conditions were derived. This entailed identifying the frequency of ratings across those items relevant to the various conditions and dimensions of personal epistemology. To explain further, each dimension was considered separately given the multidimensional nature of personal epistemology. Within each dimension of personal epistemology, and as detailed in Section 4.3 on Materials, the directness and domain of the question were manipulated across different items of the measure. Some items were indirect and others 'more direct', and some of these

indirect items pertained to Psychology and others to History and so forth. Ratings of sophistication based on groups or conglomerations of items that reflected a particular set of variations in the domain and directness of the question were grouped together. These ‘particular sets’ comprised the various conditions upon which the frequency of ratings was compared. These are itemised Table 2 below. The column headings of the table indicate variations in directness and the row headings variation in domain of the question.

Table 2: Items constituting the conditions reflected in the measure

		Directness and open versus closed-ended			
		Open-ended Indirect	**Closed-ended Indirect**	**Closed-ended More Direct**	**Closed-ended Direct**
Domain	**Psychology**	**Open-ended Indirect Psychology.** Section one (1 item)	**Closed-ended Indirect Psychology.** For each dimension, 2 items from section two of the measure. Example "The reason for why people join gangs varies from one place to another" *	**Closed-ended More Direct Psychology.** For each dimension, 2 items from section three of the measure Example "Do you think that the majority of what is understood about why people behave the way they do is:" **	**Closed-ended Direct.** For each dimension, 2 items from section four of the measure Example "How much of what we understand of the world is known in absolute and unqualified terms:" ***
	Biology		**Closed-ended Indirect Biology**. For each dimension, 2 items from section two of the measure Example "In the human body, hormones interact with each other in definite and predictable ways" *	**Closed-ended More Direct Biology**. For each dimension, 2 items from section three of the measure Example "Do you think that the majority of what is understood about how the human body functions is:" **	
	History		**Closed-ended Indirect History.** For each dimension, 2 items from section two of the measure Example "What happened in the past in South Africa is something one cannot be certain about." *	**Closed-ended More Direct History.** For each dimension, 2 items from section three of the measure Example "Do you think the majority of what is understood in the field of history is:" **	
			** The options according to which respondents answered closed-ended indirect questions were: I agree; I agree for the most part; I disagree for the most part; I disagree*	*** The options according to which respondents answered closed-ended, more direct questions varied according to dimension. For certainty, as an example, the options included: Uncertain; More uncertain than certain; More certain than uncertain; Uncertain*	**** The options according to which respondents answered closed-ended, direct questions included: Almost everything; Most of what we know; Some of what we know; Almost nothing*

Frequency distributions of the ratings of sophistication were derived for the various conditions. The frequency distributions represented ‘conclusions drawn about the sample’s epistemological assumptions’ as they described the frequency with which the sample demonstrated the four levels of sophistication (namely high sophistication, mild sophistication, mild naivety and high naivety). Hence, in the primary analysis, as will be discussed shortly, differences noted in frequency distributions indicated differences in conclusions drawn about the sample’s epistemological assumptions.

Prior to conducting the primary comparative analysis, Cronbach’s Alpha was also calculated to investigate the internal consistency of the measure. Cronbach’s Alpha is typically used to assess the reliability of a scale and satisfactory coefficients suggest that the items of a scale measure the same or similar construct. This in turn supports the validity of a scale. In addition to calculating Cronbach’s Alpha for the current measure, the Cronbach’s Alpha ‘if item deleted’ was also examined to determine if there were any items that were detracting considerably from the reliability of the measure (Pallant, 2001). The appropriateness and relevance of the items in a scale is supported if no items are detracting from the scale’s reliability.

It is important to note that only 2 items make up each of the more specific conditions. For example, only 2 items pertained to the dimension of Certainty that were also closed-ended, indirect, and pertinent to Biology. Calculating Cronbach’s Alpha is inappropriate in such a case simply because it does not make sense to talk about consistency of responses to two items as there is not enough variability. Cronbach’s Alpha was however calculated on the measure as a whole and disaggregated by dimension, as this provides evidence for the degree to which, overall, the items tapped into the same construct.

4.5.3 Analysis: Comparisons of Ratings of Sophistication

Comparisons between the frequency distribution of ratings of sophistication formed the primary analysis. Line graphs were used to analyse and interpret the data as

they facilitated the detection of differences in the pattern and concentration of frequencies across the conditions.

The primary focus of each review of the distributions was to determine which rating of sophistication showed the greatest frequency. The condition was said to show a preference for, or favour, the rating which showed the greatest frequency, and it was noted if this was a marked preference (for example where more than 50% of the sample received a particular rating). Attention was also paid to the pattern of distribution, that is, the form or path of the line representing the distribution, in order to investigate whether conditions lead to the same kind of spread of ratings even though actual concentration of frequencies may not have been the same.

As already mention, given the multidimensional nature of personal epistemology, each dimension was analysed separately. The analysis began with a review of how the directness of the question influenced the distribution within each domain. For example, beliefs about how certain knowledge is in *Psychology* were considered to determine the influence of directness, which was followed by a review of such influence regarding knowledge in *Biology*. Attention was also directed to reviews of the effect of domain within each level of directness. For example, within the Indirect condition, consideration was paid to whether the domain of the question resulted in different distributions. This process facilitated the detection of any stable effects of each variable over the influence of other variables. As a hypothetical example, it could be determined whether the indirect questions had stable effects that were replicated across all three domains.

It is noted that the Chi square statistical test, which is typically used to test for statistically significant differences in frequency counts, was not performed as the assumption for mutually independent categories, or independent observations, was not met (Hinton, 2004). That is, as all participants were scored under each condition and accordingly contributed to the frequency distribution of each condition, which contravenes the assumption of the test that each participant contributes only to one observation (Howell, 1995).

4.5.4 Analysis: Comparison between Ratings and Qualitative Descriptions

The kind of description of the sample's personal epistemology yielded from the thematic content analysis was also then compared to the kind of description yielded from rating process. This entailed identifying and then comparing the nature, scope and detail of the data yielded by the different measures. These findings responded to the research question about the influence of questions being open or closed ended.

Given that the current study sought to explore the role of methodology in the study of personal epistemology, observations about the process of enquiry as much as the products of enquiry are relevant. In addition to consideration of the difference in conclusions drawn about the sample's epistemological beliefs, analysis therefore also included reflecting on the process of measuring epistemology based on qualitative and open-ended questioning on the one hand, and quantitative and closed-ended questions on the other. Specific attention was paid to processes or procedures that impacted on, or had the potential to impact on, the validity of the findings.

5. Chapter Five: Results

The results are presented in the order of the kind of analysis used given that different types of analysis were employed to suite the varying types of data obtained. The first results presented are the results of the thematic content analysis. This is followed by the results regarding the reliability for the closed-ended sections of the measure. Thereafter, results of the primary analysis of comparisons between the ratings of sophistications across all conditions are reported. The results of comparisons between the kinds of description arrived at through thematic content analysis versus the rating of sophistication follows, and leads into reflections on the process of measurement. Concluding the results section is a summary and integration of all the findings in relation to the three research questions.

5.1 Results for the Thematic Content Analysis of the Responses to the Open-ended Question

The format of the response by the majority of the sample to the open-ended question asking them to critique their field, was to introduce the field of Psychology, usually as a multi-theoretical field, and then to raise concerns that they themselves have about the state of the field in terms of its utility, applicability and methodologies, to name a few. Underpinning the responses were several concepts that explained the ways in which knowledge was perceived and portrayed and these constituted the emergent themes. That is, several recurring perspectives on knowledge were identified that captured the different ways in which the participants critiqued the field of Psychology, and these perspectives constituted the recurring themes. Appendix F contains all data and analysis for section one of the measure.

A theme that emerged strongly was that of *Multiple Positions Identified*. This was the most commonly identified theme and referred to the belief of participants in the sample that there exists more than one theory, explanation or understanding about a given phenomenon. Some examples of phrases reflecting this theme include:

"There are several schools of thought, that have different stances – humanistic, behavioural, biological and so on" – Participant 33

"One is faced with many theories" – Participant 1

After making the observation or recognition of multiple positions, some participants went further to embrace the multiplicity. The difference and variety of positions is accepted 'as is' without any drive towards evaluating one position against another. There is no right or wrong, better or worse, but simply many. This theme was entitled *Multiplicity Accepted* and differed from *Multiple Positions Identified* in that the former is confined to an observation of there being many positions, whereas the latter is the belief that the many positions are all equally valid and worthy. The following extracts reflect *Multiplicity Accepted*:

"But as psychology is a study of humans, each individual, personal ideas and theories are valid" – Participant 25

"All these approaches are just different ways of trying to understand and interpret the human condition, and there is no one approach that is better" – Participant 23

"there are many ways of approaching various subjects. This means that there are no necessarily right or wrong answers" – Participant 30

Instead of embracing multiplicity when faced with the co-existence of multiple positions, the responses of some participants showed evidence of evaluation of different positions. The theme of *Differential Valuing* was identified and referred to instances where participants suggested that the worth, value or validity of positions are not all equal, and that some positions may be more valid or valuable than others. Instances of this theme are evidenced in the quotes below.

"There is much debate about which technique / approach is best suited to understanding an individual's behaviour" – Participant 15

""the very reductionist approach to understanding and treating of what it is to be mentally ill is not convincing enough" – Participant 31

In the first quote, participant 15 showed an awareness of the appraisal of different positions in terms of explanatory power. In the second quote, participant 31 actively argued against the merit of a particular position, namely a reductionist approach. What is evident in both quotes is a sensitivity to the possibility that different positions may be better or worse than one another, and hence can be valued differently.

Another response to the observation of multiple positions identified, was that of *Opportunity for Unity*. This theme referred to the view that it is possible and preferable to resolve, in various ways, the multiple positions. Such resolution was at times suggested through integration, combination, or accepting that the different positions complement each other. For example, in the quotes below, participant 1 suggested integration of different positions, and participant 18 suggested at least a combination of positions. Whatever the form through which the multiple positions are linked or related, the theme refers to participants' suggestion that something can (and should) be done to deal with the existence of multiple positions.

"it is interesting to find how many [theories] borrow key concepts from one another and seem to integrate" – Participant 1

"However, in recent years psychology has evolved and taken into account African and Western perspectives of healing" – Participant 18

The theme of *Justification* also emerged in the study. This theme reflected cases where participants referred to the notion of justification, such that the value, worth or truth of something is assessed against some criteria. The criteria themselves are not specified in this theme because many participants did not themselves specify

criteria and because some participants indicated different criteria. The central point here is thus that participants recognised the role of processes of justification in substantiating and evaluating ideas. Examples of this theme include the following.

"Psychology is a field of both science and critical thinking. It is highly research-based, using studies in order to investigate and to prove phenomena" – Participant 9

"The research is supposed to inform the applied techniques" – Participant 15

The notion of *Objective Truth* was also identified as a theme. The belief captured in this theme is that knowledge is constituted by objective truth. That is, an independent, objective truth or fact exists, and to know something means to grasp or understand this truth or fact. Knowledge is discovered rather than created, and reflects the way reality 'actually is'. Participant 35 showed acceptance of objective truth in the statement that "a thorough understanding of what it actually is in therapy that helps needs to be explored further" while participant 29 demonstrated a rejection of objective truth in the statement that "Instead of trying to prove as 'fact' I believe it [psychology] should focus more on understanding of individuals".

Perhaps in opposition to objective truth from a philosophical point of view, is the theme of *Relativity*. This theme captures beliefs that knowledge is relative, either to time or context (including culture). Thus, what is claimed as knowledge in one context or at one time, may not constitute true knowledge in another context. Many participants made reference to cultural relativity of psychological knowledge, as exemplified in the following statements:

"the Western world view which it [psychology] adopts provides practitioners in other contexts a challenge with regard to its relevance" - Participant 12

"In a country such as South Africa, where citizens are faced with numerous problems in living and culture is important, traditional psychology that reflects strong Western ideologies cannot be successfully applied to everyone" - Participant 13

Participant 4 below showed a rejection of relativity to time in their argument that classifications in Psychology need to be 'kept constant'. They demonstrated an intolerance for knowledge changing over time.

"I think people need to spend time on the DSM, evaluating what is or is not relevant as a disorder. It needs to be kept consistent" - Participant 4

The role of authority also appeared relevant to understanding the sample's portrayal of knowledge. In this study, authoritative sources included such sources as researchers, textbooks, lecturers, parents or any other source that presents information or ideas as given knowledge. The theme that emerged during the analysis of the data was *Questionable Authority*. Participants expressed, in varying degrees, the extent to which they adopted, without question, knowledge communicated from authoritative source. The theme of *Questionable Authority* was assigned when it was evident that participants believed that the knowledge from authority can be doubted, questioned or interrogated. Although such knowledge is not then necessarily disregarded, the possibility of it being inaccurate or incomplete is acknowledged. Instances of *Questionable Authority* include:

"Many argue that it is a 'science', however many scientists believe that by this inclusion, the criteria for a science are made too broad" - Participant 16

"A critical look at the classification system [DSM] needs to be undertaken regarding this issue" - Participant 17

Participant 16 acknowledged that there are differences of opinion amongst authoritative sources, which suggests an awareness that they are fallible.

Participant 17 actively argued that an authoritative source of information, namely the classification system of mental disorders published by the American Psychiatric Association, needs to be examined critically and not blindly accepted.

A final theme to consider was that entitled *Related to Social Practice*. Here, a utilitarian view of knowledge was adopted and participants linked the creation and/or acceptance of knowledge to social practices, needs or ideologies. For example, social norms may favour particular positions, or knowledge of fields or subfields is created or advanced on the basis of societal needs. The implication is that knowledge is either socially constructed or at least interpreted according to social practices and norms. Instances of this theme include the following:

> "The growing number of infections [of HIV] is reason enough for psychology to move into this area" – Participant 7

> "neuroscience currently offers a lot of the 'answers' to questions about the mind and brain perhaps because research in the area is flourishing and well-funded" – Participant 5

Overall, the epistemological assumptions of the sample can be described as follows. The vast majority of the sample observed that multiple perspectives about a phenomenon exist, and that these perspectives may contradict each other. For a large portion of the sample, the resolution of this state of affairs was to forgo any notion that there is one, single answer and accept, rather, that there are many truths. Acceptance of multiplicity was thus a defining feature of the sample as a whole. Related to this was a strong acceptance of cultural relativity where knowledge was seen to be relevant or true only for a given culture. However, there were also a number of participants who noted the need to evaluate the different perspectives in order to determine their relative worth. Only in very few instances was this actually carried through to the extent that a participant argued for one particular position. Similarly, motivations for justification or substantiation of knowledge were noted by several participants, although fewer proceeded to identify what the criteria for such justification may be. Those that did, referred to

empirical research and to a lesser degree, critical thinking. Notions of complexity were noted by some participants, where knowledge was seen to involve multiple factors. The sample also engaged with issues around the relation between knowledge and society with several participants suggesting that it is social need as well as social norms that informs what and how knowledge is created.

5.2 Results for the Reliability of the Closed-ended Sections of the Measure

Focusing on the closed-ended sections of the measure, the values for Cronbach's Alpha regarding the internal consistency of the measure are tabularised below in Table 3. When calculated on all items across all dimensions, the coefficient is .89. This finding strongly supports the internal consistency and accordingly the validity of the measure as it indicates that all items tapped into the same or similar construct. Moreover, the values calculated if each item in turn was deleted ranged from .88 to point .89 which provides strong evidence that there were no items detracting from the reliability of the measure. When calculated on items disaggregated by dimension, the values ranged from .752 to .890 which are all within the accepted range (Coolican, 2004).

Table 3: Cronbach's Alpha Reliability Coefficients

Dimension	Condition	Number of items	Cronbach's Alpha	Range of alpha values if each item is deleted	
				Min	Max
Across Dimensions	All items	42	0.890	0.883	0.893
Certainty	All items	14	0.752	0.725	0.753
Complexity	All items	14	0.787	0.742	0.782
Source	All items	14	0.890	0.883	0.893

5.3 Results for Comparisons of Ratings of Sophistication

As part of the primary analysis, comparison of the ratings of sophistication across all conditions (both open and closed-ended) was achieved by comparing the respective frequency distributions. As mentioned previously, each dimension was

considered separately and within each dimension, the approach was to review the effect of directness within each domain, and then to review the effect of domain within each level of directness. The results are presented via line graphs which are explained with reference to the conditions detailed in Table 2. A summation of the findings appears after the graphs for each dimension have been explained.

Before continuing with the results of the analysis of the frequency distributions, it is worth highlighting that ratings of high naivety did not, under any condition, comprise the greatest frequency. The average frequency for a rating of high naivety was 4% and the maximum 11%. There was one exception, namely for beliefs about the certainty of psychological knowledge, where the number of ratings for high naivety exceeded those for mild naivety under the open-ended condition, and special attention will be drawn to this finding in the relevant review. Apart from this exception, because the ratings for high naivety were constantly and consistently minimal, they are not reported on in each review.

5.3.1 Certainty

Figure 1 below graphs the frequency distribution of ratings of sophistication across those conditions relevant to the domain of Psychology. The Closed-ended, Direct condition, which is domain general, is included for comparison as well.

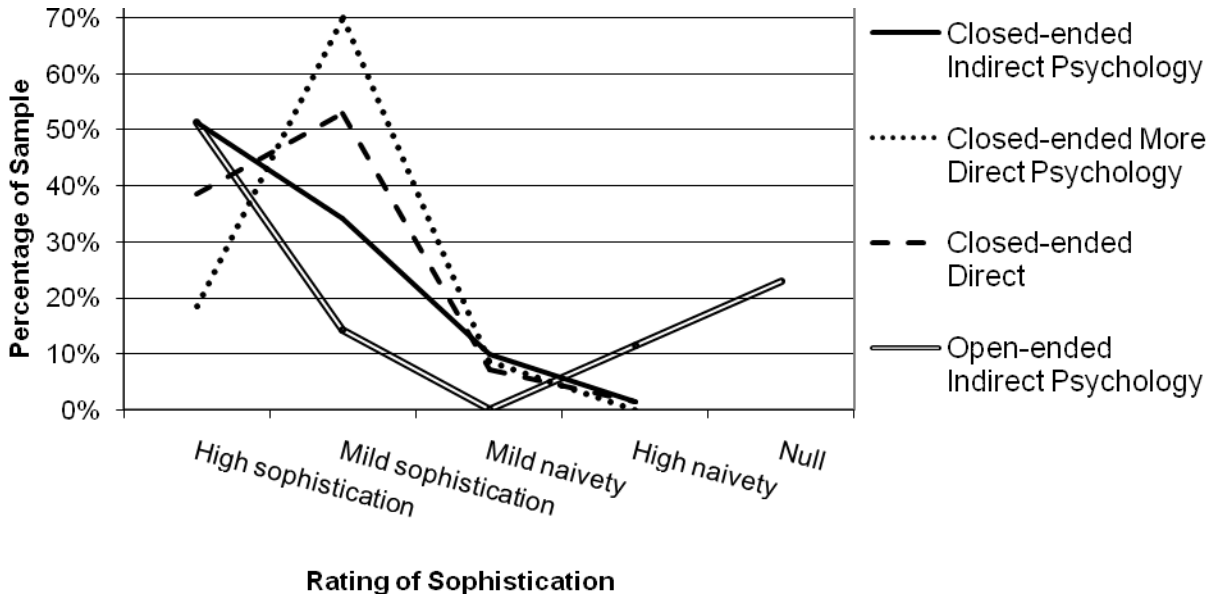


Figure 1: Ratings of sophistication within the domain of Psychology for beliefs about Certainty

Figure 1 indicates that ratings of sophistication for psychological knowledge differed depending on the directness of the question. The Closed-ended, Indirect Psychology condition showed a preference for high sophistication. This was a marked preference as 51% of the sample was rated as such. The Closed-ended, More Direct Psychology condition was different and showed a distinct preference for mild sophistication (70%). The Closed-ended, Direct condition also showed a preference for mild sophistication (53%). Finally, the Open-ended, Indirect Psychology condition favoured ratings of high sophistication (51%) although 23% of the sample received a 'null' score meaning that their beliefs about the certainty of knowledge could not be inferred from their critique of Psychology. The Open-ended, Indirect condition also gave rise to the highest percentage of high naivety expressed by the sample under any condition for any dimension.

The patterns of distribution were most similar between the Closed-ended, Direct and Closed-ended, More Direct condition. For both lines there is an incline from ratings of high to mild levels of sophistication, followed by a decline to ratings of mild naivety, followed again by a further decline to ratings of high naivety.

Within the domain of Biology, differences resulting from the level of directness were also observed. Figure 2 below reveals that the Closed-ended, Indirect condition showed a preference for sophistication but with little differentiation between high or mild levels. By contrast, the Closed-ended, More Direct condition showed a preference for both mild levels of both sophistication and naivety (44% and 49% respectively). As before, the Closed-ended, Direct condition, which was also domain-general, favoured ratings of mild sophistication with over 50% of the sample being rated as such. The patterns suggest a similarity in the spread of responses between the Closed-ended, Indirect and Closed-ended, Direct conditions while the Closed-ended, More Direct pattern is noticeably different.

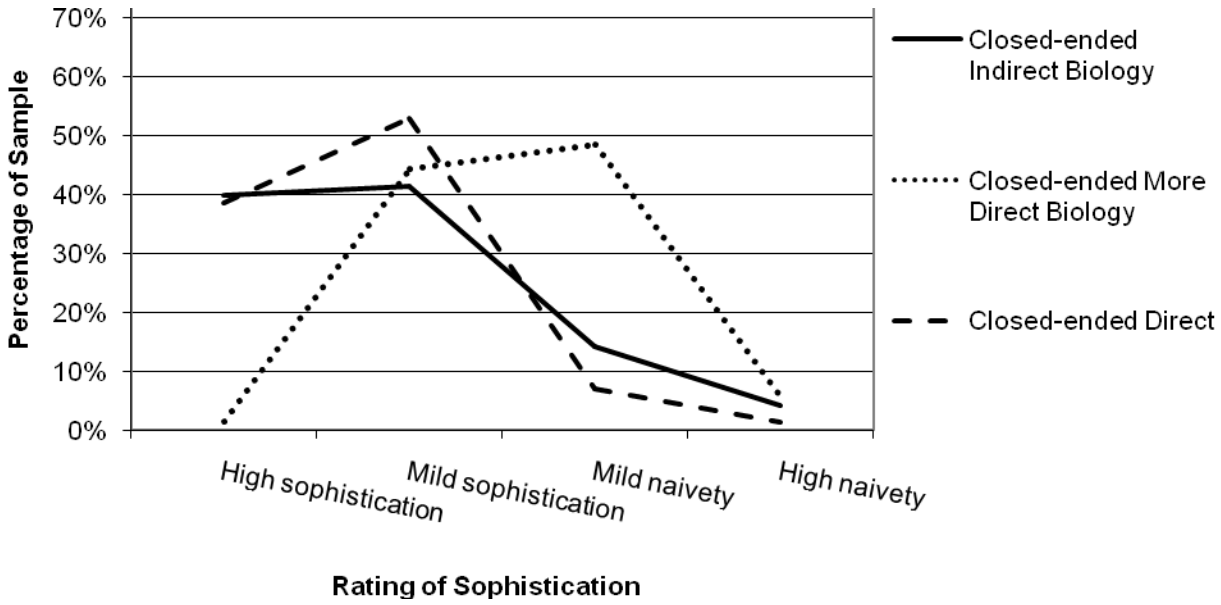


Figure 2: Ratings of sophistication within the domain of Biology for beliefs about Certainty

Continuing with the domain of History, Figure 3 depicts the different frequency distributions for the ratings of sophistication for items couched within the domain of History across different levels of directness of the question. The Closed-ended, Indirect condition favoured mild naivety with 44% of the sample being rated as such. Under the Closed-ended, More Direct condition, more than 50% of the sample demonstrated mild sophistication but followed closely by more than 40% of

the sample demonstrating mild naivety. Reiterating earlier findings, the Closed-ended, Direct condition favoured ratings of mild sophistication. A resemblance in pattern is not evident between any of the lines, suggesting that there were no common trends across the varying levels of directness.

