Critical Thinking: A Neo-Aristotelian Perspective

Gerry Dunne

A thesis submitted in fulfillment of the requirements of the degree of

Doctor of Philosophy

Trinity College Dublin, the University of Dublin

2019

Declaration

I declare that this thesis has not been submitted as an exercise for a degree at this or any other university and is entirely my own work.

I agree to deposit this thesis in the University's open access institutional repository or allow the Library to do so on my behalf, subject to Irish Copyright Legislation and Trinity College Library conditions of use and acknowledgement.

Summary

Critical thinking is commonly marketed as being one of the most desirable outcomes of higher education (Bailin & Battersby, 2009; Facione, 1990; Scheffler 1973; Siegel, 1988; 1997; 2017). Given its exalted prominence within educational discourse, theorists might reasonably expect a certain degree of conceptual uniformity in the literature. This is, however, not the case (Lau, 2015; McPeck, 1981). Though several extant expositions exist, there is still no clear agreement concerning the "referent of the term" (Siegel, 1988, p.5). This lack of conceptual clarity is arguably cause for concern, given that, "critical thinking is one of the defining concepts of western education, which enjoys widespread endorsement" (Barnett, 1997, p.1).

Against this backdrop of conceptual elusiveness and imprecision, this dissertation seeks to establish, and subsequently defend, a neo-Aristotelian account of the phenomenon. The central thesis of the project posits that, until such time as theorists have a clear understanding of what critical thinking is, including, how it works, educators will remain unclear as to what sort of educational accomplishments are required if one is to be rightly considered a critical thinker, and what pedagogical means are likely to be successful in teaching people to think critically.

To better understand the conceptual richness of critical thought, this project suggests that one must, in the first instance, fully understand the evolution of critical thought, from its early incarnation as formal and informal logic, to Aristotle's account of practical judgment, right up until its influential role in shaping social critical theory, and from here, its present incarnation in philosophy of education as a "critical spirit" and "reasons-assessment" framework (Siegel, 1988, p.23).

I then turn to one of the necessary conditions of critical thought in the form of argumentation, focusing on the normative principles of appraising deductive, inductive, causal, evidentialist and probabilistic arguments. This chapter then appraises the pragma-dialectical approach to argumentation, before briefly examining two key principles often used by interlocutors to obfuscate rational discourse, namely the burden of proof and the appeal to ignorance.

From here I argue that determining the probative reasons supporting one's claims to knowledge is the principal duty animating a critical thinker's enquiries. This undertaking necessitates an evaluative phronetic judgment, a judgment based on *reasons* that must satisfy specific standards or thresholds of sufficiency and acceptability (Bailin, Case, Coombs & Daniels, 1999b; Siegel, 1988, 2017; Gilbert, 2014). To make an informed and defensible critical judgment about what one ought to believe, accept or do, this project argues for the importance of critical thinkers personifying the prototypical *phronimos*, or person of practical judgment. This project argues that, only a *phronimos* can accurately discern, which rules (and which reasons), if any, should be regarded as decisive in a given situation (Dunne, 1993). Further still, only a *phronimos* is disposed to, and capable of, appropriately stress-testing the strength of an individual's reasons supporting their beliefs and actions (Dunne, 2015b). Accurately understanding the nature and probative force of reasons is key to critical reasoning, argumentation, and judgment (Audi, 2015; Siegel, 1998; 1997; 2017). On this basis, I argue for the inclusion of a specific typology of probative normative reasons with which critical thinkers ought to concern themselves in the practical domain. These reasons comprise: (i) evidential force and relevance; (ii) reason defeaters and undefeated reasons, and (iii) motivating and explanatory reasons.

To conclude, this project critically examines four of the main barriers to the effective deployment of critical thought. The argument is made that, individually and collectively, 'bounded rationality' (Simon, 1957, p.198), System I and System II thinking (Kahneman, 2011), cognitive biases, and finally, unwarranted assumptions, namely, paradigmatic, prescriptive and causal (Brookfield, 1995), significantly impede the quality of critical reasoning and judgment.

Acknowledgements

There are known unknowns; there are things that we know that we do not know. We also know there are known unknowns; that is to say, we know there are some things we do not know. But there are also unknown unknowns-the ones we do not know we do not know.

(Donald Rumsfeld, 2002, quoted in du Sautoy, 2016, p.11).

This Ph.D. has certainly been a *tour de force*. As a labour of love, it would not have been possible without the love, support and encouragement of so many people. Firstly, thanks to my supervisor, Dr. Aidan Seery for his forbearance and support. Thank you to my wonderful wife Áine, without whom this project would surely have driven me to despair. Thank you to my family and to my friends Emma, Marielle, Áine, Alison, Maja, Jillian, Patricia, Paula and Michael for keeping me grounded over the last few years. To my beloved girls - Róisín and Aisling - this is for you! You bring an unparalleled joy to my life, for which words betray understanding.

Abstract

This dissertation seeks to cultivate a deeper conceptual understanding of critical thinking within the philosophy of education tradition. For until such time as theorists understand what critical thinking is, including, how it works, educators will remain unclear as to what sort of educational accomplishments are required if one is to be rightly considered a critical thinker, and what means are likely to be successful in teaching people to think critically. Within this context, the dissertation argues for a neo-Aristotelian conceptualization of critical thought based on Harvey Siegel's (1988, p.23) "reasons-assessment" criteria. Here I argue for the importance of critical thought embodying the prototypical *phronimos*, where habituated deliberative excellence accurately determines undefeated or decisive reasons for normatively-calibrated actions in the practical domain. This judgment (*proairesis*) is based on stress-testing the strength of normatively-calibrated reasons supporting a given course of action. Drawing on theorists such as, Dunne (1993), Paul & Elder (2002; 2005; 2007; 2009), and Siegel (1988; 1997; 2017), I proffer a new conceptual explication of criticality, one which integrates phronetic deliberation and judgment with a deep sensitivity and responsiveness to the probative force of reasons-normativity in accurately determining undefeated reasons for "knowing what one should do" in the practical domain (Anscombe, 1957, p13).

Table of Contents

List of Figures

Chapter One: Introduction

1.0   Introduction

This dissertation seeks to contribute to a deeper understanding of the conceptual nature of critical thinking as phronêsis, within the philosophy of education tradition (Standish, 2007, p.169). For until such time as theorists have a clear understanding of what critical thinking is or amounts to, educators will remain unclear as to what sort of educational accomplishments are required if one is to be rightly considered a critical thinker, and what means are likely to be successful in teaching people to think critically. Against this backdrop, the project argues for a reasons-calibrated approach to the study of critical thinking. Drawing on theorists such as Bailin & Battersby (2009; 2015), Paul & Elder (2002; 2009), and Siegel (1988; 1997; 2017), this project advances and defends a neo-Aristotelian reasons-calibrated conception of criticality.

1.1   Research Inspiration

In many respects, this dissertation was in gestation for quite a long time. In a previous incarnation as a secondary school teacher, I was always more interested in, not necessarily *what* students thought, but rather *how* they thought. How they thought, I later discovered, was in part, the product of how they were *taught*. In constructivist settings, such as the classroom, the principles of free-enquiry, creativity, forensic questioning, collaborative thinking, interrogative reasoning and independent thought, were, in my experience, not adequately nurtured, nor were they sufficiently valued. Should a question arise, the answer surely lay in the textbook. Failing that, perhaps the teacher would know. Outside these options, there was the omniscient Google, where students, time and again, exemplified their individual epistemic thresholds for believing or accepting something to be true. Under this system, I felt alienated. I questioned my role; I questioned my conception of what it means to be a teacher; I questioned who gets to decide the value of what is worth knowing, and I questioned the long-term effects of these insidious epistemic vices infecting the minds of my students as they journeyed through their secondary education.

Through over a decade in the classroom, I derived more satisfaction from collaborative enquiries ending in *aporia* (an irresolvable internal contradiction or logical disjunction in a text, argument, or theory), or at the very least, a heated exchange between two diametrically opposed camps, each of which felt their claim to knowledge was superior to that of their peer group, than I ever did as a purveyor of incontestable facts. As an English teacher, there was considerable scope for critical enquiry. Poetry, for instance, calls for an informed and engaged hermeneutic response, whilst compositions embraced the irreducible richness of first-person lived experience, transubstantiated through the medium of language. In both these regards, teaching literature was a deeply positive and rewarding experience.

Likewise in Religious Education and Philosophy, I very much enjoyed when students vacillated from states of supposed certainty, to inconsistency, to uncertainty, and back again, all during the course of a single lesson. Students often told me of their sense of frustration, and even, sporadic bittersweet joy, as they tentatively embarked on the process of subjecting their deep-seated beliefs and values to constructive probing questioning in a supportive, caring and collaborative community of enquiry setting. As a teacher of History, I enjoyed the thrill of propositional knowledge, of knowing, and always being able to demonstrate, what a student knows or can do as a result of their learning. To all intents and purposes, teaching History validated my preconceptions of what a teacher ought to be like. And so, there was an inner tension: there was a tension between the enquiry-focused advocate of cognitive dissonance and discovery on the one hand, and the verifiable, incontrovertible safety of uncontested propositional knowledge on the other. The latter was safe; the former was what I always wanted education to be.

 When I moved to university teaching eight years ago, I assumed students were duty-bound to know the strength of the reasons on which their claims

to knowledge were based. I also assumed that they would relish the challenge of formulating reasoned judgments based on a comparative evaluation of several competing arguments from the literatures they are studying. After all, students were expected to prize truth above all else; they were expected to avoid just blindly accept truth-claims. Indeed, my idealistic expectations at the time stretched as far as assuming that students would question the cogency of all truth-claims, regardless of where they originated from in order to reach a defensible judgment about what one ought to believe or do.

Eventually I realized that to appropriately scrutinize truth-claims, students (myself included) require a deep understanding of the procedures through which we stress-test the strength of the reasons supporting one's beliefs or actions (Dunne, 2015b). To accomplish this, we need to explore the nature and scope of argumentation, including the types of reasons critical thinkers ought to concern themselves with. In addition, we also require a sufficiently fluid 'model' of judgment that does not reduce these reasons to simple aggregates, but rather one that attends to the richness of insight and situated experience, both from an internalist and externalist perspective (Kornblith, 2001). And so, in the practical domain, I argue for a reconceptualization of the Aristotelian concept of *phronêsis,* embodied in the *phronimos,* or person of judgment (Aristotle, 2011: EN Bk. VI). Part of this reconceptualization necessitates the *phronimos* exhibiting, "not only a deep attentiveness and sensitivity to reasons, as they emerge, one at a time, but a capacity to amalgamate them, weigh them, and prioritize them, in order to reach an informed judgment about what to believe or do" (Blackburn, 2010, p.13). In so doing, the *phronimos,* or person of judgment, exemplifies a rich resourcefulness, a bridge between situated experience and insight, and a deep sensitivity to particularity, context and reasons. In this way, the phronetic approach avoids subjecting situations to procrustean applications of the general rule (Dunne, 1993).

1.2   Why a Conceptual Study?

When I began researching this topic, initially I wanted to devise a domain-specific 'Critical Thinking Test' to gauge the critical thinking skills and abilities of students from disciplines such as: medicine, philosophy, science, and psychology. Within a year, it became clear that, since there was no clear agreement regarding the referent of the term, no assessment rubric nor instrument that purports to assess it, could ever be appropriately justified or defended.

After much reading, I decided to embark on a conceptual of critical thinking. From the literature it was clear that critical thinking is a contested topic, one which yields myriad different conceptualizations, some of which are better than others. In truth, the commitment to a conceptual focus was a difficult decision, for the reason that conceptual expositions tend to be highly abstract, and in some cases divorced from reality. But I kept coming back to the original point: if educators are not clear about what critical thinking is, how can they possibly teach it, learn it, practise it, refine it, or even explain it to others satisfactorily?

And so, despite my initial reluctance, I set about generating a neo-Aristotelian informed *dénouement* of criticality. In using the term *dénouement*, this project is not suggesting that the deliberations therein represent a terminal juncture in proceedings. This could not be further from the truth. Instead, this dissertation adopts a literal translation of the term to explain the principle of "unknotting" or "disentangling" phenomena for purposes of edification.

1.3   Research Questions

Three questions guide the focus of my enquiry throughout. They are framed as follows:

- What is the most cogent normative conceptualization of critical thinking in the literature?
- What abilities, skills, dispositions and judgments/actions are

characteristic of critical thinkers?

- What are the main impediments or barriers to critical thought?

In keeping with my research questions, the scope of my enquiry is limited to conceptual expositions of the phenomenon of critical thought, together with the enumeration and explication of the germane abilities and dispositions engendered in a prototypical critical thinker.

Chapter two presents an extensive literature review of the concept of critical thinking, in particular, its theoretical explications within the fields of philosophy, psychology and education. It briefly examines the historical roots of the phenomenon, before then moving to discuss the importance of critical thinking from an educational perspective. From there, the review moves to examine the role of critical thinking dispositions and abilities. Following this, several critical thinking definitions are scrutinized, at which point the review then proffers a critical analysis of *Thinking Skills* and the importance of clarity when delimiting the concept of critical thought. From there it focuses on the debate of argument-normativity which Siegel (2010, pp. 218-238) considers in his book *Education's Epistemology*. To conclude, the review briefly situates critical thinking within the broader international policy landscape, focusing on the UK and Ireland.

Chapter three traces the development of quasi-historical characterizations of critical thinking. More specifically, it critically evaluates the contribution of formal and informal logic to critical thinking discourse. From here, it moves to appraise the contribution of Aristotle's conception of phronêsis, along with the insights of social critical theory and criticality to the current debate. To conclude, the chapter terminates with a critical overview of Paulian (2007; 2009) and Siegelian (1988; 1997; 2017) conceptions of critical thinking. The overarching objective here is to pave the way for a neo-Aristotelian conception of critical thought in chapter five.

Chapter four critically appraises the salient mechanics of argumentation, more specifically, how argumentation works outside *in abstracto* contexts.

It reviews the procedures of critiquing and evaluating arguments, particularly those based on deductive, inductive, causal, or probabilistic footings. From here, it focuses on the pragma-dialectical approach, before it then sketches the importance of critical thinkers being equipped to challenge strategies frequently used by interlocutors to obfuscate the principles of rational enquiry, namely, burden of proof, and appeal to ignorance.

Chapter five proposes a neo-Aristotelian reasons-calibrated conception of critical thought. This is then duly defended, before a brief exposition of the normativity of reasons is proffered. From here, I argue for the inclusion of a specific typology of reasons with which critical thinkers ought to concern themselves in the practical domain. These reasons comprise: (i) evidential force and relevance; (ii) reason defeaters and undefeated reasons, and, (iii) motivating and explanatory reasons. To determine the 'convicting force' of these reasons when it comes to discerning what one ought to believe or do, I argue that only a *phronimos* with their rich blend of resourcefulness, character, deliberative excellence and lived experience, has the disposition and capacity to accurately formulate, and subsequently execute, the types of judgments required in situations of uncertainty and atypicality. Following a brief explanation detailing how the *phronimos* stress-tests the typology of reasons I specify, I then briefly examine some key criticisms of particularism, focusing on the work of Kristjánsson (2005) and Dewey's (1960) critique of the 'spectator theory of knowledge'.

Chapter six investigates the role of dispositions in the prototypical critical thinker. Drawing on a murder trial (Ennis, 2015), it upholds the centrality of key dispositions in animating the performative function of critical thought. In this way, it forges a clear distinction between abilities and dispositions. Most of the literature focuses on the abilities of critical thinkers (Copi, Cohen & McMahon, 2014; Halpern, 2014; Hurley, 2012), but I argue for a deeper understanding of dispositions, since abilities can only be enhanced when the right dispositions are initially cultivated, practised and refined (Passmore, 1967; Ennis, 2015).

Chapter seven critically examines four barriers to critical thought. It begins with a brief appraisal of the (i) principle of 'bounded rationality' and how this idea of 'satisficing' jettisons cognitive quality for unreliable heuristics, best exemplified in the shape of (ii) System I and System II thinking, and (iii) cognitive biases. To conclude, the chapter examines the pernicious nature of deeply entrenched assumptions, more specifically, (iv) assumptions of the paradigmatic, prescriptive and causal kind (Brookfield, 1995).

Chapter Two: Literature Review

2.0   Introduction

Critical thinking has been heralded for quite some time as being one of the most desirable outcomes of higher education (Ennis, 1987, 2015; Facione, 1990; Paul, 1992; Scheffler, 1973; Siegel, 1988; 1997; 2017). Given its vaulted prominence within educational discourse, it would be reasonable to assume a degree of conceptual uniformity in the literature. This, however, is not the case. Despite several extant expositions of critical thinking in the fields of psychology (Halpern, 2014; King & Kitchener, 1994, 2002; Schön, 1991), education (Bailin et al., 1999a/b; Davies, 2015; Ennis, 2015) and philosophy (Facione, 1990; Fisher, 2014; Scheffler, 1973; Siegel, 1988), there is still no clear agreement concerning the "referent of the term" (Siegel, 1988, p.5). This conceptual elusiveness is cause for concern, given that "critical thinking is one of the defining concepts of western education, which enjoys widespread endorsement" (Barnett, 1997, p.1). Further complications stem from the fact that critical thinking has yet to be appropriately grounded in higher education policy. This gap in the literature is significant, particularly in light of the deference afforded to critical thinking in the form of educational outcomes across universities worldwide (Arum & Roksa, 2011). One possible explanation of this "over-worked" and "under-analysed" approach to critical thinking stems from the elusive nature of the term (McPeck, 1981, p.2). Conceptually, it remains highly problematic to define satisfactorily, with the result that most of the literature on the topic fails to offer any salient edification regarding: (i) what it is (as a noun); (ii) whether it has a specific method (as a verb/an adverb); (iii) how one might teach it; and, (iv) how it might best be learnt/taught?

The purpose of this review is to chart the topography of critical thinking in the literature. Given that the literatures reviewed are extensive and complex, the review is inescapably selective. Such agreed parameters necessitate the scoping exercise focus on a selective canon of

predominantly philosophical and psychological accounts of critical thinking. Collectively these accounts shall be treated under the umbrella of education. As the primary focus of the review hinges on formulating a normative account of critical thinking, as opposed to a descriptive one, most of the deliberations draw on a philosophical conception of the phenomenon. To further narrow the boundaries, the following research questions shall be used to distil the analysis:

- What is the most cogent normative conceptualization of critical thinking in the literature?
- What dispositions, abilities, skills and judgments are characteristic of critical thinkers?
- What are the main impediments or barriers to critical thought?

Following a close reading of relevant texts critically engaging with the above research questions, the review briefly locates the parameters in which critical thinking fits into educational policy, both nationally and internationally. For this purpose, three international policy documents shall be analysed, namely those originating from the USA, Australia and the United Kingdom. From here, the focus will then turn to national policy, expressly Irish policy, in the form of the *National Development Strategy of Higher Education* to 2020, otherwise known colloquially as the *Hunt Report* (HEA, 2011). To conclude, a brief overview of the main barriers to critical thought will be presented, more specifically "bounded rationality" (Simon, 1957) in the form of "slow and fast thinking", cognitive biases (Kahneman, 2011) and assumptive thinking (Brookfield, 1995).

2.1   A Very Brief Conceptual-Historical Overview of Critical Thinking

The word 'critical' etymologically derives from two Greek roots: *kritikos* (discerning judgment) and *kriterion* (standards). In etymological terms,

the concept thus denotes a type of "discerning judgment based on standards" (Paul, Elder & Bartell, 1997, p.2). Applied to thinking more broadly, one might provisionally define critical thinking, therefore, as thinking that explicitly aims at formulating a discerning judgment based on appropriate evaluative standards.

Historically, Socrates is attributed with being the father of critical thinking over 2,000 years ago with his pioneering advancement of *elenchus*-a dialectical method of eliciting truth through cross-examination. Through elenctic exchanges, individuals were brought to discover that, upon questioning, their knowledge-claims were inconsistent, contradictory and untenable. Through these dialectical dialogues, Socrates sought to bring an individual from a state of *doxa* (opinion) to *epistêmê* (knowledge). This Socratic method of interrogative questioning persisted until John Dewey (1859-1952), the American philosopher, educator and psychologist, popularised the rebirth of the critical thinking movement in the early twentieth century (Dewey, 1910/1997). The first known use of the term 'critical thinking' derives from John Dewey's *How we Think*, originally published in 1910 in which he states:

> The essence of critical thinking is suspended judgment; and the essence of this suspense is inquiry to determine the nature of the problem before proceeding to attempts at its solution. This, more than any other thing, transforms mere inference into tested inference, suggested conclusion into proof.
>
> (Dewey, 1910/1997, p.74).

For Dewey (1910/1997), critical thinking was more appositely conceived of as 'reflective thinking'. In swapping the addendum 'critical' for 'reflective', he sought to advance a more explicit metacognitive link between judgment, education, pedagogy and praxis. In his words, he defines reflective thought as:

> Active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of the grounds which support it and the further conclusions to which it tends.

> (Dewey, 1910/1997, p.9).

This conceptualization calls for reflective thinking to be an active process. By active, Dewey (1997) is contrasting it with ideas and information received from another party. A "passive process" leads to an unquestioning acceptance of all purported knowledge claims and is the antithesis of the enquiring mind. On the other hand, "reflective thinking" effectively equips each agent to marshal relevant information, carefully and persistently scrutinise beliefs or knowledge claims in light of the reasons we have for believing/doing something, and furthermore, systematically tease out the implications of said beliefs.

Delineating the conceptual-historical development of the phenomenon of critical thinking, Richard Paul (2011), offers a brief sketch of three distinct, yet permeable developments, focusing on how the concept has been understood since the 1970s. The first iteration emphasized an atomistic approach to critical thinking as (1) the identification of arguments and (2) the evaluation of arguments. Here the focus was on informal logic, rules of inferences, avoiding fallacies, logical structures, and the skills of cogent argumentation. Dissecting and reassembling the constituent 'parts' of logical reasoning were collectively deemed sufficient for producing critical thinkers.

The influence of this re-conceptualised generalist view of critical thinking is still prevalent today. Though primarily an educational movement in the USA and Canada, some of the basic principles of argumentation under the guise of 'critical skills' are currently being customised by Irish universities (Maynooth University on-going since 2015, and UCD, pending formal approval) in an effort to teach the central tenets of a trans-curricular concept of criticality. Unlike before, where informal logic was

the exclusive preserve of philosophy students, universities such as Maynooth University have, since the introduction of their strategic plan 2012-17, spearheaded the development and introduction of a broadly conceived 'critical skills' module for their first-year students (NUIM, 2012-17, pp.16-17). This 'critical skills' module comprises the transferable skills of: academic writing; analysis and use of data; analytical thinking; communication; critical thinking; developing learning skills; information processing, and interpersonal skills. In addition to these skills, the module aims to enable students to deal with complex arguments, evaluate evidence, make balanced judgments, and communicate ideas clearly, both verbally and in writing.

To avoid the curricular intervention disintegrating into a vacuous *in abstracto* exercise (a narrow instrumentalism of sorts, divorced from real-world contexts), tutors ground the theory in practice-in Maynooth University's case, a fusion between domain-neutral and domain-specific practice. Simply put, students examine the role and centrality of criticality (broadly conceived) within their immediate disciplines, as well as other disciplines outside their chosen speciality. Sociology students thus examine the role of critical thinking in relation to, say for example, the work of Durkheim in his *The Division of Labour in Society* (1893/1997) or the causal explanations of Weber in *Economy and Society* (1922/2013), whilst History students might scrutinise primary source material originating from the time of the 1916 Rising, particularly Protestant first-hand accounts of the Rising, and its effects on their sense of self-identity and family life (see Jones, 2016).

The second epoch of critical thinking commenced in the 1980s, and was characterised by a shift in the primacy of the philosophical approach to critical thinking (Paul, 2011). Alternative scholarly works emerging from the diverse disciplines of cognitive psychology and critical pedagogy brought critical thinking more into the field of education. With this development came the idea that critical thinking was a much broader

subject with wider ramifications, socially, cognitively, ethically, and ontologically (Burbules & Berk, 1999, p.47). From here, the former understanding, vis-à-vis, the conflation between the critical thinker and a cognitive machine, whose effectiveness consisted in merely learning a set of logical rules and principles, was openly challenged (Barnett, 1997; Burbules & Berk, 1999). Instead, the focus now moved to the study of affect (dispositions) and their role in critical thinking (Ennis, 1987; 2015).

The result of the rise of critical pedagogy during this period, in part informed by critical theory and other domains such as phenomenology, existentialism and psychoanalysis, further contributed to critical thinking's evolution from its former existence in informal logic as the identification and evaluation of arguments, to a new revised model that looked beyond the myopic constraints of being able to identify valid and invalid arguments (Paul, 2011). Instead, second-wave theorists took 'critical' to mean 'critique' and with this, the focus was no longer on "atomised arguments, but on unlocking dimensions of meaning that might be missed or concealed behind some claim or argument" (Kaplan, 1991, p.362). In this way, second-wave theorists sought to look beyond the rigid parameters atomised arguments imposed on thought and language. Here the focus sharpened on understanding the interwoven ampliative meanings that lay behind rational discourse and argumentation. In short, critical pedagogy theorists ask: "who benefits?" (Burbules & Berk, 1999, p.47).

The third wave of the critical thinking movement according to Paul (2011) seeks to transcend the predominant weaknesses of the first two waves. The informal logic model was identified as being rigorous without being comprehensive, whilst the critical pedagogy approach was deemed comprehensive, but lacking rigor. Based on this understanding, Paul (2011) argues for the need to fuse the two approaches and devise a more thorough and far-reaching understanding of criticality. The individual strands of such a task, in his opinion, are only beginning to emerge. Accordingly, any new model or theory of critical thinking must attend to the earlier emphasis on cogent argumentation and logicality, while, at the

same time, integrating the importance of affect, creativity, the emotions, imagination, and moreover, the wider ramifications of critical thinking-not merely as an individualistic pursuit, but also, where appropriate, as an on-going socio-cultural pedagogy and phenomenon. Parallels might be drawn here with Barnett's (1997) conception of criticality, comprising: "critical-reasoning critical self- reflection, and critical-action" (p.6).

Turning to contemporary educational discourse, critical thinking has since become synonymous with a number of important cognitive skills, competencies, dispositions and abilities, including, but certainly not limited to: comprehensively interrogating and evaluating one's own, and indeed, others' beliefs and knowledge-claims in a variety of contexts (Barnett, 1997; Siegel, 1988); stress-testing the strength of reasons used to support what one believes or does (Dunne, 2015a); scrutinising inferences (Mulnix, 2012); a propensity for finding fault and evaluating the cogency of argumentation (Bowell & Kemp, 2015); reflective scepticism (McPeck, 1981); forensic questioning (erotetics/elenchus) of previously assumed universal truths, knowledge-claims or assumptions (Rescher, 1988); systematic and rigorous rational inquiry (Bailin & Battersby, 2015); purposeful thinking (Facione, 1990); cogent inductive and deductive reasoning leading to informed judgments and decisions (Hurley, 2012; Bowell & Kemp, 2015; Copi, Cohen & McMahon, 2014); reasonable and reflective judgments (Ennis, 2015); avoiding fallacies and evaluating reasoned judgments (Fisher, 2014); dialectical reasoning - including interrogating the probative strength of evidential reasoning together with its credibility and sources (Rescher, 2012), and, solving problems (Gardner, 2001).

From this broad composite characterisation, a further sub-division into two categories can be framed. Critical thinking thus comprises: **cognitive elements** (cogent argumentation, generating inferences, reflective judgments) and **propensity elements**, which can be broadly conceived as a constellation of dispositions, abilities and attitudes (Halonen, 1995).

2.2 Why is Critical Thinking Important? The Empirical Argument

Together the cognitive and propensity elements of criticality comprise key elements in education. Regardless of which subject-domain one finds oneself in, whether it be law, science, history or philosophy, the mechanics of questioning assumptions, together with evaluating the cogency of arguments, exemplifies a highly desirable and fundamental skill (Bowell & Kemp, 2015; Fisher, 2014; Hurley, 2012). Nonetheless, notwithstanding the evident benefits of these skills, few outside the purview of philosophy are explicitly taught the mechanics of argument-mapping, excavating unwarranted assumptions, scrutinising inferences, calculating inductive force, interrogating the cogency of probative reasons used to justify beliefs or actions, or basic informal logic in the guise of fortifying arguments and avoiding fallacies (Bok, 2006). These are skills that can be explicitly taught with a reasonable degree of success (Abrami, Bernard, Borokhovski, Wade, Surkes, Tamim & Zhang, 2008; Ennis, 2015; Facione, 2011; van Gelder, 2001). However, despite the existence of strong arguments supporting the educability of these skills, scholars contend that universities are falling short of their responsibilities in relation to teaching criticality (Arum & Roksa, 2011; Barnett, 1997, 2015; Bowell & Kemp, 2015; Davies, 2015; Fisher, 2014).

Data from a large-scale US longitudinal study entitled Academically Adrift, conducted between 2005-2009, supports the view that critical thinking is more of an assumed outcome of higher education instead of an actual, verifiable reality (Arum & Roksa, 2011). Based on the results from a standardised critical thinking test, the study found that of the 2322 student participants, almost half (45%) of the students in the sample exhibited no statistically significant gains in critical thinking after two years of the college experience (p.35). A further 36% made no significant improvement, even at the end of their four-year degree (Arum & Roksa, 2011, p.35).

Explaining these findings the report concludes that, "even though, 99% of college faculty say that developing students' abilities to think critically is a *very important* or *essential* goal of undergraduate education, commitment to these skills appears more a matter of principle than practice" (Arum & Roska, 2011, p.35). One of the consequences of this marked divorce between principle and practice serves to highlight the yawning chasm between the rhetoric of educational policy/curriculum/principles, (what the institution intends to teach), and the verifiable actuality of student learning, (what the student actually achieves). Gaps between rhetoric and reality concerning student achievement epitomise one of the key reasons why students are only marginally improving their skills in critical thinking and complex reasoning during their journeys through higher education (Abrami et al; van Gelder, 2001; Bok, 2006). Such marginal gains often mean that students cannot sift fact from opinion, appropriately question evidential claims, question ideas or assumptions, nor appropriately appraise arguments and inferences, or indeed, offer a sufficiently cogent justification for their beliefs and actions (Davies, 2015).

Another empirical study conducted in Australia by van Gelder (2001) measured the effects of an explicit approach to teaching critical thinking in university. Here students were taught to deconstruct arguments via argument mapping, scrutinise inferences, recognise and avoid fallacious reasoning, and carefully appraise the cogency of inductive and deductive arguments. After one semester of this immersion programme, (principally using an argument mapping software programme called *Rationale*), students made large gains on both a written test (Graduate Record Examination's Writing Assessment) and a multiple-choice critical thinking test. On this basis, Van Gelder concluded that an explicit pedagogical approach to teaching critical thinking "appears to dramatically accelerate improvement in critical thinking, [especially] when compared with the indirect strategy on a normal university education" (2001, p.546).

Self-evident as it might seem, in order to become proficient in any skilled domain, we need to practise that skill. Naturally, the more we practise, the better we become. Practise necessitates extensive cognitive efforts on the part of the students. There is no easy or sure fast way to imbue criticality. This is why, in a later paper van Gelder (2005) argues:

> For students to improve, they must engage in critical thinking itself. It is not enough to learn about critical thinking. These strategies are about as effective as working on your tennis game by watching Wimbledon. Unless the students are actively doing the thinking themselves, they will never improve.
>
> (van Gelder, 2005, p.43)

There are no surprises here; criticality requires effort; it requires perseverance, diligence, rigour, and painstaking discernment, together with a performative synthesis of intellectual virtues and dispositions. Within a constructivist setting, such as university education, the more it is practised and externally monitored (in a non-interventionist capacity) the greater the likelihood of its progression and enhancement (Paul & Elder 2009; van Gelder, 2005). From the point of view of the pedagogue or lecturer, habitually demonstrating the virtues of criticality negates the purpose of the exercise. Students will only improve their thinking if they are guided to engage in the thinking themselves. External interference is counterproductive, and though quite understandable, it might actually hamper the improvement of critical faculties in students (van Gelder, 2005; 2015). Gently monitoring enquiry-led activities is the key to success. This is not an exact science, but it must be brought to bear in learning encounters within a constructivist setting, such as university lectures.

The world of commerce shares some of these concerns around the lack of verifiable criticality in graduates. One such report by a consortium of US

organisations in 2006 identifies 'critical thinking' as the highest ranked skill sought after by employers in the workplace (Casner-Lotto & Benner, 2006). The study invited employers to critically appraise the skill-sets of recently hired graduates from three types of institutions: high schools, two-year college courses, and four-year college courses. Following a rigorous evaluation, a startling 92.1% of employers found graduates emerging from four-year college courses were "grossly deficient" in critical thinking (Casner-Lotto & Benner, 2006, p.10).

Of course, there are arguably several notable shortfalls inherent in these findings, including the problems associated with generalisability, replicability, sampling methodologies, and the limitations of standardised testing (see McPeck, 1981; Modjeski & Michael, 1983). Aside from the key merits of these valid reservations however, the literature broadly agrees that critical thinking remains a key skill in preparing students for life in higher education and the workforce (Barnett, 1997; Facione, 2000; Paul, 1992; Siegel, 1997).

2.3   The Importance of Critical Thinking in Education

Though it may seem self-evident that critical thinking is an essential educational *desideratum*, its exalted prominence still requires a cogent justification. On one level, the justification of critical thinking as a desirable educational outcome becomes clearer when viewed through the lens of its antithesis - namely - uncritical thinking. Uncritical thinking can broadly be characterised as a passive and numb-like acceptance of information, defective arguments, deductive or inductive, and an unquestioning acceptance of dubious facts and conclusions. An uncritical student will simple regurgitate what is found in the literature. They are neither predisposed to, nor have the necessary skills to question the cogency or inductive force of an argument. Taken together, these limitations impede students from critically engaging with the world around them (Davies, 2015). Typically students of this ilk lack a critical

edge, with the result that they merely personify prosaic or passive consumers of data, arguments and information (Barnett, 1997). In many respects, students of this persuasion are guilty of propagating a legacy of "epistemic vices" during their university careers (Cassam, 2016, p.159).

Vice epistemology is a relatively new area of philosophical study that looks to the "nature, identity, and epistemological significance of intellectual vices" (Cassam, 2016, p.159). Up until this point, most of the scholarly focus tended to fall on intellectual virtues (Greco, 1999; Zagzebski, 1996). But when it comes to analysing critical thought, looking at thinking through the lens of vice opens up a new and richer conceptual understanding of criticality, including its importance in eradicating vices of this kind from our everyday cognitive exchanges with the world. In this way, epistemic vices, understood here as intellectual character vices, are traits that impede "effective and responsible inquiry" (Hookway, 2003, p.198). Vices of this nature include: gullibility; dogmatism; insensitivity to detail; obtuseness; lack of thoroughness; prejudice; closed-mindedness; carelessness, and negligence (Zagzebski, 1996). These are best classified as "intellectual character vices, that is, intellectual vices that are also character traits" (Cassam, 2016, p.160).

University studies are a time when students are faced with making informed judgments about what to believe or do. During the course of their studies, students set about weighing the cogency of arguments/reasons emerging from the literatures they are tasked with mastering. In initial teacher education programmes, students might be asked to consider whether Religious Education is a form of indoctrination or not. In philosophy of education, they might be asked the difference between teaching and learning. In History, students might be asked to evaluate the importance of the 1912 third *Home Rule Bill* being shelved and its implications in sowing the seeds for the 1916 Rising. In Physics and Chemistry, students may be asked to formulate judgments about whether science can explain everything in the material world without

recourse to non-material concepts. Pupils studying literature may be asked to write papers on whether all poetry is in some part confessional. Psychology students might be asked about the cogency of the nature/nurture debate in behavioural psychology, or the issue of reproducibility in cognitive psychology (Earp & Trafimow, 2015). The list could go on. In all domain specific areas, students are tasked with aligning their arguments with the strongest possible *reasons* they can find.

To do this, they must substantiate their claims with evidence from the most cogently argued texts they can find. Some disciplines privilege verifiable facts more than others (Science more than English for example). So, in some cases, a cogent hermeneutic substantiation of these types of reasons in the form of arguments might be appropriate. Intellectual endeavours of this nature, depending on the task at hand, incorporate the skills of creativity and imaginative dexterity. Together these skills lend themselves to fostering the twin skills of sagacity and critical judgments, especially when moving beyond the constraints of a text when forming cogent and defensible ampliative judgments.

A cursory glance at scholarly journals will quickly show that scholars are at odds about some of the aforementioned questions. And so, it is fair to say, a large number of these putative answers are contested. In many respects, peer-reviewed journals embody the art of the dialectic. Views are exchanged, theories tested by experience and vice versa, inferences scrutinised, conclusions declared inconsistent with the facts, hermeneutic assumptions and inferences challenged and so on. Large-scale data of this *genus*, should it be appropriately considered progressive, cannot be a concordant harmony of like-minded scholars all sharing similar views about the same phenomena. Not all scholars are right. Not all scholars are wrong. Objective, reproducible, and verifiable truths are few and far between. Facts are not always easily identifiable. Nor indeed are what they (the facts) would have us do. I might know my mother has six months to live (the facts of the matter), but what ought I to do on the basis of these

facts? This is, of course, not entirely clear. Not all situations afford us the luxury of suspending judgment. Therefore, irrespective of the principles under enquiry, one must still be in a position to formulate informed and defensible critical judgments about what one ought to believe or do, in response to the immediacy of the problem under scrutiny.

In keeping with this commitment to 'truth' (whether correspondence between facts and reality or otherwise) and enquiry, critical thought necessitates forensic analysis and evaluation with a view towards perfection, interpreted for our purposes here as being a flawless alignment between thought, language, virtue and the world. It also includes the development of certain dispositions and intellectual traits which ought to be applied to one's own thinking, the thinking of others, and thinking within subject disciplines (Ennis, 1996; Fisher, 2014; Fisher & Scriven, 1997; Nosich 2009; Passmore, 1967; Paul & Elder, 2002; Scheffler, 1973). On this basis, we might divide critical thinking into these broad categories:

- **Understanding of intellectual analysis**: an ability to divide important intellectual constructs into constituent parts.
- **Understanding of intellectual evaluation:** an ability to evaluate the quality of each part or element of thought.
- **Seeking intellectual improvement:** to correct weaknesses and improve strengths identified through analysis and evaluation.
- **Seeking to develop intellectual traits,** or characteristics of mind that are both necessary for the development of critical thinking and need to be developed through critical thinking. These guard against sophistic or manipulative thinking.
- **Seeking knowledge of the problematics of thinking,** such as "cognitive biases, egocentrism and sociocentrism, which cause deep and systemic problems in human life" (Paul, 2012, p.8).

In science, criticality plays a central role in enquiry. Almost twenty years

ago, back in 1998, a scientist named Dr. Andrew Wakefield published an article in the medical journal *The Lancet,* arguing that he had discovered a link between colitis, autism and the MMR vaccine (Wakefield et. al., 1998). Predictably, the gravity of these findings quickly sent shock waves across the world. Media attention followed suit, catapulting the cost-benefit metrics of vaccinations into the public consciousness. Though critics pointed out the limitations of the study - it was a small case study (12 participants) there were no controls, three common conditions were causally linked, and some of the data relied on parental recall and beliefs; the damage had already been done. An unassailable, and almost ironclad public mistrust in vaccinations had embedded itself in the public psyche (Black, Kaye & Jick, 2002). Several subsequent independent epidemiological studies conducted in the decade after this paper was published in 1998 (including the US Institute of Medicine 2014 findings) all came to a wildly different conclusion: **there is no evidence of any link between the MMR vaccine and autism** (Honda, Shimizu & Rutter, 2005).

In spite of compelling evidence to the contrary though, somehow the spectre of Wakefield's fraudulent scaremongering still weighed heavily on parents contemplating immunisation for their infants. For those who chose to decline immunisation, some faced avoidable illnesses, whilst others still, faced far more sobering outcomes (Black, Kaye & Jick, 2002). The paper was partially retracted in 2004, and eventually a full retraction issued in 2010. This followed a series of investigations by *Sunday Times* journalist Brian Deer, who painstakingly proved that the author of the paper, Dr. Wakefield, had intentionally misrepresented evidence, knowingly altered patient's medical histories, and failed to disclose several conflicts of interests, including his paymasters (personal injury lawyers acting on behalf of clients whose children had autism).

It is seven years since the entire paper was fully retracted and declared to be fraudulent. And yet, there are still those who think there is no such

thing as smoke without fire. For instance, how many of us dare admit to harbouring (even now) the slightest niggling doubt about whether there is, in fact, a direct causal link between the MMR vaccine and autism? As is evident from this fraudulent study, doubt can be deeply pernicious when exploited by antivaxxer advocates to further their own agendas. Their pseudo- scientific agenda preys on the uniform principle: 'protect your children (where possible) from all harm'. Of course, parents want to protect their children. But rather than see vaccinations as one of the most effective means through which to bring this about, antivaxxers' exploit the latent sense of destructive doubt about the unwanted side-effects of the vaccinations that linger in every parent's ruminations about whether they are doing the right thing for their child. Here lies the importance of criticality, not only in science, but in all forms of human enquiry.

More routine evidence underscoring the importance of criticality is easy to source. Some time before the 2010 Fifa World Cup, a new product called the Power Balance Wristband hit the market. This tiny little wristband claimed to improve energy, flexibility, and balance (diSalvo, 2011). The Power Balance Company declared that wearing this tiny silicone wristband optimised your body's ionic balance ensuring your 'energy pathways' continuously operate at optimum frequency. Celebrity endorsements quickly followed, most famously from the footballer David Beckham and basketball player Shaquille O' Neal. Soon sale figures reached over the 2.5 million mark. Even CNBC declared the wristband sports product of the year (di Salvo, 2011). Everything seemed to be progressing nicely for Power Balance LLC until the Australian government eventually intervened and asked for independent scientific evidence to corroborate the 'purported benefits' of wearing the wristband. Upon receiving the request for credible scientific evidence to substantiate the claims about their product, Power Balance LLC admitted that there was no "credible scientific evidence" to support their claims, and in light of this fact being made public, offered a full refund to customers (Power Balance, 2010). Put in perspective, with projected sales of over 2.5 million

and units retailing at 29.95 a bracelet, the company stood to make 74.875 million, excluding overheads. Profit margins aside, this simple case of fraudulent marketing emphasises the importance of individuals being critical consumers of the world around them, and in turn, to question concepts, cross-examine dubious scientific findings, and discard unwarranted inferences.

One of the defining tenets of higher education is a steadfast commitment to the pursuit of truth through critical investigation (Newman, 1852/1996). For John Henry Newman, the *raison d'être* of higher education was to "educate the intellect to reason well in all matters, to reach out toward truth, and to grasp it" (Newman, 1852/1996, p.103). But of course, assuming a realist stance, whereupon a singular objective truth exists in every situation, and moreover, that it can be known, Newman's enunciation begs the question: how exactly in a world of endlessly competing truths does one set about choosing the correct one? What competencies or skills ought one employ in order to grasp *Alētheia* (Truth)? How exactly should a formative higher educative experience set about the task of instilling the skills of critical investigation?

Writing over a hundred years later, the theorist Israel Scheffler (2005) argues that an educated person "should be able to reflect critically on the principles underlying the skills, habits and beliefs he has acquired…in addition, he needs breadth, that is, an ability to connect various domains of learning with one another and to relate them to his own experience, so that his knowledge is receptive and active" (p.14). In this sense, critical thinking is, as he put it in an earlier book, the ability to "participate in critical and open evaluation of rules and principles in any area of life" (Scheffler, 1973, p.62). Educational encounters thus require students to move beyond being passive consumers of ostensive knowledge, and actively seek out and carefully examine all knowledge-claims. For this task, students need to learn that purported knowledge-claims must be contested, and not just blindly accepted. All knowledge-claims (tacit or

otherwise) are based on the strength of reasons, and these justificatory reasons need to be forensically scrutinised and methodically scrutinized to stress-test their convicting force, in order to determine whether they warrant a given belief or action (Dunne, 2015a). This process of critical enquiry requires a deep understanding of the ways in which we come to 'know' the world. Thus, critical thinkers require a basic understanding of reasons, and with it, the nature, scope and limits of claims to knowledge (Audi, 2013; Williamson, 2000).

2.4   Critical Thinking as Dispositions

There is a broad consensus in the literature that critical thinking comprises a composite of cognitive skills, dispositions and abilities (Bailin et al., 1999a; Bailin & Battersby, 2015; Ennis, 1987; 2015; Siegel, 1988). Going back to Gilbert Ryle (1949) with his knowing-how and knowing-that distinction, the reason behind this is fairly simple - it is not enough to be able to do something - one must likewise be disposed to doing it. Put another way, a person may possess the relevant critical thinking skills, and yet not be disposed or inclined to use them. As such, there is a certain dispositional and fluid procedural rubric to critical thinking.

Steadily augmented over the past twenty years to reflect the latest scholarship, this taxonomy of dispositions (affective states), though not exhaustive, includes: a desire for truth (Newman, 1852/1996); a questioning mind (Bailin & Battersby, 2015); a propensity to find fault (Ennis, 2015); systematic and rigorous scrutiny (Barnett, 1997; 2015); open-mindedness (Facione, 1990); a desire to be well informed (Ennis, 2015); willingness to consider alternative viewpoints (Willingham, 2007); impartiality (Siegel, 1988; 1997); a metacognitive awareness (Ellerton, 2015); clarity in purpose (Facione, 1990); judicious use of credible and defensible sources (Bowell & Kemp, 2015); take into account context and the big picture (Bailin; 2015; Ennis, 2015) and suspend judgment in cases where there is insufficient data/reasons (Dewey, 1910/1997); seek and offer clear reasons (Siegel, 1988; 1997); align one's position with the most

cogent reasons available (Rescher, 1988; 2014); openness to change one's views in light of contradictory and compelling evidence (Kahneman & Tversky, 1996); identify exceptions to generally-held rules, including determining in which cases certain rules apply and when they don't (Kant, 1781/2002); phronêsis/practical judgment/reasoning (Dunne, 1993), and, the disposition to employ one's critical thinking abilities (Bailin & Battersby, 2015; Ennis, 2015; Facione, 1990).

Of course, dispositions are of themselves little use without the ability to carry out their performative functions. For instance, I may well have the skills to write a novel, but lack the disposition to do so. Dispositions and skills are thus inextricably linked - it is not enough to have the skills of a critical thinker - one must likewise be disposed to use them. Otherwise, one cannot be considered a *de facto* critical thinker. I am inclined to take this point even further. This constellation of dispositions and skills that form critical thinkers leave an indelible mark on the ontological affect of a person. In this way, critical thinking is not merely a cognitive switch, which one turns on every now and then. Instead, critical thinkers are more akin to "critical beings" (Barnett, 1997, p.1). More explicitly, critical beings recognise that the world is a dialectical interface, and one of the means of reaching a reasoned judgment, specifically in the context of the inimitable uncertainty elicited from competing rational claims, necessitates actively seeking out and stress-testing the justificatory reasons underpinning *all claims to knowledge*.