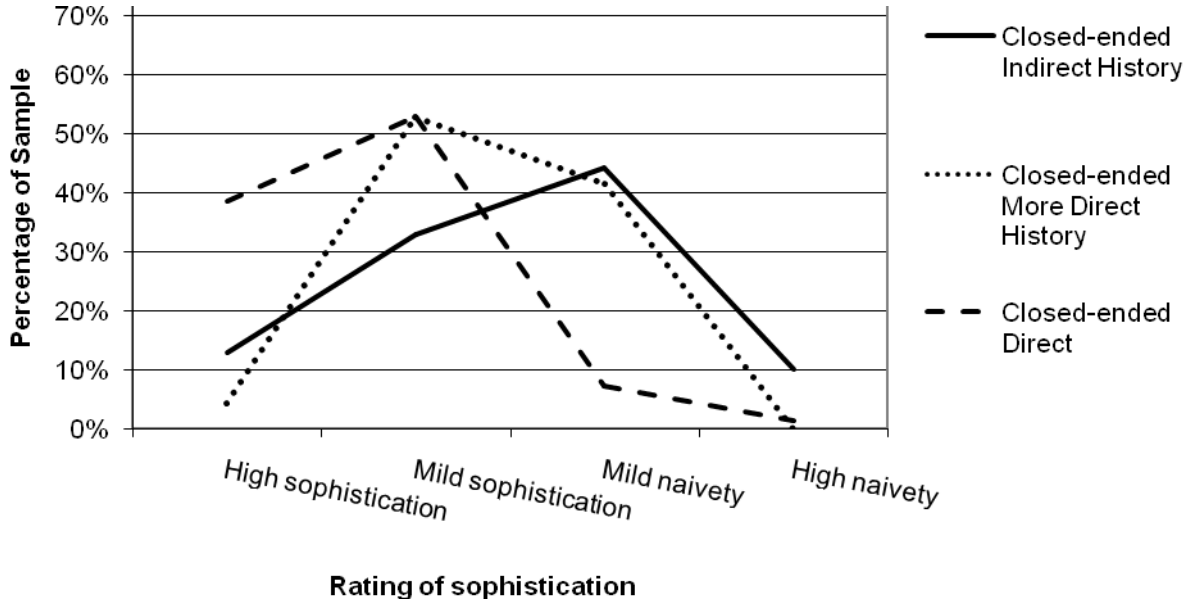


Figure 3: Ratings of sophistication within the domain of History for beliefs about Certainty

The patterns of distribution for each level of directness across domain were also analysed to determine if there were any trends common across domains but within each level of directness. Figure 4 and Figure 5 below graph the distributions for the Closed-ended, Indirect and Closed-ended, More Direct condition respectively (the Closed-ended, Direct condition was excluded as it was not domain-specific) and indicate that no domains gave rise to similar patterns in either level of directness as none of the lines followed a similar path. There is some evidence in Figure 5 to suggest that questions about History and Biology led to a similar spread of responses under the Closed-ended, More Direct condition in that they both favoured mild ratings over high ratings. However, the lines peak at different ratings, at mild sophistication for Closed-ended, More Direct History and mild naivety for Closed-ended, More Direct Biology, and cannot therefore be said to follow the same pattern.

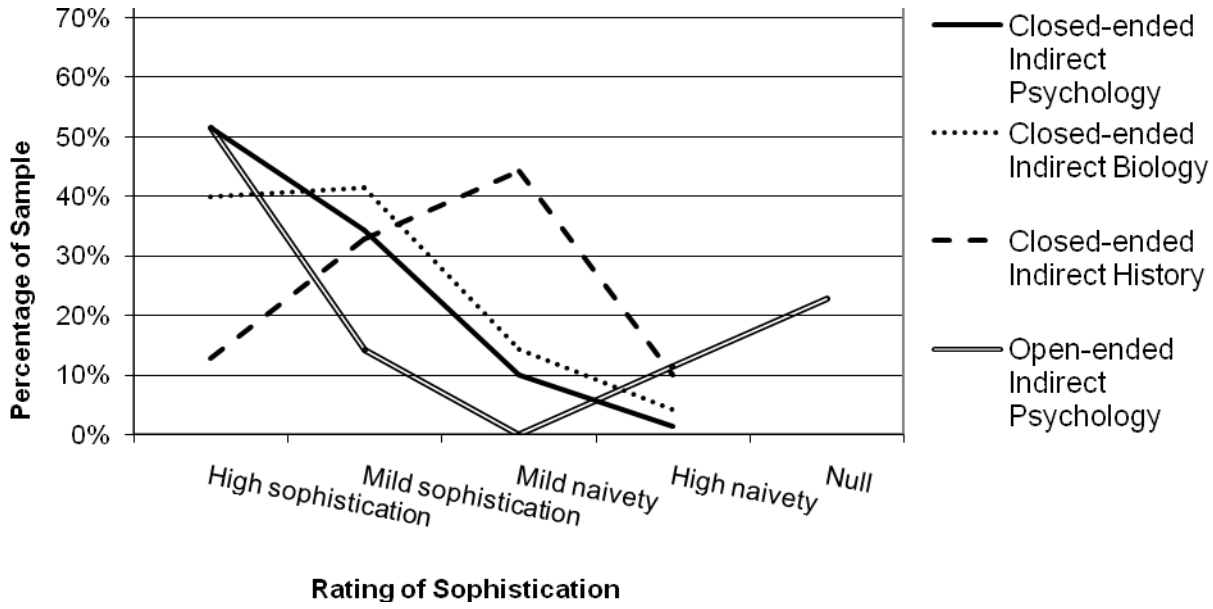


Figure 4: Ratings of sophistication for all indirect questions for beliefs about Certainty

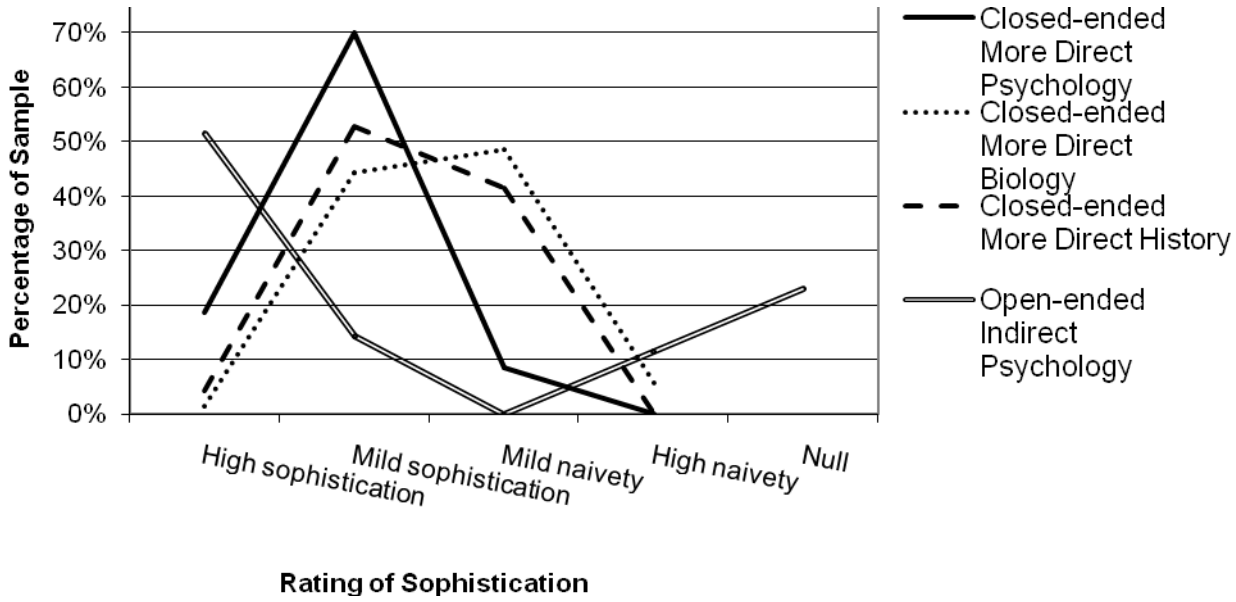


Figure 5: Ratings of sophistication for all 'more direct' questions for beliefs about Certainty

Table 4 below summarises the preferred ratings under each condition, and the key findings regarding the sample's beliefs about the certainty of knowledge can be summarised as follows. The level of directness of the question had some influence over the responses, given that the favoured rating within each domain was different depending on the specific level of directness of the question. Thus, the prominent rating of sophistication for the sample as a whole differed depending on whether participants were responding to questions about particular knowledge claims (Indirect condition), to questions targeting domains or disciplines of study (More Direct condition), and to questions targeting the concept of knowledge per se (Direct condition). This was true for questions about Psychology, History and Biology. The patterns of distribution suggested some alignment between questions about particular knowledge claims (Indirect condition) and the nature of knowledge for a whole discipline (More Direct condition), but this was only true for questions about Psychology and not Biology or History. Similarly, only for questions about Biology did a similar pattern of results emerge for questions framed in terms of particular knowledge claims (Indirect condition) and knowledge per se as a general construct (Direct condition). Accordingly, there was no evidence to suggest consistent or stable trends based on the level of directness of the question across all three domains despite that fact the directness was observed to always exert some influence.

That each domain, within each level of directness, also gave rise to different preferences indicates that the domain of the question also influenced what ratings were most likely to be demonstrated. For example, considering all closed-ended questions focusing on particular knowledge claims (Indirect condition), the most prominent ratings were different depending on what domain the question pertained to. Questions about History, for example, gave rise to more instances of mild naivety while questions about Psychology gave rise to more instances of high sophistication even though all questions were framed in terms of particular knowledge claims (Indirect condition). A more stable trend that did emerge is that the questions about Psychology tended, under all levels of directness, to result in higher levels of sophistication than Biology. Regarding specifically the patterns of

distribution for domain, there was no firm evidence suggesting similarity across domains.

Finally, in terms of differences based on whether the question was open or closed ended, both indirect conditions favoured the same rating of high sophistication and the patterns were similar. Although it must be born in mind that a significant portion of the sample received a 'null' rating based on the open-ended question, the results reveal that the same, high degree of sophistication was ascribed to the sample when participants were asked to critique the field of Psychology (Open-ended Indirect condition) and when confronted with particular knowledge claims within Psychology (Closed-ended Indirect condition).

Table 4: Preferential ratings for level of sophistication for beliefs about Certainty across all conditions.

		Directness and open versus closed-ended			
		Open-ended Indirect	**Closed-ended Indirect**	**Closed-ended More Direct**	**Closed-ended Direct**
Domain	**Psychology**	High sophistication *	High sophistication *	Mild sophistication *	Mild sophistication *
	Biology		Mild and high sophistication	Mild naivety and mild sophistication	
	History		Mild naivety	Mild sophistication *	

* More than 50% of the sample received this rating

5.3.2 Complexity

The frequency distributions regarding levels of sophistication for the sample's beliefs about how complex knowledge is were analysed in the same way as the distributions representing their beliefs about the certainty of knowledge. The figures overleaf graph the distributions for each domain across the different levels of directness.

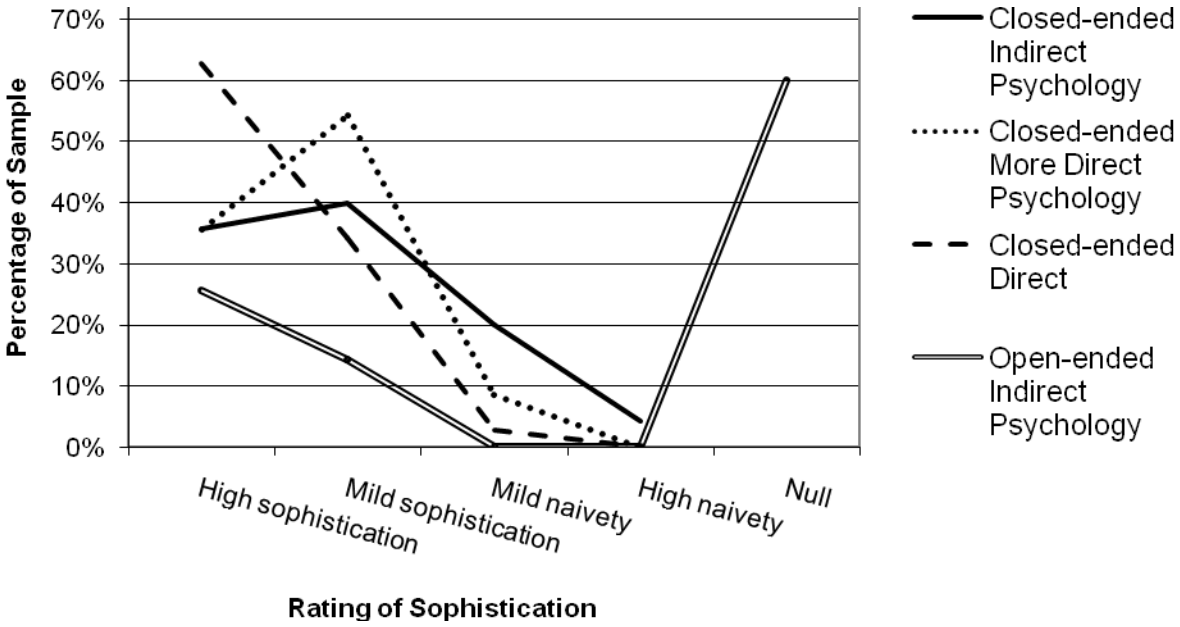


Figure 6: Ratings of sophistication within the domain of Psychology for beliefs about Complexity

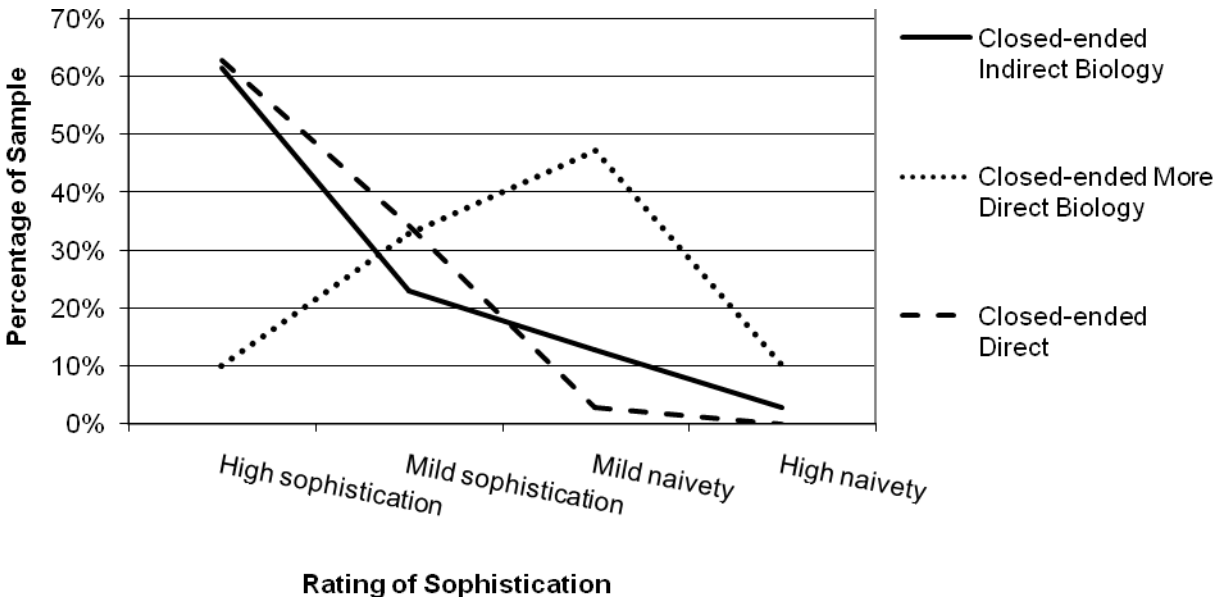


Figure 7: Ratings of sophistication within the domain of Biology for beliefs about Complexity

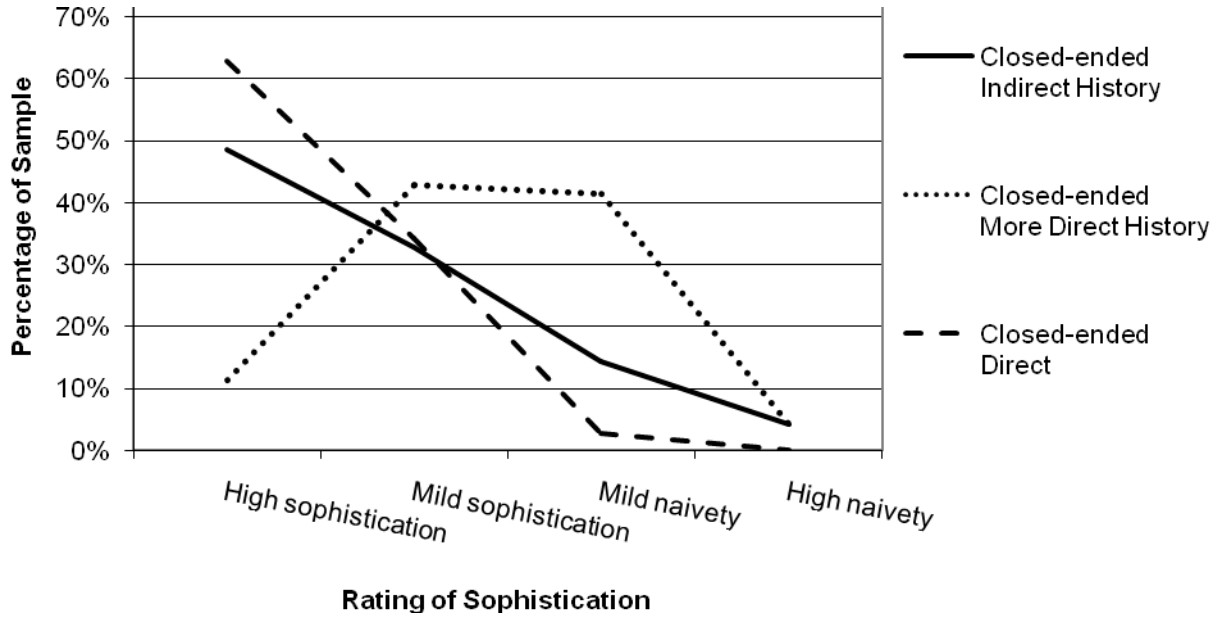


Figure 8: Ratings of sophistication within the domain of History for beliefs about Complexity

As was the case with beliefs about Certainty, variability based on the directness of the question within each dimension is evident in beliefs about Complexity. Within

Psychology, Figure 6 indicates that under the Closed-ended, Indirect condition, participants tended to be rated as mildly sophisticated (40%) or highly sophisticated (38%). Under the Closed-ended, More Direct condition, there was a marked preference for mild sophistication as 54% of the sample demonstrated this level of sophistication. The Closed-ended, Direct condition showed a distinct preference for high sophistication with 63% of the sample being rated as such. Finally, under the Open-ended, Indirect condition, the greatest portion of the sample, 60%, were scored as 'null' meaning that their beliefs about Complexity could not be inferred. The patterns of the distribution were most similar between the Closed-ended, Indirect and Closed-ended, More Direct conditions, although they differed in terms of the actual values of the frequencies.

Figure 7 shows the frequency distribution within the domain of Biology, and it is clear that the Closed-ended, Indirect condition strongly favoured ratings of high sophistication with over 60% of the sample being rated as such. Quite differently, the Closed-ended, More Direct condition showed a preference for ratings of mild naivety (47% of the sample were rated as such). The Closed-ended, Direct condition showed a remarkably similar distribution to the Closed-ended, Indirect condition with 63% of the sample showing high levels of sophistication. The patterns supported the alignment between indirect and direct forms of questioning as the path of the line for these conditions was similar.

Within the domain of History, the frequency distributions were remarkably similar to that of Biology and, again, the Closed-ended, Indirect and Closed-ended, Direct conditions gave rise to similar patterns and greater frequencies of ratings of high levels of sophistication. Similarly, the Closed-ended, More Direct condition led to lower ratings of sophistication, although within History this was spread more evenly over mild sophistication and mild naivety.

Figure 9 and Figure 10 below show the distributions across the domain within each level of directness (again excluding the Closed-ended, Direct condition as it was domain-general). Within the Closed-ended, Indirect condition, similarity in pattern is evident between the Biology and History conditions as these both show

successively lower frequencies as less sophistication is demonstrate. The line for the Open-ended, Indirect Psychology condition may be said to follow the same pattern, but because the vast majority of the sample did not receive a rating under this condition, the pattern of the distribution was not analysed. There is some evidence to suggest a continued similarity between Biology and History under the Closed-ended, More Direct condition, although the lines peak at different values and hence cannot appropriately be considered to reflect the same pattern.

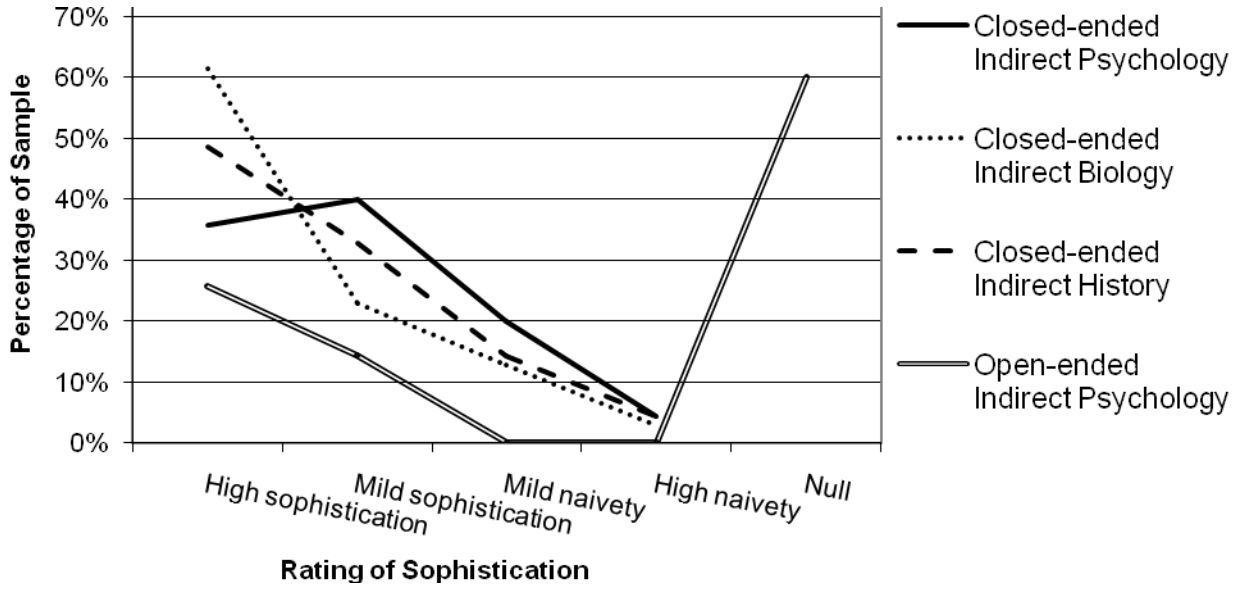


Figure 9: Ratings of sophistication for all indirect questions for beliefs about Complexity

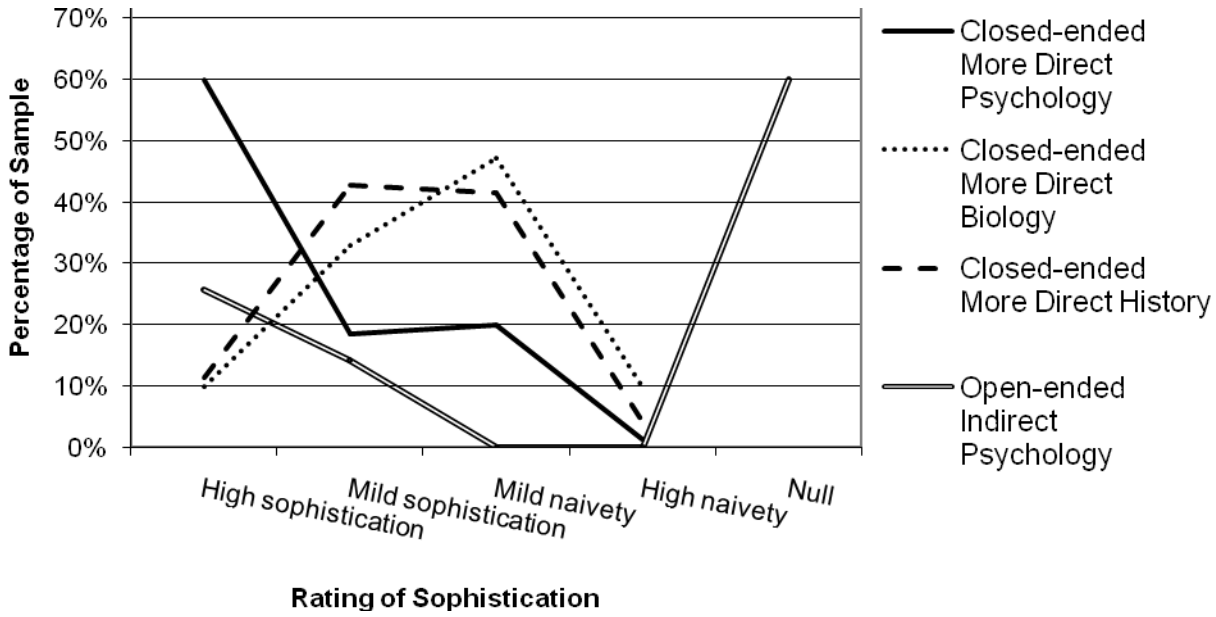


Figure 10: Ratings of sophistication for all 'more direct' questions for beliefs about Complexity

Table 5 summarises the preferences noted regarding beliefs about Complexity. The results indicate that directness influenced the ratings of sophistication as the most prominent rating differed depending on the level of directness of the question. For both Biology and History, participants were more likely to be rated as highly sophisticated when responding to particular knowledge claims within the respective domains (Indirect condition) as well as when responding to knowledge per se (Direct condition). This tendency was further supported by the similar pattern of distribution for Biology and History in addition to the same preferred rating. The sample was more likely to be rated comparatively lower when asked about the nature of the whole discipline or domain (More Direct condition). These findings were not replicated under Psychology, and under this condition responses to questions about instances of psychological knowledge claims (Indirect condition) were more similar to responses to questions about knowledge per se (Direct condition). Thus, although some stability of the effect of directness was suggested with reference to the domains of Biology and History, that it was not consistent across the domain of Psychology means that there was not sufficient evidence to indicate that directness had stable and enduring effects on ratings across domains.