There is a prevailing tendency in the literature to designate critical thinking as being an individualistic pursuit (Bowell & Kemp, 2015; Hurley, 2012). But this need not be the case. Critical thinking has both an individual dimension, as characterised as a composite of skills and dispositions, in addition to a much broader sociocultural dimension, wherein the critical thinker adds to a wider body of critical thought in the form of a wider dialectic (Paul, 1992). Not all arguments or ways of looking at the world come in the guise of isolated, atomistic syllogisms.

Conceived as part of a grand dialectic or "space of reasons...justifying, and being able to justify what one says", as Sellars (1956 §36) puts it, critical thought takes knowledge as a collective truth-searching enterprise, an inter-subjective and relational mode of understanding, almost akin to a chess board, where it is not the individual pieces that matter, but rather the relationship between the arrangement of the pieces on the board, factively and conceptually, together with the prudent judgment predicated on foot of this relationship, which is the keystone of its focused deliberations. Presented this way, it is more fruitful to distil criticality as part of a broader collective dialectic, in the form of critical thought (Barnett, 1997).

One area of disagreement in the literature focuses on whether the disposition to think critically should be conceived of solely in a normative sense (Facione, 1990). The 1990 American Philosophy Association (APA) panel which was convened to generate a definitive definition of critical thinking, failed to reach a consensus on this matter with some scholars arguing that critical thinking must adhere to certain ethical norms in order to be deemed critical. By this standard, a lawyer who gets their guilty client acquitted would not be a critical thinker (Facione, 1990). Those opposed to the explicitly ethical normative dimension of critical thinking argue that when reasons are stress-tested to determine their cogency, such a process must always insist on the consistency and impartiality of the reasons proffered in support of a given knowledge-claim (Scheffler, 1973; Siegel, 1988). In other words, to base a decision on pre-conceived ideas of what being ethical comprises, either in thought or deed, is to render the impartiality of reasons redundant (Siegel, 1988).

2.5   The Abilities of a Critical Thinker

Dispositions require abilities in order for critical thinking to occur. In and of themselves, dispositions are of little use without the requisite abilities in order to carry out their performative function. For instance, one can be disposed to being a Formula I driver, yet lack the ability to compete on

this level. The formula, dispositions and abilities equal skills, is widely used to make this point (Halpern, 2014). Fortunately, the literature broadly agrees about which specific abilities are crucial for critical thinkers: analysing arguments, claims or evidence (Bowell & Kemp, 2015; Ennis, 1985, 2015; Facione, 1990, 2011; Paul, 1992); willingness to inquire (Hamby, 2015); metacognitive rigour (Ellerton, 2015); asking questions for clarification (Ennis, 1985; 2015); identifying and challenging assumptions (Brookfield, 1997; Ennis, 1985, 2015; Paul, 1992); inquiring minds leading to a deep questioning of the world around them (Bailin & Battersby, 2015); formulating informed, reflective and evaluative judgments which stress-test the probative strength of reasons supporting what we believe or do (Dunne, 2015b); using reflective scepticism to engage in an activity (McPeck, 1981); judging or evaluating (Bailin & Battersby, 2015; Bailin et al., 1999a; Facione, 1990; Fisher & Scriven 1997; Paul & Elder, 2007); seeing multiple sides of a given issue (Facione, 1990); argument Mapping (van Gelder, 2015), and, finally, engaging in "inquiry-based learning which involves a careful, critical examination of an issue in order to come to a reasoned judgment" (Bailin & Battersby, 2015)…[where] "arguments need to evaluated comparatively, in light of alternatives and competing arguments and views" (Bailin & Battersby, 2009, p.4).

Building on the early work of John Dewey, the literature offers a further taxonomy of abilities (Glaser, 1941/1972). This somewhat lengthy list argues that the following abilities are essential for critical thinkers:

1) recognise problems
2) find workable means for meeting these problems
3) gather and marshal pertinent information
4) recognise unstated assumptions and values
5) comprehend and use language with accuracy, clarity and discrimination
6) interpret data

7) appraise evidence and evaluate statements

8) recognise the existence of logical relationships between propositions

9) draw warranted conclusions and generalizations

10) test the generalizations and conclusions at which one arrives

11) reconstruct one's patterns of beliefs on the basis of wider experience

12) render accurate judgments about specific things and qualities in everyday life (Glaser, 1941/1972, p.6)

Ennis (2015) enhances this list further by including fifteen essential skills inherent in critical thinkers. Supplementing Glaser's list, he argues for the need for critical thinkers to be able to "make and judge value-judgments", "handle equivocation appropriately" and "deal with fallacy labels" (1941/1972, p.33). Other scholars extend "interpreting and explaining" to this list (Facione, 1990). Further abilities identified as being crucial for critical thinkers include the ability to reason verbally, especially in the context of uncertainty (Halpern, 1998) and being able to see both sides of an issue (Willingham, 2007). Though these taxonomies of dispositions and abilities are useful, there is a danger of reducing critical thinking to a composite of dispositions, abilities and cognitive skills (Bailin et al., 1999b; Paul et al., 1997). One possible solution to this problem involves formulating a range of intellectual resources necessary for critical thinking to take place, in addition to, sound pedagogical approaches to nurture their development. According to theorists (Bailin et al., 1999b) the following essential intellectual resources are crucial for critical thinkers:

1) background knowledge: what someone knows or can find out about an issue;

2) knowledge of critical thinking standards in a particular field: knowledge of relevant standards and principles (e.g. the credibility of statement made by authorities), including the ability to use them in a non-mechanical way;

3) possession of critical concepts: ability to identify and work with, for example, assumptions, arguments, implications of arguments, statements, definitions; knowledge of a wide range of strategies or

heuristics useful in thinking critically: for example, thinking of counter-examples, or discussing a problem or issue with another person;

4) certain habits of mind: respect for reasons and truth and an inquiring attitude (Bailin et al., 1999b, pp.298-9).

A further three pedagogic components are deemed essential in critical thinking:

- engaging students in dealing with tasks that call for reasoned judgment or assessment;

- helping them develop intellectual resources for dealing with these tasks;

- providing an environment in which critical thinking is valued and students are encouraged and supported in their attempts to think critically and engage in critical discussion (Bailin et al., 1999b, pp. 298-9)

While identifying essential resources for critical thinkers is beneficial on one level, little work has been done on developing these resources conceptually for purposes of operationalisation. Empirically the approach still remains untested, making it difficult to render an informed judgment on its educational efficacy. Over and above these limitations, the enumeration of a list of intellectual resources, though compelling and educationally sound, ultimately betrays a descriptive approach to the cultivation of criticality. Educators need to know what critical thinking is, before they can teach it. Tasks calling for a "reasoned judgment or assessment", whilst educationally progressive, tell us nothing about the *types of reasons* critical thinkers ought to concern themselves with, nor the principles on which they carry out determining *a fortiori* reasons in different domains of enquiry. To do so, thinkers, should they wish to think critically, must know what the necessary and sufficient conditions of critical thought amount to. They must know the types of probative reasons on which to base their judgments; they must know how to *stress-test these*

reasons (Dunne, 2015a), and finally, they must formulate careful judgments based on the rationally convicting force of these reasons (Siegel, 1988). Furthermore, educators need specific pedagogical content to ground critical thinking in real-life scenarios in order to maximise learning outcomes (Halpern, 2014). These questions are largely left unanswered by this approach.

2.6   Critical Thinking in Philosophy

The first point to emphasise about philosophical conceptions of critical thinking is that they almost exclusively focus on the normative character of the concept. Traditional normative accounts focus on enumerating the qualities and characteristics of the hypothetical critical thinker. This emphasis sharply diverges from psychological accounts which are essentially descriptive, essentially reducing the phenomenon of critical thinking to a taxonomy of psychological processes, procedures or skills, such as: classifying, hypothesising, observing, synthesising etc. Such accounts are problematic insofar as:

- it is impossible to determine which mental operations correlate with specific examples of critical thinking;
- there are no procedures which are either necessary or sufficient for critical thinking; and
- terms denoting thinking such as hypothesizing, classifying, inferring, observing analysing, refer not to mental operations or processes but rather to different tasks requiring thinking (Bailin et al., 1999b, p.285).

In contrast to reductionist approaches inherent in psychological accounts of critical thinking, philosophical theorists emphasise the normative dimension of the phenomenon. This means that to characterise thinking as 'critical' is to make an informed judgment as to whether or not it meets *certain standards* or *criteria of acceptability* (Bailin & Siegel, 2002*)*.

Philosophical accounts of critical thinking emphasise such criteria. They focus on the criteria which 'thinking', in order for it to be appropriately judged 'critical', ***ought*** to fulfill (Bailin & Siegel, 2002). By this standard, to properly characterise 'thinking' as 'critical,' means it must meet certain standards of adequacy and accuracy. Naturally, given the complexity and diversity of human endeavour, the particular criteria deemed germane in a particular situation will depend on the domain in which the thinking is exercised. For example, the criterion required to evaluate a piece of architecture is wildly different to those needed to assess the strength of a legal argument (Lipman, 1988).

To avoid a situation whereby each subject or domain requires the implementation of separate criteria based on the unique needs of each domain, attempts are made to adopt a more uniform criteria rooted in core intellectual standards (Paul & Elder, 2005). These standards are along the lines of 'perfections of thought' and are presented as an alternative to the view that each domain calls for a uniquely tailored criterion. With this, core standards offer a means through which we can evaluate our own thinking, irrespective of the domain in which it is exercised. This conceptual benchmark constitutes an attempt to furnish a rubric through which one can make an informed judgment about the quality of their thinking. Trans- curricular rubrics such as this are important since they attempt to circumvent the problem of individually tailored benchmarks through which one determines the quality of thought in domain-specific enquiries. The list includes: "clarity; accuracy; precision; specificity; relevance; consistency; logic; depth; completeness; significance; fairness and adequacy" (Paul & Elder, 2005, p.26). Again, this canon is arguably still descriptive, and as such, little use in the pursuit of truth through critical investigation. "Fairness" and "adequacy" can be somewhat relative terms, given that one's idea of *fairness* and *adequacy* may significantly differ from some else's. In light of this, in order to avoid the pitfalls of relativism, this rubric, according to Bailin & Siegel (2002) requires a solid

grounding in accessible and objective normative terms, where standards are visible, accessible, measurable (to some extent) and verifiable.

2.6.1   Defining Critical Thinking

Critical thinking remains one of the most "over-worked" and "under-analysed" phenomena in educational discourse (McPeck, 1981, p.2). Scholarship in the area over the past twenty years or so has resulted in a plethora of definitions and minute distinctions, many of which have failed to advance the cause for the teaching and learning of critical thinking in higher education.

One of the central problems in the literature can be traced to scholars' marked reluctance to distinguish <u>critical thinking as a noun</u> from <u>critical thinking as an adverb or verb</u>. Few definitions try to encompass both appraisals of the phenomenon. This leads to a wide degree of conceptual uncertainty. On the one hand, critical thinking is clearly a thing (noun), but it also refers to a distinct method (verb/adverb). Conceptual expositions need to therefore focus on:

i.   generating a cogent definition of the phenomenon (as a noun), and

ii. provide a clear account of the mechanics of how it operates (as a verb/adverb).

Prevailing definitions of critical thinking refer to it as "the ability and disposition to critically evaluate beliefs, their underlying assumptions, and the worldviews in which they are embedded" (Paul, 1992, p.46). Though this characterisation has several strengths, it fails to mention anything about the role of critical thinking in informing, evaluating, or interrogatively discerning the appropriateness of one's actions. A belief may not always result in action, and likewise, an action may not always conform to a belief. In this model, it is possible to be a critical thinker without examining the role of agency (Sandis, 2012). What is more, this definition fails to tackle the importance of the metacognitive dimension of critical thinking, that being, reflective judgments predicated on a

commitment to thinking critically about our thinking (Redmond, 2006; Schön, 1983; 1991).

Critiques of Paul's definition also focus on his emphasis on 'worldviews', and how such a contention can arguably lead to a myriad of subjective epistemologies, characterised by one truth for you and one for me. Siegel (1988), for example, argues that such a view proposes that the evaluative criteria utilised for informal arguments, and specifically, critical thinking, are "ultimately grounded in worldviews...[if this is so], we are left with a vicious form of relativism in which all 'rational' disputes boil down to unanalysable differences in worldview" (pp.13-14).

A similar criticism could be levelled against another definition which views critical thinking as the "propensity or skill to engage in an activity with reflective scepticism" (McPeck, 1981, p.8). Again, this lacks any mention of the importance of the mechanics inherent in judgment and agency. In addition, the term 'reflective sceptic' fails to attend to the diverse forms of scepticism within philosophy. For instance, would it be possible to be a solipsist and still be a critical thinker? On this account, such a position would be conceivable. And yet, there would be something fundamentally wrong with viewing a solipsist as being a critical thinker.

A second criticism of the 'reflective sceptic' conception hinges on its assumption that reflective scepticism is an appropriate means-ends form of interrogative and defensible reasoning. According to this view, this nebulous, and somewhat indefinable process of reflective scepticism, in and of itself, is deemed sufficient for critical thinking. But this is not the case. One may be reflectively sceptical about lots of phenomena (the fact that I am typing this sentence now for example), but all the reflective scepticism in the world has no bearing on the veracity of my statement, which incidentally, can be verifiably proven. Reflective scepticism likewise leaves us no closer to judging the quality of human thought in a particular domain. It also leaves us open to a circular form of

foundationalist thought, where each belief must be individually scrutinised before one can appropriately accept it as being justified, all before we judge the cogency of whether this belief warrants the acceptance of a further belief. Reflective scepticism, in its purest form, compels the agent to engage with each belief with the fervour of a reflective sceptic - but this is untenable and unnecessary. To approach each belief in this way would be absurd, seeing as it either (i) "terminates in unjustified beliefs, (ii) justified beliefs, (iii) regresses infinitely, or (iv) circles back on itself" (Blaauw & Pritchard, 2005, p.63).

One of the most frequently cited definitions in the literature refers to critical thinking as "reasonable reflective thinking that is focused on deciding what to believe and do" (Ennis, 1987, p.10). A similar iteration defines critical thinking as "judging in a reflective way what to do or what to believe" (Facione, 2000, p.61). As is the case with the above definitions, both of these accounts seem promising. They encompass the need for critical thinking to be a reflective judgment leading to a belief or action, and firmly position it as a metacognitive exercise.

The major strength of this conception is that it offers a cogent account of critical thinking, both as a noun, and as a verb/adverb. Such an account incorporates what critical thinking is (as a noun) and a clear overview of its method (as a verb/adverb). In order to be operationalised, critical thinking requires a precise account of both of these dimensions before it can be successfully implemented in any educational setting.

However, again, these classifications are open to criticism. Firstly, reflective thinking says nothing about the procedures or standards invoked in making judgments of this nature. What does this say about the Sunni Muslim man who beats his wife, and upon reflection, sees nothing wrong with his actions? Or, the woman whom, after careful consideration and reflection, decides to skim her husband's bank account, without a shred of remorse, all because he is a multi-millionaire, and therefore, won't miss it?

On this account, evidently, reflection, in, and of itself, is insufficient without recourse to a framework that operates in tandem with a normative compass.

A second criticism centres on the issue of generalisability. For instance, if you put an ethical dilemma to two different people and ask them to rigorously apply the criteria above ("reasonable reflective thinking"), in order to resolve the dispute, will they always reach the same conclusion? Let me be more specific. If we pose the ethical dilemma of whether we should provide free drug testing for those who wish to take drugs at a music festival, the parents of a deceased teenager who lost their child as a result of ingesting tainted drugs laced with toxic chemicals, might be inclined to answer in the affirmative. For those who have not, or have had any personal contact with such issues, they may be disinclined to offer such services at festivals. In either case, both parties are likely to hold diametrically opposed views, each based on cogent reasons, which, to their minds (and objectively so) are reasonable and metacognitively calibrated.

For the criteria to be generalisable, inductive reasoning dictates that one should be able (with a degree of certainty) to move from the particular, (one situation), to the general, (all situations). This is especially problematic when evaluating the merits of the candidate's reasons for making their decision[s]. Further complications arise when trying to establish whether the merits of said reasons are the same (carry the same epistemic weight) in all contexts. What is more, will a decision made twenty years ago still be correct today? In light of these questions, the question remains: are the criteria, ("reasonable reflective thinking"), "absolute or [temporally] bound?" (Bailin et. al., 1999a, p.189).

More promising promulgations refer to the critical thinker as someone who is "appropriately moved by reasons" (Siegel, 1988, p.23). On this account, a critical thinker must exercise a mastery of the epistemic criteria

that reasons must meet in order to be appropriately judged as being cogent reasons, or reasons that warrant beliefs and actions. Since the critical thinker is, on this conception, appropriately moved by reasons, one of the central characteristics for Siegel (1988; 1997) is the disposition, ability and skill to properly assess reasons and their ability to warrant beliefs, claims and actions. These dispositions, habits of mind and character traits necessitate critical thinking being "consistent, impartial and based on standards which are taken to be universal and objective" (Siegel, 1988, p.34).

Though these accounts offer a strong *prima facie* case for being accepted as being sufficiently cogent for operationalisation, they are not immune to certain criticisms. Chief amongst such criticisms are the lack of clarity around an instance where a reflective judgment needs to be made between two or more equally compelling and weighty epistemic reasons, both of which stake an equal claim of being rational. Another criticism stems from the insistence on impartiality, which this model advocates. Impartiality requires an emotionally neutral and detached position - a type of positionality that relegates the insight of emotion and motivating reasons to the sidelines. This is arguably a mistake, if for no other reason - it reduces criticality to the smooth running of a cognitive machine - a machine with a restricted series of cognitive moves available to it (Barnett, 1997; Burbules & Berk, 1999). Side-lining motivating reasons in this way, alongside affect, emotional insight and imagination, effectively divorces the thinker from the context-specific situation which he/she faces formulating a judgment about (Blackburn, 2009). Aside from this *caveat*, it is equally important that the pendulum not swing too far the other way, a move whereby emotion and motivational reasons are exalted in such a way as to immunise thought against any sort of rational and constructive critique which robs it of the chance of self-regulation, dialectical pruning and enhancement.

One of the key weaknesses of this conception is that it fails to provide a yardstick by which one can appropriately determine whether critical

thinking is taking place. In many cases, it is elementary to identify situations where a given person may mistakenly believe something based on a series of insufficient non-epistemic reasons. But this does not bring us any closer to deciphering the precise nature of sufficiently cogent reasons which warrant a given belief or action. Instead, this process merely enumerates those reasons which are insufficient to warrant a particular belief and action. At the heart of all critical enquiry lie the following questions: (i) when and to what degree does evidence sufficiently support a hypothesis, (ii) how does one objectively discern whether there are better reasons for alternative beliefs/actions, and (iii) at what point is evidence E considered strong enough to warrant a belief B or action C (Bird, 2014; 2016). In focusing on insufficient reasons for belief and action, the critical thinker sometimes forgets the positive framing of this mode of critical enquiry. This is regrettable-critical thought is as much about probing reasoning as it is about a collective search for truth. It is easy to criticise a cake recipe after all, but much more challenging to propose viable improvements.

One of the purposes of stress-testing reasoning is to engage in collective enquiry; this search for truth adds to the rigour of dialectic, where the objective is not merely to obliterate other people's reasons, or expose weaknesses of some kind, but rather lies in sourcing better alternatives, more plausible inferences, more sagacious judgments, so that we can fortify our knowledge-claims. To say that critical thought is dialectical means that it take place in the context of some controversy or debate where a diversity of views exist, each ostensibly plausible, and for which there is no straightforward logical answer (Bailin & Battersby, 2015). This dialectical aspect typifies the nature of the interaction between the arguers and the arguments-an interaction where objections, criticisms, responses, reflections frequently lead to some sort of conceptual, theoretical or practical revisions to initial positions (Bailin & Batersby, 2009).

Consider for example, a person whom, after a period of reflection, believes that visiting their local witchdoctor in Uganda will cure them of

terminal cancer. Suppose further, that in six months time, following a CAT scan, the said patient is told they are in remission. Doctors are baffled by this development, and the patient is utterly convinced that the remedy the witchdoctor recommended (spreading chicken blood over the site of the cancer) is the sole reason for their remission. However, is this scenario an example of critical thinking in action? How can we accurately determine whether the reasons the woman posits as being the sole cause of her remission are sufficiently cogent in order to warrant her belief in the curative powers of her witchdoctor? Conversely, how can we evaluate whether western medics are warranted in believing that this aberration is just an unexplained phenomenon, and that the witchdoctor had nothing to do with ridding the woman of cancer? Which set of reasons are stronger?

To answer this question, we require a clear set of standards or benchmarks that reasons must satisfy in order to be appropriately adjudged to meet the threshold of putative acceptability. For this purpose, this dissertation argues for the inclusion of a specific typology of reasons with which critical thinkers ought to concerns themselves. This newly devised typology comprises: **(i) evidential force and relevance, (ii) reason defeaters and undefeated reasons, and (iii) motivating and explanatory reasons**. To avoid the force of these reasons simply being determined by means of a crude aggregation, I argue for a reconceptualised account of Aristotelian *phronêsis* as the type of practical and fluid judgment required to accurately determine the strength and force of these reasons. On this view, as I shall argue later on, the *phronimos*, or person of judgment, needs "not only a deep sensitivity to reasons, as they emerge, one at a time, but a capacity to amalgamate them, weigh them and prioritise them" (Blackburn, 2010, p.13). The better he/she does this, the more reasonably they act. In chapter seven, I develop this typology of reasons more fully, including how the *phronimos* is best equipped to stress-test the force and strength of these reasons in the practical domain.

For the critical thinker, when making a judgment about what to believe or do, they stress-test the strength of each of these kinds of reasons. In certain

cases, where beliefs or actions are not grounded in appropriately cogent evidential or undefeated reasons, the critical thinker will point out where the deficiency lies. Contrary to some misguided accounts of the role of the critical thinker, their duty does not stop there: he/she is further obliged to fortify the pre-existing belief and bring about a conceptual or belief revision based on their deliberations. Conceived this way, criticality does not exist to rip down the edifice of knowledge but is also equally responsible for fortifying it.

Here I think a slight reinterpretation of Quine's (1960, pp. 3-4) analogy is helpful in explaining what I mean here. Quine once said philosophers are like sailors. Wise sailors know the history of their ship, including how it was constructed and maintained. They also know the details of its past journeys. They know that during the course of its travels some parts of the ship were completely destroyed; other parts were severely damaged and subsequently repaired; other parts still only sustained minor damage, whilst the final remaining parts remain as strong as ever. Good sailors exercise constant vigilance and have developed an extensive toolkit that helps them to keep the ship afloat. To quote Quine (1960), "our boat stays afloat because at each alteration we keep the bulk of it intact as a going concern" (p.4). In the case of critical thought, the ship represents our inherited store of human knowledge, developed over the last two-and-a-half thousand years. Critical thinkers know its history right down to the minutiae of detail. Like the sailors, they have developed a critico-evaluative, conceptual tool kit. These tools enable them to take a critical stand toward their inherited wisdom, to test the strength and worthiness of ideas. Like the sailors' ship, critical thinkers will throw out part of their inherited knowledge, keep parts and repair others. They do not dispense with their ship because some parts are defective. They have not lost faith in the ship (knowledge). On the contrary, they are interested in making the ship fit for purpose, strong enough to withstand the vagaries of the seas (stronger reasons that may damage knowledge claims). In this way, I see the role of the critical thinker as someone who is tasked with not only stress-testing the planks of the ship, but also one in which they look to

fortify it (if possible), in a collective effort to render it strong enough to withstand the vagaries of the seas.