Within each level of directness, evidence was also found to support the effect of domain as the preferred or favoured rating within each level of directness varied according to the domain of the question. For example, the favoured rating for Psychology was mild sophistication and for Biology it was mild naivety even though all the questions were framed about the nature of the body or domain of knowledge. The actual differences varied within and across directness and so there was no evidence to support the claims that the domain of the question exerted a stable influence. Comparison of the ratings of sophistication based on the open or closed-ended questions were not conducted given that the open-ended question resulted in the majority of the sample being rated as ‘null’.

Table 5: Preferential ratings for level of sophistication for beliefs about Complexity across all conditions.

		Directness and open versus closed-ended			
		Open-ended Indirect	**Closed-ended Indirect**	**Closed-ended More Direct**	**Closed-ended Direct**
Domain	**Psychology**	High sophistication	Mild and high sophistication	Mild sophistication *	High sophistication *
	Biology		High sophistication *	Mild naivety	
	History		High sophistication	Mild sophistication and mild naivety	

* More than 50% of the sample received this rating

5.3.3 Source

The graphs representing the frequency distribution for ratings of sophistication regarding beliefs about the source of knowledge appear as Figure 11, Figure 12 and Figure 13 below.

Figure 11 graphs the frequency distribution for items related to beliefs about the source of knowledge in the field of Psychology as well as direct and domain-general questions. The Closed-ended, Indirect condition results in a 'flat' distribution with a minimal preference for ratings of mild naivety. Under the Closed-ended, More Direct condition, the vast majority of the sample, over 60%, demonstrated high sophistication. The Closed-ended, Direct condition resulted in a different pattern where over 50% of the sample was rated as mildly sophisticated. The pattern of distribution for the Open-ended, Indirect condition was remarkably similar to the Closed-ended, More Direct condition.

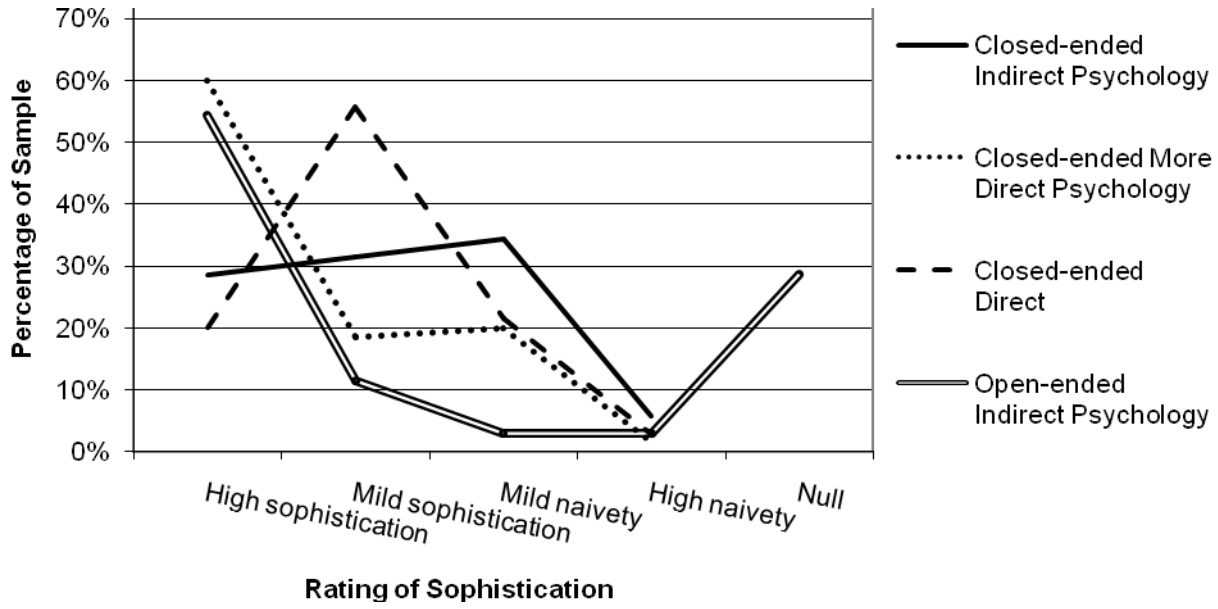


Figure 11: Ratings of sophistication within the domain of Psychology for beliefs about Source.

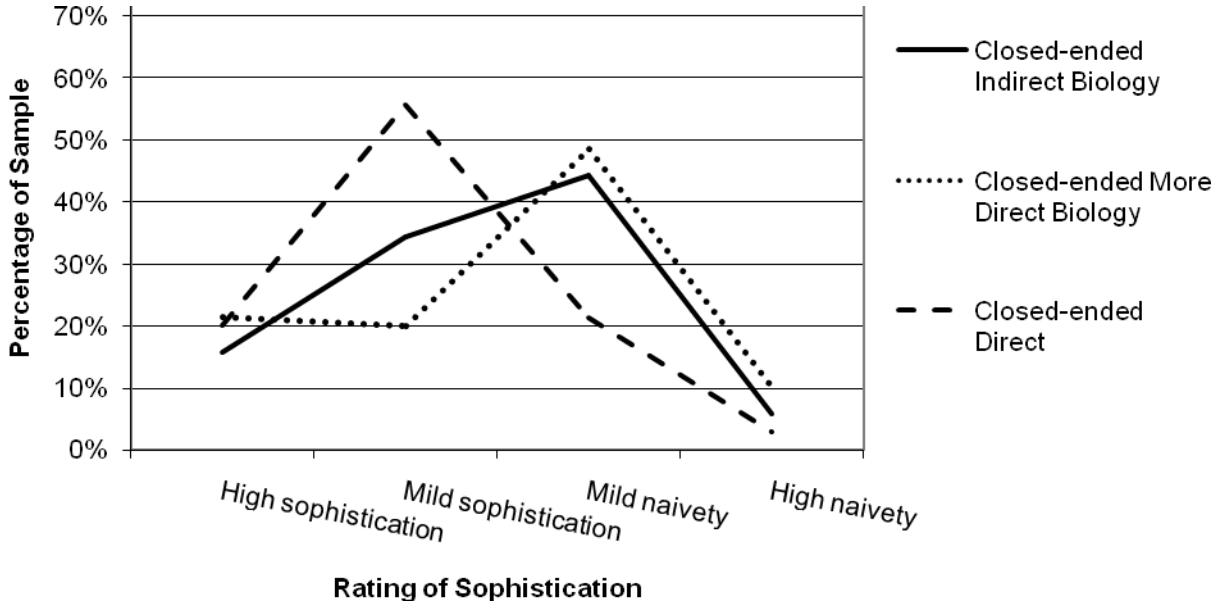


Figure 12: Ratings of sophistication within the domain of Biology for beliefs about Source.

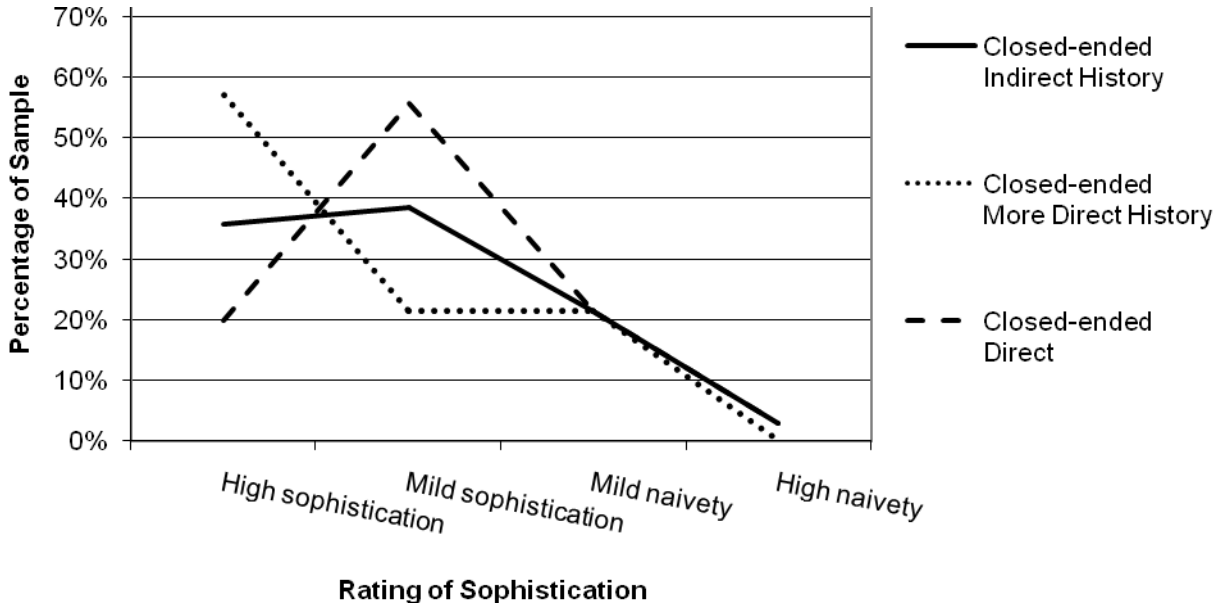


Figure 13: Ratings of sophistication within the domain of History for beliefs about Source.

When asked specifically about Biology, as illustrated in Figure 12, the Closed-ended, Indirect condition showed a mild preference for ratings of mild naivety, which was also observed under the Closed-ended, More Direct condition. The pattern of distribution for these conditions was also similar. By contrast, the Closed-ended, Direct condition showed a distinct preference for ratings of mild sophistication with 56% of the sample being rated as such.

Regarding the domain of History, Figure 13 reveals that the Closed-ended, Indirect condition showed a mild preference for ratings of mild sophistication which is closely followed by high sophistication. Under the Closed-ended, More Direct condition there was a definite preference for high sophistication with 57% of the sample demonstrating this level of sophistication. As already observed, the Closed-ended, Direct condition favoured mild levels of sophistication. None of the distributions showed a similar pattern.

Figure 14 and Figure 15 below graph the distributions based on level of directness. The only case where distributions were similar was between Psychology and History, and only when questions were framed about the body or domain of

knowledge (Closed-ended, More Direct condition). No other similarities in patterns were identified.

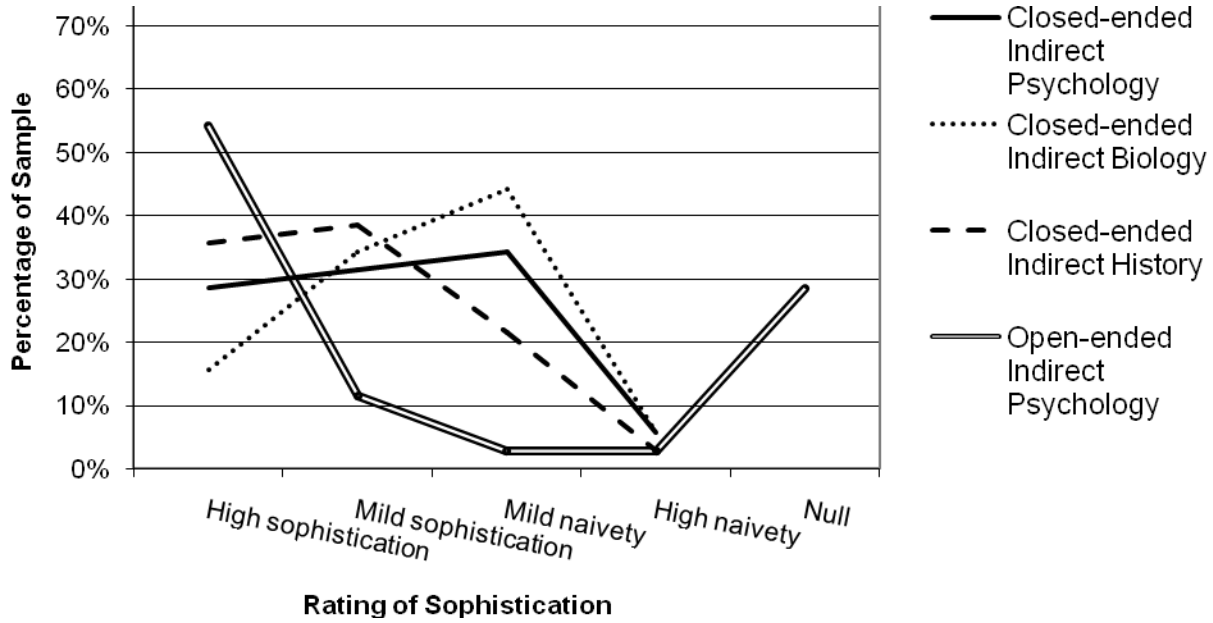


Figure 14: Ratings of sophistication for all indirect questions for beliefs about Source

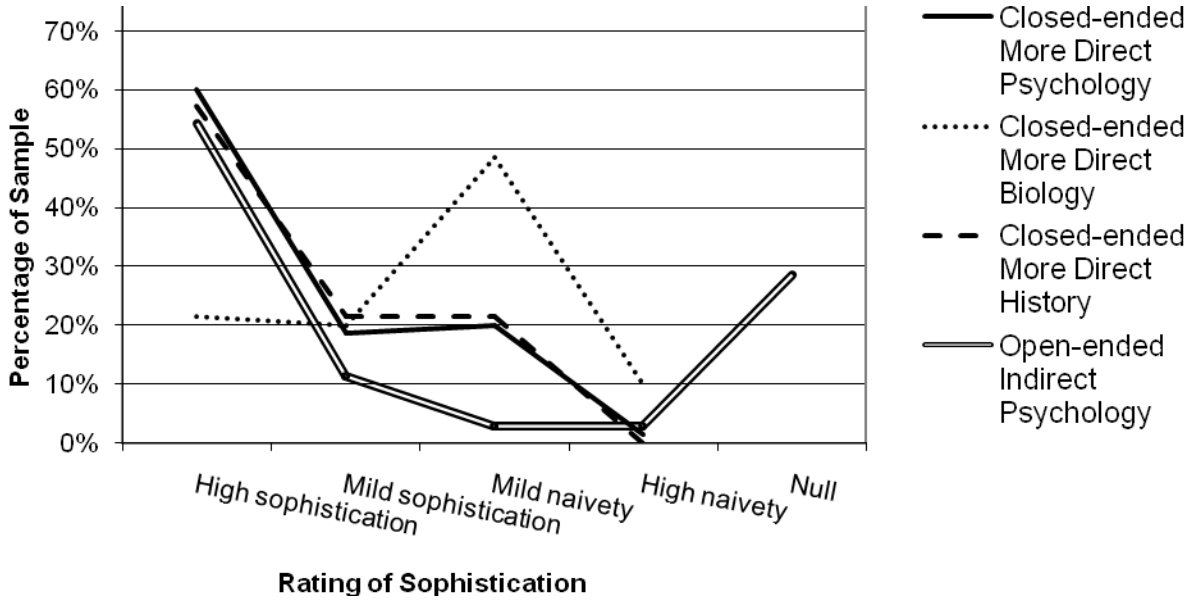


Figure 15: Ratings of sophistication for all 'more direct' questions for beliefs about Source

Table 6 tabularises the perferred ratings for each condition for beliefs about the source of knowledge. Once again, directness was seen to influence the ratings of sophistation as the preferred ratings, as well as the patterns of distribution, differed according to the directness of the question. The only instance where directness did not seem to have an effect pertained to questions about Biology, where both questions about particular knowledge claims for Biology (Indirect condition) as well as questions about the body of biological knoweldge (More Direct condition) resulted in the majority of the sample demonstrating mild naivety. However, for both the questions about Psychology and History, the most prominent rating differed according to the level of directness. Thus, evidence for a stable or constant effect of directness was not found.

The domain of the question was likewise found to influence the ratings as the favoured rating within a level of directness varied depending on the domain of the question. For example, when asked about particular knowledge claims (Indirect condition), questions about Psychology favoured ratings of mild naivety and mild sophistication, whereas questions about History favoured mild and high levels of sophistication. The only evidence supporting a stable effect of a domain was that the questions for Biology, regardless of whether they targeted particular knowledge claims (Indirect condition) or the discipline (More Direct condition), resulted in comparatively lower ratings of sophistication than Psychology or History.

Finally, the results indicated that the same degree of sophistication was concluded about the sample when participants were asked to critique the field of Psychology (Open-ended, Indirect condition) and when they were asked about the nature of Psychology as a discipline or body of knowledge (Closed-ended, More Direct condition). The patterns for these distributions were also similar. It is also noted that the Open-ended condition again resulted in high levels of sophistication.

Table 6: Preferential ratings for level of sophistication for beliefs about Source across all conditions.

		Directness and open versus closed-ended			
		Open-ended Indirect	**Closed-ended Indirect**	**Closed-ended More Direct**	**Closed-ended Direct**
Domain	**Psychology**	High sophistication *	Mild naivety and mild sophistication	High sophistication *	Mild sophistication *
	Biology		Mild naivety	Mild naivety	
	History		Mild and high sophistication	High sophistication *	

* More than 50% of the sample received this rating

5.4 Results of Comparison between Ratings and Qualitative Descriptions

In response to the research question about the effect of open versus closed-ended question formats, the primary analysis also entailed comparing the nature of conclusions between the ratings of sophistication (based largely on the closed-ended questions) and the content analysis of the qualitative data (based on the open-ended question). Two aspects were taken into account regarding this comparison. Firstly, attention was paid to the differences in the kind (nature and scope) of the description of the sample's personal epistemology. Secondly, reflection on the actual process of the methodology was considered as this too impacted on the way personal epistemology was operationalised and construed in the current study. For this purpose, the process of rating (based largely on the closed-ended questions but also including the rating of the textual data) was

considered as quantitative methodology because the data were ultimately transformed into classifications or gradings upon which frequencies were calculated. The process of arriving at qualitative descriptions of the sample's personal epistemology was considered as qualitative methodology.

5.4.1 Differences in the kind of descriptions of personal epistemology

That the kind of information yielded by quantitative methodology (typically numbers and classifications) as compared to qualitative methodology (typically descriptions and narratives) is different is a point that is commonly accepted and requires little argumentation. The intention in this section is to explain what difference emerged particular to this study with reference to the conceptualisation of personal epistemology.

Although the measure in the current study manipulated three independent variables to determine their effects, if the total rating across all variables is considered as a composite rating, the description of the sample's personal epistemology based on the rating of epistemological assumptions (quantitative methodology) would be as follows. The majority of the sample (42%) demonstrated mildly sophisticated beliefs about the certainty of knowledge, suggesting that while they did not believe entirely that knowledge is tentative and uncertain, they were inclined to believe that it is not certain and definite. Regarding beliefs about the complexity of knowledge, 36% demonstrated high levels of sophistication while 35% demonstrated mild levels of sophistication. This means that, overall, the sample was inclined to hold that knowledge is at least somewhat complicated. The overwhelming majority of the sample (77%) demonstrated highly sophisticated beliefs regarding the source of knowledge, meaning that most participants believed it necessary to evaluate evidence for oneself instead on relying on authority.

Based on the results of the thematic content analysis (qualitative analysis), the sample's epistemological assumptions were described as follows. A common trend was for the sample to recognise the absence of certainty due to the existence of multiple perspectives, which was often couched in terms of cultural relativity, and

then to explore ways of making sense of the multiplicity. For some this resulted in abandoning the pursuit of single, certain truths in favour of accepting multiple truths. For some, the possibility of unity was explored through integration or eclecticism. For others still, the relative merit of the different perspectives was considered. Other important themes that emerged were the role of justification, as well as the role of social need and practice, in knowledge creation.

Juxtaposing the conclusions based on the open-ended and qualitative, or closed-ended and quantitative methodologies, highlights the differences in the way personal epistemology was portrayed. The most obvious is that the qualitative data gave rise to detailed and in-depth accounts of the sample's beliefs. While the quantitative results provided little more than a rating, the meaning of which readers would have to find in the way the dimensions were operationalised in the items in the measure, the qualitative results explained with more precision exactly how participants portrayed the certainty of knowledge. In this case, certainty was rejected on the basis of both the recognition of the existence of multiple positions as well as cultural relativity. Moreover, the qualitative results provided some insight into the reasoning processes of the participants as it described that, when faced with multiple positions, the majority of the sample concluded that no single truth can be correct. Closely related to this, the qualitative profile also succeeded in highlighting what kinds of issues were most relevant to the sample. The current sample was seen to be grappling with issues surrounding multiplicity and how to make sense of the observation that many perspectives exist, and it was clearly evident in the analysis that this was a prominent characteristic of the epistemological orientations of the sample.

The counterpart to this is that the quantitative data successfully elicited an array of beliefs regarding knowledge, thereby addressing all theorised dimensions of personal epistemology. More specifically, the quantitative methodology resulted in ratings of sophistication for beliefs about the complexity of knowledge which did not surface in the qualitative results. While some participants did raise the concept of complexity in their critique of Psychology, it was not evident in the majority of the sample's responses. Thus, beliefs about complexity did not emerge spontaneously

and so were not adequately captured via the qualitative methodology, but were captured in the quantitative results. The quantitative methodology also succeeded in indicating how ratings fluctuated over different levels of domain-specificity and directness of the question, in part because the manipulation of conditions were more easily integrated into the design of the quantitative methodology.

5.4.2 Reflections of the process of enquiry based on quantitative methodology

Of most relevance to the current study when considering the process of enquiry, were reflections on the design and development of the measure. Although it depends largely on the design of a study, quantitative data tends not to be able to provide much insight into the relevance of the items for respondents because the resultant data is simply a number. In the case of the current study, for example, a rating of mild sophistication across a collection of items does not speak in any way to the participants' perception of the relevance or accessibility of the items. As this study concerned itself with such methodological issues, participants were asked to note any thoughts or comments they had in response either to the questions posed in the closed-ended sections and/or their actual responses. In total, 37 comments were made. The comments generally entailed elaborations of the participants' reasons for their answers, for example why "we cannot be sure if doctors really do understand biological processes", but the comments that were particularly relevant for the research were those that addressed the actual items in the measure.

Seven comments were made about the items in section two of the measure where participants responded to particular knowledge claims. Three of these pointed to participants feeling less comfortable or confident answering the items because they were not familiar with the content. For example participant 7 remarked that "these are questions we don't actually think about". A further three comments focused on the questions being too vague, or as participant 20 described "They could be more specific examples". In contrast, participant 27 felt that "the statements were very narrow when about broad topics". One participant suggested that the items reflected very extreme positions, and one other that they simply wanted to be able to have no opinion.

Fewer comments were made regarding section three of the measure where participants responded to questions about the disciplines or domains of Psychology, History and Biology. Three comments were made of which two indicated that the items were “confusing”, and one that argued that there are many different instances of knowledge within one field so it is difficult to make a generalised response. Finally for section four where participants responded to questions about knowledge as a generalised and abstract concept, only one comment was made, which read “mixture of all 4 if that was a possibility” suggesting that the participant was reluctant to characterise knowledge as a general construct.

That there was only one comment expressing difficulty in characterising knowledge as a general construct as was asked in section four of the measure was a surprising finding, as the expectation was that participants would struggle to make generalised judgements and hence that more participants would have raised such concerns. However, several participants indicated that items from section two were too vague to make a judgement which does reflect the expected reluctance to make a judgement when there are possibilities for qualification. While there is insufficient evidence to make any assertion about the full sample’s appreciation of generalisations, what is clear is that there were occasions where participants were not confident that any of the options provided a true reflection of their beliefs. There were items in the measure in the study, and by extension possibly in other quantitative measures, that were either not readily accessible to participants or where the options did not reflect their perspective. Participants did nonetheless answer the questions, upon what basis is not known, and profiles about their epistemological beliefs were concluded. This was true for at least nine participants, or 26% of the sample in the current study. The threat highlighted is that the conclusions may not have been valid representations of the participants’ assumptions about knowledge.

Insights gleaned from the construction of the measure pertained mostly to operationalisation of the construct of personal epistemology. For instance, the

dimension of source of knowledge was operationalised more specifically as the extent to which individual's feel the need to question authority. This operationalisation was made on the supposition that to frame sophisticated beliefs as the belief that all the evidence should be evaluated in context in order to determine the truth of some assertion is unrealistic, and that often accepting what others profess based on their own learning is reasonable. Sophistication was accordingly framed as a willingness to doubt what others have claimed to have learnt. Such a refinement of the dimension of source of knowledge is particular to the current study, which restricts the meaning and interpretation of the results. It also demonstrates the influence of the researcher's own epistemological assumptions in that some degree of acceptance on knowledge espoused by authorities was deemed reasonable.

Such concerns arise again in consideration of the fact that three dimensions were selected for the study, namely Certainty, Complexity and Source. While such a selection may be theoretically informed, it nonetheless restricts the data collected to only these dimensions and conclusions about personal epistemology were from the outset limited to a given conceptualisation about the scope of personal epistemology.

5.4.3 Reflections on the process of enquiry based on qualitative methodology

A first reflection on the process of enquiry using open-ended and qualitative methodology, is that the actual question underwent several revisions. Through the piloting of the measure, initial questions that were based on methods used by previous researchers (for example where respondents were asked to write a concluding paragraph in response to conflicting arguments) had to be revised because the resultant responses did not reflect conclusions or decisions which reflected views on knowledge. Instead, they tended simply to list points made in the conflicting arguments. Only when the question included clear instructions to be critical and arrive at their own conclusion did respondents present any kind of argument or description of their opinion. This observation suggests that epistemological assumptions are elicited only in particular conditions, which raises

questions about the possibility of being able to surface enacted beliefs in their natural state of operation. This question will be considered in more detail in Chapter Six, but it is noted here that the piloting of the question revealed that the participants needed to be told explicitly to be critical and to present their own perspective, and that less directive questions such as asking them to write a concluding paragraph did not yield data that contained portrayals of knowledge.