2.7   Delimiting Critical Thinking

Given that critical thinking is such an elusive concept, this section proposes to debunk a few misconceptions regarding the myriad of conceptualizations that have become synonymous with it. This section thus critically examines several examples of what critical thinking is *not*. Similar to the method employed in the *Theaetetus* in the next chapter, this shall help delimit the boundaries of the concept. All of the below are examples of category mistakes - a common mistake since critical thinking is more than the sum of its parts (van Gelder, 2005). Though criticality may operate out of some, or all of these frameworks, depending on the context, it is crucial to remember that its sole purpose rests in stress-testing the reasons someone provides for their knowledge-claims or actions (Dunne, 2015a). At all times, critical thinkers ask themselves: has this person a right to say that they know Y? What reasons do they offer to substantiate their position? Do these reasons move me in a rational way? Are these reasons relevant, sufficient and acceptable? (Gilbert, 2014). Are these reasons strong enough to withstand contradictory reasons for alternative explanations/courses of action? With all this in mind, critical thinking is not to be conflated with any of the classifications, to which we now turn.

2.7.1   Radical Scepticism
First, the correlation between critical thinking and scepticism needs to be qualified. If critical thinking is to serve a purpose, it must avoid the pitfalls of radical scepticism, if for "no other reason than, dogmatism and [radical] scepticism are both, in a sense, absolute philosophies; one is certain of knowing, the other of not knowing" (Russell, 1950, p.27). Accordingly, radical scepticism and dogmatism are clearly of no use in the search for knowledge.

Radical sceptics assert that the world is ultimately unknowable. They refuse to believe that there is any proposition in the world that can be proved conclusively, beyond reasonable doubt. Ironically, doubt is the only thing that they do not doubt. When questioned about his knowledge of propositions, G. E. Moore (1939) acerbically responded to radical sceptics by proclaiming he has two hands. Since he could see them, they must occupy space. *Ergo*, they are real.

I would take this slightly further. Suppose you choose to strike yourself with two hands - would that be sufficient evidence that they exist? Or better still - assuming you are of virtuous character -if you are not sure your hands actually exist - would you strike your child since you are not sure they would feel pain? How far ought one to take the logic of the radical sceptic? Taken to its logical extreme, radical sceptics collapse into a radical form of idealism known as solipsism. On this view, solipsism maintains that the only thing that exists is one's own mind. Thus, both the external world and other minds are to be understood as lacking any independent existence, as they exist only as elements of one's own mind.

On the other hand, there is healthy scepticism - a 'reflective scepticism' rooted in the probative strength of epistemic reasons justifying a person's actions, thoughts or beliefs. In principle, aligning oneself with the strongest epistemic reasons leads to an 'appropriately justified true belief'. Here the critical thinker is akin to an engineer stress-testing the probative strength of appropriate reasons employed by a given agent to justify their beliefs, thoughts or actions. All our knowledge claims live in glasshouses in one respect - what the critical thinker does is make an informed judgment as to whether their glass roof (call them our beliefs) can withstand people throwing rocks at it. If someone else discovers a flaw in one of the panes of glass in the roof and targets it, later smashing it; rather than view this as destructive, critical thinkers are grateful that the person has exposed this weakest point. They then either choose to fortify this point and protect it from subsequent attacks, or they throw out the pane

and start from scratch. There are no certainties about whether the glass will hold, since we cannot account for all the projectiles that may come our way. For this reason, we rely on the robustness of our calculations, knowing that there may be some projectiles whose mass and density we have not accounted for.

2.7.2 Arbitrary thinking

Although it may seem self-evident, critical thinking is not careless, misdirected or disordered thinking. Failure to sufficiently probe sources and evidence, in addition to unquestionably relying on the inferences postulated by seemingly irrefutable authorities are considered *anathema* to critical thinking. Critical thinking relies on meeting certain epistemic standards, specifically providing the strongest possible justifications in the form of epistemic reasons/evidence for our beliefs or actions (Rescher, 1988). It looks toward normatively evaluating probative reasons based on "relevance, sufficiency and acceptability" (Gilbert, 2014, p.88). In this way, critical thinkers are committed to making reasoning visible, so that the *reasons* any given agent offers in support of their beliefs or actions, are subjected to a series of stress-tests in order to determine if a person has a right to believe or do what they believe or do (Dunne, 2015a).

2.7.3 Purposeless Thinking

Critical thinking should not be characterised as vague, spurious or idle thinking, since none of the aforementioned qualify for the adjective 'critical' (McPeck, 1981, p.3). Instead, critical thinking must be goal-orientated and purposeful. 'Critical' is an addendum we use when a person asks the question: am I, or another person, *warranted* in believing X and Y? Are the reasons they give sufficiently strong enough to withstand pressure from other reasons? And finally, what sort of judgment must we execute in light of these reasons? This need not be construed as a destructive endeavour. If one views critical thinking as contributing to critical thought by way of a grand dialectic, then we are all collectively working on adding new connections to our communal plumbing system. Our collective responsibility lies in ensuring each connection is secure,

and that we remain vigilant when it comes to isolating and expelling air-locks (bad reasons for beliefs or actions). The water running through the pipes is thought (hard water), mixed in with critical thought (soft water), and like all systems, this eventually leads to a build-up of limescale in the pipework. The critical thinker needs to flush out the system (pipes) in order to maximise the efficiency of the radiators. The more efficient the radiators, the more optimal the conditions for the successful bombardment and friction of these ideas. The greater the friction of ideas, the better the chances of philosophical progress.

2.7.4   Accidental or Unintentional Thinking

Since Gettier's (1963) seminal paper critiquing the 'Justified True Belief' account of knowledge, epistemologists have agreed that in addition to having a justified true belief, to arrive at knowledge, agents must meet two requirements: 1) to know something cannot be the product of sheer luck, and 2) cognitive effort is required to *ipso facto* know something to be the case (Pritchard, 2005; 2013). Consistent with the anti-luck and ability platitudes in epistemology, all interrogations of knowledge claims, along with the subsequent epistemic position adopted on foot of these interrogations, must be arrived at via the cognitive faculties of the agent (Pritchard, 2005; 2013). To arrive inadvertently, unintentionally or surreptitiously at an appropriately justified knowledge-claim (putative or otherwise), is insufficient for critical thinking. The gambler playing roulette who bets on red and wins, can never claim they knew the ball would land on red (anti-luck platitude). Only the gambler who has rigged the table beforehand to make sure the ball lands on red (by means of a magnetic pulse or otherwise) can justifiably say they knew the outcome of their bet (ability platitude).

The student that answers 2+4=6 correctly, but when later questioned about their response says they gave the answer of 6 simply because this is their favourite number, did not know that 2+4=6. And so, in keeping with this fact, criticality is never accidental or unintentional thinking- it is purposive, self-directive, cognitively effortful and never the result of pure

fortune.

In the case of the student, a critical thinker will ask - did she know the answer? The test in this case is the reason the student offers to substantiate or justify their answer. This reason (it was my lucky number) is not deemed sufficient for her to *know* the answer. Therefore, any agent engaged in critical thinking must submit to the fact their thinking meets certain intellectual standards, "even if these standards cannot necessarily be verbalised" (Bailin et al., 1999b, p.287).

2.7.5 Logicality

Further to this, critical thinking should not be conceived as the mindless application of a set of logical principles in order to bring about some desired goal or purpose. This view effectively reduces critical thinking to the realm of formal and informal logic, and positions it as nothing other than, the skill of "acquiring, developing, and exercising the skill of being able to grasp inferential connections between statements" (Mulnix, 2012, p.464). As is the case with all the other qualifications however, while critical thinking may utilise the principles of logical reasoning and argumentation, this does not necessarily entail that it is *governed exclusively* by these principles.

Given that logicality stems from the assumptions, frameworks and inferences of inductive and deductive reasoning, critical thinking remains focused on acquiring critically reflective knowledge - a knowledge that attends to the fact that even inductive and deductive methods can be highly problematic when dealing with epistemic certainties (Popper, 1972; Skyrms, 2014). After all, following rules is not always required [for reasoned thinking], since "one task of rational assessment is to determine which rules should be followed in a particular situation...mindlessly applying rules just because they are logically correct is foolish" (Brown, 1995, p.744).

In keeping with this, critical thinking must demonstrate some kind of

metacognitive awareness and rigour as well (Ellerton, 2015). Effectively this means they pledge themselves to always think *critically* about their thinking, regardless of the framework they deploy to justify their beliefs or actions, or indeed the intended or unintended consequences, either positive or negative, which may arise from their deliberations.

Logicality has several notable strengths, one of which I will detail here. This is a logic puzzle used by science teachers to stimulate critical and creative thinking in the classroom. Imagine you are standing outside a closed door. On the other side of the door, there is a room which has three light bulbs in it. The room is completely sealed off from the outside. It has no windows and nothing can get in or out except through the door. On the outside of the room there are three light switches that control each of the respective light bulbs on the other side of the door. Your assignment is to determine which light switch controls which light bulb. You are allowed to enter the room only once, and once you come out, you must be able to state with 100% certainty which light switch controls which light bulb. Using the principles of logic it can be worked out that the solution to this task rests on remembering that light = heat. Therefore, the answer is: turn one light switch on, wait a few minutes, then turn it off and turn another light switch on. Go into the room and feel the light bulbs. The one that's still warm is connected to the switch that you first turned on, the one that is on was the second switch you turned on, and the last bulb is controlled by the switch that you didn't touch.

Logic helps us build computer motherboards, guidance chips, code, calculate risks, make predictions, and formulate laws. It helps us to establish patterns. Being able to spot patterns in the caves of Lascaux meant that pre-historic man could count the 13 quarters of the moon from the first winter rising of the Pleiades, meaning they could calculate when the horses are pregnant and easy to hunt. Stonehenge is another example of the elegance of logic and mathematical precision. Logic has also helped us reach the moon and explore the cosmos. However, despite logic's clarity and incisiveness, it still remains a closed system tainted with several assumptions. It does not handle internal inconsistency; cope with

the richness of context; allow space for exceptions to generally-held rules; respect the insight of particularity over universality; acknowledge the hermeneutical dimension of experience, nor concede that there may be nomological knowledge which defies systemisation. For logic to operate, it must discard these variables. Over and above these concerns, logic also confines itself to a limited series of pre-determined cognitive moves (Barnett, 1997).

Logicality has several weaknesses, one of which I will briefly address here. Suppose a teacher in class writes the following number sup on the board 2, 4, 6, 8…and then asks her students what comes next. Logicians will answer 10, 12,14.16. What they have done is treated the numbers on the board as part of a pattern, a sequence which follows mathematical (and logical rules). Of course, other answers which may be correct, based on circumstance, include: there is no next number; the next four numbers are 86; 42; 12; 19 and so on. Unbeknownst to the students, 2,4,6,8 might have been the first 4 numbers of my UPC password. The next 4 characters may be XYU1 and so on.

For thinking to be appropriately characterised as critical, it must attend to formulating judgments based on the weaknesses of every framework in which we claim to arrive at knowledge. That includes all forms of inductive and deductive reasoning, logicality, abductive reasoning, probability, rationalisations, and so on. Each framework has significant strengths, however, in an ever-complex world, even when one factors in the putative certainty afforded to these frameworks, they are still susceptible to error, and therefore, ought to be scrutinized. And so, though criticality may involve logical reasoning at times, depending on the nature of context and domain of enquiry, it must always stress-test the limits of all the frameworks through which we acquire knowledge.

2.7.6   Rationality and Rationalisations

Although closely connected, rational thinking and critical thinking are not identical concepts. Critical thinking is a facet of what it means to be "rational" (McPeck, 1981, p.12). This means that whilst critical thinking

must ideally be grounded in the principles of rationality, it is vital that it also attend to the fact that rationality too has its limits in relation to enquiry and knowledge. In order for thinking to be appropriately characterised as 'critical' therefore, it must remain committed to exposing the frontiers of all unjustified knowledge-claims, regardless of the framework from which they originate. Rationality consists in thought and action culminating in the "appropriate use of reason to resolve choices in the best possible way" (Rescher, 1988, p.3). Rationality is a matter of deliberately doing the best one can with the means at their disposal. It consists in striving for the best results one can achieve within the range one's resources, specifically within a cognitive context. Put simply, a person acts rationally in matters of belief, action, and evaluation, when his/her reasons are cogent reasons (Audi, 2003).

At the heart of rationality lies the principle of optimisation in everything one does, thinks or values (Searle, 2001). To do something rationally is to do it for good and cogent reasons; rationality accordingly pivots on the deployment of good reasons. It is not simply just a matter of having some reasons for what one does, but rather, aligning one's beliefs, actions, and evaluations with the best or strongest available reasons (Rescher, 1988). On this view, reasons come in varying degrees of strengths (Scanlon, 2014). To act rationally is to determine the strongest reasons and align one's beliefs and actions with those reasons.

To elucidate rationality in more everyday terms, the philosopher Frank Ramsey (1926/1978) suggested one make use of an economic conception, whereby irrational degrees of belief would cost us money if we let them guide our actions. Ramsey's view of rationality hinged on the probability of achieving a positive outcome through one's betting behaviour. Essentially
 this amounts to the inclination to accept or reject bets according to degrees of belief. He argues that, "all our lives we are in a sense betting. Whenever we go to the station we are betting that a train will really run, and if we had not a sufficient degree of belief in this, we should decline

the bet and stay at home (Ramsey, 1926/1978, p.85). Though there are several merits to this conceptualization, it still assumes agents can accurately determine the odds of X or Y being the case. In turn, this again assumes that these odds are immediately accessible and determinable, and, with this, their cogency immediately identifiable. This is not always the case, and is an issue I will address in the final chapter through the lens of 'bounded rationality'.

Rationality and rationalising are occasionally conflated (Searle, 2001). Naturally one can always rationalise something by "means of finding some reasons for thinking or doing it" (Audi, 1985, p.159). This is an obvious danger and needs to be guarded against. A further problem is the issue of rationalising, where we posit reasons for what we want, in place of good reasons for what we ought to do. Again, this is not rationality, but rationalising, and is an abuse of rationality (Nickerson, 1986). Occasionally this crucial distinction goes unnoticed. As is the case before, such actions are not rational unless the reasons posited are the strongest reasons available for a given belief or action.

There are several key limits to rationality too - more specifically in relation to its assumption that there is always an optimal way of proceeding. Let us briefly look at one such example (Gardner, 2001, p.580). Imagine two closed boxes, B1 and B2 are on the table. B1 contains €1,000. B2 either contains nothing or €1,000,000. You do not know which. You have an irrevocable choice between two actions:

1) Take what is in both boxes
2) Take only what is in B2.

At some point before the test, a superior being (supercomputer) has made a prediction about what you will decide. It is not necessary to assume determinism. You only need to be persuaded about the Being's predictions are 'almost certainly' correct. If the being expects you to choose both boxes, he has left B2 empty. If he expects you to randomise your choice by, say, flipping a coin, he has left B2 empty. In all cases B1 only contains €1,000. You understand the situation fully, the Being knows you

understand, you know that he knows and so on. What should you do?

Earlier we looked at how rationality is the process of aligning yourself with he strongest available reasons for belief and action. This holds a strong *prima facie* appeal. But in the case above, an equally cogent argument can be made for either course of action. Taking what is in both boxes is undoubtedly rational, whereas taking only what is in B2 might equally be considered rational. The competing claims to the strongest reasons for either course of action end in an impasse. In this way, rationality has limits, both as a normative compass, and in terms of the process it deploys in order to reach informed and evaluative judgments.

It is further hampered by the fact that the best reasons available are temporally conditioned, in some cases incomplete, and therefore, can only be held pro tem. It was once rational to hold for example that Chronic Fatigue Syndrome (CFS) was nothing but a psychosomatic disorder, and those who complained of chronic fatigue were merely deluded, sedentary and listless individuals. Luckily, this false belief has long since been vanquished. But this should not take away from the fact that medics and scientists alike once declared it rational (on grounds of absence of evidence), to refuse to acknowledge or believe that such a thing as CFS exists.

2.7.7 Good or Clear Thinking

Critical thinking *can* be exemplified in 'good' thinking, but the relationship is asymmetrical: "not all instances of good thinking are examples of critical thinking - the concepts are not equivalent" (Davies, 2015, p.46). All 'critical thinking' is 'good thinking', but not all 'good thinking' is critical thinking. In some respects, critical thinking is more about finding exceptions to generally held rules, or exceptions or alternatives to, what is marketed as ostensibly 'good' thinking. What might be characterised by some scholars as being 'good', is not necessarily 'critical', for there may be flaws or limits inherent in these examples of ostensibly 'good' thinking. For instance, it was once held that slavery was morally permissible. As a result, slavery was only made

illegal (civil law) in Britain in 1772, with slavery in the colonies only abolished in 1833. Christians who sought a justification for this belief pointed to the passage that says: "tell slaves to be submissive to their masters and to give satisfaction in every respect" (Titus 2:9). Intuitively this was considered 'good reasoning' at the time, since it was based on a strong evidential base, that being, a literal interpretation of Holy Scripture.

Before the repeal of these laws, this was deemed by many Christians to be clear and good thinking based on the moral code illustrated in the Bible. But it was clearly wrong (morally) and even though the church recognised such in the 14th and 15th centuries, the practice continued until the late nineteenth century. Regardless of the issue under consideration, critical thinkers must look beyond cultural norms and uncontested ethical practices when forming their beliefs and actions. This renders the use of the term 'good' slightly misleading and therefore asymmetrical.

Good thinking is a bit like a flat roof - it might fulfil its purpose for a period of time. But to be critical of it, one must look to better configurations (pitched roof), including better materials with greater performance (say zinc). Good might be considered *good*, but *not good enough* - in this way - critical judgment wants *better* - better being a closer alignment between thought, facts, language and the world. This might not always be possible, but this should not mean it is automatically ruled out. In summary, all critical thinking is good thinking, but not all good thinking is critical thinking.

2.7.8   Independent Thinking
 Consistent with the distinction between critical thinking and 'good' thinking, it is likewise possible for one to think independently without thinking critically. The relationship is again, asymmetrical (Davies, 2015). The student who tears up his leaving certificate English exam paper because he wants to raise awareness of the pointlessness of exams, may be acting independently, but certainly not, critically. Similarly, the Ugandan who refuses to take his ARV drugs for HIV, might be acting independently, but certainly not critically.

2.7.9   Problem-Solving & Decision Making

While sometimes used interchangeably, critical thinking and problem-solving are not equivalent either (Davies, 2015). Not all examples of critical thinking necessarily involve solving problems. But why is this the case? Firstly, problem solving involves making judgments in order to complete set pre-established tasks. Such judgments, may, or may not, meet the intellectual standards of critical thinking. Therefore, in solving a given problem, one may engage, or indeed, fail to engage, in critical thinking. Hence, problem-solving and critical thinking are not equivalent.

An example in point is the light-bulb puzzle we looked at earlier. Solving this puzzle merely involves adopting the principles of logic. It requires no critical capacity, since logic is simply the application of pre-determined rules to reach a narrowly defined option range of conclusions.

In many respects, critical thinking may be just as much about problem clarification as problem solving and decision-making (Rescher, 2014). Exercising criticality, may, or may not, result in solving a problem. Depending on the context of the enquiry, Rescher (2012) argues that problem clarification may even be more important than problem solving. After all, an answer is only as good as the question used to elicit it.

Similar to the above, both 'problem solving' and 'decision making' are "best seen as arenas in which critical thinking should take place rather than other specific types of thinking to be compared with critical thinking" (Bailin et al., 1999b, p.288).

2.7.10   Higher-Order Thinking

This umbrella term refers to the nexus between the skills and components comprising: critical, logical, reflective, metacognitive, creative and cogent thinking. Higher-order thinking has a wider ambit than that of critical thinking whose specific focus is decidedly narrower in scope. It is therefore inaccurate to characterise critical thinking and higher-order thinking as equivalent.

In summary, the addendum 'critical' applies when one asks oneself the following question: are there sufficiently strong rational reasons to move me to believe or do something? Can I anticipate any potential flaws in my reasoning? Are there stronger reasons/evidence for alternative or contradictory conclusions? Telling me there are fairies at the end of the garden is not a sufficiently strong rational reason to convince me that there are fairies there. Arriving at an informed judgment in this regard does not require higher-order thinking. Should my wife tell me she bought me a villa in Spain, it should not take higher-order thinking to catch her out on her jest. All that is required is to check our bank account to verify/disconfirm the claim. And so, higher-order thinking is not necessarily required for critical thought, nor is it to be conflated with the phenomenon. More complex conundrums of course may require higher-order thinking, but it (higher order thinking) should not be conflated with criticality.

In summary, the key dimensions of a philosophical account of critical thinking can be framed as follows. Firstly, critical thinking is both a noun and a verb/adverb. As a noun, we need to generate a cogent definition of what it is; otherwise we risk "shooting arrows at a target we can't see" (Mulnix, 2012, p.464). As a verb/adverb, critical thinking refers to a specific method (Siegel, 1988; 1997). This *reasons-assessment method* needs to be unpacked and explicated in order to demonstrate how it works (Siegel, 1988; 1997). Secondly, critical thinking requires us to reach some form of reasonable and reflective judgment about what to believe, accept, or do (Ennis, 2015). This judgment can be either generative (reflectively calibrated so that the person generates the informed decision/judgments themselves as to what they should do in a given situation), or conversely, it can be an evaluative judgment based on the merits of competing external arguments/evidence/reasons about what to believe or do (Bailin & Battersby, 2015). Either way, the judgment is principally arrived at via the cogency and convicting force of the justification/argument/reasons offered in support of a given belief, claim or action. Thirdly, critical judgments, should they be appropriately characterised in these terms, must meet a

certain level of "acceptability", both internally (from agents & their intellectual community of enquiry within the select domain of enquiry), and externally, (from other critical enquirers stress-testing the cogency of the reasons underpinning these knowledge claims). Thresholds of putative acceptability (in the form of undefeated reasons) may vary from person to person, and from expert to expert.

Fourthly, critical thinking stress-tests human thought, belief and action, regardless of the framework in which it operates (theoretical or practical reason), and exposes the limits of that which we can justifiably say we truly know to be the case. It also stress-tests epistemically objective and subjective truth claims. Epistemically objective claims are true or false independent of one's attitudes toward them. For example, the laws of gravitation hold (under certain conditions) regardless of our feelings on the matter. On the other hand, epistemically subjective statements are based on feelings: for example - Rembrandt was the greatest painter that ever lived. Either way, each truth claim is based on reasons (some of them more objective/rationally forceful than others), whose cogency critical thinkers question and stress-test (Scanlon, 2014; Searle, 2001).

Fifthly, critical thinking is an enquiry-based approach to thoughtfully discern what to believe or do (Bailin & Battersby, 2015). It is rooted in rationality, that is to say, the convicting strength or force of reasons (Siegel, 1988; 1997). Reason in the form of principles (when it comes to theoretical reason, and phronêsis for practical reasoning) dictate the epistemic force of specific reasons (Audi, 2015), specifically: (i) evidential force and relevance (Lipman, 1988; 1991); (ii) undefeated reasons and reason defeaters (Pollock 1987); (iii) epistemic force of motivating and explanatory reasons (Audi, 1983); and the final arbiter of all, (iv) the phronimos, or person of practical judgment (Dunne, 1993). To understand the principles embedded in scrutinizing these reasons, critical thinkers require a solid grounding in epistemology and the standards of cogent justifications (Scheffler, 1973; Siegel, 1988; 2017).

Sixthly, critical thinking is *a normative pursuit* (it has, depending on the domain of enquiry, cognitively accessible and objective standards/thresholds, in the shape of undefeated or acceptable *reasons*). Based on this grounding, it must always remain open to epistemic pluralism (attentive to particularities and context-specific judgments) and yet, at the same time, still circumvent the pitfalls of relativism, or, "one truth for you, and one truth for me". There are normative standards attached to the mechanics of critical thought (Davies, 2015; Siegel, 2017; van Gelder, 2015). With this, criticality is not merely a reductionist form of "logic chopping" (Burbules & Berk, 1999, p.10), nor is it detached, disembedded or sanitised "*a priori* reasoning" (Wood, 2002, p.16).

More accurately, criticality is a situated person thinking critically - it is not a brain in a vat divorced from context, nor is it an algorithm designed for cognitive optimisation or success. It is an operationalised concept - a concept enmeshed in our individual and interlinked 'worldhoods', our worlds of lived experience (Husserl, 1970). To operate, it integrates creativity, hermeneutic imagination, contingency (seeing viable alternatives to established norms), and collaborative inquisitive reasoning under the rubric of a normatively orientated evaluative judgment reached through *phronêsis* (practical judgment). In terms of practical reasoning, the Aristotelian concept of *Phronêsis* is the final arbiter when it comes to deciding which reasons are the most rationally forceful (Blackburn, 2010; Dunne, 1993). The *phronimos* is ideally placed through deliberative excellence and prudence to stress-test the reasons on which we base our actions in order to reach an informed judgment as to whether they are acceptable, relevant, and sufficient (Dunne, 2015a). Finally, critical thought is a metacognitive enterprise. By this, it is meant that it involves a self-regulatory dimension, or in other words - a cognitive and ontological disposition to always critically reflect on the strengths and weaknesses of one's thinking (Flavell, 1976, 1979; Mulnix, 2012).

2.8   Critical Thinking in Cognitive Psychology

In contrast to philosophical and normative conceptions of critical thinking which seek to enumerate the qualities and characteristics of the ideal critical thinker, and by extension, furnish a benchmark through which thinking should it be appropriately deemed 'critical' must meet, cognitive-psychological accounts of critical thinking tend to be descriptive. This means cognitive-psychological approaches are framed in terms of atomistic cognitive skills, or more generally, the range of mental processes involved in reasoning, such as, observing, classifying, hypothesising, interpreting and analysing. Traditionally cognitive psychologists are interested in cognitive architecture, such as how the mind organises, represents and processes knowledge, and phenomena such as long and short-term memory, language, problem-solving, reasoning, decision-making and cognitive development (McGuinness, 1993).

One of the problems with this descriptive approach is that mental processes, in the sense of what goes on in the brain, are largely unobservable, and it is therefore impossible to determine whether particular mental operations correlate with particular cases of good thinking. Even in the event of a CT scan presenting a description of thinking at the level of brain processes, such data are largely unhelpful to pedagogues in their quest to foster critical thinking. After all, terms such as classifying, observing, interpreting, or hypothesising do not refer to mental operations at all but rather to different tasks requiring thinking (Ryle, 1949). There is also the further issue of understanding the role of context to contend with. Interpreting a poem for instance, is a very different challenge to that of interpreting a graph, or interpreting the inflections in someone's voice. For psychologists, interpreting not just what a person says, but what they do not say, is vital to the critical skill-set expected of their profession. As the old adage goes, "context can change a poison into a cure and a cure into a poison". For this reason, in order to know which context requires a specifically tailored course of action, critical thinkers need to display a deep sensitivity to the context in which all of their judgments are calibrated (Lipman, 1988;1991).

Cognitive psychologists, on the other hand, particularly those rooted in the behaviourist tradition with its experimental emphasis, argue that they focus on how people *actually think* as opposed to how they *could or should think* under ideal conditions (Sternberg, 1986). This has the advantage of not simply enumerating the qualities of the ideal hypothetical thinker, but more importantly, assigning a hierarchical taxonomy of thinking skills that thinking must satisfy in order to be worthy of the addendum 'critical'.

Those working within this field define critical thinking by means of the types of actions or behaviours critical thinkers can engage in. Thinking is viewed as a multi-skill activity rather than a unitary propensity and stage, with each skill individually teachable (Halonen, 1995; Schön, 1983; 1991). One criticism of this atomised approach to critical thinking is that it reduces the phenomenon to a list of developmental skills or procedures performed by critical thinkers (Bailin, 2002; Lewis & Smith, 1993). The work of King & Kitchener (2002) is a case in point. According to this model, there are three stages of critical thought - pre-reflective reasoning (stages 1-3) quasi- reflective reasoning (stages 4-5), and reflective reasoning (stages 6-7). Each stage corresponds to an epistemic category, based on subjects' inclination and skill to probe knowledge claims and challenge assumptions (King & Kitchener, 2002, p.39-41). The notion that each person's epistemic predispositions and skills follow the same trajectory in terms of sophistication is testament to the neatly packaged developmental approach cognitive psychologists favour. Not all people operate according to the diktats of these stages. Depending on the domain of enquiry, sophisticated enquirers might fall short in their epistemic duties; similarly, those of the opposite persuasion might excel, depending on particularities of the situation under scrutiny.

Building on Bloom's (1956) taxonomy of classifying educational learning objectives into levels of complexity and specificity, one approach proposes criticality comprises six cognitive processes: (remembering, understanding, applying, analysis, evaluation, creativity), and four knowledge categories: (factual, conceptual, procedural and metacognitive

(Anderson & Krathwohl, 2001). Other frameworks define critical thinking as a set of generic skills such as hypothesis testing, making informed decisions, establishing likelihoods, reasoning and scrutinising inferences (Halpern, 2014). Critical thinking is therefore, on this conception, "the use of those cognitive skills or strategies that increase the probability of a desirable outcome" (Halpern, 1998, p.450). Further definitions emerging form the cognitive tradition refer to critical thinking in terms of "seeing both sides of an issue, being open to new evidence that disconfirms your ideas, reasoning dispassionately, demanding that claims be backed by evidence, deducing and inferring conclusions from available facts, solving problems, and so forth" (Willingham, 2007, p.8).

Philosophers have criticised this developmental approach to critical thinking on a number of grounds. Firstly, they argue that this approach is misguided because it is overly reductionist. According to this view, any attempt to reduce a complex orchestration of knowledge and skills into a series of disconnected steps or procedures is a mistake (Bailin, 2002; Barnett, 1997; Williams, 2016). To put it another way, to view critical thinking as a series of disconnected steps or skills represents a fundamental misconception, since it ultimately stems from the behaviourist's need to define constructs in ways that are directly observable (Bailin, 2002; Bailin & Battersby, 2015).

According to this argument, because the actual processes of thought at a neurological level are unobservable, and moreover, inconclusive, cognitive psychologists have tended to focus on the products of such thought in the form of behaviours or overt skills (e.g., classifying, analysis, reasoning, interpretation, formulating good questions). Philosophers critical of this behaviourist and reductionist approach caution against confusing the activity of critical thinking with its component skills, arguing that critical thinking is more than simply the sum of its parts (van Gelder, 2005). To conceive of critical thinking as merely a rule-based rubric ignores the fact that, "one task of rational assessment is to determine which rules should be followed in a given situation…mindlessly applying rules just because they are logically

correct is foolish" (Brown, 1995, p.744). To put it another way, depending on the situation, critical thinkers must recognise "when to apply various principles and criteria" (Bailin 2002, p.370).

2.9   The Specifist/Generalist Debate and Transferability

The specifist/generalist debate is one of the most contested areas in the literature (see McPeck, 1990, Bailin, 2002; Halpern, 2014; van Gelder, 2005; Lipman, 1988; 1991). Proponents of domain-specificity argue that critical thinking requires extensive domain-specific knowledge. Only then can one be critical in their respective discipline (McPeck, 1990; Willingham, 2007). Generalists, on the other hand, contend that there are generic critical thinking skills that stretch across domains of enquiry (Halpern, 2014; Lipman, 1988, 1991; van Gelder, 2005). After all, critically appraising the quality of a documentary source is just as useful in History, as it is in journalism for example.

Though this topic will not form part of my later deliberations, it is important to briefly synopsise the issue, since the model of critical thought I advance later assumes that there is an identifiable cross-fertilisation of sorts between domains of thought, which means that, on occasion, domain- specific thought intersects with domain-general enquiry. Predominately this cross-fertilisation occurs in the practical domain, but it may also manifest itself in domain-specific intellectual enquiries.

Arguably one of the most intractable debates overshadowing critical thinking hinges on resolving whether it is appropriately conceived as something general, or conversely, as something domain-specific or context- specific. Generalists contend that criticality is a set of "generalised skills, abilities and disciplines", which can be "utilised or applied across a broad range of contexts and circumstances" (Bailin & Siegel, 2002, p.190). An example of this would be a critical thinker dissecting a journalistic piece. Given their abilities and competencies, it is logical to assume that they would be able to identify fallacies, such as (*argumentum ad hominem*) - the fallacy of attacking the character or

circumstances of an individual who is advancing a statement or an argument instead of trying to disprove the truth of the statement or the soundness of the argument), and (*argumentum ad verecundium*) - the fallacy of appealing to the testimony of an authority outside their specialist field. Other professionals, such as medics, dismiss unwarranted causal inferences like (*post hoc, ergo propter hoc*) - "after the event, therefore because of it", on a daily basis, both in their clinical judgments, and in their evaluation of pioneering research. Another example would be a judge making her deliberations on a controversial case. She would be able to examine the evidence, scrutinise relevant testimonies and make an informed decision based within the parameters of the law.

On the other hand, proponents of the specifist-school, deny any such general ability. One such exponent is John McPeck (1981) who strongly disputes the idea that critical thinking skills can be applied generally across subject-area domains, because "thinking is always thinking about something…to think about nothing is a conceptual impossibility" (p. 3). Explaining his position, he asserts, "to the extent that critical thinking is not about a specific subject X, it is both conceptually and practically empty" (p. 5). In his view, thinking is always tied to a particular subject and content; therefore, to speak of critical thinking skills as a general measure to enhance students' critical thinking is both unwise and a costly mistake.

Though I agree with McPeck's assessment in some respects, (expecting explicit instruction in critical thinking to automatically enhance student's skills being one), there are still some anomalies in his reasoning. First, I want to refute his claim that thinking about nothing is a "conceptual impossibility" (1981, p.3). Academic literature drawn from a wide range of disciplines such as: cosmology, theology, philosophy and mathematics, have all grappled with the idea of nothingness (Barrow, 2002; Leibniz, 1989). Indeed, the enduring question of how something can come from nothing is not only a metaphysical question, but rather an *apory* that unites theists, atheists and indeed scientists in their quest for a satisfactory

answer. For example, Thomist theologians have grappled with the very idea of nothingness and its ramifications for the Kalām cosmological argument for God's existence (Davies, 2004). How can God (something) come from nothing? If God always existed, does She have within herself the reason for her own existence? Because everything that has a beginning of its existence has a cause of its existence, how do we avoid an infinite regression? Assuming God exists and has within Herself the reason for her own existence, is it possible there are other entities that have also always existed? These interlinked questions are not only confined to theology. Mathematicians and physicists likewise wrestle with the very question "out of nothing, nothing comes" and Leibniz's idea of "nothing is without a reason" (Barrow, 2002, p.112). Since science relies on the idea that "nothing is without a reason," this epistemic stance would seem to imply the universe has a reason for its existence. If so, what is it? And what caused the cause? And what caused the cause of the cause? Evidently, the study of *nothing* is of vital importance to both science and theology, and therefore clearly not, as McPeck contends, "a conceptual impossibility" (1981, p.3).

Granted, in these instances, *nothing* is being treated as *something*. Critical thinking skills cannot exist in a vacuum; however, we do not exist in a vacuum. As human beings, we occupy an infosphere - a world where a sea of information and data swamp us on a daily basis. Indeed, it is terribly difficult to avoid it. To do so would be tantamount to ignoring our own existence. Thus, critical thinking is rarely "conceptually empty" (as McPeck puts it) because we are rarely conceptually empty. Our everyday lives require us to interact with an endless stream of input and data generated from the world around us. Such input comes in the guise of all forms of media: news, books, journals, conversation, testimony, the internet, and so on and so forth. With this input comes the universal human challenge of sifting out and determining: (i) what to believe or accept, and what to do or perform (Rescher, 1988).

This challenge is made all the more complicated by virtue of the fact that

researchers have estimated the world's data storage capacity at 295 exabytes - in other words, enough information to fill a pile of CDs that would stretch beyond the moon. Worse still, this overwhelming pile of information is increasing by a factor of 10 every five years (Winerman, 2012). To further compound matters, this information (input) is seldom linear, atomised, or neatly packed into certain pre-ordained subject-specific domains. Sometimes this data transcends typical subject-content demarcations. The task the educationalist and philosopher are left with remains - to drain the infosphere swamp and render an informed judgment on T. S. Eliot's sphinx-like challenge: "where is the wisdom we have lost in knowledge/where is the knowledge we have lost in information?" This, of course, is no easy task. Information has no satiation point. Try asking Google about the best way to achieve *Eudaimonia* (happiness or flourishing), and you will quickly see that, out of 6 billion hits, it still remains unclear as to the best way to proceed, or the best course of action to adopt. Not only is this such a contested area due to disputed context-specific causal factors, but also because this topic draws together a myriad of disciplines under the one umbrella, all with admittedly, slightly different foci.

For example, the questions: must happiness always involve a measure of self-delusion, or what is the difference between happiness and contentment, are questions of equal concern for psychologists, social scientists, psychiatrists, and philosophers alike. For this reason, I argue that critical thinking need not be exclusively attached to only one particular subject or content. Such a reading ignores the fact that whatever decision one comes to in any sphere of knowledge almost certainly hinges on a knowledge or truth-claim. For sure, the business of establishing the robustness of knowledge and truth-claims is part and parcel of life. We do it every day, whether it be analysing the merits of some new scientific discovery, formulating judgments about whether the article we are reading is 'fake news' or not, distinguishing between facts and non-facts, sifting between fact and value based judgments, or deciding if we believe in a

supernatural being. Each decision we arrive at invokes reference to a knowledge or truth-claim. For educationalists, these decisions rest on the principles of justification (in the form of cogent reasons), and for some, subjective Bayesianism, where probability theory specifies how rational agents should reason in situations of uncertainty (Hacking, 2006). In the case of Bayesianism, named after Thomas Bayes (1702-1761), this interpretation of the concept of probability, assigns a degree of rational expectation to the probability of a certain belief or knowledge claim being true, or, as was the case with the original theorem, the chances of a horse winning a certain race, based on prior form and other factors, such as the length of the race and the condition of the course.

2.10   Teaching Thinking Skills

Following on from the generalizability debate, Stephen Johnson (2010, pp. 1-47) in the book *Teaching Thinking Skills*, takes issue with the characterization of 'thinking skills' as being commensurate with generalizable non-domain specific transferable competences. He carefully argues how the myth of general transferability rests upon a number of fallacies and conceptual errors, which, once exposed, weaken the argument that, thinking skills, (if there are such things), can be applied to diverse domains of expertise with minimal difficulty. From here he then critiques the direct approach to teaching thinking which can lead to knowledge playing a subsidiary role and even being seen as an impediment. Finally, he warns of the reductionist checklist approach to thinking, where ostensible examples of general thinking skills fail to stand up to scrutiny.   In short, Johnson seeks to cast doubt on the purported educational value, and existence of, thinking skills *tout court*. In his view, educationalists' preoccupation with the enhancement of thinking skills, can, if left unchecked, lead to the disparagement of knowledge, the impersonalizing and neutralizing of thought, the neglect of truth, and the computerization of thought (p.2).

Responding to some of these claims in the same book, Harvey Siegel (2010, pp. 51-83) shares many of Johnson's concerns with the policy

document on which much of this criticism is based, namely, the McGuinness Report (1999). However, though both Siegel and Johnson's views harmonize in many respects, Siegel is quick to distinguish between the cogent criticisms springing from a critical reading of the philosophical suppositions on which this policy document is based, as opposed to a robust conceptual exegesis of the conceptual merits of thinking skills as debated in educational discourse. Too many of Johnson's arguments in Siegel's view rest on the assumptions on which the policy document rests, in contrast to the merits of key philosophical claims from other scholars working in the field (p.53). In what follows, I briefly trace the background to the McGuinness Report (1999). I then draw on some of Johnson's key points, focusing in particular on a critical reading of his objections to thinking as a skill, before then terminating with Siegel's response to Johnson's concerns about the pursuit of thinking skills in educational settings.

2.10.1 A Brief Background to the McGuinness Report

Burgeoning interest in the value and efficacy of 'thinking skills' in the UK curricula stemmed principally from the publication of a document in 1999 entitled: *From Thinking Skills to thinking Classrooms: a review and evaluation of approaches for developing pupils' thinking* (hereafter the McGuiness Report). The McGuiness Report is named after the former director of the Activating Children's Thinking Skills project funded by the Northern Ireland Council for Curriculum, Examination and Assessment, Dr. Carol McGuinness of Queen's University. In her report, McGuinness (1999) tells us there are "several general taxonomies" of thinking skill such as:

> sequencing and ordering information; sorting, classifying, grouping; analysing, identifying part/whole relationships, comparing and contrasting; making predictions and hypothesising; drawing conclusions, giving reasons for conclusions; distinguishing fact from opinion; determining bias and checking the reliability of evidence; generating new ideas and brainstorming; relating cause and effect, designing a fair test;

defining and clarifying problems, thinking up different solutions, setting up goals and sub-goals; testing solutions and evaluating outcomes; planning and monitoring progress towards a goal, revising plans; making decisions, setting priorities, weighing up pros and cons (p. 5).

Students, in McGuiness's view, therefore, ought to be taught thinking skills in line with the broad aims of liberal education, those being: drawing conclusions; distinguishing fact from opinion; checking the reliability of evidence; relating cause and effect; defining and clarifying problems and testing solutions and evaluating outcomes. She outlines three main approaches to teaching thinking: the *general*, the *subject-specific* and the *infusion* approach. According to the *general* approach, McGuinness states, "cognitive development is driven by a general central processor and that intervention at this level will have widespread effects across many thinking domains" (p. 7). Implicit in this understanding is that some courses strive (and ought to strive) to enhance general information processing skills within a context-free setting. Instruments such as *Somerset Thinking Skills Course*, *Cambridge International AS* and *A Level Thinking Skills* are cases in point. These instruments strive to enhance the skills of problem solving and critical thinking without the reliance on domain-specific background knowledge or expertise.

Other approaches target general cognitive development from within particular subject areas (e.g., Cognitive Acceleration through Science Education (CASE), see Shayer and Adey, 2002). The aim of the *subject-specific* approach is to enhance thinking within domain-specific contexts. Several examples of this exist, for instance, *Engineering Reasoning* (Paul, Niewoehner, & Elder, 2013), and the *Thinking through History* project (Fisher, 2002). Finally, we have the approach "personally favoured by McGuinness, the *infusion* method" (Johnson, 2010, p.6). This pedagogic approach seeks to enhance thinking skills by utilizing contexts naturally occurring within certain curricular content as a kind of hook to hang general thinking skills on. As McGuinness puts it, "this approach does

have a generic character, it seeks to embed thinking skills…and exploit naturally occurring opportunities for developing thinking within the ordinary curriculum" (p. 19).

2.10.2 Johnson's Position – A Brief Summary

Johnson identifies four fallacious moves that proponents of thinking skills are guilty of executing, namely: *reification, essentialism, naming* and *generalization*. Reification involves "wrongly treating X as if it were a thing" (p.20). Johnson explains that though we can refer to thinking, there is no such thing as thinking tout court. This is because 'think' takes an indirect object. In summary, Johnson objects to educationalists assuming that if X can do Y skillfully, "there must be a skill of Y-ing and that X has it" (p.20). Talk of skillful thinkers therefore, lead to the temptation that there is a 'skill' to be isolated and subsequently trained for. This is a mistake in Johnson's estimation.

Essentialism maintains that thinking critically or solving problems is explicable in terms of underlying structures of the brain or mind which operate in terms of determinable scientific and verifiable principles. Put simply, essentialists maintain that mental operations work in much the same way as physics: magnets attract iron fillings and acid turns blue litmus red. Thus, once a person develops a sufficiently sophisticated mental process, it follows that they will always think critically. Johnson argues that essentialism might lead to "beliefs desires and context being ignored" (p.21). He also worries that general labels such as problem-solving or critical thinking gain a "spurious unity and precision" (p.21). Finally he argues that, on this view, it would be extremely difficult to explain why so-called critical thinkers fail to think critically, in the same way that, it would be difficult to explain why a magnet failed to attract iron fillings.

The *naming fallacy* arises, according to Johnson, from the fact that it does not follow that a general term exists that it refers to, for example, a general ability. From the truth of "Jones is evaluating the applicant's CV", it does not follow that there is a general activity, *evaluating* that he is currently

engaging in (Winch, 2010, p.111). Drawing on Wittgenstein, Johnson argues that instead of common feature running through all instances of a concept, there is a network of overlapping similarities. Much like in the case of games (family resemblances) where Wittgenstein makes his point, Johnson thinks "you will not find something common to all, but [rather] similarities, relationships" (p.31). So because we can recognize specific acts as acts of "judging" or "being accurate", it does not follow that there are corresponding general skills, such that we could coherently claim to be able teach a person judging skills or accuracy skills *simpliciter* (p.23).

Finally, there is what Johnson calls the *generalizing fallacy*. If one knows how to open a tin, it does not follow that one knows how to open things (Winch, 2010, p.112). This makes sense, but an interlocutor might argue that there are general principles that might be useful in carrying out the task of opening something. Opening a bag with a zip operates the same way, regardless of the type of bag one is attempting to open. Opening a tin of tennis balls (might not be exactly the same, but similar enough to carry it out without difficulty) as, say, a tin of tuna. That said, it is true that just because the above examples might hold, that one might infer that there is some sort of "general activity of *opening* that can be applied to *all sorts* of different objects" is a mistake (Winch, 2010, p.112). One type of task is not necessarily true of all types of tasks because it is "false to conclude of some property that applies to a specific type of instance (…is able to open a can) that it can be applied to a range of types of activity (…is able to open an X)" (p.112).

2.10.3 Critiques of Johnson's Opposition to Thinking as a Skill

Talk of the existence or educability of thinking skills according to Johnson rests on the mistaken assumption that they are clearly identifiable processes capable of manipulation and enhancement. Johnson does not deny that thinking is an important activity, nor does he deny that it is an activity that some fare at better than others. What he argues is that, as Christopher Winch (2010) surmises, "whatever these abilities are, they are poorly characterized as skills, and to say that they involve thinking is also

problematic, as thinking is too vague or ramified a concept to be associated with a particular kind of activity" (p.107). Reductionist approaches to teaching thinking as a skill are likely to be unsuccessful according to Johnson (2010) because "mastery of the so-called sub-skills still leaves the learner well short of mastering the whole" (p.11). One may possess the skill of being a superb set-piece taker in football, but lack sufficient understanding of the theoretical underpinnings of their procedural technique when doing so. David Beckham, argues Johnson, does not go through a checklist covering feet, body-angle, follow-through and so on before he takes a free kick (p.11). So too, with critical thought, if we reduce it to a skill (where thought is redundant, since the skill is a product of mindless habituation), there is a danger of conceptualizing it in terms of an unreflective activity, often carried out with minimal conditions of understanding (pp. 7-13). In the same way, Johnson argues, equating thinking with 'know-how' is inappropriate since to have "mastered a skill usually means to be able to exercise it without thinking" (p.10).