Despite that fact that the question explicitly asked participants to be critical, a key reflection in terms of the process of qualitatively analysing the textual data was that perspectives on knowledge, or epistemological beliefs, provided a sensible way to summarise and reduce the data. While the analysis was performed using a 'bottom-up' approach, the guiding principle of using portrayals of knowledge to code the data was easily and sensibly applied. However, another significant issue that arose, which is perhaps always the case when making inferences about theoretical constructs, is that misinterpretation of the data that supported conclusions about a participant's epistemological beliefs presented a real threat. Qualitative research can be argued to have, as one of its core characteristics, interpretation of data where the researcher actively makes sense of or adds meaning to the data (Creswell, 2007). Beyond the criticisms of subjectivity typically levelled against qualitative analysis especially where latent content and not manifest content is the unit of analysis, for the current study the role of interpretation was particularly pronounced. What seemed to complicate the matter was that, conceptually, the assumptions of certainty, complexity and source appear to participate in logical connections with one another, and yet logical connections were not always evident in the beliefs of the participants. The concern is best explained with reference to examples.

Participant 11 remarked that "Psychology is the study of the psyche / mind". Such an assertion shows no evidence of any questioning or criticality (especially since participants were asked to write a critique for a postgraduate level textbook) and an interpretation of a belief in certainty seems warranted. In the case of participant 11, however, there was additional evidence for belief in relativity, which indicates a rejection of certainty. This is clearly demonstrated in their comment that "Religion,

culture and belief systems / practices have scarcely been taken into account". In a similar example, participant 14 points to a belief in certainty through their matter-of-fact assertion that "many people require professional help". In this sentence, "Help" suggests that the psychologist can know (for sure) how to assist people, and consequently that knowledge can be certain. At the same time, however, participant 14 actively argued for cultural relativity (refer to Appendix F for a detailed profile). Both participants provided some degree of evidence for belief in both certainty as well as cultural relativity, and yet these concepts appear to be mutually exclusive. Certainty would seem to demand permanent single truths, which cannot then logically be relative to different contexts. This observation raises several questions about the nature and study of personal epistemology which will be considered in Chapter Six.

A final reflection on the analysis of the data collected from the open-ended question refers to the rating of the textual data. Evidence of some degree of sophistication was easily identified, however two difficulties were noted. Firstly, determining the appropriate degree or level of sophistication proved to be a challenge. The scope of raw data available to interpret was limited, and using a bottom up-approach without reference to an existing model that clearly stipulates the differences in degrees of sophistication, determining exactly when an idea was more sophisticated than another was not always easily achieved. Even though rigorous reviews were conducted, the danger that ratings did not accurately portray the participants' assumptions was a real threat.

A further difficulty was noted in cases of absence or lack of elaboration, where the question arose of whether such lack correlated with a lack of sophistication, or was simply due to the participant's understanding of what the task required. For example, if participants' wrote a 'matter of fact' statement, the question must be asked whether this was best analysed as the absence of sophisticated thinking, or rather due to entirely different reasons such as participants being of the opinion that reflection on the state of knowledge in Psychology is not appropriate for an introduction to a textbook. The point may seem to some degree arbitrary as research, particularly in the social science, is very seldom if at all capable of

determining the exact causal line of an individual's thought process or behaviour. However, it seems worthwhile to draw attention to real examples of factors that may be undermining the study of personal epistemology.

5.5 Summary and Integration of Results

Before continuing with a discussion of the implications of the findings, a brief summary of all the results reported is first provided. The first research question asked whether the level of directness of questions eliciting epistemological assumptions influenced the conclusions drawn about such assumptions. The results of the comparison between ratings of sophistication across levels of directness indicate that directness did have an effect. This was true for all dimensions of personal epistemology (i.e. for beliefs about Certainty, Complexity and Source of knowledge). However, although difference was regularly found, there was no evidence to suggest that the effect of the different levels of directness was the same across the different domains, and the study accordingly did not identify stable trends in ratings of sophistication resulting from the directness of the questions asked.

A similar finding was made in regard to the effect of the domain of the question in that differences based on domain were regularly found, but that stable or constant effects across directness were less easily detected. Two cases where the influence of domain across directness was identified were as follows. Regarding beliefs about the certainty of knowledge, more instances of sophistication were consistently noted for questions about Psychology than for Biology. Regarding beliefs about the source of knowledge, ratings for beliefs about Biology were consistently lower than beliefs about Psychology and History.

The results of comparison between the open-ended and closed-ended question formats were threefold. Firstly, in terms of comparability of ratings of sophistication, the Open-ended condition did not consistently align with ratings based on other conditions. For beliefs about the certainty of knowledge it aligned with the Closed-

ended, Indirect condition, but aligned best with the Closed-ended, More Direct condition for beliefs about the source of knowledge. In both these cases the pattern of the distributions aligned as well as the preferred rating. Furthermore, the Open-ended condition was the only condition that consistently gave rise to the same rating which was a rating of high sophistication. Although this trend was tempered by the fact that the majority of the sample was not rated on their beliefs about Complexity, there is evidence to suggest that the sample was more likely to be described as demonstrating high sophistication when an open-ended, indirect, and qualitative question was used to elicit their assumptions.

Secondly, regarding the type of information gleaned from the different methodologies, it was noted that the qualitative methodology was better able to explain more precisely the nature of beliefs for a dimension (for example on what basis the sample did not hold knowledge to be certain) and also better reflected what epistemological issues the participants were grappling with (in this case making sense of multiple positions). The quantitative data however was able to tap into beliefs that better reflected the range of personal epistemology and resulted, for example, in ratings for sophistication of beliefs about Complexity which did not emerge from the qualitative methodology. It also revealed how responses changed according to the features of the question asked.

The third and final aspect regarding the effect of open and closed-ended questions came from reflections on the process of measurement. The findings for such consideration included the observation that the quantitative methodology provided no opportunity to check the relevance and accessibility of questions asked of participants. Based on the inclusion of other open-ended questions, however, participants raised concerns about the familiarity of the content of questions, the level of vagueness of questions and discomfort with generalised responses. Limitations of the measure based on operationalisation of variables and the scope of the construct were also considered. For instance, the dimension of authority was operationalised as the need to question authority figures which is a more specific operationalisation of the dimension than has typically been reported in previous research.

Reflections on the process of qualitative enquiry brought to light real threat of misinterpretation compounded by the nature of the subject matter, being that it seems to require logical connection but that this is not necessarily realised in people's belief systems. The development of the open-ended question also gave rise to concerns about the possibility of surfacing enacted beliefs. It was also noted that interpreting absent data as opposed to data that is explicit presented an additional threat to the validity of the analysis.

6. Chapter Six: Discussion

The hypothesis that particular features or characterisations of the questions used to elicit epistemological beliefs would influence the conclusions drawn about such assumptions was supported by the current study. The differing frequency distributions of ratings of levels of sophistication over various conditions, as well as difference in kinds of conclusions based on qualitative and quantitative methodologies, suggests that all variables being manipulated (domain, directness, and open versus closed-ended question formats) account for some difference in the way an individuals' personal epistemology is described. These findings have implications for how personal epistemology is conceived and measured as will be discussed.

One of the most striking observations in the study is that while all the independent variables were regularly seen to exert an effect on the conclusions drawn about the sample's epistemological assumptions, there were very few instances where this effect was stable and consistent over the influence of the other variables. That the variables regularly accounted for difference, but that such difference did not consistently take the same form, is an interesting finding that has implications for the study of personal epistemology. The few consistent influences or differences will be discussed first before considering the implications of the difference typically not taking the same form.

The comparisons between the ratings of sophistication revealed three cases of consistent effects or influence of the independent variables. The first two pertained to the role of domain, where beliefs about the certainty of psychological knowledge were found to consistently result in higher sophistication than beliefs about biological knowledge. Regarding beliefs about the source of knowledge, beliefs about biological knowledge consistently resulted in lower levels of sophistication than Psychology or History. These findings can be taken to support other studies, for example that by Jehng et al. (1993) that argue that beliefs across hard and soft sciences are different with more naivety being demonstrated in hard sciences.

Although discussion around the merit of this classification system goes beyond the scope of this research, it is reported that some evidence supporting the likelihood that people express more naivety regarding a hard science than a soft science was found.

At first glance, one may be tempted to continue to draw the conclusion that the findings further support the assertion contained in both Muis et al.'s (2006) and Buehl and Alexander's (2006) models that domain-specific beliefs are more sophisticated than domain-general beliefs because the sample performed better with regard to beliefs about Psychology. However, closer examination reveals that the findings of the study support neither of the models. According to Muis et al. (2006), domain-general beliefs are those about topics for which individuals have not been schooled, and according to their model, the sample's beliefs about both Biology and History would constitute domain-general beliefs. While Psychology did in two cases yield more high ratings of sophistication than Biology, beliefs about Psychology did not consistently result in more sophistication when compared to beliefs about History and in some cases the reverse scenario was observed. The study hence did not provide evidence to support the model as the sample did not typically and predictably respond more favourably to psychological knowledge, which is their field of expertise, than to all other domains for which they are not completing a higher degree.

Nor do the findings support Buehl and Alexander's (2006) model under which domain-general beliefs are defined as beliefs about knowledge per se as a general concept. Under Buehl and Alexander's (2006) model, one would have expected less sophistication to be demonstrated in response to the domain-general and direct questions. However, this was not found in the current study. For example, questions about the complexity of knowledge per se as a general concept showed high ratings of sophistication to be the most common whilst questions about the complexity of specific knowledge claims within psychology resulted in more instances of mild sophistication.

An important point to emphasize is that the models by Muis et al. (2006) and Buehl and Alexander (2006) have different conceptions of what constitutes domain-generality. Hofer (2006) has argued that the issue of domain-generality and domain-specificity has been resolved through the various articles published in the 2006 volume of Educational Psychology Review in terms of a recognition that people have both domain-general and domain-specific beliefs. However, the current study demonstrated how the concept of generality could be operationalised in different ways, aligning with different definitions of generality, which further complicates the task of resolving questions about the difference between domain-general and domain-specific beliefs. Future research in the study of personal epistemology needs to define exactly what is meant by 'domain-generality' and 'domain-specificity'. Another classification system that may be more useful than general versus specific, would be to have a cross-tabulated classification system where beliefs can pertain to schooled or not-schooled knowledge, and also to volumes or types of knowledge (for example particular knowledge claims, or knowledge about a whole domain, or knowledge as an abstract concept). A similar classification system to this was used in the current study and has proved to be useful in defining different kinds of knowledge.

The second consistent finding was that the sample was more likely to be rated as highly sophisticated based on their responses to the open-ended as opposed to closed-ended questions. While this finding is tempered by the majority of the sample not receiving a rating of sophistication for beliefs about the complexity of knowledge, there is nonetheless some evidence to support the claim that more favourable ratings resulted when based on qualitative and emergent data than on quantitative, multiple-choice type data. This finding may be attributed to a number of things, including the susceptibility of qualitative analysis to subjectivity and other forms of misinterpretation, social desirability, or the degree to which the question emphasised and encouraged critical reflection. The design of the current study focused on determining if the identified variables had any influence and accordingly did not offer extensive insight into reasons for such influence. Reference to existing literature to explain the finding is also not helpful as researchers have not tackled the comparability of qualitative and quantitative methodologies in multimodal

research. Future research is therefore needed to investigate further the reasons for the difference. This should include determining whether anticipated threats, such as social desirability, are genuine and active threats, and moreover, how to guard against them.

Despite the study's inability to draw firm inferences about the reason for the variability in responses, what is nonetheless clear when taking into account the role of all variables, is that the variables did exert and influence, and moreover that they appeared to interact with each other. That only few consistent trends for the influence of the independent variables were evident from the results, despite the observation that directness, domain and open versus closed-ended question formats almost always influenced the sample's ratings of sophistication, points to several important considerations.

Firstly, it strongly suggests that the variables influenced the effect of each other, or that the variables contributed to interaction effects. This in turn draws attention to the complexity of the construct and influencing factors as it raises questions about whether our conception of the construct is sufficiently sensitive to the nuances and malleability of people's belief systems or assumptions about knowledge. The constant variability across manipulations of the independent variables suggests that it is a combination of these that influences levels of sophistication. Such combinations can be construed as important descriptors of the context under which epistemological assumptions are elicited, and the centrality of context is underscored. Thus, in addition to more common descriptions of the context such as 'in an academic setting', the current study suggests that more refined contextualisations, such as 'in response to particular knowledge claims' are further descriptions or qualifiers to consider.

One may be tempted to embrace Hammer and Elby's (2002) idea of epistemological resources where the relevance of the precise context in which beliefs are elicited is stressed. While there is certainly value in emphasising context, as stated earlier, the notion of epistemological resources does little to help develop a more overarching theory that explains assumptions at a level higher than

each particular and individual instance. While Hammer and Elby's (2002) view is arguably too extreme, the results of the current study support the need for a more refined conception of epistemological assumptions. The conception needs to consider the possibility that people respond to or think about singular knowledge claims differently than they do larger bodies of knowledge. As an illustration, it can be argued that Schommer (1994) recognised the complexity of epistemological assumptions and accordingly argued for the recognition of multiple dimensions. Likewise, recognition of variations across forms of knowledge, defined by both domain and scope of knowledge, would seem to do more justice to the complexity of the construct.

More reference to established theories of human cognition may serve to account for this, for example Bloom's taxonomy of educational objectives that addresses peoples 'ways and means of dealing with specifics' through to abstractions and generalisations (cited in Mosley et al. (2005)). Hence, while the conception of personal epistemology requires refinement and increased explanation, much of this may come from existing theories within cognitive psychology. Further theoretical research to explore such possibilities is warranted.

Secondly, the implications of the interaction effects between the variables on personal epistemology are compounded by the observation, made earlier in the paper, that the variables are inextricably bound to one another and in operationalising them, all variables immediately come into play. That is, there appears to be a logical and necessary connection between directness, domain, and open or closed-ended question formats. An open-ended question must at the same time be framed at some level of directness and must at the same time have some level of domain-specificity or generality. The implication of this for future research is that the particular or unique effect of each variable needs to be controlled for, and that to achieve this, careful and scrupulous design and review of questions needs to be undertaken. Future research can also serve to tease out and explain the unique effect of each variable.

A third and final point to note regarding the variability across all conditions across all dimensions, is that support is given for the multi-dimensional nature of personal epistemology. Because ratings of sophistication differed based on the focus of the question (whether it focused on the certainty, complexity or source of knowledge), there is evidence to support the notion that there are several aspects or dimensions pertinent to an individual's approach to knowledge for which the same degree of sophistication may not be demonstrated.

Further insight into the conceptualisation and dimensions of epistemological assumptions also came to light through an analysis of the qualitative data yielded from the open-ended question. There are two main sources of insight, one being comparisons between dimensions of personal epistemology from existing models and themes identified in the current study, and the second being reflections on the process of analysis, particularly between analysis of the open as compared to the closed-ended question formats. Firstly, however, caution is raised in that the current study did not employ grounded theory and the intention was not to arrive at a fully developed theory or model of personal epistemology. While the themes emerging from the current study should not be confused with a full model of epistemological beliefs, the findings can nonetheless offer support for, or raise concerns about, existing models.

The results of thematic content analysis of the open-ended qualitative data aligned well with generic framework of most models of personal epistemology based on qualitative data. To explain, the overarching approach of the sample was to introduce Psychology as a multi-theoretical field of study, and to continue with a discussion of how to respond to the multiple positions. For some, recognition of the multiple positions was made sense of by concluding that no one opinion is better than the other and embracing relativity, or proceeding to evaluate the merit of different claims. Less frequently, it was found that a participant would themselves express such evaluation and argue for a particular theory or position.

This framework strongly resembles the models put forward by Perry (1970), Kuhn (1991), Baxter Magolda (1992) and King and Kitchener (1994). For Perry (1970),

this model was framed in terms of ‘perceiving diversity in opinion’, ‘acceptance of diversity’ and finally making ‘personal commitment’. Kuhn (1991) referred to ‘multiplists’ and ‘evaluativists’ to characterise the transition from accepting multiple positions to making judgments of their relative worth. Baxter Magolda (1992) used such descriptions as knowledge being uncertain in that everyone has their own belief, and later as knowledge being judged on the bases of an evaluation of evidence in context. Finally, King and Kitchener (1994) referred to knowledge being ‘idiosyncratic to the individual’, of knowledge seen later as ‘contextual and subjective’ and then ultimately as the outcome of an evaluation of what is ‘most reasonable or probable according to the current evidence’.

All existing models locate this framework within an individual’s progressive move away from the belief in the certainty of knowledge to acceptance of uncertainty, and then finally a move to making a judgement as best is possible given the uncertainty and importance of context. The current findings lend support to the existence of such positions, although as a cross-sectional study any inference about progression would be unfounded. A slight variation amidst the similarity between the frameworks, is that the current sample did not show evidence, or at least considerable evidence, for firm belief in certainty. Thus, Perry’s (1970) first stages of viewing the world in polarities like right-or-wrong, or Kuhn’s (1991) stages of ‘absolutism’, or King and Kitchener’s (1994) stage of belief in the absolute and concrete, were not demonstrated. Instead of this absence pointing to a substantial difference in results about the nature of epistemological beliefs, it is more likely that this result indicates simply that the sample had beliefs that were more sophisticated and advanced, which again is in accordance with the general agreement that sophistication increases with education and age since the sample was constituted by postgraduate students. Similarly, very few participants provided evidence for the other pole of active evaluation of available evidence in context to substantiate knowledge. Again, this is consistent with arguments that very few people attain this level of sophistication and hence that it is not expected to be demonstrated by the majority.

Before continuing with discussion around the dimensions of personal epistemology, the points above also bring to the fore a concern raised in Chapter Five, namely that the open-ended question was made explicit about the requirement for participants to be critical and present their own perspectives. Thus the absence of lower ratings of sophistication noted above may be attributed to the question being 'leading', not because it focused on knowledge but because it stressed criticality. The question that is raised is what the likelihood is of epistemological assumptions, especially enacted assumptions, being surfaced or elicited. That the question eliciting assumptions needed to explicitly ask for a critique, suggests that the kind of thinking and reasoning demonstrated by the sample depended on their appreciation of the demands of the question. While such an observation is hardly surprising, and also bearing in mind that this observation was based on a very small number of respondents, it does suggest that in the study of personal epistemology, careful thought needs to be paid to the conditions under which epistemological assumptions can and should be elicited, as well as consideration about the possibility that assumptions behave differently or have varying degrees of influence over behaviour depending on the context. Factors relevant to the context would include the participants' appreciation of the demands of the question, as well as other possible factors such as their affect and motivations. Again the relevance of context and the nuances of the construct are underscored.

Returning to conceptions of the dimensions of personal epistemology, and paying special attention now to conceptions of based more on the multidimensional and quantitative research designs, it is noted that the theme of justification, absent from Schommer-Aikins' work (2004) but present in Hofer's work (2000), emerged. For Schommer-Aikins (2004), ideas about justification may be adequately addressed by the dimension of source of knowledge. That is, individuals may justify truth with more or less reliance on authority (and consequently less or more evaluation of evidence). Such a conceptualisation may adequately capture the role of authority in justification, but there appear to be more facets related to justification that demand that the dimension be revisited. Other than reference to authority, other means of justification cited by the sample in the current study were critical thinking

as well as empirical research. Such concepts are not well represented by the dimension of source of knowledge under Schommer-Aikins' (2004) model, and the allowance for various other expressions of the processes in, and value of, justification seems more accurate and comprehensive and hence necessary for a model of personal epistemology. It is also noted that justification features strongly in King and Kitchener's Reflective Judgement Model (2002) and appears also in Kuhn and Weinstock's (2002) work.

A further dimension that requires consideration was that of belief in the certainty of knowledge. It was noted in the results that there were several different portrayals of knowledge that may fall under certainty but which may be best conceived as distinct beliefs. These were belief in temporal relativity, cultural relativity, and belief in the possibility of objective and independent truth. While the latter may readily be subsumed under the concept of certainty, the different forms of relativity, if collapsed into one dimension, may fail to capture fairly and accurately an individuals' epistemological assumptions. That is, some participants expressed relativity to time whereas others expressed relativity to culture, and to describe these both as simply the relativity of knowledge, and furthermore grouping them both as sophisticated views of certainty, seems to miss important subtleties. Such individuals may in fact have very different epistemologies, where one who believes that knowledge is relative to time may hold that over a substantial amount of time knowledge will better approximate a real and objective state of affairs, whereas an individual espousing relativity to culture may have the view that knowledge is not about real and objective state of affairs but is by nature fundamentally linked to the culture that generates it. These views are remarkably dissimilar and the distinction may be lost at the point where all acceptances of relativity are grouped together despite variations in what knowledge is seen to be relative to.

The debate reiterates arguments made earlier in Chapter Two about the differences in conceptualisation from the earlier qualitatively-based, development models and the later multidimensional belief models. In earlier models, relativity and to some degree, subjectivity, were key aspects which do not appear in later models and at best have been collated into beliefs about certainty. The findings

add support for the inclusion of concepts of relativity and subjectivity, and suggest that these need to be better represented in current conceptualisations and hence in current measures based on the multidimensional belief model.

Another finding related to the dimensions of personal epistemology was that ideas about the complexity of knowledge did not emerge as a theme. This was a curious finding as the dimension has not often been contested in more recent quantitatively-based methodology, except for suggestions that it is not separate from beliefs about certainty (Hofer, 2000; Qian & Alvermann, 1995). A question that is raised is whether complexity is an important aspect to consider for personal epistemology. Relating the issue back to open versus closed-ended questioning, the latter is able to collect data on issues that may not naturally or spontaneously emerge in response to open-ended questions. The question, however, is whether the non-emergence is an indication that the concept is not meaningful or relevant, or that people may not be sufficiently aware of the issue to raise it, or that the methodology is limited. To some degree the inclusion of complexity is theoretically informed, and a review of the questions about complexity that were asked in this study and that have been asked in other studies, provides strong motivation for their relevance and importance in understanding the nature of knowledge. For instance, items in the current study such as “The reasons why people steal are complicated” do appear relevant to assumptions about knowledge. Thus, although the dimension did not emerge, it is an important aspect or dimensions of personal epistemology. Further research can explore the issue further to help clarify if the dimension consistently does not emerge spontaneously and if so why.

Concerning reflections of the process of analysis that provide additional insight into the study of personal epistemology, a key concern is the role of inference in making decisions about another individual’s epistemological assumptions. The reflections in Chapter Five suggested that inference is particularly problematic for numerous reasons, and perhaps more so than in other qualitative analyses as the subject matter seems to demand a logical appreciation of the various beliefs which may not accurately reflect people’s belief systems. It was noted in Chapter Five that there were cases where participants demonstrated what appear to constitute

two conflicting epistemological assumptions, namely an acceptance of the certainty of knowledge as well as cultural relativity. The question arises whether the apparent irregularity is best explained by misinterpretation of the data or by the fact that people's beliefs systems may be contradictory and incoherent and hence that people may assume both certainty and relativity.

Clearly the first explanation highlights the threats of subjectivity, bias and over-interpretation attached to the analysis of qualitative research, a threat to which the study of personal epistemology is undoubtedly vulnerable. The second explanation, however, complicates interpretation of beliefs even further. If the second explanation is assumed, then the interpretation of the individual's epistemological assumptions is complicated by the fact that the overall picture of what is to be interpreted may be illogical. Accurate interpretations of a collection of beliefs which conceptually relate to each other but which may also be contradictory, and possibly uniquely so for each individual, makes summarising and categorising an individual's epistemology a challenge. The degree of nuance and the complexity entailed in a belief system held together by distorted logic may be too unwieldy to classify even though it more accurately represents an individual's disposition to knowledge.

King and Kitchener's (2004) argument that people tend to operate in more than one stage at a given time as their beliefs progress offers one way forward. Individual's that demonstrate contradictory or tenuous beliefs systems may hold beliefs characteristic of two or more levels of sophistication, although with a greater frequency of their beliefs falling into one camp. For example, an individual may believe in relativity most of the time, but lingering beliefs of certainty from their previous stage of development still remain and may surface from time to time. More recently, the idea that people may simply have contradictory beliefs has been embraced as by some researchers. For example Buehl and Alexander (2006) assert that "even seemingly contradictory beliefs could be espoused depending on the nature of the context or situation to which they pertain" (p. 31). While this acceptance that belief systems need not be logical or coherent seems fair and appropriate, the problem that faces the study of personal epistemology is how to

capture and describe, on a large scale, people's assumptions or beliefs about knowledge when such beliefs form an intricate web which may be contradictory at any number of points. The effect of multiple variables, including but not limited to, characteristics of the context, content of questions, type of knowledge, relevance of knowledge, will need to be explored in more depth in order for the web to be more sufficiently explained and accounted for.

The ultimate implication of the threats introduced by qualitative analysis of responses to open-ended questioning is that the conclusions do not reflect accurately (either by over-interpretation, under-interpretation, or misinterpretation) an individual's approach to knowledge. Not only does this undermine the validity of the conclusions drawn for each study, but also the conception of epistemological beliefs and what is considered a 'normal' level of sophistication for a given population. Continued research using inference should be mindful of the possible threat of misinterpretation of data.