There are two key points here. First there is Johnson's claim that mastering a skill (thinking) entails that it can be typically exercised "without thinking". The second issue rests on Johnson's claim that thinking skills do not necessarily require anything more than "minimal conditions of understanding" for their effective implementation. Contra both of these claims, I argue that both readings betray a misunderstanding of so-called mastered skills, firstly in terms of them being exercised "without thinking", and secondly, in terms of such skills operating with only "minimal conditions of understanding".

Equating the mastering of a skill in terms of exercising such 'without thinking,' is a mistake in my view. In the most extreme sense, I may have mastered the skill of playing tennis, but if you remove my cognitive faculties in a tennis match, you will soon discover I cannot hit the ball, anticipate my opponent's responses or weaknesses, nor adapt to the changing demands of the match. Likewise, I might have the skills of a terrific forehand, but on a given day, my choice shot keeps letting me

down. To exercise my skill effectively therefore, I might take a shorter backswing or adjust my grip to a less extreme western one, thus optimizing the probability of getting more forehands back into play. This adjustment, (which some call matchplay or phronetic judgment), is linked to my possessed skill of playing tennis. It also requires an understanding of the subskills (swing, stance, footwork, balance, backlift etc) involved in hitting a forehand. Without such knowledge, there would be no way of tweaking my shot. In this way, I see Johnson's declaration that mastering a skill usually means "to be able to exercise it without thinking" to be unfounded. Thought is required for any skill. Moreover, many skills are often linked to other skills. They cannot be divorced from context. For instance, David Beckham does not take the same amount of steps for every free kick he takes. He decides (a product of thought, not just habituation) on how many he requires depending on the distance from goal, condition of playing surface, angle, and so on. The skill of striking the ball is not something one can do without thinking. It is inextricably linked (and in some cases contingent on) the position of the keeper, the position of the wall, and the quality of the playing surface, to name but a few. Whatever way you choose to look at it, phronetic deliberation (in the form of thought) is required for the effective implementation of quite a number of skills, whether it be the skills of a good listener, or a good cook.

A talented pastry chef cannot make *pasteis de natas* in warmer climates using the same old techniques. Their hands will be warmer, so they need to factor this in when making the pastry. Here I think Johnson mistakes a skill as something that never changes. He tends to see skills as something which, when possessed, eschew thought and proper understanding. He also views skills as an inert possession. Once possessed, they operate outside the scope of correction, improvement or questioning (Siegel, 2010, p.67). There is a danger in taking Johnson's view to entail that skills might operate independent of context, deliberation or insight. This is where we diverge.

A professional pianist may play differently on a Steinway as opposed to a Yamaha given the sensitivities and tone of the soundboards on both. Ultimately the technique for playing the piano remains the same, but the effective implementation of that skill might change from instrument to instrument. For this reason, skills require thought in order to adapt and flourish. This question largely springs from the failure of Johnson to distinguish between a skill (as something possessed – a noun) and the operationalization of such skill (the performative dimension – a verb). On such a reading, there is a skill in and of itself, and there is the performative dimension where such activities are carried out in diverse settings. In both cases they require thought to be sustained or practised effectively. Clarifying this point, Winch (2010) suggests that Johnson accept that, "thinking is very often concerned with broader categories of activities than tasks…but these examples can be resolved by refusing to confine thinking to skills and by admitting that the adjective 'thinking' can be applied to broader categories of agency as well as to the performance of highly specific tasks" (p.103).

The second point Johnson makes in relation to viewing thinking as a skill hinges on his claim that often skills are only "minimally involved in understanding" (Barrow, 1987, pp.190-191). This view is echoed by Scheffler (1965) who maintains that 'knowing-how' is applicable in cases where "repeated trial or practice is thought relevant to performance and where it is carried out under minimal conditions of understanding" (p.93). This point is much harder to refute. No doubt there are a huge range of skills which operate according to a limited understanding. But this is more complex and nuanced than it first seems however. Ask an expert painter such as William Orpen to explain his painting style and you might find it difficult to follow his explanation. In such a case however, is this because his skill is carried out under minimal conditions of understanding? Might his inability (in your eyes) to explain his skill in minute detail be a result of the limits of language, your imperfect technique, or indeed, your inadequate interpretation? Certainly a strong argument could be made that in such instances it could be one or a combination of the above. When it

comes to the painter himself carrying out his skill with minimal understanding, one could also claim that without understanding of perspective, colour, texture and so on, Orpen's painting skills would be greatly diminished. This leaves us with a question: to understand one's skill, is it a necessary condition that one be able to explain it satisfactorily? Can understanding be an internal matter where the agent understands perfectly well their particular skill, but might find it beyond their reach (or beyond the person's reach) to model, demonstrate or explain?

2.10.4 Inherent Dangers of Thinking of Thought in Terms of Skills: Siegel's Response to Johnson

Though Siegel's response to Johnson takes up most of his key objections, space precludes a full discussion here. To narrow the scope of our discussion, I focus on Siegel's response to one of Johnson's arguments regarding the inherent educational dangers of thinking of thinking in terms of skills, specifically, the disparagement of subject knowledge. According to Johnson (2010), "there is a real danger that subject knowledge will be seen as nothing more than material on which to practice skills, or even as something that gets in the way of the real business of education: thinking skills" (p. 37). On this matter, Siegel agrees that knowledge is important. In all of his seminal writings, he has never declared otherwise (Siegel, 1988; 1997; 2017). What Siegel has argued for is centrality and importance of subject knowledge along with "the mastery of skills and abilities which are general in that they can be applied, exercised and manifested in many diverse situations and subject matters" (pp.80-81). Where Siegel and Johnson diverge is the generalisability of such skills. For Siegel, a thorough understanding of probability is useful for the mathematician, the actuary, the hedge fund manager, and the ordinary punter just about to take a plane. A person with a good grasp of probability can bring this generalizable skill into banking, equities and bonds investments, along with calculating the risk of a plane crash in the event of being a nervous flyer. The principles hold across the disciplines. Johnson, on the other hand, is skeptical of the generalizability of such skills, whether they be probability, reasoning, or conceptual analysis. He

posits such a view as being inherently dangerous because it can lead to the disparagement of knowledge, where knowledge is sometimes seen as an impediment to the generalizable skills educators seek to foster in their students.

Here I think Siegel makes the more compelling case for the generalizability of thinking skills. What is at stake here is - the extent to which these generalizable skills apply (Winch, 2010, p.107). Probability is a good example insofar as its utility is easily explained. A hostile interlocutor to Johnson might argue that several of his arguments rely on the principles of informal logic. The whole point of fallacious reasoning for example is that these principles are generally applicable, regardless of subject matter or domain. This reading would undermine his claim that generalizable skills and transfer rest on a series of conceptual and fallacious errors. Concepts are typically the domain of the philosopher. In utilising conceptual analysis, is this yet another example of Johnson undermining his arguments? If concepts carry across disciplines, is there not a strong argument for including them as part of one's education? Finally, most of Johnson's critiques take the form of carefully crafted arguments. In his arguments, he relies on conceptual clarifications, philosophical analysis, pointing out fallacious reasoning (naming fallacy etc), and uses reasons to convince his reader of the cogency of his views. Animating each of these endeavours is thoughtful deliberation. Taking up this point, Winch (2010, pp.112-13) questions whether some of this work actually undermines Johnson's own project? After all, conceptual clarifications and analysis are not always confined to individual disciplines, nor are the principles of argumentation or reasoning (Siegel, 2010, p.78). There are, of course times when subject-specific background knowledge is necessary to engage in critical thought. But there are equally times when generalized principles hold across subject domains. For the philosopher of education, Winch maintains, the dispute is the extent to which these generalizable skills apply (Winch, 2010, p.107). Unfortunately, despite the intricacies of the debate, this question largely goes unanswered.

Johnson and Siegel agree on a great deal. Much of their agreement derives from a shared disregard for the cognitivist approach to thinking skills in the McGuinness Report, especially its unstated assumptions recommending pedagogic interventions to enhance such skills in educational settings. The main substantive disagreement between the two theorists concerns generalizability. Siegel holds that it makes perfect sense to think that some thinking skills/abilities are generalizable, in the sense that-once acquired-they can be applied in numerous diverse situations/contexts. He emphasises the importance of refraining from treating thinking skills in terms of mysterious processes or habitual and mindless routines. Instead he suggests that theorists view skilled thinking in terms of *quality*: that is, thinking that admits of positive normative evaluation in that it meets relevant criteria of acceptability (Bailin and Siegel 2003).

2.10.5 Education's Epistemology: Siegel's Views on Argumentation

Taking up this issue of quality, Siegel (2017) in his most recent book on critical thinking entitled, *Education's Epistemology,* tackles some of the central issues in philosophy of education, focusing in particular on issues germane to criticality within educational discourse. Though his edited collection ranges from education conceived along the lines as an "initiation into a space of reasons", (pp. 20-33); "critical thinking and the intellectual virtues" (pp.89-108); open-mindedness, critical thinking and indoctrination" (pp. 108-123) and "rationality and judgment" (pp. 156-172), to narrow my discussion, I confine myself to his views on argument-normativity in the chapter, 'Argument Quality and Cultural Difference' (Siegel, 2017, pp. 218-238).

Siegel refutes the claim that argumentation ought to be conceived along the lines of a culturally contextualized phenomenon, where the quality of the argument is inseparable from the cognizer's standpoint, and one where the cognizer's culture plays a central role in accurately determining whether such arguments are worthy of provisional acceptance by those who appraise them. Argument normativity, Siegel contends, must be

defended, for the evaluation of such is an epistemic matter, in that, what makes an argument cogent is the strength of the premises (in the form of reasons) supporting the conclusion. Arguing for this position, Siegel identifies arguments as being "impersonal and transcultural" (p.218). He contends the quality of an argument is impersonal, in the sense that its normative status is independent of the person evaluating its cogency. Along these lines, therefore, the quality of the argument is a feature of the argument itself, rather than "the person appraising its quality" (p.218). A second claim Siegel makes centers on the purported transcultural nature of argumentation. He suggests that the normative status of all arguments is "independent of the cultural locations and perspectives of its evaluators" (p.218). On this view, it does not matter who is appraising any argument, nor does it matter in what cultural context this occurs. What ultimately matters in argument normativity is whether the premises of the argument provide sufficient support for its conclusion. This ranges from little to no support whatsoever in the case of a really bad argument, to extremely strong support in the case of a really good argument, with every degree of support in between for arguments of every degree of quality.

Siegel takes aim at several theorists who argue that the quality of an argument depends upon culturally specific beliefs, values, and presuppositions. For such theorists, no acontextual, culture-independent characterization of argumentative quality can succeed. One such proponent, according to Siegel is Alasdair MacIntryre. His book *Whose Justice Which Rationality* (1988) exemplifies this extreme "relativistic" approach. In this book MacIntyre argues for a more particularist understanding of the probative force of reasons, and by extension, argument quality, telling the reader that all rational activity is "inescapably historically and socially context bound" (p.4), meaning that, as he states elsewhere, one "cannot find…any genuinely neutral and independent standard of rational justification" (1989, p.198). Though Siegel briefly counters some of McIntyre's views, he saves his most robust challenge for the self-proclaimed relativistic sympathies of the multicultural theorist, David Theo Goldberg. For purposes of brevity, this short exposition

focuses on the narrative of this debate to determine the merits of each theorist's claims and their relevance to philosophers of education working in the field of argumentation theory.

Theorists of the above persuasion (Siegel uses the loose term "multiculturalists" to refer to Goldberg), maintain that the quality of an argument depends upon culturally specific beliefs, values, and presuppositions. Proponents hence argue that no atemporal, acontextual, culture-independent characterization of argumentative quality can succeed since judgments are always relative to time and place. In his work the pragmatist Richard Rorty (1982) famously rejects the search for "an Archimedean point from which to survey culture" (p.150), instead favouring a position of "solidarity" according to which there is no noncircular or non-question-begging way to justify one's own ideals, values, and commitments to those who reject them in favor of their own equally ethnocentric alternatives. Commenting on this phenomenon, David Theo Goldberg (1994) develops Rorty's view, stating:

> As Rorty insists, there is no transhistorical or supersocial Godly view on which such universal (moral) principles can be grounded or from which they can be derived. Axiological concepts and values are necessarily those of some historically specific community…Thus, any insistence on the universalism of values must be no more than the projected imposition of local values – those especially of some ethnoracial and gendered particularity – universalized (pp. 17-18)

In this passage Goldberg suggests Rorty's ethnocentrism rejects the possibility of "universal principles of reason" through which arguments can be impersonally evaluated. Though Rorty's denial of the possibility of impersonal, transcultural beliefs, values and ideals is directed to moral values and principles rather than to principles of 'reason' or of argument evaluation, Goldman takes the view that is readily extended there, since, in his words,

Axiological relativism is bound to deny neither some basic formal principles of thinking-call them universal, if necessary-nor generalizable value judgments concerning pernicious social conditions and practices. So, owning up to formal principles of logical relation implies nothing about the assertive content of thought…Logical formalism enables only that inconsistent and incoherent claims for the most part can be ruled out; it is thoroughly incapable of assertively promoting some coherent or consistent standard over another (pp.16-17).

Goldberg here accepts there may be universal 'formal principles' both of 'thinking' and of 'logical relation,' but that these alone are insufficient to determine the quality of 'the assertive content of thought'. Since determinations of argument quality are the product of a culturally embedded agents grounded in a particular historical context, theorists are still left with the question: how does one determine the quality or cogency of a given argument, then? Goldberg acknowledges the difficulty of a hard form of relativism, instead advocating a 'more robustly nuanced' 'multicultural' relativism, where distinctions can and should be drawn between more or less accurate truth claims and more or less justifiable value. As he puts it:

If the truth is relative simplistically to the group proclaiming it, then all claims to truth, no matter how much they lack substantiation, are on an equal footing…A more robust and more robustly nuanced conception of relativist underpinning the multicultural project will enable distinctions to be drawn between more or less accurate truth claims and more or less justifiable values (in contrast to claims to the truth or the good) (1994, p.15, emphases in original).

As we can see here, Goldberg rejects epistemological relativism-at least the form of it according to which the truth is relative to the group proclaiming it. Instead he favours an epistemology that explicitly and

legitimately distinguishes between more or less accurate truth claims and more or less justifiable values. Later, expanding his views on relativism, he goes on to say:

> The relativism upon which a sophisticated form of critical multiculturalism rests is not restricted to value particularism. Multicultural relativism is ready and able to fashion general judgements, that is, revisable inductive generalizations as the specificity of (particular) circumstances and relations warrant. These circumstances and relations will include, often though not necessarily always, racial, class, and gendered articulation. Thus multiculturalists are able to condemn a specific form of racism, say, apartheid, in terms of a general judgment that racist exclusions are unacceptable because they are unwarranted in a specifiable scheme of social value to which we do or should adhere for specifiable (and, perhaps, generalizable) reasons. But there is no transcendental proof or grounds, no universal foundation, for this scheme or any other (1994, p.19).

A close reading of this passage suggests, in Siegel's estimation, that Goldberg's understanding of 'multicultural relativism' is not, as the theorist believes, fully relativistic at all (Siegel, 2017, p.222). Rather it allows for (and indeed accepts) general judgments, such as, 'racist exclusions are unacceptable,' and also, unwarranted within 'a specifiable scheme of social value to which we do or should adhere for specifiable reasons'. This literal reading would suggest that the 'scheme of social value' is one to which we should adhere for specifiable reasons, even if we (or some of us) do not in fact so adhere: "we would be wrong not to adhere to it, given the reasons which can be offered for it" (Siegel, 2017, p.222). This seems, in Siegel's estimation, to be "not only not relativistic, but the very definition of absolutism" (p.222).

According to Siegel, Goldberg identifies as a "robustly nuanced multicultural relativist" because he rejects all claims to "the truth" and

"the good" (p.15), along with any "transcendental proof or ground", operating out of a "universal foundation[s] for any particular scheme" (p.19). One reading of this might suggest that Goldberg's main concern rests in rejecting foundationalism. Like Rorty (1994) and McIntyre (1988; 1989), he rejects the existence of necessity, certainty and transhistorical Godly perspectives from which claims to the truth or the good might be made. This, along with Goldberg's rejection of foundationalism and fallibilist leanings, firmly place him, not as a self-identified "robustly nuanced multicultural relativist", but rather as a non-relativist fallibilist whose views on argument quality being relative to the cognizer and his/her culture amount to an ultimately misguided position, for the reason that he himself holds that some cultural beliefs, values, and practices "can be legitimately criticized on the basis of reasons which, while neither necessary nor certain, are nevertheless good ones which we should acknowledge as probatively telling, even if we in fact do not" (Siegel, 2017, p.222).

In conclusion, Siegel contends that even though we cannot discard our conceptual schemes or frameworks, nor shed our cultural embeddedness and presuppositions fully, we can nevertheless transcend such perspectives when it comes to judging argument quality (p.224). The key here, he insists, is drawing a distinction between transcending or escaping any "particular perspective, from transcending all such perspectives" (p.224). Once this distinction is drawn, the "no transcendence, therefore argument quality is relative to culture disagreement, collapses" (p.224). People are often disposed to and capable of transcending their conceptual baggage, their presuppositions, their perspectives, and their cultural embeddedness. Sexists can evolve in the right environment, perspectives can alter and belief revision can occur in certain settings. That is not to say these events do not happen within a specific ahistorical framework, 'perspectiveless perspective' or conceptual scheme, or more importantly that our judgments are necessarily tainted because they originate from a certain framework, or moreover, that they are 'good' only relative to their framework.

On the contrary – all I suggest here is that agents who make these improvements (epistemic or otherwise) – are not trapped in one or another of these frameworks. Indeed, they can overcome them, stretch them, and transcend them. They can, as Popper (1970) puts it elegantly: "break out of their frameworks to a better and roomier one; and [thereupon] can, at any moment, break out again" (p.56). To remove this possibility of finding a "better or roomier" framework is to automatically rule out belief revision alongside all meaningful rational debate based on the primacy of *a fortiori* or decisive reasons. Without the possibility of such conditions, there is a real danger that all rational debate will be confined to the limitations and restrictions imposed by one's conceptual schemes and socio-cultural embeddedness. Though we are all confined to certain limited conceptual horizons in some respect, to suggest that we are incapable of transcending or moving out of our frameworks or perspectives, automatically rules out meaningful progress from the outset. Compromising oneself in such a way, should this occur, allows entrenched assumptions, cultural biases or ethnocentrism, to not only prevail, but to flourish. In the next section I move to examine the importance of higher education tackling some of these prevalent epistemic vices.

2.11   Critical Thinking in Higher Education

Frequently the justification for teaching and learning critical thinking in higher education goes unchallenged, perhaps in principle because criticality is just assumed to be a desirable educational outcome. Exceptions to this tacit, yet prevalent acceptance include several philosophical theorists, all of

whom strongly argue for its primacy in higher education (Barnett, 1997; Ennis, 1987, 2015; Facione, 1990; Paul 1992; Siegel, 1988). Barnett contends, "the underlying purpose of education and educators is to "develop the capacities to think critically…to understand oneself critically, and to act critically, thereby forming persons who are not subject to the world, but able to act autonomously and purposively within it" (1997, p.7). Our education system needs critical thinkers to help

regulate knowledge, to keep knowledge-claims honest by means of impartial and systematic interrogations. The notion of students as passive receptacles storing uncontested knowledge is changing. As human beings, we live in "an interrogative world", a world that we not only ask questions of, but also a world that also asks questions of us (Merleau-Ponty, 1968, p.103). To avoid being passive consumers of knowledge, our educational system needs to teach students how to reflectively discern what one ought to do by means of probing, questioning, sifting through, and probing the cogency of competing knowledge claims.

To do this, students need to be taught to turn away from the assumptive world. According to Brookfield (1988), critical reflection is key to any sort of meaningful change of this magnitude. Four key conceptual interrogations are recommended to enrich and cultivate the virtues of critical reflection. They comprise: 1) assumption analysis 2) contextual awareness 3) imaginative speculation, 4) reflective scepticism. On this view, critical thinkers must be skilled in excavating unwarranted assumptions; exhibit a deep attentiveness to particularity in the shape of contextual awareness; possess a refined imaginative gift to speculate about contingency, and practise the art of reflective scepticism. But prior to all this, students need to understand the trajectory of assumptions and their stealth-like ability to stultify our critical faculties.

Understood this way, our education system ought to foster 1) "the ability to reason well, i.e. to construct and evaluate the various reasons, which have been or can be offered in support or criticism of candidate's beliefs, judgments and actions; and 2) the disposition or inclination to be guided by reasons so evaluated, that is, actually to believe judge, and act in accordance with the results of such deliberations" (Siegel, 2003, p.306). Students, and people more generally are rational to the extent that they believe act, and judge on the basis of appropriately evaluated reasons. This is why, according to Siegel the "cultivation of reason ought to be a core aim or ideal of education" (2003, p.306).

On the most basic level, critical thinking is about the cultivation and

development of certain sorts of skills. These may include the skills often associated with the informal logic movement, such as, cogent argumentation; identifying and avoiding fallacies; argument mapping; deductive and inductive reasoning; scrutinizing inferences; a propensity for finding fault in reasoning patterns, skills in making sound judgments; distilling the merits of equally competing rational claims, and making a justified choice based on the most cogent reasons available (Salmon, 2013; Bowell & Kemp, 2015).

Both academia and industry place a premium on these skills. Recent studies suggest employers want to see evidence of critical thinking skills in their employees (OECD, 2011-13). Central to the development of critical thinking is the cultivation of dispositions and abilities. As mentioned earlier, abilities *in abstracto* serve no purpose unless you are disposed to use them. So, at the heart of the matter are not only the cognitive faculties of students, but also the animated insights gleaned from the totality of affects, including self-knowledge, creativity, imagination and constructive scepticism. This assemblage of dispositions and skills we can refer to as the individual dimension of critical thinking (Davies, 2015).

The individual dimension of critical thinking is just one cog in a nexus of socio-cultural thinking that stretches far beyond the role or purview of one individual. Not only is critical thinking an individual attribute, it likewise has a wider social-dimension (Burbules & Berk, 1999). Individual thinking leads to collective thought, and collective thoughts leads to a grand dialectic. But to begin with, students initiate their own encounters with knowledge. This is why the focus of this dissertation shall, for the most part (with some minor exceptions), fall exclusively on the individual components of critical thinking, as exemplified in the dispositions and skills outlined above. This is something we shall examine further in due course.