Other observations made on the process of enquiry were that the development of the closed-ended quantitative measures required refinement of the variables which reduced their scope and accordingly their comparability with other studies; that the closed-ended sections were unable to allow for assessment of the relevance of the items to the sample, and that the open-ended question was unable to elicit kinds of beliefs that are theoretically relevant to personal epistemology. The implication of these findings are that serious misconceptions of personal epistemology may be incorporated into quantitative methodology through the development of measures and items, and then carried forward without being interrogated as closed-ended questions do not allow for such reflection. It appears that the field is too young and has too many uncertainties still to resolve that reliance on purely closed-ended questions, while ultimately valuable, is currently premature. Instead, multimodal research that assesses the accessibility and relevance, as well as scope and appropriateness, of items of closed-ended and quantitative measures is necessary.

Some may argue that such issues, particularly around the difference between open and closed-ended questions, overstates the simpler truth that the different

methodologies have different strengths and weaknesses that social scientists negotiate in research designs. It is accepted that these observations are not new to any social science researcher. The aim of these discussions is to emphasise, and more importantly demonstrate, how these concerns have influenced the current study, suggesting that they may have had important roles to play in a field of study that is still punctuated with uncertainties about the nature of the construct and how to measure it. Such demonstration is offered as a starting point to determine more precisely the effect of confounding variables and to assist in the design of future research.

6.1 Limitations and Recommendations for Future Research

In addition to the concerns relevant to the overall study of personal epistemology, there are several limitations for the present study. Firstly, the measure was developed for the study and although it was piloted, there is little data to support its validity and reliability. Internal reliability coefficients as well as the consistency of many of the results offer support for its validity, but there is no firm evidence about the properties of the instrument. Secondly, the study was conducted using a small homogenous group of students from one university in Gauteng, South Africa and is thus unlikely to be representative. While the homogeneity of the sample is a strength of the study in that it controlled for extraneous variables, the sample cannot be considered representative of students in South Africa. Thirdly, the study only employed analysis of frequencies as the quantitative method of analysis. Rigorous statistical analysis was not conducted and future research that aims to test specifically the individual effects of each variable would benefit from experimental designs and the use of parametric statistical testing. Larger sample sizes for such research are needed.

Building on recommendation of more experimental research, it is also noted that the study was limited by the fact that the open-ended question pertained only to one domain, namely Psychology. By not including other other open-ended questions about biological and historical knowledge, the study was unable to draw

comparisons across these conditions. The exclusion of such conditions was made on the basis that the measure would have been significantly longer making it less practical and introducing the threat of participant fatigue. The issue that is also raised by this consideration is that as a complex, multilayered and multidimensional construct, designing studies to investigate epistemological assumptions that are sufficiently comprehensive and sensitive to all the relevant factors presents a challenge.

The study was also limited by the fact that it collected only self-report data. Although indirectness of questions was included in the design, all data collected was derived from what the participants claimed or reported. Enacted beliefs, using Limon's (2006) terminology, were not investigated and the study shares the criticism directed at many other studies into epistemological beliefs, namely that it did not address epistemological beliefs as they function in a natural setting and hence that the study's ecological validity is weak.

A further limitation of the paper is its focus purely on the cognitive aspect of personal epistemology. Motivation and affect are likely to play significant roles in tempering, moderating, mediating or impacting on the assumptions people have about knowledge, as is true for any other cognitive activity. Generally in the history of the study of personal epistemology, the interplay between affect and the cognitive aspect has not received due attention reflecting a limitation of the study of personal epistemology as a whole. It is an important consideration to take forward in future research.

Additional opportunities for further research are plentiful. The avenues suggested by the current study are more multimodal research, using both quantitative and qualitative methodologies, to inform refinements of the conceptualisations of personal epistemology and to determine the influence of each methodology, and more precisely the characterisations of the questions. Ethnographic research that aims at exploring how such assumptions may operate or be enacted in context, especially in an education setting, may provide further insight into the role of personal epistemology in teaching and learning. Finally, a key aspect to be

explored is the relevance of personal epistemology, as well as the applicability of the specified dimensions, in other cultures. As South Africa presents a remarkably different mix of cultural considerations than the United States of America and other Asian countries where the studies into personal epistemology have typically taken place, sensitive and careful exploration into if and how the construct applies in South African students is a promising opportunity.

6.2 Conclusion

DeBacker et al. (2008) concluded their assessment of three existing measures of personal epistemology with the statement that "researchers should seriously reconsider the state of knowledge in the area of epistemic beliefs" due to large amounts of measurement error they found (p. 304). While some may find this conclusion overly scathing, the current study similarly suggests that the validity of the study of personal epistemology may be undermined due to the effects of various characterisations of the questions used to elicit epistemological assumptions.

Reflecting on the history of the study of personal epistemology, it is clear that the issue of the domain has, to a large degree, already been examined and conceptually, personal epistemology is now generally conceived to include both domain-general and domain-specific beliefs. Studies have consequently begun to take domain into account in their design and methodology. Such exploration and advancement has however been done in isolation and without consideration to other key variables with which domain may interact. The current study emphasised that directness of such questions and whether they are open or closed-ended require similar investigation. Although in the past the study of personal epistemology has employed both open and closed-ended questions, there has been little critical debate, even less multimodal research, and hence no resolution as to the differences in the conceptualisation of personal epistemology these methodologies have supported. To date, the issue of the directness of the questions eliciting assumptions has not been overtly engaged with at all. As was

achieved regarding the influence of domain, these two factors need to be investigated not only to better inform appropriate measures of epistemological beliefs, but also to clarify and refine conceptions of personal epistemology. While exploration into the unique effect of these variables is necessary, the findings of this study provide good reason to consider more broadly how the factors inter-relate with one another.

Investigations into personal epistemology appear to be gaining strength and momentum, and progress has undoubtedly been made with regard to some conceptual and methodological issues that have plagued its history. While this progress is encouraging, there are still fundamental and pressing concerns about what and how we are studying individuals' assumptions about knowledge which future research will indeed need to take seriously for our understanding to grow and have meaningful impact in education settings. Especially when researchers are asking students what it means to know, what they know and how they know it, it is important for researchers to be critical about their own epistemologies, what they know and how they know it.

7. References

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Appendix A – Models of Personal Epistemology

Perry (1970)

Below is a table of the nine positions posited in the scheme of the intellectual development of students. The positions are differentiated on the basis of beliefs about the certainty, objectivity, relativity, and source of knowledge. Summarising the positions based on their 'formal attributes', Perry suggests that positions 1,2 and 3 reflect a dualistic orientation. The essence of these positions is that the individual holds that definitive or certain knowledge is attainable and something is either the case or it is not. The main challenge to people in these positions is the recognition of multiplicity. Positions 4,5 and 6 are characterised by the realisation of relativism. Here people acknowledge that knowledge is relative and there are multiple truths. The challenge for these positions is the instability inherent in relativism. Positions 7, 8, and 9 involve committing to knowledge and values in spite of the relativism. A person in position 9 can be said to adopt knowledge whilst still appreciating that it is not fixed or certain.

Position	Description
1	The student sees the world in polar terms of we-right-good vs other-wrong-bad. Right Answers for everything exist in the Absolute, known to Authority whose role is to mediate (teach) them. Knowledge and goodness are perceived and goodness are perceived as quantitative accretions of discrete rightnesses to be collected by hard work and obedience (paradigm: a spelling test)
2	The student perceives diversity in opinion, and uncertainty, and accounts for them as unwarranted confusion in poorly qualified Authorities or as mere exercises set by Authority "so we can learn to find The Answer for ourselves"
3	The student accepts diversity and uncertainty as legitimate but still temporary in areas where Authority "hasn't found The Answer yet". He supposes Authority grades him in these areas on "good expression" but remains puzzled as to standards.
4	(a) The student perceives legitimate uncertainty (and therefore diversity of opinion) to be extensive and raises it to the status of an unstructured epistemological realm of its own in which "anyone has a right to his own opinion", a realm which he sets over against Authority's realm where right-wrong still prevails, or (b) the student discovers qualitative contextual relativistic reasoning as a special case of "what They want" with Authority's realm"
5	The student perceives all knowledge and values (including authority's) as contextual and relativistic and subordinates dualistic right-wrong functions to the status of a special

	case, in context.
6	The student apprehends the necessity of orienting himself in a relativistic world through some form of personal Commitment (as distinct from unquestioned or unconsidered commitment to simple belief in certainty).
7	The student makes an initial Commitment in some area
8	The student experiences the implications of Commitment, and explores the subjective and stylistic issues of responsibility.
9	The student experiences the affirmation of the identity among multiple responsibilities and realises Commitment as an ongoing, unfolding activity through which he expresses his life style.

Clinchy, Goldberger and Tarule (1986)

Belenky et al. (1986) posited five ‘ways of knowing’ which reflect woman’s relation to knowledge.

Perspective	Description
Silence	a position in which women experience themselves as mindless and voiceless and subject to the whims of external authority
Received knowledge	a perspective from which women conceive of themselves as capable of receiving, even reproducing, knowledge from the all-knowing external authorities but not capable of creating knowledge on their own.
Subjective Knowledge	a perspective from which truth and knowledge are conceived of as personal, private, and subjectively known or intuited
Procedural knowledge	a position in which women are invested in learning and applying objective procedures for obtaining and communicating knowledge
Constructed knowledge	a position in which women view all knowledge as contextual, experience themselves as creators of knowledge, and value other subjective and objective strategies for knowing

Baxter Magolda (1992)

Baxter Magolda (1992) derived four ‘ways of knowing’ based on responses to pre-determined questions or domains.

Domain	Absolute knowing	Transitional knowing	Independent knowing	Contextual knowing
Role of learner	Obtains knowledge from instructor	Understand knowledge	Thinks for self Shares views with others Creates own perspective	Exchanges and compares perspectives Thinks through problems Integrates and applies knowledge
Role of peers	Share materials Explain what they have learned to each other	Provide active exchanges	Shares views Serve as a source of knowledge	Enhance learning via quality contributions
Role of instructor	Communicates knowledge appropriately Ensures that students understand knowledge	Uses methods aimed at understanding Employs methods that help apply knowledge	Promotes independent thinking Promotes exchange of opinions	Promotes application of knowledge in context Promotes evaluative discussion of perspectives Student and teacher critique each other
Evaluation	Provides vehicle to show instructor what was learned	Measures students' understanding of material	Rewards independent thinking	Accurately measures competence Student and teacher work toward goal and measure progress
Nature of knowledge	Is certain or absolute	Is partially certain and partially uncertain	Is uncertain - everyone has own beliefs	Is contextual; judge on basis of evidence in context

Kuhn (1991)

Kuhn puts forward a categorisation of the different epistemological theories evident in her study. The first category is Absolutist which is distinguished by the fact that such participant's believe that experts do and can know for certain the cause of a given problem. Absolutists are further characterised as being certain of the truth of their own causal explanations of the problems, and likely to see reconciliation of different views as matter of clarifying the facts. The second category is Multiplist which includes participants who do not believe that experts can be certain and instead believe that there are several causal explanations. Multiplists tend to hold the truth of an explanation as being subjective, meaning that no one cause will be more valid than another. The final category is the Evaluativist who holds that experts know more than the average person, but that neither they nor the average person can be certain. Reconciliation of divergent explanations is possible, for the Evaluativist on the grounds of evidence and argument. In 2002, Kuhn and Weinstock added a fourth level to their taxonomy, the Realist, which precedes the Absolutist. What marks the distinction between the two is that the Realist assumes that assertions are direct copies of the external world, whereas the Absolutist assumes that assertions are facts which can be misrepresentations of the external world.

King and Kitchener (1994)

King and Kitchener (1994) proposed a seven stage model depicting the development of reflective thinking. Views of knowledge and concepts of justification (epistemological assumptions) determine the level of reflective thinking.

Stage	phase	views of knowledge	concept of justification
1	Pre-reflective thinking	Knowledge is assumed to exist absolutely and concretely; it is not understood as an abstraction. It can be obtained with cetainty by direct observation	Beliefs need no justification since there is assumed to be an absolute correspondence between what is belied to be true and what is true. Alternate beliefs are not percieved
2		Knowledge is assumed to be absolutly certain or certain but not immediately available. Knowledge can be obtained directly through the senses (as in direct observation) or via authority figures	Beliefs are unexamined and unjustfied or justified by their correspondence with the beliefs of an authority figure (such as a teacher ot parent). Most issues are assumed to have a right answer, so there is little or no conflict in making decisions about disputed issues.
3		Knowledge is assumed to be absolutley certain or temporarily uncertain. In areas of temporary uncertainty, only personal beliefs can be known until absolute knowledge is obtained. In areas of absolute certainty, knowledge is obtained from authorities	In areas in which certain answers exits, beliefs are justified by reference to authorities' views. In areas in which answers do not exist, beliefs are defended as personal opinion since the links between evidence and beliefs is unclear
4	Quasi-reflective thinking	Knowledge is uncertain and knowledge claims are idiosyncratic to the individual since situational variables (such as incorrect reporting of data, data lost over time, or disparities in access to information) dictate that knowing always involved an element of ambiguity.	Beliefs are justified by giving reasons and using evidence, but the arguments and choice of evidence are idiosyncratic (for example, choosing evidence that fits an established belief).
5		Knowledge is contextual and subjective since it is filtered through a person's perceptions and criteria for judgement. Only interpretations of evidence, events or issues may be known.	Beliefs are justified within a particular context by means of the rules of inquiry for that context and by context-specific interpretations of evidence. Specific beliefs are assumed to be context specific or are balanced against other

			interpretations, which complicates (and sometimes delays) conclusions.
6	Reflective thinking	Knowledge is constructed into individual conclusions about ill-structured problems on the basis of information from a variety of sources. Interpretations that are based on evaluations of evidence across contexts and on the evaluated opinions of reputable other can be known.	Beliefs are justified by comparing evidence and opinion from different perspectives on an issue or across different contexts and by constructing solutions that are evaluated by criteria usch as the weight of the evidence, the utility of the solution, or the pragmatic need for action.
7		Knowledge is the outcome of a process of reasonable enquiry in which solutions to ill-structured problems are constructed. The adequacy of thsoe solutions is evaluated in terms of what is most reasonable or probable according to the current evidence, and it is reevaluated when relevant new evidence, perspective, or tools of unquiry become available.	Beliefs are justified probabilitstically on the basis of a variety of interpretive conclusions, such as the weight of the evidence, the explanatory value of interpretations, the risk of erroneous conclusions, consequences of alternative judgements, and the interrelationships of these factors. Conclusions are defended as representing the most complete, plausible, or compelling understanding of an issue on the basis of the available evidence.

Schommer (1990 onwards)

Schommer (1990; Schommer-Aikins, 2002, 2004) posited five dimensions of epistemological beliefs, each of which is described in terms of poles reflecting naive or sophisticated beliefs. For her measure, each dimension is described in terms of subsets that were developed by educational psychologists.

Hypothesised in 1990			Subsets	Summarised in 2002	
Dimension	Variable	Poles		Variable	Poles
Structure	Simple knowledge	Knowledge is simple or complex	Seek single answeres Avoid integration	Structure	isolated bits or integrated concepts
Certainty	Certain knowledge	Knowledge is certain or tentative	Avoid ambiguity Knowledge is certain	Stability	unchanging or tentative
Source	Omniscient authority	Knowledge gained from authority or reason	Don't criticize authority Depend on authority	Source	authority or reason
Ability to learn	Innate ability	Ability is innate or learned	Can't learn how to learn Success is unrelated to hard work Ability to learn is innate	Control of acquisition	fixed at birth or life-long improvement
Speed of learning	Quick learning	Learning is quick or not-at-all	Learning is quick Learn first time Concentrated effort is a waste of time	Speed	quick-or-not-at-all or gradual learning

Appendix B – Measure

RESEARCH INTO UNIVERSTIY STUDENT'S PERCEPTIONS AND BELIEFS

QUESTIONNAIRE

July 2008

Instructions

There are four sections in this questionnaire. Please complete these in order and please do not look ahead. For example, please complete section one fully before looking at and completing section two.

Demographic Data
(The data is required for statistical purposes and is not intended to offend in any way)

Age: _____

Racial group: _____

Highest level of qualification achieved (e.g. Bachelor degree): _____

Section One

Imagine you have been asked to write short critique of your field of study for a textbook for postgraduate students. Please write a critical commentary (no more than a few paragraphs) on your field of study. This could include reference to methodologies used, advances made and/or current debates in the field. Please draw a conclusion that reflects your own perspective on the issues raised in your critique.

Section Two

Below is a series of statements about a variety of topics. By circling one of the four options on the right hand side of the table, please indicate how much you personally agree or disagree with the statement. The questionnaire is intended to target perceptions and opinions and there are no right or wrong answers. Please answer according to your personal view. There is also space at the bottom of the table for any comments you would like to make about the question or your answers.

	For each statement please circle the option below that most closely reflects how much you agree or disagree with the statement.			
The history of Cape Town is best described as a straightforward chain of events.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
If a psychologist has published an article on the reasons for people joining gangs, then you can definitely trust what the psychologist said.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
It is possible to know for sure what the reasons for the political changes in South Africa's history were.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
Understanding how the Greek civilisation changed over time requires consideration of multiple and interlinked factors.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
The concept of 'physical health' is complex .	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
School text books provide highly reliable accounts of battles that took place between the English and Dutch settlers in South Africa.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement

The functioning of the human immune system is best explained as the functioning of a few independent biological processes.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
What happened in the past in South Africa is something one cannot be certain about.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
There is no good reason to doubt the diagnosis my doctor makes when I get sick.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
The reason why people steal is complicated.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
It is necessary to interrogate what historians say happened in South Africa in the 1960's.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
The reason for why people join gangs varies from one place to another.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
It is better to make decisions about why some people bully others based on your own reasoning instead of accepting everything experts say.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
One should question what neurologists state about what parts of the brain perform what functions.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
The answer to why people return to crime after being released from prison can be known without any doubt.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
The causes of road rage are plain and simple.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement

In the human body, hormones interact with each other in definite and predictable ways.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement
Explanations for the ways in which chemicals interact in the human body might change in future.	I agree with this statement	I agree with this statement for the most part	I disagree with this statement for the most part	I disagree with this statement

Would you like to make any comments about your responses to the items above or the items themselves?

Section Three

Below is a series of questions about a variety of topics. By circling one of the four options on the right hand side of the table, please indicate which answer most closely reflects your view. The questionnaire is intended to target perceptions and opinions and there are no right or wrong answers. Please answer according to your personal view. There is also space at the bottom of the table for any comments you would like to make about the question or your answers.

	For each question, please circle the option below that most closely reflects your answer to the question.			
Do you think knowledge about how the human body functions is generally:	Straightforward	More straightforward than ambiguous	More ambiguous than straightforward	Ambiguous
Do you think knowledge about why people behave the way they do is generally:	Straightforward	More straightforward than ambiguous	More ambiguous than straightforward	Ambiguous
Do you think knowledge about history is generally:	Straightforward	More straightforward than ambiguous	More ambiguous than straightforward	Ambiguous
Do you think knowledge about why people behave the way they do is generally:	Complicated	More complicated than clear-cut	More clear-cut than complicated	Clear-cut
Do you think knowledge about history is generally:	Complicated	More complicated than clear-cut	More clear-cut than complicated	Clear-cut
Do you think knowledge about how the human body functions is generally:	Complicated	More complicated than clear-cut	More clear-cut than complicated	Clear-cut

Do you think the majority of what is understood in the field of history is:	Uncertain	More uncertain then certain	More certain than uncertain	Certain
Do you think that the majority of what is understood about how the human body functions is:	Uncertain	More uncertain then certain	More certain than uncertain	Certain
Do you think that the majority of what is understood about why people behave the way they do is:	Uncertain	More uncertain then certain	More certain than uncertain	Certain
Do you think that the majority of what is understood about how the human body functions is:	Absolutely true	More absolute than conditional	More conditional than absolute	Conditionally true
Do you think that the majority of what is understood about why people behave the way they do is:	Absolutely true	More absolute than conditional	More conditional than absolute	Conditionally true
Do you think the majority of what is understood in the field of history is:	Absolutely true	More absolute than conditional	More conditional than absolute	Conditionally true
In order to understand the history of South Africa, it is best to:	Look for and evaluate different arguments in the field and draw your own conclusion	Trust conclusions that other professionals have drawn	Trust for the most part what the leading specialist says	Trust what the leading specialist says
In order to understand why people behave the way they do, it is best to:	Look for and evaluate different arguments in the field and draw your own conclusion	Trust conclusions that other professionals have drawn	Trust for the most part what the leading specialist says	Trust what the leading specialist says

In order to understand how the human body functions, it is best to:	Look for and evaluate different arguments in the field and draw your own conclusion	Trust conclusions that other professionals have drawn	Trust for the most part what the leading specialist says	Trust what the leading specialist says
In order to understand how the human body functions, it is best to:	Rely on what has already been published	Rely on most of what has already been published	Question most of what has already been published	Question and interrogate everything you read
In order to understand why people behave the way they do, it is best to:	Rely on what has already been published	Rely on most of what has already been published	Question most of what has already been published	Question and interrogate everything you read
In order to understand the history of South Africa, it is best to:	Rely on what has already been published	Rely on most of what has already been published	Question most of what has already been published	Question and assess everything you read

Would you like to make any comments about your responses to the items above or the items themselves?

Section Four

Below is a series of questions about a variety of topics. By circling one of the four options on the right hand side of the table, please indicate which answer most closely reflects your view. The questionnaire is intended to target perceptions and opinions and there are no right or wrong answers. Please answer according to your personal view. There is also space at the bottom of the table for any comments you would like to make about the question or your answers.

.	For each question, please circle the option below that most closely reflects your answer to the question.			
How much of what we understand of the world is known with certainty:	Almost everything	Most of what we understand	Some of what we understand	Almost nothing
How much of what we understand of the world is known in absolute and unqualified terms:	Almost everything	Most of what we understand	Some of what we understand	Almost nothing
How much of what we understand of the world is complex:	Almost everything	Most of what we understand	Some of what we understand	Almost nothing
How much of what we understand of the world is multifaceted and inter-related:	Almost everything	Most of what we understand	Some of what we understand	Almost nothing
How much knowledge is best acquired by accepting what experts or authority figures say:	Almost everything	Most of what we understand	Some of what we understand	Almost nothing
How much knowledge is best acquired by analysing arguments and evidence:	Almost everything	Most of what we understand	Some of what we understand	Almost nothing

Is it possible to know some things for certain:	Definitely	I guess so	I wouldn't say that	Definitely not
How complicated do you think 'knowledge' generally is:	Highly complicated, consisting of interlinked ideas	More complex than simple	More simple than complex	Ultimately a collection of discrete facts
The best way to acquire knowledge is to:	Trust completely what experts say they already know	Refer to expert opinion but with an open mind	Figure things out yourself but with a little help from others	Evaluate everything for yourself based on reason and evidence

Would you like to make any comments about your responses to the items above or the items themselves?

Appendix C – Information Letter

Dear Student

Invitation to participate in research into student perceptions and beliefs

In partial fulfilment of the Masters in Research Psychology course I am completing research into university students' perceptions and beliefs about a number of topics and hereby invite you to participate in the study. Participation is strictly voluntary and you will not be disadvantaged in any way by choosing not to participate. You are also free to withdraw from the study at any time during the data collection with no negative consequences. There are no risks or benefits attached to participation in this research.

Participation in the study will require you to complete a questionnaire pack. The questionnaire does not ask for identifying information and participation is anonymous. One of the questions in the questionnaire will ask you to write one or two paragraphs, and the remainder of the questions are presented in multiple choice format. You will also have the opportunity to comment on the questions and/or your answers.

Although individual feedback will not be possible given that participation is anonymous, a brief report with general findings will be available at www.headoffice.co.za. All data collected will be held in the strictest confidence and will be viewed only by myself and my supervisor. All data collected will be destroyed after the research is completed.

In order to participate, you will need to complete the consent form overleaf.

Your participation in the study will be greatly appreciated and I thank you for your time.

Kind regards
Kathryn Pope

Appendix D – Consent Form

Consent Form

In order to participate in this research study on student beliefs, it is necessary that you give consent.

By signing this consent form you are indicating that you have read and understood the information sheet attached and that you are agreeing to participate in psychological research. Please consider the following points before signing:

- I understand that that all information I provide will remain confidential;
- I understand that the results may include the use of direct quotes from participants' answers, but that this will be completely anonymous.
- I understand that participation in research is not required, is voluntary, and that, after the research project has begun, I may refuse to participate further without penalty.
- I understand that I may contact the researcher at kath@headoffice.co.za should I have any questions or comments about the research.
- I understand that there are no risks or benefits attached to my participation in this research.
-
-

I (name) _____ hereby consent to participate in research

conducted on (date) _____ by Kathryn Pope.

Appendix E – Debriefing Letter

Dear Participant

Thank you for your participation in the study.

As indicated before, the focus of the study is on university students' perceptions and beliefs. More specifically, the focus of the research is on students' perceptions and beliefs about knowledge and how these are studied. The different questions in the study were constructed to elicit beliefs in different ways in order to test the validity of the type of question. It was feared that participants may have responded to questions differently if it was clear that the focus was specifically on questions targeting beliefs about knowledge and so this was not declared earlier. Please do not hesitate to contact me at kath@headoffice.co.za should you have any questions about this or any other aspect of the research.

Kind regards
Kathryn Pope

Appendix F – Qualitative Analysis of Open-ended Responses to Section One of the Measure

Participant 1: Quote: “I find myself drawn to several different methodologies and find it both challenging and exciting when thinking of how to combine them”		
Actual data	First round of coding	Second round of coding
psychology is a constantly expanding and changing field	Field not fixed / static.	Multiple positions, confusing Is possibility of unity through combination, this is valued Suggestion of relativity of knowledge Reference to different methods of enquiry
which is both extremely interesting and challenging.	Field is challenging, not easy/simple - complex	
One is faced with many theories	Recognition of multiple positions in field	
that could be contradictory /	Multiplicity involves contradiction / inconsistency	
Confusing	Inconsistency experienced as confusing - uncertainty	
however it is interesting to find how many borrow key concepts from one another and seem to integrate	Suggestion of multiplicity being a façade, suggestion of underlying unity	
I find myself drawn	Absence of justification (empirical or theoretical) for taking up a position,	
to several different methodologies	Recognition and acceptance of multiplicity	
and find it both challenging and exciting when thinking of how to combine them in therapeutic practice.	Striving for synthesis amongst multiplicity. Recognition of complexity in synthesis.	

My area of interest within the field of psychology is one focused on eating disorders and the psychology behind weight gain. Currently my research is focused on eating disorders. However I feel that at Wits university the focus is on a psychodynamic approach– at least I feel we are encouraged in this direction	Possibility of adoption of one position amongst multiple Position defined as 'direction', not objective truth.	
and in light of where my interests lie and topic of research I would really like to investigate and be instructed in various other methodologies from a behaviour perspective.	Slight indication of differential valuing instructed – passive learner, knowledge received.	
Keeping this in mind however I do realise that as an honours student there is still so much to learn and expand on	Acceptance that current knowledge incomplete, not sure if confined to being a student.	
and that it is essential to become knowledgeable	Suggest a state of complete knowledge is possible and desirable	
in all the various different kinds of approaches	Recognition and acceptance of multiplicity	
that make psychology a diverse	Recognition of multiplicity	
and challenging field.	Recognition of complexity	

Qualitative Profile

Q1 claims that knowledge is "expanding and changing", suggesting that it is relative to time. It is not clear from this statement whether it is advancing or simply changing. Q1 recognises that there exist multiple positions, or "many theories", regarding knowledge. It is further stated that the existence of multiple positions may lead to conflict as they "could be contradictory". In addition it is experienced as "confusing", and Q1 appears to identify and value the opportunity for unity in the form of combination or integration. This is reflected in the phrase "[I] find it both

challenging and exciting when thinking of how to combine them". There is some support for a differential valuing of these positions, in the phrase "in light of where my interests lie and topic of research I would really like to investigate…other methodologies". However this is based more on personal preference than considered appraisal of the evidence or argument, as Q1 is "drawn to several different methodologies". Thus justification is not defined or motivated for. Knowledge is portrayed as complex in that it is "challenging" and "diverse". Referral to authority as an unquestionable source of knowledge is accommodated in that the participants welcomes being "instructed", however so is "investigation" which is more of a personal and active source.

The most prominent feature of Q1's personal epistemology is an acceptance of multiple positions, with some suggestion that these can be integrated, but without reflection on the differential value of the positions. In terms of the pre-determined dimensions of personal epistemology, Q1 demonstrates considerable rejection of certainty of knowledge (in terms of multiple positions and relativity to time), a mild reference to knowledge being complex in terms of diversity, and an acceptance of both authority and investigation as sources of information. Regarding levels of sophistication, Q1 demonstrates a high level of sophistication for certainty of knowledge and slight levels of sophistication for complexity. The acceptance of investigation as a source of knowledge is consistent with slight levels of sophistication regarding source of knowledge as allowance is given to sources other than authority.

Participant 2: Quote: “the field remains fiercely divided – some would say irreconcilably. But these divisions and factions are actually no bad thing.””		
Actual data	First round of coding	Second round of coding
Psychology as a field of study has never been short of conflict and differences of opinion	Recognition of multiple positions, involves conflict Multiplicity based on opinion, positions are opinions not truths	Multiple positions leading to conflict. No possibility of unity
Even today, over 100 years since its inception,	Multiplicity as enduring	
the field remains fiercely divided	Multiplicity involves conflict,	Multiplicity accepted, but also differential valuing
– some would say irreconcilably.	multiplicity as fixed divisions without possibility of integration. Some = reinforcement of multiple positions even over multiplicity	Influence of social practice
But these divisions and factions	multiplicity as fixed divisions without possibility of integration.	Relativity of knowledge
are actually no bad thing	Multiplicity accepted and valued Actually = position adopted as truth	Embraces complexity
– it means that psychology is a broad church where robust critical debate is encouraged	Identifies with need for justification involving criticality	
and no particular viewpoint can claim orthodoxy.	Rejects authority of one position. Position as viewpoint – not truth	

While this is all very well and egalitarian	Acceptance of multiplicity and relativity	
I believe the greatest threat to the professions is coming from psychiatry and cognitive behavioural therapy (and the like).	Highlights multiplicity as fixed divisions Difference / divisions presented as threats.	
I see a potential schism in the future between the more prescriptive and medicalised CBT / psychiatric treatments.	Difference / divisions presented as threats to field.	
The way that the health care systems of the world are currently structured plays into the hands of more short terms, results driven therapies that promise quick and effective solutions to mental health problems.	Identifies relations between positions and context in form of social practices.	
While you can't dispute the efficacy of CBT when dealing with phobias, its (long-term) effectiveness when dealing with more nuanced disorders is doubtful.	Accepts a position as undeniably / certainly true in one context, but as unlikely or doubtful in another. Relativity Nuanced – recognises complexity of disorders	
So, in summary, I believe that the psychodynamic psychotherapy will break away from the others in the near future.	Emphasizes division between positions within field	

Qualitative profile:

Q2 makes strong reference to existence of multiple positions or "differences of opinion". There is some evidence that Q2 values and accepts the co-existence of multiple positions and hence multiplicity, stating that "no particular viewpoint can claim orthodoxy". There is however also evidence for a differential valuing of positions, as demonstrated by the statement "[the effectiveness of CBT] when dealing with more nuanced disorders is

doubtful". In addition, this comment also suggests that the value judgments are bound or relative to context, so that one position may be more valid but only under certain conditions. Reference is also made to "robust critical debate" as a source of justification of knowledge. Q2 relates knowledge to social practices in that health care systems are seen to favour certain positions. The complexity of knowledge is acknowledge as content can be "nuanced". Finally, it is also suggested that knowledge can be temporally bound.

The most prominent features of Q2's personal epistemology are the recognition of multiple positions and the conflict this results in, with a preference for making differential value judgments but based on context. Justification for positions is also noted in terms of the value of critical debate. Clear arguments are made for the role of social practice in knowledge acceptance. Applying the theorized dimensions of personal epistemology, certainty is strongly questioned through the recognition of existence of multiple positions, relativity to time, relativity to context and by extension the rejection of objective truth. Complexity is asserted in terms of knowledge being 'nuanced', and authority as a source is obviously contested. An appropriate rating of Q2's profile is high levels of sophistication for all dimensions.

Participant 3:
Quote: "A critical debate in this study concerns the definition or standard of what bullying entails or involves"

Actual data	First round of coding	Second round of coding
a qualitative study on exploring teachers perceptions of bullying among primary school learners has been undertaken on a sample of ten teachers. The purpose of this study is to investigate and comprehend	Knowledge as comprehension	Complexity as multiple and related factors
the degree of insight teachers possess	Knowledge as insight	Objective truth questioned in terms of questioning of construct validity – some
on the phenomenon of bullying.	Subject matter as real, objective, thing	

and its related issues	Knowledge as relational - Recognition of complexity of subject matter	denial of objective truth Multiple positions, no differential valuing
In carrying out this research, interviews were conducted pertaining to the concept of bullying	Subject matter as theoretical idea	
and various factors thereof.	Knowledge as relational - Recognition of complexity of subject matter	
In analyzing the data found, thematic content analysis will be administered to determine the common themes and patterns across the thoughts and views of the teachers.	Knowledge about identifying what exists objectively	
This study wishes to assess whether teachers are aware and cognisant of the extent of bullying, and how this translates into the ideas and perspectives they relay regarding the issue of bullying and solutions to counteract this. A critical debate in this study	Recognition of multiplicity / disagreement	
concerns the definition or standard of what bullying entails or involves and this is what is be tested.	Recognition of complexity of subject matter	

Qualitative profile:

Q3 suggests that knowledge is complex in that it involves consideration of various related factors or issues. There is also evidence of the rejection of the notion of objective truth as Q3 questions the validity of a construct, namely the “concept of bullying”. That is, by questioning “what bullying entails or involves”, the implication is that the construct does not represent an objective truth and can instead be interrogated. Q3 notes that defining what bullying means “is what is to be tested” which points to the role of empirical research as a method of justification. Thus, while the source of knowledge is not obviously discussed, questioning of the validity of a construct and rationale for research to support construct validity

would be consistent with a rejection of authority as an unquestionable source of knowledge. The reference to the "debate" about what bullying entails also indicates an awareness of multiple positions, although this is not extended into differential valuing.

The most prominent feature of Q3's personal epistemology is a mild acceptance of the complexity of knowledge in terms of constructs entailing related and various factors. This is coupled with a questioning of the certainty of knowledge expressed as a questioning of construct validity. In terms of applying the theoretical model of personal epistemology, the certainty of knowledge is moderately questioned in terms of the rejection of objective truth which reflects high levels of sophistication. High levels of sophistication are also demonstrated regarding complexity as construct validity is actively questioned. Mild levels of sophistication are evident in Q3's eluding to empirical research as a method of justification. The complexity of knowledge is moderately accepted, and there is a mild questioning of authority as a source of information.

Participant 4:

Quote: "people need to spend time on the DSM, evaluating what is or is not relevant as a disorder. It needs to be kept consistent."

Actual data	First round of coding	Second round of coding
My critique in the field of psychology would relate to the DSM criteria. Many disorders are left out of the criteria, some are not even considered	Field seen as having objective reality which can be known but have not been identified and reported on. Authority as source of knowledge is found as performing badly	Intolerance of change in knowledge Acceptance of objective truth, but authority not reach this, but also suggestions of constructivist view of
and the DSM diagnostics seem to change all the time.	Rejects possibility of change in knowledge.	

I think people need to spend time on the DSM, evaluating what is or is not relevant as a disorder. It needs to be kept consistent.	Authority seen as capable of presenting knowledge but not yet having achieved it Evaluating – suggestions of knowledge being constructed	knowledge. Reference to need for justification. Involves evaluation but criteria not speficied.
Another critique would be the Masters course for psychology, I think one should be able to do their masters in absolutely anything the [person?] want to focus on. I know some universities you are able to, but I think if an individual wants to do their masters in play therapy, for example, one should be able to. To conclude, although I have referred to two critiques in this situation, the debate about the DSM	Recognises multiplicity	
and the change that seems to occur within the criteria needs to be focused on	Rejects possibility of change in knowledge	
and individuals need to focus on what should be considered a disorder and stick to it	Rejects uncertainty (and complexity?) of knowledge – conclusions should be definitive Should be considered – suggests a constructivist view of knowledge. Authority as source of knowledge	
As for masters, I feel people should be able to choose whatever they want and there should not only be 4 – 5 options.		
Qualitative profile: Q4 presents an interesting and somewhat confusing portrayal about the certainty of knowledge. Q4 demonstrates a strong frustration with the lack		

of certainty about the subject matter, with things being “left out” and changing all the time, and arguing that “it needs to be kept consistent”. However, Q4 implies that certainty can be reached by consideration by “people” who will “[evaluate] what is or is not relevant as a disorder”, although it is not clear whether this certainty will be socially constructed (and therefore relative) or a reflection of objective truth. Given that Q4 is frustrated by change in knowledge, objective truth as the reason for certainty would seem more likely. A similar curiosity in Q4’s personal epistemology, is a rejection of authority in terms of those that contribute to the DSM, at the same time as the desire for an authoritative source of knowledge, namely the DSM. One possibility that may make sense of these oddities, is that Q4 is intolerant of uncertainty as expressed by change and multiple positions, but requires only the consistency of a “working theory” even if this does not amount to a reflection of objective truth. Such a conjecture cannot however be supported with the given evidence. In terms of arriving at a clear and consistent definition of the subject matter, in this case psychological disorders, it could be inferred that Q4 accepts that knowledge is fundamentally simple, however there is no direct evidence for this belief.

The most prominent feature of Q4’s personal epistemology, is an intolerance for uncertainty, and the need for capable authorities as a source of knowledge. It is not clear whether Q4 accepts knowledge as reflecting an objective truth or as being socially constructed, however evaluations and consideration are accepted as justifications for knowledge although exact criteria are not specified. In terms of applying the theorized dimensions of personal epistemology, Q4 strongly accepts the certainty of knowledge in terms of stability across time and culture indicating high levels of naivety. Complexity is not discussed. Authority as a definite source is valued, at least in some forms such as the DSM, and Q4’s beliefs about source of knowledge can accordingly be rated as mildly naive.

Participant 5:

Quote: “neuroscience currently offers a lot of the ‘answers’ to questions about the mind and brain perhaps because research in the area is flourishing and well-funded,”

Actual data	First round of coding	Second round of coding
Psychology as a field does not adhere to a single	Recognition of multiple positions	Relativity to time
paradigm or theoretical framework.	Paradigm – position framed in relative/subject? terms	Multiple positions
Even though the major researchers in the field have adhered to certain broad epistemologies	Recognition of multiplicity being relative to different levels	Identifies justification, no criteria
at different periods of history (e.g. psychodynamic o the early 1900s, behavioural around the mid-20th century, and neurocognitive today),	Recognition of multiplicity being relative to time	
the field today consists of multiple vastly different coexisting sub-fields,	Recognition of multiplicity	Makes own judgement and rejects positions that embrace certainty – rejects certainty
all of which accumulate evidential support and critique easily	Recognition of judgments or worth within multiplicity Identifies with justification based on evidence	
For much of psychological theory and methodology, however, a positivist, biomedical paradigm is very much the norm.	Recognition of relativity (acceptance of one position for a given time)	Embraces complexity Relates developmend to knowledge to social practices
neuroscience currently offers a lot of the ‘answers’ to questions about the mind and brain	Rejects certainty of knowledge	
perhaps because research in the area is flourishing and well-funded,	Relates knowledge to construction to context in form of social practices	

., and because it answers the empiricists need to match abstract psychological phenomena with material structures in the 'real' world.	Awareness of ontological ideologies and their impact on epistemology. Subjectivity/relativity? of knowledge.	
It could be asked, however, whether this method truly comes to grips with who we are as people	Awareness of and problematises differences in methods of justification	
, and offers any in roads into helping human beings and improving the lives of most of us.	Locates and questions value of knowledge within social practices	
Does discovering which chemicals cause joy – and very often exact chemicals and structures are impossible to isolate, given the complexities of the interactions involved- bring more joy to the world?	Recognition of complexity and uncertainty	

Qualitative profile:

Q5 refers to the co-existence of multiple positions, or '"vastly different coexisting subfield" and argues further that the multiplicity varies according to both levels of detail (in that different positions can share "broad epistemologies") and time ("at different periods of history"). Q5 continues to demonstrate a differential valuing of positions which are said to all "accumulate evidential support and critique easily". Q5 extends even further to reject one position outright, thus making a judgement and selecting their own position. Different methods of justification are acknowledge and critiqued as Q5 asks "whether this method [empiricism] truly comes to grips with who we are as people". This is again exemplified in the statement: "the empiricist need to match abstract psychological phenomena with material structures in the "real" world". This quote also suggests that Q5 rejects the certainty of knowledge in terms of representing objective truths, as does their comment that "neuroscience currently offers a lot of "answers" to questions about the mind and brain". Knowledge is furthermore related to social practices as funding is cited as a reason for the development of the field of neuroscience illustrating how social practice can influence what knowledge is developed. Finally, knowledge is clearly described as complex as Q5 argues that "very often exact chemicals and structures are impossible to isolate, given the complexities of the interactions involved".

The most prominent features of Q5"s personal epistemology include: the differential valuing of multiple positions as well as methods of justification; relation of knowledge to social practice and ideology; differential value of methods of enquiry and justification; and acceptance of the complexity of knowledge. Applying the theoretical dimensions of personal epistemology; Q5 strongly rejects the certainty of knowledge as reflecting objective truths, and as being temporally or culturally constant. Complexity is strongly accepted, and authority as an unquestionable source of knowledge is strongly rejected. Q5's personal epistemology is best rated as highly sophisticated across all dimensions.

Participant 6:

Quote: "the very reductionist approach to understanding and treating of what it is to be mentally ill is not convincing enough"

Actual data	First round of coding	Second round of coding
With regards to abnormal psychology the very reductionist approach	Recognition of multiplicity	Multiple positions with differential value, dismisses on position, but says all positions should be considered. Rejects certainty as objective truth in favour of constructionist view
to understanding and treating of what it is to be mentally ill	Knowledge as constructed	
is not convincing enough.	Recognition of need of justification	
I think that this categorical approach and use of the DSM as an ultimate 'bible' of psychiatry is often	Rejection of simplicity Rejection of authority as unquestionable source of info	
over utilized as the only means and methods of 'labeling' or 'boxing' someone as mentally ill or not	Acceptance of 'working' knowledge even if not certain	
Advances made in this field of study have constantly been made in ? directions,	Recognition of improvement / development / growth in knowledge	

however this 'scientific' approach has still reduced people to categories, and still been given the high seat when it comes to teaching and understanding pathologies.	Makes judgements about the worth of particular position	Reference to justification in terms of being 'convincing' or criticality
. A more broader view and one that includes aspects and views on culture, religious beliefs and experiences, should be incorporated into the teaching and learning of these mental states	Accepts more relativistic position	Rejection of authority as ultimate source, re DSM and teachers
Progress needs to be assessed and optimized	Recognition of growth in knowledge but need for justification	
according to all methods of practice, this include many modalities to understand such	Acceptance of relativism. Rejects certainty.	Rejection of simplicity in terms of categorical and reductionist approach. Accepts complexity in terms of various factor
complex occurrences.	Recognition of complexity	Progress is possibility, although this requires criticality

Qualitative profile:

While Q6 does not make explicit statements reflecting the recognition of multiple positions, they do tackle one of the resultant issues, namely differential valuing. Q6 argues against a "categorical approach", indicating that they regard different approaches or positions as having different value. Rejection in the "categorical approach" in particular also denotes Q6's rejection of certainty as definite answers. Q6 points to the role of justification in such valuing, in that some approaches are deemed "not convincing enough", however criteria for justification are not explored. Q6 continues to argue against over-reliance on authoritative sources, namely the DSM, and favours instead positions that accept the complexity of the

subject matter. This is evident in the phrase “a more broader view and ones that includes…should be incorporated”. Direct reference is also made to “complex occurrences”. There is some evidence for the rejection of knowledge as a representation of objective truth as Q6 refers to “what is to be mentally ill”. Despite this apparent rejection of certainty, Q6 also suggests that advancement or progress in knowledge is possible although this is said to require criticality, which again points to need for justification although criteria for this are not discussed.

The most prominent features of Q6’s personal epistemology is a differential valuing of positions with particular emphasis on rejecting simplistic and categorical accounts. Applying the theoretical dimensions of personal epistemology, Q6 strongly rejects the certainty of knowledge by recognising multiple positions and rejecting the notion of objective truths. This indicates high levels of sophistication. Q6 shows highly sophisticated beliefs about complexity through assertions that the subject matter is complex. By actively questioning and evaluating ‘authoritative sources’, Q6 demonstrates high levels of sophistication regarding source of knowledge.

Participant 7:
Quote: “Psychology is challenged through a prevailing belief being challenged”

Actual data	First round of coding	Second round of coding
Psychology is a field that seems to be forever changing.	Recognition of relativism	relative to time
Advances have been made in that the field does not seem to be as rigid as before.	Recognition of growth in knowledge Recognition and appreciation of complexity	progress is a possibility
An example of this is the belief that psychology is mainly a relationship (one to one) between psychologist and client. Given the ratio of psychologists to the number of people needing psychological help. There is quite a large gap and more people are remaining untreated.	Rejection of authority or pre-existing knowledge as unquestionable source Rejection of certainty	influence sociology authority questioned

Community psychology is attempting to address this by focusing on aiding and intervening in communities i.e. working with groups of people and helping them more than ne person at a time.	Relates knowledge to social practices	certainty as objective truth questioned, refers to beliefs which can be fallible
. Thus psychology is challenged through a prevailing belief being challenged.	Recognition of change in knowledge – relativity or growth Rejection of certainty	
My field of study is into HIV/AIDS. I feel this area to be very important as there is no cure for HIV or AIDS and this virus will continue to spread so long as people continue to aid to its spread. In South Africa approximately 1700 people are infected with the virus each day. The growing number of infections is reason enough for psychology to move into this area and intervene. The emotional trauma surrounding becoming infected is large and thus is why community psychology could have a better place in psychology than just the one to one relationship. Speaking to one person will not cure the spread of a virus. Reaching out to whole communities and groups of people could aid in the decrease of infection.	Relates knowledge to social practices	

Qualitative profile:

Q7 states that knowledge is relative to time in that it is “forever changing”. Extending this point, Q7 argues that the knowledge can advance or progress, but it is not clear what differentiates progress from change. It is also suggested that knowledge is linked to social practices or needs, as it is argued that the prevalence of HIV/Aids is “reason enough for psychology to move into this area”. Existing knowledge is referred to as “belief” which implies that Q7 sees authority as a questionable source of knowledge. The concepts of change and belief can be taken to reflect Q7’s rejection of the idea that knowledge consists, or at least currently consists, of representations of objective truth.

The most prominent feature of Q7's personal epistemology is the rejection of certainty and authority as an unquestionable source; and the link between knowledge and social practice or social need. Applying the theoretical dimension of epistemological beliefs, then, certainty (in terms of relativity to time and objective truth) is strongly rejected revealing highly sophisticated beliefs. Complexity is not discussed. Authority , in terms of existing and prevailing beliefs, is actively questioning similarly revealing highly sophisticated beliefs.

Participant 8: Quote: "at Honours level, independence, self-study and self-responsibility is required in every student, but certain areas could benefit from more concentration and help from professional bodies"		
Actual data	First round of coding	Second round of coding
the field of psychology is extremely interesting and 'attractive' for those studying psychology in undergrad. The entire psychology course has a lot of potential if certain things are adapted and changed. Psychology undergrad could benefit from increasing the density of work si that post-grad is an elaboration on topics instead of an introduction to topics.	Interest in complexity?	Reference to self as involved in creation of knowledge and reliance on authority, but authority and professions still acknowledge.
Undergrad lecture styles are suitable and assisting to a students, whereas the lecture styles in Honours is a foreign procedure.	Expression of preferred learning strategy	Some reference to complexity
It is a realization that at Honours level, independence, self-study and self-responsibility is required in every student	Some recognition of rejection of authority as ultimate source of knowledge Expression of preferred learning strategy involves construction of knowledge	

, but certain areas could benefit from more concentration and help from professional bodies. The course as a whole can be very disappointing to some, as no clear requirements of getting into Masters is given. Additionally, failure and non-acceptance into further courses effect the students and little, if any, counseling is offered to those who feel run down and unable to do and be the best.	Some acceptance of authority as source of knowledge	

Qualitative profile:

Q8 makes mild reference to the complexity of knowledge in that they feel their studies should include an “elaboration” on topics. The most salient feature of their epistemology is however the suggestion that while authority is seen as a legitimate source of knowledge that can “help”, their independence and role on learning is recognized. It is not clear whether this role extends to the creation of knowledge or is instead limited to learning. Applying the theorized dimensions of personal epistemology, certainty is not questioned at all, mild suggestions of complexity are made, and authority is mildly questioned. Levels of sophistication cannot be inferred for certainty, but are best desrcibed as low or mild for both complexity and source.

Participant 9: Quote: “It is highly research-based, using studies in order to investigate and to prove phenomenon”		
Actual data	First round of coding	Second round of coding
Psychology is a field of both science and critical thinking. It is highly research-based, using studies in order to investigate and to prove phenomena.	Recognises types of justification Prove = accepts certainty	Reference to various methods of justification / methods of enquiry.
There are many different scopes? To psychology. By either taking an industrial or general psychology postgraduate course of degree there are different focuses and outcomes. Although there are different outcomes the structure of research still remains the same. Stats and RDA form the foundation of the process. The rest involves issues learnt in RDA and followed by its application.	Recognise method of enquiry re justification	Accepts certainty – ‘proves’
The importance of research is understood as a key part of psychology and its way forward. Psychology is an important and applicable aspect to everyday life and the need for it is vital.	Accepts importance of method of justification	

Qualitative profile:

Q9 note the methods of enquiry that form the justification for knowledge in their opening sentence that "[psychology] is highly research-based, using studies in order to investigate an prove phenomena". Q9 accept both empirical, "science", and theoretical, "critical thinking", as methods of justification. It is also suggested that knowledge resulting from such enquiry is certain in that it can be proved. Hence, the most prominent feature of Q9's personal epistemology is a valuing of empirical and theoretical methods of enquiry and justification. Applying the theorized dimensions, certainty is accepted as objective truth, reflecting highly naive views about certainty. Complexity is not discussed. Sources of knowledge are discussed and two methods of justification are valued. By extension, authority is not the ultimate source, and systematic investigation instead is valued. Their beliefs about source can accordingly be described as highly sophisticated.