2.12   International Policy

Given the complexities of unravelling the conceptual mechanics of

criticality, it comes of no surprise that international educational policy has little substantive to say about the concept. Turning to the southern hemisphere, The *Review of Australian Higher Education* (Bradley, Noonan, Nugent & Scales, 2008) presents "critical analysis" and "independent thought" as "essential skills" for twenty-first century graduates (p.5). Throughout the entire report however, there is no further exploration of the concept of critical thinking, nor whether it can be taught or examined. This omission is rather odd given the prevalence of assessing critical thinking in outcomes-based assessment tools employed in Australia, such as, for example, Graduate Skills Assessment, the function of which is to gauge critical thinking and problem-solving skills amongst the undergraduate population. It purports to assess students' generic skills (critical thinking, problem solving, interpersonal understandings and written communication) just as they begin university and shortly before they graduate. Similar instruments are used in Mexico, namely, *Examen Nacional de Ingreso al Posgrado*, which examines candidates' ability to infer, critically analyse and synthesize information. The US have three main assessment instruments at their disposal, namely, the *Collegiate Learning Assessment*, the *Measure of Academic Proficiency and Progress* (MAPP) and the *Collegiate Assessment of Academic Proficiency* (CAAP). All these tests comprise some form of critical thinking and analytical reasoning, skills deemed crucial in the humanities (Nusche, 2008, p.48).

Given the focus on critical thinking in the US, and moreover, the diverse assortment of instruments on offer, one would expect critical thinking to centrally figure in their national policy on higher education. Despite the fixation with measuring critical thinking, the document *A Test of Leadership* (US Department of Education, 2006) simply states, "employers repeatedly report that many new graduates they hire are not prepared to work, [since they] lack the critical thinking, writing and problem-solving skills needed in today's workplaces" (p.3). Again, as is the case in the Australian report, no attempt is made at teasing out how pedagogues can effectively embed critical thinking into their teaching and learning environments.

Closer to home, the UK policy report, 'The National Committee of Inquiry into Higher Education' otherwise known as *The Dearing Report* (Dearing, 1997) stipulates that undergraduates should develop the skills of "learning to learn", "critical analysis" and "independent thought" (p. 6). As is the case with the US and Australian policy documents, there is no justificatory rationale offered for this assertion, nor any pragmatic steps detailing how it should be infused into curricula.

In the case of the Australian, US and UK policy documents, the marked absence of any sustained debate on critical thinking is worth highlighting. All three documents agree there is a problem, but neither delves any deeper, either in relation to proposing some feasible solutions, or offering suggestions on how to incrementally counteract this shortcoming. The scant treatment of critical thinking as an educational concept underscores the need to produce a thorough policy framework that not only deals with the conceptual problems, but also offers guidance for HEIs on the matter of how to infuse critical thinking in teaching and learning.

2.13   National Policy: The Hunt Report

Published in January 2011, the *National Strategy for Higher Education to 2030*, otherwise known colloquially as the 'Hunt Report', after the chair, Dr. Colin Hunt (Higher Education Authority, 2011), was published three and a half years into the most severe economic crisis affecting the state since the 1950s, and barely two months after the Irish government accepted a bailout from the International Monetary Fund (Walsh and Loxley, 2014). Within this context the report identifies higher education as the "cure and restorative" (p.10) for the imploding Irish economy and explicitly declares education as "the key to economic recovery in the short-term and to long- term prosperity" (p.29). These claims are made on foot of international policy influences, namely the Lisbon Treaty 2000 and the OECD review of Higher Education in 2004 in which both documents explicitly acclaim how the purpose of education is to serve the economy (Walsh & Loxley, 2014).

The Hunt Report is principally a synthesis of the findings from various EU Education Commissions and OECD reports on higher education. This is evidenced by the fact most of the conclusions are underpinned by EU and OECD deliberations since Bologna 1999. In accordance with this principle, the report aims to provide a roadmap for Irish HEIs to continue feeding the knowledge economy. Chaired by economist Dr. Colin Hunt, the report is framed in the context of two previous reports, *Powering the Smart Economy* (SFI, 2009*)* and *Tomorrow's Skills: Towards a National Skills Strategy* (Forfás, 2009).

The *Smart Economy* report pledges to position Ireland as a location of choice in the International Education market, by "restructuring the higher education system…to enhance system wide performance" (p.6). The *Tomorrow's Skills* (Forfás, 2009) report fundamentally calculates education in terms of skills, and in so doing, effectively reduces the *raison d'être* of HEIs to a commercial transmitter of skills and competencies. Against this backdrop the National Strategy for Higher Education to 2030, incorporates a strong view that "higher education is central to future economic development in Ireland" (Higher Education Authority, 2011, p.3). Its tone, rhetoric and stance are accordingly punctuated with a strong economic fervor.

Fundamentally the Hunt Report focuses on the importance of higher education adapting to meet the needs of a changing society. In relation to the topic of critical thinking the report concludes that: "in order to address the societal needs over the coming years, increased attention must be paid to core skills such as quantitative reasoning and critical thinking" (2011, p.35). Like all the previously mentioned policy documents however, there is nothing more said on the matter. Critical thinking remains a vague, under-operationalized and elusive concept.

2.14   Barriers to Critical Thought

Three key impediments to critical thought populate the literature. First of all, there is the thorny issue of "bounded rationality" (Simon, 1957). The

second barrier can be traced to "fast and slow thinking" in the form of cognitive biases (Kahneman, 2011) whilst the third focuses on the nature of critical reflection (metacognition) in excavating unwarranted assumptions, more specifically, paradigmatic, prescriptive and casual assumptions (Brookfield, 1987; 1995).

Most definitions of critical thinking exalt rationality (Bailin & Battersby, 2015; Ennis, 2015; Facione, 1990; Siegel, 1988, 2017). They also posit a link between rationality and belief. Thinking rationally is deemed a superior epistemic pursuit - the most correct way of thinking so to speak. However, one matter they arguably fail to address fully is the very subject of rationality. What exactly is rationality? Are there limits to rationality in relation to epistemic endeavors? If so, what are those limits? Are all of our beliefs and actions rational? Indeed, should they be fully rational? Is rationality a separate human faculty? Must a person's reasons for their beliefs or actions be accessible and explainable? Whose rationality do we invoke when we speak of rationality? Are there cognitively accessible and objective standards in relation to determining the best possible reasons for belief or action? And finally, is it fair to characterize rationality as an impartial, value-free, context-independent, and universally binding construct given its temporally confined, culturally-embedded context-specific positionality, where the information and cogent reasons we deploy to justify our beliefs and actions are more often than not incomplete and unverifiable? (Rescher, 2003).

As we have seen earlier, Rescher (1988) argues that "rationality is not just a matter of thought, but of action as well…rationality accordingly pivots on the deployment of good reason, and the appropriate use of reason to resolve choices in the best possible way" (p. 3). Put simply, a person acts rationally in matters of belief, action, and evaluation, when his/her reasons are cogent reasons. Since Kant's (1781/2002) *Critique of Pure Reason*, there are normally three main contexts of choice with regard to reason: those of belief, of accepting or endorsing theses or claims, of action, of what overt acts to perform, and of evaluation, of what to value or disvalue.

These domains thus comprise: (i) "cognitive rationality (what to believe or accept); (ii) practical rationality (what to do or perform) and (iii) evaluative rationality (what to prefer or prize") (Rescher, 1988, p.3).

Of course, people can rationalize anything they wish by excavating reasons for their actions. In this way, rationality is not just a matter of having specific reasons for what one does, but of aligning one's beliefs, actions and evaluations in accordance with the best or strongest available reasons (Nozick, 1993; Rescher, 1988; Searle, 2001). Rationality thus operates in line with three key principles: (i) sensibly pursue and implement appropriate means-ends measures to intelligently pursue realistic goals; (ii) align one's beliefs, actions and values with the strongest available probative reasons; and, (iii) strive for optimization (choose the best alternative/putative optimum) in order to maximize the chances of realizing one's original goals (Audi, 2013; Nozick, 1993; Searle, 2001). As an educational goal, it remains truth-oriented, albeit with the caveat that we can only make our reason-based decisions based on the best available reasons/evidence at hand at any given moment in time (Dunne, 2015b).

Conceptualizing rationality in this way is both a blessing and a curse for the educationalist. On the one hand, it allows rationality (as the alignment of one's beliefs or actions with the strongest reasons available) to evolve. This seems a sensible position, given that we often have insufficient data or cogent reasons to make certain decisions or judgments. On the other hand, it raises the thorny question of incompleteness. What once was deemed to be rational in the past, may of course, now, in light of new *a fortiori* cogent reasons developing for one's new positionality, not be the case anymore. So, in a sense, rationality can only really tell us how rational a position/belief is at a given time in human history (Nozick, 1993). Though it continuously remains focused on reaching out toward truth, depending of the scope of enquiry, it remains perpetually hampered by its flawed incompleteness (Dunne, 2015b).

Though the conceptual underpinnings of rationality are interesting,

focusing on an idealized notion of the concept, says nothing of our cognitive limitations, weaknesses, proclivities or predispositions. Barriers to critical thought encapsulate some of these impediments. For this purpose, the project examines, in the first instance, the nature of 'bounded rationality', and how it relates to 'slow and fast thinking' predispositions. From there, it examines the pathology of 'bounded rationality', in terms of 'slow and fast thinking', and further, how this manifests itself in the form of cognitive biases (Kahneman, 2011).

The concept of "bounded rationality", broadly speaking, refers to the idea coined by Herbert Simon in 1957, which claims that when individuals make decisions, their 'rationality' is limited by the tractability of the decision problem, the cognitive limitations of their minds, and the time available to make the decision. As he puts it:

> The principle of bounded rationality [is required because]… the capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world - or even for a reasonable approximation to such objective rationality.
>
> (Simon, 1957, p.198)

Optimization in thought or expected utility are not always our key concerns, firstly because we are unable to access all the relevant data, and secondly, we cannot cognitively process the salient data quickly enough or effectively enough in order to render an accurate judgment about what to believe or do. We are thus bound by "cognitive limits" (Simon, 1957, p.95). In the final chapter, I will argue that these cognitive limits are best exemplified with reference to cognitive biases, more explicitly, how these pervasive biases impede our ability to think rationally.

One of the final barriers to the optimization of critical thought are entrenched assumptions (Brookfield, 1987; 1995; 1998; 2012). In particular, I will argue how paradigmatic, prescriptive and causal

assumptions stultify critical thought. According to Brookfield (1995) paradigmatic assumptions are the hardest of all assumptions to uncover. They are the structuring assumptions we use to order the world into fundamental categories. At times, we do not even recognize these assumptions, in part, because we are hardwired to compartmentalize our understanding of reality. Sometimes this manifests itself in false binary dichotomies such as heterosexual/homosexual/compassionate/heartless and so on. It makes our understanding of reality more cognitively digestible, easier to defend, and theoretically, much easier to explain. But it misses out on the insights of context. Universal truths are easier to explain than enumerating exceptions to generally held rules. Here lies the allure of leaving paradigmatic assumptions unchallenged.

Prescriptive assumptions are assumptions based on what we think ought to be the case. They are deeply entrenched assumptions about how things ought to be done, whether it is how a teacher should teach algebra, to how a teacher should look, how a student ought to behave, or how one ought to dress for a funeral. All of these entrenched prescriptive assumptions are pernicious to the extent that they nullify contingency. More succinctly put, contingency can be interpreted as the inclination and ability to see the world a different way, to move beyond norms, entrenched assumptions and established values (Rorty, 1989). Inevitably, prescriptive assumptions are grounded in, and extensions of, our paradigmatic assumptions (Brookfield, 1995). For example, "if you believe that adults are self-directed learners then you assume that the best teaching is that which encourages students to take control over designing, conducting and evaluating their own learning" (Brookfield, 1995, p.16).

Causal assumptions are assumptions about how different phenomena operate-more precisely-under what conditions these phenomena can be changed (Brookfield, 1995, p.16). Typically they are cast in predictive terms (if X occurs, Y will follow). Causal assumptions are very common in every form of human enquiry. In education, trainee teachers (and some experienced teachers) may assume that learning contracts will enhance students' self-directedness and self-regulation (Brookfield, 1995, p.17).

This, may or may not hold, depending on a myriad of causal factors. Of all the assumptions we hold, causal ones are the easiest to uncover.

Assumptions are "statements for which no proof or evidence is offered" (Halpern, 2014, p.237). Characterized in terms of impediments to critical thought, Brookfield's (1995) seminal work addresses an untapped area in critical thinking scholarship. Since assumptions often implicitly taint one's arguments and reasoning, it is vital that critical thinkers learn how to weed them out. To a degree, all of our putative knowledge about the world is in some way based on a series of assumptions (Rescher, 2003). To avoid unwarranted assumptions tainting one's judgments about what to believe or do, critical thinkers need to move beyond the assumptive world. But to do so, they must first learn about the nature of assumptions and how they infiltrate our thinking.

2.15   Conclusion

This review has covered quite a lot of ground. It began with a brief conceptual-historical synopsis of critical thinking, focusing on three distinct, yet permeable developments, namely: 1) the identification and evaluation of arguments; 2) the broader power-based ontological dimensions of social-critical theory, and, 3) the process of synthesizing the rigor of rational argumentation and discourse with the broader dimensions of criticality in the form of critical-reasoning, critical self-reflection and critical-action (Barnett, 1997; Siegel, 2017). From here, the review explored the empirical arguments for critical thinking, one of which focused on the gap between criticality as an assumed outcome, as opposed to a verifiable one (Arum and Roksa, 2011), whilst the other study examined an interventionist approach using argument mapping software (Rationale) and how this explicit approach to teaching critical thinking yielded some very positive results (see van Gelder, 2001).

The review then moved to explore the importance of critical thinking in education (Newman, 1996). To emphasize this central point, it drew on the Wakefield scandal to illustrate the importance of students scrutinizing

knowledge-claims, regardless of the domain they originate from. Following on from this, the review scrutinized the centrality of critical thinking dispositions and abilities in the formation of "critical beings" (Barnett, 1997; Burbules & Berk, 1999). From here, the review delimited critical thinking from the plethora of terms which have become synonymous with it over time. At this point, the conceptual iterations of critical thinking in the disciplines of philosophy and cognitive psychology were critically examined. The specifist/generalist debate was then introduced briefly to demonstrate how there is cross-fertilization between fields of enquiry, especially within the domain of practical reasoning. This is an important point for the new conceptualization of critical thinking I propose and later defend in the dissertation. The review then situates critical thinking within the international and national policy landscape, focusing in particular on the McGuinness Report, 1999 and its subsequent criticisms emanating from Johnson (2010) and Siegel (2010). To conclude, it presents a salient exposition of some of the main barriers to critical thought, namely, 'bounded rationality' (Simon, 1957) System I and II thinking (Kahneman, 2011) and deeply entrenched assumptions (Brookfield, 1995).

Chapter Three: Tracing the Evolvement of Critical Thought

3.0   Introduction

This chapter analyses some of the most important historical characterizations of critical thinking, specifically, critical thinking as formal logic, critical thinking as informal logic, critical thinking as phronêsis, critical thinking as social critical theory, and critical thinking as criticality. Following a concise synopsis of each conceptual position, the chapter then formulates a profitable synthesis of Paulian and Siegelian theories of critical thought (Paul & Elder, 2006, 2009; Siegel 1988; 1997). Whilst the former framework affords sufficient fluidity to critical enquiry in terms of charting intellectual standards and elements of thought, the latter furnishes a reasons-based conception that successfully immunizes against the threat of extremist relativism and phenomenal subjectivism. Limitations inherent in both accounts then pave the way for a new and more refined neo-Aristotelian reasons-calibrated conception of critical thought in the next chapter.

3.1   Critical Thinking as Formal Logic

The present-day conception of critical thinking derives from several former incarnations in formal and informal logic, in addition to critical theory (Black, 1946; Marcuse, 1937; Habermas, 1962/1991). Formal logic experienced something of a renaissance through the prolific and pioneering work of Bertrand Russell and Albert North Whitehead in the early 20th century, where both philosophers sought to return attention to the nature of argumentation, and with this, the logical relationship between propositions and conclusions. Here the focus is on the *form* of the argument as opposed to its *content.* This gave rise to the name "formal logic" (Malpass & Marfori, 2017, p.14).

Having just finished their groundbreaking *Principia Mathematica* (1910-13), Whitehead and Russell spent the next 30 years developing the precise rules and procedures required in the realm of formal logic. Formal logicians at the time believed that the truth of arguments could be determined by

investigating the manner in which component parts were arranged and connected. In accordance with this newly established mathematical rubric, "if the proper logical relations are established and followed correctly, the answer we seek is bound to be (logically) the correct one" (Malpass & Marfori, 2017, p.15). Initially, the likes of Whitehead and Russell made some awe-inspiring progress in their field. Such was their optimism, Russell (1924) initially argued:

> [Formal logic] has, in my opinion, introduced the same kind of advance into philosophy as Galileo introduced to physics, making it possible at last to see what kinds of problems may be capable of solution, and what kinds must be abandoned as beyond human powers. And where a solution appears possible, the new logic provides a method which enables us to obtain results that do not merely embody personal idiosyncrasies, but must command the assent of all who are competent to form an opinion.
>
> (Russell, 1924, p.363)

One unique characteristic of the formal logic movement was the unashamedly mathematical bent of its chosen method. This unique method based on the language of mathematics comprised the reduction of all arguments to a series of logical connections, in which, each and every essential component of the argument is assigned a specific mathematical notation whereby its relation to other propositions follow a pre-ordained path based on the axiomatic principles of mathematics.

Given the narrow parameters within which formal logic worked, it quickly became evident that even simple matters like proving 1+1=2, a proof extended midway through Book II in *Principia Mathematica* (Whitehead & Russell, 1910/2011: *54:43) were of little use in the business of deciphering real-world problems outside the formalized constraints of mathematical linguistics (Ryle, 1953, p.114).

*54·43. $\vdash :. \alpha, \beta \, \epsilon \, 1 . \supset : \alpha \cap \beta = \Lambda . \equiv . \alpha \cup \beta \, \epsilon \, 2$

Dem.

$\vdash . *54 \cdot 26 . \supset \vdash :. \alpha = \iota`x . \beta = \iota`y . \supset : \alpha \cup \beta \, \epsilon \, 2 . \equiv . x \neq y .$

[*51·231] $\equiv . \iota`x \cap \iota`y = \Lambda .$

[*13·12] $\equiv . \alpha \cap \beta = \Lambda$ (1)

$\vdash . (1) . *11 \cdot 11 \cdot 35 . \supset$

$\vdash :. (\exists x, y) . \alpha = \iota`x . \beta = \iota`y . \supset : \alpha \cup \beta \, \epsilon \, 2 . \equiv . \alpha \cap \beta = \Lambda$ (2)

$\vdash . (2) . *11 \cdot 54 . *52 \cdot 1 . \supset \vdash . \text{Prop}$

From this proposition it will follow, when arithmetical addition has been defined, that $1 + 1 = 2$.

Figure 1: Precursor Theorem for 1+1=2. Full proof appears in section *102

One of the main problems with the formal logic movement was that in order for it to be in any way successful, it needed to ascribe values to every eventuality of life. To be fully understood, eventualities require systems, and systems, in turn, require rules. Unfortunately, however, no matter how elegant the systems or mathematical principles on which they were based, the irreducibly complex particularities of life tended to surpass the option-ranges computed by formal logic, specifically the standard categorizations of 'yes/no' 'all/some' and 'true/false' type dichotomies. The first stumbling block confronting Russell and Whitehead was the thorny issue of providing a cogent account of three undefined terms in arithmetic, specifically: 'zero' 'number' and 'successor'. Since every other proposition of arithmetic follows on from these, it was vital that this account be framed correctly. For this task, Russell turned to cutting-edge theoretical mathematics, in particular, 'sets' or 'classes' (Whitehead & Russell, 1910, pp. 31-37).

The specifics need not plague us too much at this point, but Russell's approach led to a series of paradoxes that arise from situations where we attempt to treat classes in the same way as the objects they contain. In Russell's own words, such an eventuality, should it ever come to pass, would prove insurmountable, since formal logic rests on the assumption that "whatever involves all of a collection must not itself be one of the collection (Whitehead & Russell, 1910-13, p.155).

Luckily, this inconsistency can be explained by way of a simple example. Picture a six-pack of beer as a set or class of beer bottles. Obviously, the six-pack isn't itself a bottle, and a six-pack can't contain another six-pack. However, a case of beer may contain four six-packs, rendering it a 'class of classes' (a set of four six-packs, which are themselves sets). This scenario begs the question: is there less a difference between a case and a six-pack than there is between a six-pack and a beer bottle? After all, "both a case and a six-pack are classes, so they have similar properties" (Macrone, 1998, p.109).

This brings me to the paradox in question. A set of physical things clearly cannot contain itself, since a set is not a physical thing; it is purely a mathematical construct. For instance, a box of bottles does not contain itself, simply because a box is not a bottle. In an attempt to rectify the paradox that ensues from such uniform definitions of classes, Russell proposed dividing sets or classes into categories or types. But he knew this again unsatisfactory because an infinite series of similar problems could be formed by means of the same method. And all of these continually led to an impasse (Rescher, 2005).

Explicating these limitations, the philosopher Gilbert Ryle (1953) declared formal logic was thus:

> ill-suited for the complex and messy nature of multi-logical problems as they have been solved by reducing it to [formal logic]...[and] now we have learned, what we should have foreseen, that questions which can be decided by calculation are different, *toto caelo* different, from the problems that perplex...where the philosopher concerns himself with full-blooded concepts like that of *pleasure* or *memory*, the Formal Logician concerns himself only with meatless concepts like those of *not* and *some…*
>
> (Ryle, 1953, p.113-114)

Ryle's criticisms are resoundingly accurate. Formal logic, no matter how well conceived, couldn't account for complex option-ranges and situations

in terms of binary choices. Formal logic's restrictive nature was hence unable to solve complex real-world problems, especially situations where context and particularity transcend mathematical reductionism. There is a risk of being overly revisionist here. Whitehead and Russell's work was groundbreaking. That much must be acknowledged. And their pioneering work laid the foundations for subsequent work in mathematical logic and linguistics. Predictably their philosophical precision and insight played a significant role in the early field of critical thinking. Most philosophy students take a module in logic, utilizing many of the principles pioneered by Russell and Whitehead, to name but a few. Indeed, one of the earliest textbooks devoted exclusively to the topic of critical thinking was almost entirely based on the principles of formal logic (Black, 1946). One of the lasting legacies of the 'formal logic movement' is the emergence of a more user-friendly version of ordinary language reasoning, known as 'informal logic', that is to say, the science and appraisal of arguments (Fisher, 2014) to which I now turn.

3.2   Informal Logic

The informal logic movement's influence is gathering pace in academia once more (Hurley, 2012; Gilbert, 2014; Salmon, 2013). During the past fifty years or so, there has consistently been a niche contingent of professional philosophers devoted to the intricacies of exposing fallacious reasoning and resolving paradoxes (Rescher, 2005). However, in the past ten years, this group has grown, possibly in part due to the empirical evidence at hand purporting to show that many undergraduates and postgraduates (regardless of discipline) cannot, accurately and repeatedly, separate fact from fiction, scrutinize inferences, move beyond the assumptive world, stress-test evidential claims, or, in short, properly scrutinize knowledge claims in a systematic and rigorous manner (Bok, 2006, p.8). At present, most of these developments have taken place in the US, where there is a long-established background in SAT. exams and critical thinking tests, both of which heavily influence college acceptance rates (Bok, 2006; Nusche, 2008). There is also a very popular journal

devoted to the area of informal logic, imaginatively named 'Informal Logic', where scholars devise fresh critical thinking conceptualizations, define new fallacies, develop new models of rational argumentation, or present new ways for teaching fallacies/criticality to students.