Participant 10:

Quote: "allow the student to critique the approach and find the approach which is right for them"

Actual data	First round of coding	Second round of coding
The field of general psychology looks at various aspects within the field. There are various courses which contribute to one's understanding and interpretation of the field. For example. Health psychology looked specifically at health issues and the psychological effects and contribution to particular diseases or illnesses. It also looked at how psychology plays a vital rile in a person's well-being.	Allows for uncertainty - interpretation	Rejects certainty as objective truth – 'interpretation' Multiple positions, mild reference to differential valuing but in absence of

Psychological interventions looks at the different approaches to therapy, for example, the psychodynamic approach, attachment theory, behaviourist, humanistic approach to name a few.	Recognition of multiple positions	justification Reference to self in construction of experience, possibly extend to knowledge
This course looks at the process involved in each approach and allow the student to critique the approach	Recognition of need for making judgements about positions Student = rejects authority as ultimate source	
and find the approach which is right for them.	Choice of position matter or preference, justification	Mild rejection of authority
This course uses a lot of case studies which allows students to get a 'first-hand' experience of what therapy might entail and what the role of the therapist entails.	Recognition of self as source of knowledge / constructed knowledge	
Psychopathology is the study of abnormal behaviour in which we look at specific disorders in a critical way	Accept need to question knowledge	
and critique the way psychiatry / psychology have been developed	Accept need to question construction of knowledge	

Qualitative profile:

Q10 refers to "understanding and interpretation" and therefore suggests a rejection of knowledge as representation of objective truth or certainty. Q10 makes reference to multiple positions or "different approaches". This is extended to acknowledges the expectation to make value judgments about these, as indicated in "allow the student to critique the approach and find the approach which is right for them". However, no indication of justification or the criteria is justification is made in determining what is "right for them". Furthermore, Q10 does not indicate that they have taken a stance about which position is most valid. The role of the student in the critique also provides some evidence that Q10 questions authority as a source of knowledge. This is again evidenced in the phrase "critique the way psychiatry / psychology have been developed" which illustrates a

more critical role of the self in the development of knowledge.

The most prominent feature of Q10's personal epistemology is reference to the expectation that knowledge should be critiqued, however it is not clear whether this notion is simply recited or believed as there is little argumentation. In addition, justification for making different value judgments about multiple positions is absent. In terms of applying the theorized dimensions, high levels of sophistication are demonstrated for beliefs about certainty in that singular, universal truths are denied. Complexity is not discussed. High levels of sophistication are again evident regarding source as Q10nvalues the role of self in critiquing theories.

Participant 11:

Quote: "psychology taught at various universities in South Africa and the world over is based on the Western ideologies"

Actual data	First round of coding	Second round of coding
My current field of study is psychology with particular reference for clinical psychology. Psychology is the study of the psyche / mind.	No problematisation of the field	objective truth (reality) exists Relativity to culture
Psychology has often been critiqued for focusing solely on the individual and not taking communities and societies we live in into account. Furthermore psychology taught at various universities in South African and the world over is based on the Western ideologies. Religion, culture and belief systems / practices have scarcely been taken into account.	Recognition of relativity of knowledge – relative to place / culture. Belief systems: knowledge as constructed and uncertain Rejects authority by questioning what universities teach	Knowledge constructed complexity (related factors)

Methodologies as well are Eurocentric.	Recognition of relativity of knowledge – relative to place / culture.	

Qualitative profile:

Q11 appears to accept that knowledge entails objective truth in that they introduce the content or subject matter of psychology as a matter of fact: “Psychology is the study of the psyche / mind”. However, they also make reference to “culture and belief systems” which suggests not only a recognition that knowledge can be uncertain and relative to groups of people, but also that knowledge may be constructed by people to some degree. This description is supported by Q11’s assertion that methodologies can be culture-bound when they remark that “methodologies as well are Eurocentric”. Q11 accepts that knowledge is complex in that they make reference to several factors to consider when dealing with psychology, namely religion and culture. Authority is viewed as a questionable source of knowledge in that Q11 reflects on what is “taught at various universities...is based on the Western ideologies” thus pointing to factors other than simple fact or truth that can influence the knowledge professed by authorities. This statement also reveals that Q11 links knowledge to social practices in terms of social ideologies.

The most prominent features of Q11”s personal epistemology is that knowledge is linked to social practices, in terms of ideology informing how knowledge is constructed. In terms of the theoretical dimensions, Q11 moderately questions certainty, in terms of highlighting the cultural relativity of knowledge reflecting highly sophisticated beliefs. Levels of sophistication are high as Q11 notes that various factors need to be considered. Authority is strongly questioned reflecting highly sophisticated views.

Participant 12:

Quote: “Psychology in South Africa...requires cultural refinement with regard to which behaviours are seen as deviant and which are deemed to manifest a disorder”

Actual data	First round of coding	Second round of coding
Psychology is a critical branch in both the social sciences and medicine. However, despite is importance and prominence, it remains subject to various short comings. Firstly, the Western world view which it adopts	Knowledge related to ideology / social practice	Knowledge related to other fields. Knowledge related to social practice / ideology is so is culturally bound. Leads to suggestion that knowledge is socially constructed
provides practitioners in other contexts a challenge with regard to its relevance.	Acceptance of relativism to context / culture	
Psychology in South Africa (Africa in general too), Eastern countries and Latin America requires cultural refinement with regard to which behaviours are seen as deviant and which are deemed to manifest a disorder.	Acceptance of relativism Recognition of social construction of knowledge	
A second problem within psychology is the emphasis placed on ‘labels’ of diagnosis. These labels have wide-reaching consequences that include stigma and ostracization. Practitioners need to be aware of the devastating impact of labelling a patient, as this label can take on a life of its own.		

Qualitative profile:

Q12 focuses on the idea that knowledge is influenced by the ideology and practices of the social world in which it functions, and Q12 accordingly accepts that knowledge is relative to culture. The influence of society is reflected in the phrase “Western world view which [psychology] adopts”, and acceptance of relativity is reflected in the phrase “provides practitioners in other contexts a challenge with regard to its relevance”. Although not explicitly stated, Q12 appears to suggest that knowledge is socially constructed, as evidence in the phrase “cultural refinement with regard to which behaviours are seen as deviant and which are deemed to manifest a disorder”. The most prominent feature of Q12’s epistemology is thus a

strong acceptance of knowledge being relative to culture and bound to social ideology and practice. This implies a constructivist view of knowledge. Applying the theorized dimensions, Q12 argues against certainty of knowledge in that knowledge is instead seen to be relative to culture. There is also a rejection of certainty as objective truth in that it is relative to culture and socially constructed. This suggests highly sophisticated beliefs about certainty. Complexity is not discussed. Authority is moderately questioned in that the influence of an ideology that guides the construction of knowledge is acknowledged. This is consistent with highly sophisticated views about source of knowledge.

Participant 13: Quote: “traditional psychology that reflects strong Western ideologies cannot be successfully applied to everyone”		
Actual data	First round of coding	Second round of coding
Traditionally, psychology has been a predominantly middle class enterprise that is reserved for the affluent with less serious mental health problems. Today, however, this still remains true. As future psychologists we should be concerned about the well-being of ALL people and should therefore be committed to helping all people. Psychology does not do this. Help is only given to those who can afford it, while others who are not wealthy and who suffer from problems in living on a daily basis are not in a position to receive help.	Knowledge related to social practice No questioning of truth / value / certainty	Accepts certainty and authority – ‘help is given’ Relates knowledge to social ideology extending to belief that knwoleldge is relative to culture
In a country such as South Africa, where citizens are faced with numerous problems in living and culture is important, traditional psychology that reflects strong Western ideologies cannot be successfully applied to everyone.	Acceptance of knowledge relative to culture	Believes knwoeldge can advance, which too is linked to social practice.

Psychology needs to be rethought and applied in a more effective way. This is being done however in the form of community psychology which is an indication that things are slowly being reshaped.	Knowledge can advance Knowledge related to social practice	

Qualitative profile:

Q13 does not appear to question at all the certainty nor authority as a source of knowledge in their comment that "help is given". However, they continue to acknowledge that knowledge is related to social practice, for example "Western ideology", noting that this "cannot be successfully applied to everyone". It is clear that Q13 accepts cultural relativity. Despite such relativity, Q13 argues that knowledge can progress and become "reshaped" and again this is related to social practice.

The most prominent feature of Q13's personal epistemology is that knowledge is bound to social practice and is culturally relative. It can progress but this is framed in terms of relevance to social needs as opposed to close alignment with objective truth. Applying the theorized dimensions, Q13 strongly rejects certainty in favour of cultural relativity. Complexity is not discussed. Authority is found to be limited or circumscribed in that social ideology influences what knowledge is created and hence its relevance. Appropriate ratings for sophistication are high levels for both certainty and authority.

Participant 14:
Quote: "Psychological theories tend to be very Western in origin and this is a problem when trying to practice in other cultures"

Actual data	First round of coding	Second round of coding
Psychological theories tend to be very Western in origin and this is a problem when trying to practice in other cultures.	Recognition of relativism to culture.	Cultural relativity

For example, it is difficult to generalize different psychopathologies as what may appear to be schizophrenia in one culture may be seen as a spiritual calling in another.	Rejection of certainty	Related to social practice, ideology
Another problem is the psychopathologies are gender biased against woman.	Relates knowledge to ideology / social practice	Accepts research as source of knowledge
However, I feel that if psychology is taught in a way that incorporates these cultural differences then it would add greatly to the field	Values acceptance of relativism	Instances of acceptance of certainty
. Many psychometric instruments are also culture and gender biased and more research needs to be conducted in this field.	Cultural relativity, Bias stemming from social practice Research as method of justification	
Overall I feel that psychology is an exciting and dynamic field and psychologists are desperately needed in this field. It is also a very important field as many people require professional, psychological help (as mental illnesses affect every aspect of a person's life).	No questioning of truth / certainty / value of psychology	

Qualitative profile:

Q14 points to the relativity of knowledge to culture in the statement that "psychological theories tend to be very Western in origin and this is a problem when trying to practice in other cultures." Q14 also makes reference to the impact of social practices, such as gender biases, in the construction of knowledge when they argue that "instruments are also culture and gender biased". Research, as an alternative source of knowledge and one the relies on evidence for justification, is valued. Despite these more sophisticated views, there is also an instance where Q14 shows no questioning of the certainty of knowledge. They comment that "many people require professional, psychological help" and the notion of "help" is in no way interrogated. It would appear that Q14 rejects certainty on the basis of cultural relativity, but not on the basis of objective truth. Although it cannot be stated with much surety, perhaps it is Q14's belief that while knowledge is relative to culture, within each culture knowledge is certain.

The most prominent feature of Q14's personal epistemology is acceptance of cultural relativity. Applying the theorised dimensions, certainty is clearly and strongly rejected on the basis of cultural relativity, but may not be questioned on the basis of the possibility of an objective truth. Complexity is not discussed explicitly. Authority is questioned not only on the basis of cultural relativity, but in that Q14 values research and evidence as sources of justification and knowledge. Ratings of sophistication indicated are high levels of sophistication for both certainty and source. Complexity cannot be inferred.

Participant 15:

Quote: "There is much debate about which technique / approach is best suited to understanding an individual's behaviour"

Actual data	First round of coding	Second round of coding
The field of psychology is an extremely diverse one. The practice and study of the subject is divided into applied and research, very broadly. The research is supposed to inform the applied techniques.	Recognition of need for justification (empirical), but doubts it happens in practice	Reference to methods of enquiry
There is much debate about which technique / approach is best suited to understanding an individual's behaviour and helping an individual.	Recognition of multiplicity, and debate between multiple positions	Multiple positions, accepts differential value but maintains multiplicity on basis of complexity and that no theory is certain.
This would be unavoidable as human beings are extremely diverse creatures and the mind is a complex phenomenon.	Acceptance of complexity, and relativity to people / culture. Acceptance of multiplicity	
It seems that there are separate approaches for separate issues. For e.g. CBT for anxiety and obsessive disorders and mood disorders. Psychodynamic therapy to gain an insight into one's childhood experiences and their influence.	Acceptance of relativity. Differential valuing of positions but relativised	Complexity Relativity to time

One may adopt an eclectic approach but this is challenging. It is impossible to know every theory and account for human behaviour.	Possibility of unity through eclecticism but experienced as problematic. Questions utility / value of strong relativity	
People who adopt a specific approach may not be well suited for just anybody. It may be difficult to find the right therapist that is suited for your specific needs, it may take time.	But affirms acceptance of relativity	
Advances made include electronic equipment to be able to study the brain more accurately for disorders to be treated by medicine. Different approaches like the feminist approach to empower women specifically	Relates knowledge to ideology / social practice	
are becoming more and more popular.	Recognition of relativity to time\	
The problem with studying psychology and practicing it is that human beings never stop evolving. Due to the fact that human behaviour is so diverse it makes that much more difficult to pin down, explain and control for.	Acceptance of complexity	

Qualitative profile:

Q15 observes that there are multiple positions, the existence of which is accounted for on the basis of the complexity of the subject. This is evident in the phrases “there is much debate about which technique / approach is best..” and “this would be unavoidable as…the human mind is a complex phenomenon. Q15 actively explores how to make sense of the co-existence of multiple positions. There is evidence of differential valuing as Q15 suggests that some approaches are better, or relative to, particular situations or circumstances. This is expressed in the statement “it seems that there are separate approaches for separate issues”. An “eclectic approach”, which would represent a degree of differential valuing and a possibility of unity through the selection and combination of various ideas from a variety of positions, is also considered. This is again rejected on the basis that there are too many multiple positions to know. As an alternative, one may “adopt a specific approach”, but this is also rejected on

the basis that it would or not applicable for all situations. A final conclusion is not drawn, and it would appear that Q15 resigns to accept relativity. Knowledge is linked to social practices, as feminist theories respond to gender-based power relations. Q15 goes further to recognise that this link is time bound as theories "are becoming more and more popular". This point is not however elaborated on to include reference to criteria for justification of popularity. However, Q15 does make reference to the role of research in supporting theories, which suggests that authority is questioned and empirical criteria for justification are acknowledged. Q15's portrayal of knowledge also highlights complexity of knowledge which renders behaviour "difficult to pin down, explain and control for".

The most prominent feature of Q15's personal epistemology is an acceptance of the differential valuing of multiple positions framed in terms of relativity to context or subject. Complexity is also stressed. Applying the theorised dimensions of epistemological beliefs, certainty is strongly rejected in favour of multiple, relative positions. Complexity is likewise strongly accepted. Beliefs about source of knowledge appear to reflect a constructivist view of knowledge and a questioning of authority. High levels of sophistication regarding all three dimensions are indicated.

Participant 16:
Quote: "there is much in the field (e.g. mind, unconscious) that is not or cannot be studied objectively."

Actual data	First round of coding	Second round of coding
Psychology is an extremely diverse field that investigates almost every aspect of human functioning. Since it combines views from biology, philosophy and sociology, there is the possibility that it cannot be adequately categorized with any one field.	Recognition of complexity / inter-relatedness of knowledge	Complexity (inter-relatedness) method of enquiry

Many argue that it is a 'science', however many scientists believe that by this inclusion, the criteria for a science are made too broad.	Questioning of authority Recognition of differences in methods of justification. Judgment about justification	validity of method of enquiry Questions authority
This is ? ? that there is much in the field (e.g. mind, unconscious) that is not or cannot be studied objectively.	Recognition of nature of methods of justification Rejection of objective truth	
This sometimes leaves the student of psychology without a clear sense of where his expertise might fit in the academic world.	?	

Qualitative profile:

Q16 focuses on methods of justification, observing that "many argue that it is a 'science' however many scientists believe that by this inclusion, the criteria for a science are made too broad". Q16 considers that psychology many study things that "cannot be studied objectively". These comments illustrate that Q16 identifies different methods of justification and then makes judgement about their applicability and value. The second quote also suggests that Q16 rejects the possibility of knowledge as a representation of objective truth, specifically within the domain of psychology. The use of the phrase "many argue" also shows a sensitivity to difference in opinions of theories, which is consistent with a questioning of authority. Complexity is hinted at in terms of the observation that it is "extremely diverse", although complexity here would represent breadth as opposed to intricacy

The most prominent feature of Q16's epistemological beliefs is a reflection and judgment on different methods of justification and a rejection of certainty. Applying the theorised dimensions of personal epistemology, certainty is questioned, complexity, but only in terms of breadth, is accepted, and authority is interrogated. Q16 demonstrates low levels of sophistication regarding beliefs about complexity and high levels of sophistication regarding beliefs about source.

Participant 17: Quote: “A current debate relating to psychopathology is one that focuses on the role of culture in diagnoses and treatment of pathologies”		
Actual data	First round of coding	
I am currently studying towards attaining a BA Honours degree in psychology. I am interested in the clinical field. A current debate relating to psychopathology is one that focuses on the role of culture in diagnoses and treatment of pathologies. A major critique in this regard is how culture is defined and what it means to people and in terms of psychopathology.	Recognition of relativity to culture. Rejection of certainty.	Relativity to culture, social construction. This is directly related to questioning of authority as DSM. Recognition of need for justification, which is criticality, no criteria
Also, what constitutes normal and abnormal behaviour in terms of the DSM-IV classification system. It is important to acknowledge the role that culture plays in defining pathologies. Different cultures may experience similar symptoms of schizophrenia, anxiety, and childhood disorders for instance, but the causes thereof vary from culture to culture, particularly from a Western perspective or an Eastern perspective. The cause will have an impact on the treatment, for example, an Eastern family would have a better support structure than a Western family, thereby impacting on the treatment. It is essential therefore to locate the role of culture within the field of critical psychology relating to psychopathologies. It is important also to define culture and to emphasise what role culture plays in peoples lives.	Knowledge as social construction.	
Another issue is that of normal and abnormal behaviour and the classification of specifically abnormal behaviour in the DSM-IV classification system. It is a possibility that many ordinary or ‘normal’ living problems and behaviours are being classified as abnormal or deviant behaviours and disorders.	Rejection of certainty. Rejection of authority as ultimate source.	
A critical look at the classification system needs to be undertaken regarding this issue.	Recognition of need for justification but no criteria	

Qualitative profile:

Q17 argues that it is “important to acknowledge the role that culture plays in defining pathologies”. Q17 stresses that knowledge is culturally relative, and extends this to a rejection of authority as an unquestionable source of knowledge given that knowledge and authorities of it are culturally bound. This is most clearly reflected as Q17 relates the role of culture in “what constitutes normal and abnormal behaviour in terms of the DSM-IV classification system”. The strong cultural relativity is consistent with a constructivist view of knowledge. Q17 also points to the need for justification of knowledge which is framed in terms of a “critical look”, however the actual criteria for justification entailed in this are not explored.

The most prominent feature of Q17’s personal epistemology is relativity to culture, and secondly a rejection of authority as an unquestionable source. Applying the theorised dimensions, Q17 rejects certainty of knowledge by arguing for cultural relativity and this reflects a high level of sophistication regarding certainty. Complexity is not explicitly discuss. Authority as a source of knowledge is actively questioned, demonstrating high levels of sophistication.

Participant 18:

Quote: “Alternative perspectives need to be sought un order for psychology to be useful in the world”

Actual data	First round of coding	Second round of coding
it has been argued that psychology is a racist profession. This could be because of its Western origins and lack of inclusion of other perspectives such as the African and Eastern perspectives.	Relate knowledge to ideological / social practices. Knowledge as relative to culture	Relates to culture Multiple position

Many of its theorists are predominantly white males and from the west	Recognition of social construction of knowledge and role of the characterizations of the' authorities'	Relativity to culture
who based many of their studies around Western methods of healing.	Knowledge as relative to culture	
However, in recent years psychology has evolved and taken into account African and Western perspectives of healing.	Recognition of multiple positions. Inclusion of cultural knowledge seen as progress. Progress involves integration or multiplicity or relativity?	
I think that this is a very important step for the advancement of healing methods and agree that alternative perspectives need to be sought in order for psychology to be useful in the world.	Knowledge relative to culture or context. Rejection of authority as unquestionable source.	

Qualitative profile:

Q18 focuses on the cultural relativity of knowledge, noting that knowledge stemming from one culture only does not necessarily apply to other cultures. They first note the existing of multiple positions, evident in the quote "[psychology's] Western origins and lack of inclusion of other perspectives". This difference is then understood to result in knowledge being biased or "racist". This comment also indicates the existence of differential valuing as a single position is deemed to be insufficient. Q18 continues to argue that in order for knowledge to be "useful", it must take "into account African and Western perspectives of healing". It is not clear however whether ultimate aim is for other perspectives to be integrated, suggesting a possibility through unity, or whether these should be applied to the particular context from which they originate, suggesting a relativist stance. At the very least, it can be concluded that Q18 recognises that current knowledge is relative to culture. Analysis of Q18's passage highlights that an individual may have different beliefs about the current nature of knowledge, and what is ultimately possible.

Applying the theorised dimension, Q18 shows highly sophisticated beliefs about certainty by arguing for the existence of multiple positions and cultural relativity. Complexity is not explicitly discussed, and authority is rejected in accordance with cultural relativity and the need to recognise other perspectives. This is again consistent with high levels of sophistication.

Participant 19:

Quote: “it is multi-theoretical and this raises a lot of conflict between different schools of thought”

Actual data	First round of coding	Second round of coding
My field of study is not based on scientific conclusions. For e.g. we cannot go to a lab and study consciousness in a test-tube.	Recognition and evaluation of different methods of justification (empirical)	Multiple positions, leads to conflict
It is also not based into one testable theory	Recognition of multiple positions	Evaluation of methods of enquiry / justification
. Therefore it is multi-theoretical and this raises a lot of conflict between different	Multiplicity seen as leading to conflict	
schools of thought.	Positions are schools of thought – not truth	

Qualitative profile:

Q19 makes reference to multiple positions, framed in terms of “different schools of thought”. This is seen to lead to conflict, as expressed in the phrase “it is multi-theoretical and this raises a lot of conflict”. The point is not extended to a differential valuing of positions. Q19 does make reference to different methods of enquiry and justification in their reference to basing knowledge on “scientific conclusions”, and goes further to make judgements about the applicability of a particular method, namely empiricism. This is evidenced in the statement that “we cannot go to a lab

and study consciousness in a test-tube".

The most prominent features of Q19's personal epistemology is the recognition of multiple positions which are not differential valued, and the recognition of different methods of justification which are differentially valued. Applying the theorised dimensions of epistemological beliefs, Q19 moderately rejects certainty of knowledge in favour of multiple positions. However, t=allowance is made for the existence of 'one testable theory' so mild sophistication seems an appropriate rating. Complexity is not discussed, and Q19's evaluation of different methods of justification is consistent with a moderate questioning of authority. That is, being 'testable' suggests the possibility of accruing evidence for and against, based on empirical research, which goes against an unquestioning acceptance of authority.

Participant 20:
Quote: "It is not necessarily a debate against which is the ultimate theory"

Actual data	First round of coding	Second round of coding
Psychology is a discipline that has been around for a period of time and continues to evolve and advance	Progress is possible and continues	Progress is possible and occurring
. The sub-disciplines of psychology are vast and allow or a wide range of interests. New areas in psychology are constantly being created with more specific topics	Rejection of certainty. Recognition of social construction of knowledge	Identifies different methods of enquiry with different rules / criteria
. For example: social psychology. Social psychology is the study of psychology within a social context, considering issues such as intergroup relations, prejudice and several others. It originally started as an empirical school – having its basis in experimental studies and naturalistic	Recognition of different methods of justification.	Hint at differential value, but then accepts and values

observation.		multiplicity as richness
However after the crisis then developed and altered and now critical social psychology that takes a more social constructivist point of view in branched off from that.	Relates knowledge to ideology / social practice	Relates knowledge to social practices
I suppose the field of psychology and social psychology is so vast that branching off into different perspectives only increases the richness and knowledge of such a school of thought	Values multiplicity – seen as rich Positions are schools of thought – not truth	
. It is not necessarily a debate against which is the ultimate theory or way of understanding human behaviour	Rejects certainty of one position, almost rejection of differential valuing	
but rather enables different views and theories that are able to explain and show how each time from and specific theory has moulded the thoughts available today.	Accepts knowledge as relative to time, and context, and maybe also incomplete?	

Qualitative profile:

For Q20 knowledge is relative to time in that it “continues to evolve” and “new areas…are constantly being created”. With reference to evolution Q20 goes further to note that change is due to progress. The reference to new areas “created” also supports a more constructivist view of knowledge. Change in methods of enquiry is noted as Q20 asserts that social psychology has moved from an empiricist to a constructionist stance. The existence of multiple positions as “different perspectives” is acknowledged. Q20 continues to argue that “It is not necessarily a debate against which is the ultimate theory or way of understanding human behaviour but rather enables different views and theories that are able to explain and show how each time from and specific theory has moulded the thoughts available today”. This quote, as well as the statement that “different perspectives only increases the richness” provides evidence that Q20 embraces multiplicity, and rejects the pursuit of a singular truth. Thus there is no evidence of differential valuing, and instead a strong acceptance of multiplicity

The most prominent feature of Q20's personal epistemology is the acceptance of multiplicity and a rejection of differential valuing in pursuit of a single truth. Applying the theorised dimensions, certainty is strongly rejected in favour of multiplicity and relativity to time, reflecting highly sophisticated views. Complexity is mildly suggested through reference to the development and branching off the given field. This is best described as reflecting mildly sophisticated views as there is some recognition of breadth but no evidence for complication or intricacy. In the phrase "thoughts available today", highly sophisticated beliefs of authority are evidenced as authority, as a source of knowledge, is seen as fallible or incomplete.

Participant 21: Quote: Not applicable		
Actual data	First round of coding	Second round of coding
Psychology is a field that opens up a whole range of possibilities to the individual. With a postgraduate degree in psychology at the Masters level one can go into the field of research, counseling or even professional psychotherapy. One cannot only work at the individual level but at the community level too. Psychology leaves all this to you to decide – the only downfalls: after your bachelor's degree t takes four additional years to reach this level, and it's a real challenge to be accepted into a Masters program – so work hard from day one!	Absence of any critical reflection or commentary	

Qualitative profile:

Q21 did not provide a critical reflection of their field of study, and the text does not lend itself to being analysed in terms of how knowledge is portrayed

Participant 22:
Quote: Not applicable

Actual data	First round of coding	Second round of coding
Concerning the psychology Honours course I would firstly change selection processes on entrance to honours so that people who are not accepted into honours aren't given false hope. The course itself if structured well in the first semester however for assessment marks for psychoanalytic theory 2 essays counting for 60% of the mark is not reflective of capabilities. Likewise five hour research exam seems feeble in relation to practice and attainment of knowledge. My conclusion would then be that: the psychology discipline at Wits appears to be lazy, material is not interactive enough, and assessment is not based on practicality.	Absence of any critical reflection or commentary	

Qualitative profile:

Q22 did not provide a critical reflection of their field of study, and the text does not lend itself to being analysed in terms of how knowledge is portrayed. The greatest insight into their beliefs comes from their comment that a five hour exam “seems feeble in relation to practice and attainment of knowledge”. This comments implies that Q22 accepts that knowledge is complex and is bound to social practice, although such a conclusion cannot de firmly drawn.

Participant 23:
Quote: “All these approaches are just different ways of trying to understand and interpret the human condition, and there is no one approach that is better”

Actual data	First round of coding	Second round of coding
The field of psychology is very broad and offers many different perspectives– ranging from social psychology to clinical psychology.	Recognition multiplicity Position is a perspective – not truth	multiple positions co-exist
What these areas have in common is trying to understand the human condition in a variety of contexts – from the individual to the community	Recognition of complexity of knowledge. Rejection of certainty	opportunity for unity and complementary in multiplicity, but multiplicity accepted
The different approaches to psychology echo the period of the time they were conceptualized, for example feminism applied to psychology obviously came about with the feminist movement.	Relates knowledge to ideology / social practice	
All the approaches are just different ways	Accept multiplicity as opposed to relativity	influenced sociology

of trying to understand and interpret the human condition	Recognition of complexity. Interpret = knowledge as constructed	knowledge constructed (interpretation as limit of knowing)
, and there is no one approach that is better than the other, rather they are complementary.	No differential valuing (multiplicity does not entail conflict)	complexity (as multi-layered, contextual?)
The same as humans are multi-layered, so too are the ways in trying to understand them	Acceptance of complexity	
However, for me, I believe that at the heart of all the approaches must be a sense of empathy, in trying to understand and enter into the feelings that another person is experiencing. This underlying concept is key	Value a integration as some level of different positions	
to accurate understanding and interpreting of the person.	Rejection of certainty. Knowledge as constructed	

Qualitative profile:

Q23 recognises multiple positions, or “different approaches”. These are not differentially valued in that “no one approach is better than the other” however there is an opportunity for unity as positions can be “complementary”. That no approach is better illustrates Q23’s rejection of a relativist stance in favour of multiplicity. Q23 points to the relation between knowledge and social practice by remarking that “different approaches to psychology echo the period of the time they were conceptualized”. Q23 believes that knowledge is complex in that it is “multi-layered”. Also, Q23 speaks of “trying to understand and interpret” which supports the idea that the subject matter is complex. By talking in terms of interpretation, it would appear that Q23 favours a more constructivist view of knowledge as opposed to a knowledge being a representation of objective truth.

The most prominent feature of Q23’s personal epistemology is the acceptance of multiplicity and a rejection of certain knowledge. Applying the theorized dimensions, Q23 shows high levels of sophistication by rejecting certainty of knowledge both in terms of their being a single truth or that knowledge is constituted by representations of objective truth. Q23 likewise shows highly sophisticated views of complexity by highlighting

'multiple layers'. Authority is not bolindly accepted in that approaches are seen as relative, which reflects high levels of sophistication.

Participant 24: Quote: "I believe certain aspects of psychology are too interpretive and rely on a lot of subjectivity."		
Actual data	First round of coding	Second round of coding
Psychology is an extremely useful field in that it associates mind and behaviour. The main [aim?] is to determine why people behave in a certain manner.	Absence of any questioning of certainty, no exploration of complexity.	Alludes to certainty in terms of objective truth (causes of behaviuor, and help) Identifies the existence of subjectivity but rejects it, does not tolerate differences and lack of certainty. No differential valuing. But suggests that there have been advancements. No judgement.
Furthermore psychology allows people to overcome any negative events that have occurred to them or maladaptive behaviour	Absence of exploration into complexity, acceptance of certainty	
I believe certain aspects of psychology are too interpretive and rely on a lot of subjectivity.	Rejection of knowledge as construction, rejection of relativity and objectivity	
This can be problematic when it comes to individuals interpreting things in different manners	Lack of certainty experienced as problem	
However, it still remains a field with a lot of advancements.	Progress is possible and happening. Not explained or elaborated.	

Qualitative profile:

Q24 implies that knowledge provides certain answers in that they refer to the field as determining causes of behaviour and its role in “allowing people to overcome...maladaptive behaviour”. They identify the existence of subjective interpretation in the field, but find this “problematic”. It would thus appear that they accept certainty in terms of objective truth, and find the lack of certain, singular truths distressing. Amidst the multiplicity which is viewed as problem, however, Q24 makes no reference to differential valuing of different positions. Also, despite the lack of certain truths, it is asserted that progress has occurred in the field, in the concluding phrase that “it still remains a field with a lot of advancements”. There is however no elaboration of this point and no criteria for advancement is offered.

The most prominent feature of Q24’s personal epistemology is the rejection of subjective interpretation in favour of knowledge as representation of objective truth. Applying the theorized dimensions of personal epistemology, Q24 moderately values and accepts certainty as objective truth, demonstrating highly naive views. Neither complexity nor source of knowledge are explored.

Participant 25:
Quote: “But as psychology is a study of humans, each individual, personal ideas and theories are valid.”

Actual data	First round of coding	Second round of coding
Psychology is a field with many theories and standpoints.	Recognition of multiple positions Positions are standpoints not truths.	Multiple positions, that conflict with each other, is

It is a fluid field of study in that it continuously changes	Recognition of relativity to time. Rejection of certainty	reference to differential valuing but ultimately multiplicity is accepted. Relative to time
. It focuses on people, their behaviours, their beliefs, their mind and their brain each aspect is unique and has many standpoints	Recognition of multiple positions	
Each view has it's positives and negatives.	Makes judgment about worth of different positions	
. As one walks through this text book a critical yet open mind is important.	Values reflection and judgement	
It is often was to be pulled into one 'school' of thought	Position as school of thought – not truth	
as sometimes the various points of view appear to not be able to live together, i.e. either or, rather than a combination.	Recognition of difference beyond integration. Highlights need to make judgments of worth.	
Students may feel that they are unable to exert their viewpoint for various reasons.	?Authority? Positions are viewpoints - not truths.	
But as psychology is a study of humans,	Reference to (nature of) domain	
each individual, personal ideas and theories are valid.	Accepts multiplicity as opposed to relativity	

Qualitative profile:

Q25 speaks of "many theories" and "many standpoints", highlighting the co-existence of multiple position. This is seen to lead to conflict in terms of some positions being unable to "live together" and the possibility of unity through "combination" is denied. There are several overt suggestions of differential valuing, for example "a critical yet open mind is important", and "each view has it"s positives and negatives". However, multiplicity is

ultimately accepted as the text concludes that “each individuals, personal ideas and theories are valid”. This is overtly linked to domain as the phrase begins with “as psychology is a study of humans”. Lastly, although the need for reflection and judgement is made, no criteria for justification are offered.

The most prominent feature of Q25’s personal epistemology is the recognition and acceptance of multiplicity in terms of the co-existing of multiple positions. While each position has negatives, ultimately they are all equally valid. Applying the theorized dimensions, Q25 strongly embraces multiplicity which reflects high levels of sophistication regarding certainty. Complexity is not addressed. Source of knowledge is not explicitly discussed but reference to keeping a ‘critical yeet oen mind’ suggests that authority is questionable, indicating high levels of sophistication.

Participant 26:
Quote: “Psychology is a multifaceted discipline”

Actual data	First round of coding	Second round of coding
Psychology is a multifaceted discipline that concerns itself with a great number of topics encompassing the broader topic of human behaviour.	Recognition of complexity	Complexity in terms of multifaceted and breadth
Because of its diverse nature, psychology draws on a wide range of methodologies including qualitative and quantitative kinds.	Recognition of different methods of justification	Recognition of different methods of enquiry
Included in these topics are concerns relating to mental illness, group dynamics, development, pathologies, therapeutic interventions and generally anything that has to do with the mind.	Absence of any exploration into uncertainty…	

Qualitative profile:

Q26 observes that the field is “multifaceted” and deals with “a great number of topics” which illustrates a recognition of complexity but complexity as a matter of breadth as opposed to intricacy. Different methods of enquiry are referred to but there is no discussion or appraisal of these. Similarly, content areas such as “mental illness” and “anything that has to do with the mind” are noted in a matter-of-fact tone and there is no interrogation. The absence of any critique would suggest then that Q26 has naïve beliefs regarding the certainty, structure and source of knowledge, however there is no direct evidence for this and strong conclusions cannot be drawn.

Participant 27:
Quote: “The work is lectures, with students input such as seminars and reading. This is a good method of learning”

Actual data	First round of coding	Second round of coding
Psychology is taught as a purely academic degree through to the Honours years, and practical training begins at a Masters level.	Identifies distinction between ‘academic’ knowledge and ‘applied’ knowledge	Knowledge as received and constructed
Unfortunately, the places for Masters are limited and this process turns people (who should sometimes be given opportunities) away. The work is lectured, with students input such as seminars and reading. This is a good method of learning.	Identifies preferred learning strategy – involves received knowledge as well as constructed knowledge	Learning strategy
The process of doing a research educates and ? student capabilities to a higher level.	Absence of explanation as why research is important for education.	

Qualitative profile:

There is little evidence upon which to infer the epistemological assumptions of Q27. Reference is made to both passive and active learning processes (framed as lectures and student-led seminars), which may be taken to reflect a degree of acceptance of both authority and the self as a source of knowledge, however there is insufficient data to be able to draw firm conclusions about Q27's beliefs.

Participant 28:
Quote: "The current literature depicts motherhood through a homogenous lens"

Actual data	First round of coding	Second round of coding
My research study aims to explore the personal experiences of motherhood experienced by mothers within the SA context. There is a gap in the current literature regarding how race, culture and personal belief systems may contribute to the mothering process.	Recognition of complexity	Questions authority in the form of literature – incomplete and incorrect
.Additionally, the current literature depicts motherhood through a homogenous lens	Rejection of authority as unquestionable. Rejects certainty	Implication of complexity thru circumstance and multiple factors
Qualitative methods will be used in order to obtain in-depth accounts of these experiences.	Recognition of different methods of enquiry, complexity	

. Psychology (ironically) perpetuates the stereotypes surrounding motherhood and the mothering process. I feel that each individual (mother) and each child is unique as well as the circumstances in which the mothering process occurs and thus it is not absurd to think that there is a diverse nature regarding mothering which often (not always) can be defined as adequate, or 'good'.	Recognition of relativity of value Knowledge as related to and influencing social practice	

Qualitative profile:

Q28 questions authority, as embodied as "literature", in terms of it being incomplete (in that "there is a gap") and biased (in that it "depicts"). This questioning of current authority and knowledge is consistent with a rejection of the certainty of knowledge, however it may instead be the case that Q28 believes that certainty is possible but not yet reached. Q28 implies an appreciation of complexity of knowledge in that reference is made to the contribution of various factors in, or circumstances surrounding, a given concept. Reference is also made to different methods of enquiry or methodologies with different strengths through their comment that "qualitative methods will be used in order to obtain in-depth accounts". The most prominent feature of Q28's personal epistemology is a questioning of authority and appreciation of complexity.

Applying the theorized dimensions of personal epistemology, it is not clear what Q28's beliefs about the certainty of knowledge are although more evidence points to a moderate rejection of certainty. The most appropriate rating given the ambiguity is low levels of sophistication. Complexity in the form of multiple factors is accepted, and authority as embodied by literature is strongly questioned. Q28 thus demonstrates high levels of sophistication from complexity and source.

Participant 29:

Quote: “Instead of trying to prove as ‘fact’ I believe it should focus more on understanding of individuals”

Actual data	First round of coding	Second round of coding
Psychology has always aimed at being a science,	Recognition of different methods of justification	Recognition and differential valuing of methods of enquiry and justification (art vs science) Related science to predictable and constant truths (implies objectivity). Relates art to understanding, which involves appreciating difference and subjectivity. Field should not prove as fact - because of the field or because fact does not exist?
and in doing so I believe it has jeopardized some of its fundamental characteristics	Makes judgments on different methods of justification	
. Instead of trying to prove as ‘fact’ I believe it should focus more on understanding of individuals, and personal perceptions.	Rejection of certainty. Certainty not valued in this domain. Consistent with subjectivity and complexity	
In trying to be a science it assumes people are the same, and compromises the view that everyone has a unique view of the world.	Acceptance of relativity and subjectivity	
This would obviously apply to methodologies such as quantitative studies or involving statistics etc.	Recognition of different methods of justification.	
I feel that instead of focusing on nature versus nurture, assuming a right versus wrong,	Rejects certainty	
psychologists should aim to understand what personal experiences are, rather than fact. I just feel that I should be viewed as more of an art, rather than a science.	Makes judgment about what is valuable about knowledge. Accepts relativity to individual	

Qualitative profile:

The text produced by Q29 focuses on methods of enquiry reflecting on whether psychology should be considered an art or a science. Q29

recognizes the two different methods of enquiry and/or justification and argues that the specific field of psychology should operate as an art and not a science. Q29 relates science to the uncovering of facts about predictable and constant truths which Q29 feels this method inappropriate for the given field because “it assumes people are the same, and compromises the view that everyone has a unique view of the world”. A question arising from Q29’s text, is whether Q29’s view of psychology as an art has implications for knowledge or rather for psychology. In other words, can knowledge be acquired through both science and art, or is psychology rather just not about knowledge? Given that allowance is made for science in quantitative studies and statistics, and that the proving of facts is not debated, it would appear that Q29 holds that objectively true knowledge is possible, but not within the domain of psychology. However, psychology is in no way devalued because of this. Q29 appears to believe that the subject matter is complex in that they refer to “aim[ing] to understand”. The phrase suggests that understanding is not easy to attain which in turn suggests that the subject matter is complex.

The most prominent feature of Q29’s personal epistemology is a recognition of the existence of different methods of enquiry that have different rules and roles. Q29 would appear to believe in the possibility of objective truth although it is argued that the given field does not readily partake in such truth which, moreover, is not viewed as a weakness. Applying the theorized dimensions of personal epistemology, Q29 accepts certainty of knowledge but in some domains only. This is best described as mildly naive views in that some knowledge can be certain. Complexity is implied through reference to everyone’s uniqueness, but there is no clear evidence upon which to base a rating. Similarly, beliefs about the source of knowledge cannot be inferred.

Participant 30:

Quote: “there are no necessarily right or wrong answers”

Actual data	First round of coding	Second round of coding
Psychology is a multidimensional discipline.	Recognition of complexity	Multiple positions, frustrating but accepted Multiple methods of enquiry Recognition of complexity
It incorporates a vast amount of different perspectives	Recognition of multiplicity Positions are perspectives – not truths	
and methodologies.	Recognition of different methods of enquiry	
There are many different facets that make up the discipline	Recognition of complexity	
and there are many ways of approaching various subjects.	Recognition of multiplicity	
This means that there are no necessarily right or wrong answers	Rejection of certainty	
which can sometimes be frustrating.	Uncertainty experienced as frustrating	
Psychology is a discipline that requires a lot of time, patience and understanding and one should never expect to find any clear cut’ answers.	Rejection of certainty Rejection of simplicity Rejection of authority as giving ‘answers’	

Qualitative profile:

While Q30 recognises the co-existence of multiple positions and the absence of certainty, as expressed in “there are no necessarily with of wrong answers”, Q30 experiences this as “frustrating”. Thus while certainty is rejected it is not done so comfortably. Similarly, the absence of “clear cut

answers" shows an appreciation of complexity of knowledge and a rejection of certainty. There is also reference to multiple methods of enquiry, or "different methodologies" but no evaluation is involved and justification is not discussed.

The most prominent feature of Q30's epistemology is a rejection of certainty, in terms of singular and definite answers. Despite assertions about there being no right or wrong answers, mild as opposed to high levels of sophistication appear a more reasonable rating given Q30's reluctance to accept such a stance. That is, they appear to recognise lack of certainty but do not embrace it. Reference to 'multidimensional' shows recognition of complexity although that this is not explained or supported suggested a rating of mild sophistication. Source of knowledge is not discussed.

Participant 31:

Quote: "clinicians are too quick to go by set guidelines such as the DSM and label a person with a diagnosis without looking at him / her holistically and within their contexts"

Actual data	First round of coding	Second round of coding
I am studying psychology and feel that often, in order to make a diagnosis of a disorder, clinicians are too quick to go by set guidelines such as the DSM or ICD classification systems	Rejection of authority as ultimate source	Rejection of authority Acceptance of complexity
and label a person with a diagnosis without looking at him / her holistically and within their contexts.	Acceptance of relativity to individual Acceptance of complexity	
This label 'sticks' to the person and may have serious consequences for him / her and their families.		

Qualitative profile:

Although there is little text to analysis, it is clear from Q31"s statement that "clinicians are too quick to go by set guidelines…without liking at him /her holistically and within their context" that Q31 recognises complexity in knowledge. The claim also indicates that Q31 questions authority as a source of information, which is further supported by the description of the DSM as "guidelines". The most prominent feature of Q31's personal epistemology is hence a recognition of the complexity of knowledge, as well as a questioning of authority as a source of knowledge. Applying the theorized dimensions, then, Q31 does not discuss certainty of knowledge, but acknowledges the complexity of knowledge and questions authority as a source. High ratings of sophistication for complexity and authority are evident

Participant 32:

Quote: "there are relatively few stable theories that can be regarded as fixed and stable"

Actual data	First round of coding	Second round of coding
Psychology is an ever-changing field that is in constant flux.	Recognition of relativity to time.	Relative to time, constantly changing.
It is a relatively new field and so therefore open to debate and criticism.	Rejection of certainty. New field implies that this might change with time	Knowledge changing in terms of new ideas (not sure if construction or discovery)
It also therefore means that new ideas and theories are constantly filtering into the field	Knowledge as constructed	
All this means that there are relatively few stable theories that can be regarded as fixed and stable	Rejection of certainty	Multiliciplity accepted in

For example, the DSM is composed of categories that tend to be changed every few years. These categories are characterised by boundaries that tend to cross one another. Further, because the field of psychology is composed by a number of contrasting and opposing theories, the DSM is atheoretical so that if can by used by all clinicians. However clinicians rest their practice on different models of psychology and so communication across the field becomes characterised by subclasses of the field that often remain closed. That is, clinicians drawing on one model often do no communicate and work with clinicians drawing on another model.	Multiple positions Rejects knowledge as re-presentation, knowledge as constructed?	terms of few stable or fixed theories. No certainty. No differential valuing Multiple positions prevent communication, represent deep divide. Knowledge seen to inform practice / social

Qualitative profile:

Q32 stressors that knowledge is “ever-changing” with “new ideas and theories constantly filtering into the field”. Knowledge is thus portrayed as relative to time. The reference to “ideas” and “theories” also suggests that certainty in terms of fixed objective truth is denied. Q32 also rejects certainty with reference to the co-existence of multiple positions, or “a number of contrasting and opposing theories”. While the potential for multiple positions to result in conflict is acknowledge, Q32 shows no evaluation of the positions and no judgment is passed when referring to clinicians who work with different models. Q32 notes that social practices are informed by or “rest” on theory and so knowledge is related to social practice, though in this case knowledge informs practice and not the other way round. Of interest also is reference to an “a-theoretical” classification system which can be used be all practitioners regardless of theory. This statement could suggest that Q32 believes there to be an objective truth that exists outside of or beyond theory.

The most prominent feature of Q32’s personal epistemology is acceptance of multiplicity and the absence of differential valuing even though co-existence of multiple positions causes conflict. Relativity to time is another key feature. Applying the dimensions, arguments are made for the rejection of certainty. Complexity is not addressed. Source of knowledge is not discussed in detail, but reference to the changing classification

system and clinicians reference to various models, provides evidence for mildly sophisticated beliefs.

Participant 33: Quote: “There are various schools of thought that have different stances”		
Actual data	First round of coding	Second round of coding
The field of psychology studies interpersonal and intrapersonal issues. Hence it is an umbrella term for self understanding, where the aim is psychological awareness and choice.		Multiple positions, no differential valuing
There are several schools of thought, that have different stances – humanistic, behavioural, biological and so on	Recognition of multiplicity Positions are schools of through – not truths	Empiricism referred to as method of justification
This issues are researched through a variety of means – questionnaires, interviews, focus groups – that can study many topics.	Recognition of different methods of enquiry	Complexity in terms of breadth of subject matter covered but no questioning
Psychology ? ? vast range of issues and themes – from mental disorders, to culture, to personality, to dream analysis, to relationship interactions	Recognition of complexity	
Different schools of psychology include psychodynamic, CBT, and many others.	Absence of any judgement about value of different positions	
Psychology is unique field, as it requires self-?ment, self-awareness and the willingness to change.		

Qualitative profile:

Q33 makes reference to the co-existence of multiple positions, framed as “several schools of thought”, as well as empiricism as a method of enquiry, framed in terms of the use of such methodologies as interviews and focus groups. However, Q33 neither elaborates on nor interrogates these points. Similarly, complexity is hinted at in terms of the breadth of subject matter, “vast range of issues”, but no reference is made to complexity as intricacy or ambiguity. The most prominent feature of Q33’s personal epistemology is a reference to multiple positions. In terms of applying the theorised dimensions, the reference to multiple positions represents a mild rejection of certainty and hence mild levels of sophistication. Complexity as a matter of difficulty is not identified which constitutes an absence of evidence. There is no evidence upon which to infer beliefs about source of knowledge.

Participant 34:
Quote: “I disagree with the seminar / class led lecture method.”

Actual data	First round of coding	Second round of coding
My main critique is that during the undergraduate years, we get no practical experience whatsoever. Also at honours level (where I’m at) with regards to the theoretical training, I disagree with the seminar / class led lecture method.	Reference to learning strategy. Rejects student involvement / contribution to construction of knowledge?	Mild rejection of student involvement in learning
Overall I think we need many more psychologists in SA, but is made very difficult to get into due to limited numbers taken in.		

Qualitative profile:

There is little evidence of Q34's personal epistemology. The only inference that can be drawn is a mild rejection of student involvement in the construction of knowledge, inferred from the claim that "I disagree with the seminar / class led lecture method". However, since no reason or insight is offered, it is not clear whether Q34 believes that authority is instead an unquestionable source of knowledge.

Participant 35:
Quote: "I think that the advances resulting in the many different types of therapy may serve to confuse the population and it needs to be clearly explained"

Actual data	First round of coding	Second round of coding
Psychology is a field of study focussing on the internal world of people. I think that the advances resulting in the many different types of therapy	Recognition of multiple positions Possibility of progression	Progress is a possibility
may serve to confuse the population and it needs to be clearly explained as to what therapy is as it would encourage people to see a therapist as the stigma would be reduced.	Multiple positions may be confusing Acceptance of certainty	Multiple positions, leads to confusion
Also, a thorough understanding of what it actually is in therapy that helps	Striving for certainty which hasn't yet been reached.	Acceptance of objective truth, can be reached
needs to be explored further.	Knowledge currently incomplete but suggestion that full understanding can be researched.	

Qualitative profile:

Q35 recognises multiple positions in terms of “many different types of therapy” but seems to find this intolerable as it is “confusing”. Despite this, however, Q35 attributes the existence of multiple positions to “advances” in the field. These two ideas appear to be logically incompatible as one would assume that advances in knowledge would represent a move away from confusion. This interpretation of Q35’s personal epistemology points to the possibility that an individual’s belief system may be ‘illogical’ or inconsistent. Q35 continues to argue that the subject matter “needs to be clearly explained”. The quote is suggestive of both an acceptance of authority and certainty. Regarding authority, the phrase embodies the idea of an authority that knows and can explain to the uninformed. Regarding certainty, the possibility of a clear explanation suggests that there is a singular and objective truth that can be communicated. An acceptance of certainty, also as the existence of a singular objective truth, is also evident in the reference to “what it actually is”. The prominent features of Q35”s personal epistemology is hence an acceptance of certainty in knowledge with respect to singular objective truth as well as an intolerance of multiple positions. This can be described in terms of high levels of naivety. While complexity is not discussed, there is a firm acceptance of an authority that can explain to the population, and this again reflects high levels of naivety.