Here in Ireland, Maynooth University recently moved to establish four full-time academic posts in the area of critical skills in an attempt to facilitate the cross-curricular development of these dispositions and skills in their college community. At the time of writing (2017) UCD were also in discussions about reintroducing a course in logic to philosophy undergraduates. In Maynooth's case, critical skills are not reducible to acquiring and practising the identification and removal of the twenty-two informal fallacies logicians subdivide according to: (i) fallacies of relevance; (ii) "weak induction; (iii) presumption, ambiguity and grammatical analogy" (Hurley, 2012, pp.119-178). On the contrary, Maynooth have a much broader conception of critical skills, according to which argumentation and dialectic are rooted in the principles of rational discourse. In UCD's case, they likewise wish to reconceptualize informal logic courses to cater for students thinking critically outside *in abstracto* contexts.

There are several exponents of the educational merits of informal logic (Bowell & Kemp, 2015; Ennis 2015; Hurley, 2012; Salmon, 2013; Walton, 2008). They contend that critical thinking is like any muscle; the more you use it in the right situations, the more it is stretched and strengthened. For Ennis (2011 pp.14-15), his method comprises a list of skills and dispositions, in addition to his easy to remember acronym, FRISCO which stands for: 'Focus, Reasons, Inference, Situation, Clarity, and Overview'. The precursor to FRISCO was an amalgamation of RRA ('Reflection, Reasons & Alternatives') and SEBKUS ('sensitivity, experience, background knowledge, and understanding of situation'). To suitably limit my discussion, I confine myself a few short comments on his most widely used model, FRISCO (Ennis, 2015).

Ennis's rubric has several strengths, but on closer inspection, it remains an

inescapably reductionist approach to the complex nature of what it means to be a critical thinker (Paul & Elder, 2005). Indeed, some commentators refer to Ennis's method as nothing more than logicality in the form of the analysis and evaluation of arguments (Burbules & Berk, 1999; Paul & Elder, 2005). Another issue with Ennis's (2011) rubric stems from his lack of conceptual clarity around what types of reasons are most rationally forceful. 'Focus' is a suitably vague concept, since it fails to provide examples of the types of questions critical thinkers should master to appropriately frame their enquiries, whilst 'reasons' show no understanding of the weaknesses of human nature, nor understanding of the types of probative reasons in play, especially when it comes to certain situations which defy the rules of logic. Likewise, 'inference' is a logical concept where premises (reasons) lend support to a given conclusion, but in the absence of knowing which types of reasons are putatively acceptable, this concept remains tied to the limited principles of inductive force. Finally, 'situation' presupposes that universalizations apply to particularities; 'clarity' offers no guidance on how one ought to achieve such, and 'overview' presupposes a foreknowledge of utilizing the right questions to elicit the one true answer based on the principles of logic.

Like any taxonomy, where scholars proffer a series of discrete steps for critical thinking, people who tend to think critically will tell you a hundred ways in which this closed system of logicality falls short (Barnett, 1997). For instance, in the area of ethics, what does logic have to say about whether or not designer babies are morally permissible? Should we allow parents to choose eye color or eliminate genes based on their particular desires, be they cosmetic or therapeutic? What sort of premises (reasons) are permitted or considered rationally forceful in relation to supporting ethical conclusions? In answering these questions, the limits of logic loom large.

To put it more eloquently, Lim argues,

> Problems steeped in discourses of logic and argument analysis, [maintain] little consideration of notions of [ethical] rightness/wrongness…[such an approach is] morally indifferent

and emotionally apathetic…What is privileged is a particularly narrow conception of rationality that accepts as logical only the standards of truth/falsity and validity/invalidity.

(Lim, 2011, p.783)

Self-evident though it may seem, not everything in life can be reduced to a yes/no dichotomy, nor can logic satisfactorily attend to the particularities of a context-dependent saturated world. To this end, informal logic as a subject tends to meet with a mixed reception. There are those who enjoy the fact that there are hard and fast answers, and that by virtue of applying the method correctly, these answers can be reached (Bowell & Kemp, 2015; Hurley, 2012; Salmon, 2013). On the other hand, there are those who find the closed nature of informal logic as being wholly detached from the type of skills they require for academia, or everyday living (Barnett, 1997; Burbules & Berk, 1999; Lim, 2011).

Regardless of your view on this matter, the work of informal logicians have been shown by a number of critics drawn from a diverse range of backgrounds to be limited, and as some argue, potentially damaging to the emerging field of critical thinking studies (see Evans, 2011; Yàñez, 2012). Arguably, reductionist approaches do little to advance the case for criticality in the academy, or beyond (Barnett, 1997; Burbules & Berk, 1999). Spotting fallacies is a skill, but not all fallacies necessarily render arguments untrue. At most they point toward a misstep in the reasoning process. In summary, a strong argument could be made that informal logicians arguably overstate the importance of their discipline in rational argumentation and discourse (McPeck, 1981). No doubt, informal logic has a great deal to offer, but concerns linger regarding its instrumentalist merits in fostering criticality.

3.3   Aristotle and Practical Knowledge

Outside of his pioneering work in the area of logic (both formal and informal), including his extensive work in ethics, Aristotle (384-322 BCE)

was the first philosopher to make an explicit distinction between a theoretical and a practical form of thinking (NE VI.1 1139a6-15). Contra Plato, he argued that practical thinking could be the object of rational considerations and arguments. Theoretical knowledge, Aristotle argued, does not leave us better positioned to carry out certain actions. Instead, in the practical domain, experience (*empeiria*) can be more useful than knowledge (Meta. I.1 981a13-15; NE VI.7 11411b14-23). Thus, Aristotle contends, there must be "another kind of knowledge" distinct from theoretical knowledge (NE 1246b35-36). This "another kind if knowledge" he classified as phronêsis, a supreme virtue which derives in part from a fusion between the conjoined intellectual and moral virtues (Zagzebski, 1996, pp. 211-12). According to Aristotle, it is impossible "without practical wisdom to be really good morally, nor without moral excellence to be practically wise" (NE VI. 13.1144b30-1). On this basis, phronêsis is defined as, "a state accompanied by reason, which is true, which is about the good and bad things for humans, and which is conducive to action" (NE 1140b4-6; 20-21). Aristotle holds that the phronimos achieves his *ergon*, his proper function, by deliberating well (*kalôs bouleusasthai* 1140a26; *eu bouleusasthai* 1141b9-10). He is, because of his practical wisdom, outstanding in conduct, and his state, instead of resembling virtue, is 'full virtue' or virtue 'in the primary sense' (1144b13). As a virtue, phronêsis is a 'state' of the soul, a *hexis* (1106a11-12). Broadly construed therefore, phronêsis refers to a kind of wisdom operating in the realm of practical moral and political deliberation (1140a25-31; 1141b8-14; 1142b31-33), pursuant to living well or flourishing (eudaimonia) (NE I.7). More generally, the phronimos or practically wise person is perpetually disposed to, and moreover, able to, deliberate well on practical matters (1141b9-10), such that, he is able to achieve what he sets out to do (1144a24-27) (Dunne, 1993, p.352).

3.3.1   The Distinction Between Practical and Theoretical Knowledge

In the broadest possible sense, practical knowledge can be defined as the kind of knowledge we use when we perform actions. Typically practical knowledge is conceived in terms of know-how, while theoretical

knowledge (*epistêmê or sophia*) is defined in terms of know-that. Epistêmê relies on principles that cannot be otherwise (necessary things), while phronêsis deals with things that can be otherwise (contingent things) (NE.1140a34). Gilbert Ryle (1949) in *The Concept of Mind* refers to the distinction in terms of practical knowledge being "knowing how to do something", while theoretical knowledge is 'knowing that something is the case'. Though this remains a widely contested distinction, philosophers broadly speaking interpret practical knowledge in three different ways 1) knowing how; 2) knowing what one is doing; 3) knowing what one should do (Anscombe, 1957, p.13). In this thesis, I take practical knowledge to encompass all three classifications, but focus on the kind of reasons-based phronetic knowledge in play the moment we make a decision (*proairesis*). This type of knowledge, I argue, is best conceived as the agent's (the phronimos') disposition and ability to accurately discern through phronetic judgment (*proairesis*) undefeated reasons for one's actions in the practical domain. This requires, as I shall argue later on, not only a deep attentiveness and sensitivity to reasons, as they emerge, one at a time, but a capacity to amalgamate them, weigh them, and prioritize them, in order to reach an informed judgment about what to do (Blackburn, 2010, p.13). I take this to be a predominately cognitivist position, (though there is also a conative component, because, as Hume (1739/1945, p.416) argues, reason has no motivational force nor share in the determination of ends), whereby phronetic judgment determines undefeated reasons for action through dialectical discussion of reputable opinions or beliefs (endoxa) (Cooper, 1975, pp.66-70), and prudent deliberation based on atypical situations, which require a sensitivity to, and deep understanding of particularities (Wiggins, 1980; McDowell, 1998).

This phronetic process through which an agent brings about the right action, I propose, operates in accordance with Siegel's (1988, p.23) "reasons-assessment conception" of critical thought, where a rationally defensible action is one which is supported by the strongest possible reasons. The strongest possible reasons, I contend, are only determinable through phronetic deliberation (*bouleusis*) and judgment (right desire informed by

right reasons), where it is not the quantity of reasons through which an agent makes their judgment, but rather, the quality of the reasons through which they are swayed. Through this deliberative process, the *phronimos* has a certain reasons-based reliable conviction about the content of their decision (*proairesis*), which, in some way, guarantees the appropriateness of their choice (Dunne, 1993; Wiggins, 1980).

3.3.2 Critiques of Practical/Theoretical Distinction

In her book *Virtues of the Mind*, Zagzebski (1996 pp. 213-31) explains the difficulties that emerge from Aristotle's division of the soul into rational and irrational parts. Aristotle tells us that the former (the rational part) focuses on the kind of things 'whose principles cannot be otherwise' and in the latter (the irrational part) those 'we consider contingent things' (NE. 1.1139a 4-9). The rational part of the soul Aristotle refers to as intellectual virtues (*aretai dianoêtikai*). This part of the soul is properly rational, in the sense that, it is said to 'have reason in the proper sense' (*ton logon echon kuriôs* 1103a2). Intellectual virtues encompass, speculative wisdom (*sophia*), intuitive reason (*noûs*), and knowledge (*epistêmê*). These virtues are directed toward the necessary. The virtues of character, (practical intellect) (*aretai êthikê*), on the other hand, comprise, art (*technê*) and practical wisdom (*phronêsis*). Unlike intellectual virtues directed toward the necessary (that which cannot be otherwise), the practical intellect (the desiderative part) is directed toward the contingent, the former "pertaining to things to be made, the latter, things to be done" (Zagzebski, 1996, p.213).

Each part of the soul develops in different ways. The desiderative part develops through habituation (*ethis-mos*), whereas the intellectual part develops through teaching (*didaskalia*-1103a14-18). Habituation involves the repetition of certain types of actions under guidance (by one's parents or teacher). By contrast, teaching, Aristotle says, takes experience and time (*empeiria kai chronou*). Habituation is more limited than in the intellectual virtues, insofar as it enables the young learner to develop a moral sensitivity, along with acquiring the necessary conceptual tools to name his encounters with his surroundings. In contrast, teaching involves a different,

more developed conceptual apparatus. The function of each part of the soul is truth (1139b12). However, upon closer examination, it quickly becomes clear that Aristotle means different things for 'truth' in the practical and theoretical sense. He thus forges a crucial distinction between two kinds of 'truth':

> So, since virtue of character is a state involving decision, and decision is deliberative desire, the reason must be true and the desire correct, if the decision is a good one, and reason must assert the same things that desire pursues. This [good decision], then, is practical thought and truth. In the case of theoretical thought, however, which is neither practical nor productive, what constitute its being good or bad are truth and falsity, because truth is the characteristic activity of everything concerned with thought. But in the case of what is practical and concerned with thought, consists in truth in agreement with correct desire (NE VI.2 1139a22-31).

As we can see, in the case of theoretical thought, working well or badly consists merely in "being true or false" (Kristjánsson, 2015, p.456). Arguably this equates to a correspondence theory of truth, where 'truth' consists in the agreement between what is asserted and what is the case in the world. However, the concept of truth in play in the practical case is more complex. In this passage, Aristotle develops a notion of practical truth, which roughly approximates to the congruity of thought and correct desire (Dunne, 1993, p. 304). Rightness in a situation of action, therefore, depends not only on my grasp and understanding of salient true propositions, but also on whether I am suitably attracted to (or repulsed by) the situation. This is what is known as *euphuia*, what enables people to 'discern correctly what is best by a correct love or hatred of what is set before them' (Top. VIII 14 163b15-16). Accordingly, the function of the practical part of the soul is asserting, or achieving, practical truth. In this way, practical truth does not refer to the content of practical thought, but to the state itself (Broadie & Rowe 2002, p.362).

From this passage we can see that decision (*proairesis*) can be rationally evaluated in terms of practical truth. Thus, as I will argue later in this thesis, there is space and sufficient grounding for a neo-Aristotelian reading of phronetic judgment based on Siegel's reasons-assessment criteria for critical thought. Since phronetic judgment is open to scrutiny, it can be rationally evaluated, not just by the person making the decision leading to a 'correct' action, but also by other agents, so long as they offer sufficiently strong reasons. For a decision (*proairesis*) to be good or correct (*spoudaia*), Aristotle states that, necessarily, (*dei*), logos is true and desire is correct (*orthê*), and logos asserts the same thing that desire pursues. A decision is, therefore, correct or incorrect, depending on both a cognitive and a conative component (1139a32-33; 1139b4-5). This seems to confirm the mixed nature of decision as both cognition and desire, and thereby the complex way to evaluate decision as true or false practically (Dunne and Pendlebury, 2003). From this we can infer that practical truth and falsehood is a way to evaluate practical thought, not only in terms of its descriptive content, but also in terms of the attitude of the agent towards the situation. Practical truth means that the content of decision is true, insofar as it is appropriate to the situation (Broadie & Rowe, 2002). Put another way, practical truth necessitates the action type the agent intends to perform is the right thing to do (Dunne, 1993, p.308).

Problems arise with Aristotle's separation of the desiderative and intellectual parts of the soul when one considers contemporary understandings of the function of the intellect. In assigning the speculative intellect toward the necessary, and the practical toward the contingent, Zagzebski (1996) suggests Aristotle leaves out "one of the most common uses of the intellect, [namely], grasping the contingent" (p.214). To accurately determine that which is contingent and that which is not, requires more than the two distinct and independent categories Aristotle's ascribes for the task under the umbrella of the intellectual and the practical. This omission neglects the types of intellectual virtues one expects to find in seekers of truth and wisdom, virtues defined earlier by Zagzebski as, "motivations arising from the general motivation for knowledge and

reliability in attaining the aims of these motives" (p.166). More importantly, these virtues are considered necessary to "regulate intellectual inquiry and the voluntary aspects of perceptual processes, as well as emotions that influence belief formation" (p.214). Such virtues as we may recall from earlier in the project comprise, but are not limited to: open-mindedness, wholeheartedness, responsibility, impartiality, intellectual sobriety, intellectual courage, humility, flexibility, insightfulness and epistemic conscientiousness and so on (Dewey, 1933, p.30-3).

Though the domain of the necessary was significantly broader than it is now, including as it did back then, almost all of the natural sciences, this failure to develop a set of virtues dealing with belief formation in relation to contingent matters in Aristotle is considered by Zagzebski to be a "serious omission from the point of view of contemporary investigation into the nature of intellectual virtue" (p.215). This omission further undercuts the validity of the Aristotelian intellectual and practical virtue divide, for the reason that, desires are just as capable of disrupting the speculative use of reason as they are in the practical domain. Scientists working to secure 'necessary truths' are just as susceptible to carelessness, dogmaticism, close-mindedness and so on. Scientists likewise, in start contrast to Aristotle's division of intellect into speculative (intellectual) and practical virtues, frequently rely heavily on practical abilities "to find out what the world is like - abilities that are neither speculative nor practical in the sense of leading to overt action" (Zagzebski, 1996, p.217). Turning away from phronêsis now, a topic which is treated in more detail in chapter five, I now move to discuss the issue of overt action in more detail. In the section that follows, I briefly examine the parallels between social critical theory and criticality.

3.4   Social Critical Theory

Much like logicality and phronêsis, the critical theory movement also intersects with the nature and purposes of critical thinking. Broadly speaking, critical theory brings together scholarship in the arena of human

emancipation. Theorists from this tradition stipulate that 'critical theory' is distinct from 'traditional theory' because of its specific practical purpose. In other words, a theory is critical to the extent that it seeks human "emancipation from slavery"…[and] acts as a "liberating…influence", and [further] works "to create a world which satisfies the needs and powers" of human beings (Horkheimer 1972, p.246). This section briefly discusses some of these strands along with their important implications for a critical theory of education.

The precise genesis of critical theory can be traced (though not exclusively) to the intellectual labors of five preeminent Frankfurt School theoreticians: Herbert Marcuse (1898-1979), Theodor Adorno (1903-1969), Max Horkheimer (1895-1973), Walter Benjamin (1892-1940), Erich Fromm (1900-1980), and second wave theorists such as Jürgen Habermas (1929-) and Paulo Freire (1921-1997).

All of the above theorists (Habermas is of course still alive) focused on building a sustainable theory of critical action capable of leading a political, economic, and intellectual revolution. This new form of social enquiry sought to combine the domains of philosophy and the social sciences in an effort to find human-centered values rooted in the principles of explanation and understanding, structure and agency, regularity and normativity. The project for critical theorists is simple: their labors ought to be distinctively *practical* in a moral rather than *instrumental* sense. This sharp teleological focus seeks to bring about an egalitarian society built firmly on human-centered concepts such as social justice, interpersonal respect, universal rights and global citizenship. As Marcuse (1968) puts it, this universal normative project ought to "claim that all, and not merely this or that person, should be rational, free and happy" (pp. 135-6).

Critical theory pivots on the normativity of the concept of 'praxis' and what this entails for the human project of emancipation. The Brazilian educational philosopher Freire (1970) refers to praxis in *Pedagogy of the Oppressed* as "reflection and action upon the world in order to transform it...to achieve this goal, the oppressed must confront reality critically,

simultaneously objectifying and acting on that reality" (p.52). On this view, human emancipation is the natural consequence of being disposed and skilled at confronting "reality critically".

For Freire (1970) theory must never approach inertia; rather it must look to the experiences of the people in an effort to continually develop over time through intervention. Theory should never be static or stagnant; experiences of people change, and therefore, experiences ought to test the theories which form part of the project of human emancipation. The metaphor of anti-virus software may be useful here for purposes of edification. Anti-virus software protects computers (and by extension, people) against sinister programmes such as malware or adware. In order for such software to effectively meet the needs of its users, it must be updated to deal with modern threats. And so, too, critical theory is tasked with the same objective. Theory is carefully refined and becomes more attentive to reality through the process of multiple cycles of change. Deeper and more lasting change may be achieved by means of new theories that emerge from the friction of former theories, which are now inadequate, or in some sense out of kilter with the needs of the people.

According to Freire, the needs of the people remain perpetually out of reach until such time as educators moves beyond the banking model of education in which teachers deposit pre-established chunks of knowledge, divorced from the lived experiences of students in their minds (1970, p.58). The term "banking education" captures the system through which students are receptacles in which pre-ordained knowledge is deposited (p.58). In this model, the teacher decides what is worth knowing, and by virtue of this choice, the students merely mirror the choices of the teachers. Students in this model are merely containers that passively receive unquestioned knowledge from their teacher. Disempowered, they never question what is deposited in their accounts (minds). The culmination of this dehumanizing process reduces students to objects. Students are no longer subjects in their worlds; instead, they become "alienated like the slave in the Hegelian dialectic" (p.58).

In Freire's words, "banking education" even fuels the following attitudes and practices, which reflect oppressive society as a whole:

a) the teacher teaches and the students are taught;

b) the teacher knows everything and the students know nothing;

c) the teacher thinks and the students are thought about;

d) the teacher talks and the students listen - meekly;

e) the teacher disciplines and the students are disciplined;

f) the teacher chooses and enforces his choice and the students comply;

g) the teacher acts and the students have the illusion of acting through the action of the teacher;

h) the teacher chooses the program content and the students (who were not consulted) adapt to it;

i) the teacher confuses the authority of knowledge with his or her own professional authority, which she and he sets in opposition to the freedom of the students;

j) the teacher is the subject of the learning process, while the pupils are mere objects (Freire, 1970, p.58).

To counteract this oppressive situation, Freire (1970) introduces the term '*conscientização*', a pregnant term in Portuguese signifying the disposition and ability of people to accurately perceive social, political, and economic contradictions at play in the world around them (p.60). *Conscientização* is the means through which students avoid being fatalist consumers of their own oppressive reality. When students realize that these contradictions are stultifying, they slowly begin to see the importance of 'problem-posing education', 'codifications', 'culture circles', 'reading the word and reading the world' - five measures, which, when taken together, dissolve the traditional power dichotomy between teachers and students. Here the situation whereby a teacher is the omniscient expert and the student knows nothing is steadily broken down to reveal a new paradigm, one in which the teacher and learner co-construct learning together. In so doing, learning is reframed as a process where knowledge is a collaborative and co-constructed entity, not, as was the case in the banking model, a

dehumanizing and disenfranchised dystopia. Co-constructing knowledge through shared enquiries quickly transforms learning into an empowering process.

Social critical theory and critical thinking are inextricably linked. I argue the fundamental mechanics are almost identical; the main difference lies in the domain in which it is exercised. Thinking, should it be appropriately considered critical, ought to question norms, scrutinize injustices, seek better alternatives, and question established cultural practices and assumptions. To this end, social critical theory focuses exclusively on the project of human emancipation, exemplified here through a brief examination of Freire's argument that, "authentic education is not carried on by "A *for* B" or by "A *about* B," but rather by "A *with* B" (1970, p.12). To realize the project of human emancipation, the oppressed must learn to co-construct their representation of knowledge, as opposed to passively accepting its alienating imposition. In many respects, social critical theory and critical thinking make comfortable bedfellows. However, though several overlaps exist between the two disciplines, critical thinking, is arguably more wide-ranging and all encompassing, for the reason that, it focuses on stress-testing *all knowledge claims*, including those emerging from the human emancipation project itself. In so doing, critical thinking never assumes the veracity of a worldview or ideology. In this way, it scrutinizes all knowledge claims, regardless of the situation or framework in which they arise.

3.5   Critical Thinking as Criticality

Often the terms 'critical thinking' and 'criticality' are used interchangeably. Following the work of Barnett (1997), most theorists now refer to critical thinking as "criticality" (Barnett, 2015; Davies, 2015; Davies & Barnett, 2015). Barnett's original conception (1997) aimed to broaden critical thinking in order to incorporate, "not only argument, judgment and reflection, but also the individual's wider identity and participation in the world" (Davies & Barnett, 2015, p.15). Thus, criticality comprises a composite of three things: *thinking*, *being*, and *acting* under the nexus of:

"critical reason, critical self-reflection and critical action" (Barnett, 1997, p.6). Broadly put, criticality, much like critical pedagogy, requires one to be moved *to do something* (Burbules & Berk, 1999, p.52). To simply conceive of critical thinking as the deployment of cognitive skills is inadequate - "it is thinking without a critical edge" (Barnett, 1997, p.17). Viewed this way, criticality is not merely a cognitive switch we turn on every now and then - instead, we are more akin to "critical beings" - *beings* that approach the world with the fervor of a reflective skeptic (Barnett, 1997). Our fresh ontological orientation calls for us to make cogent and defensible judgments, formulate robust arguments, engage in thoughtful and reflective enquiry, be attentive to the intersubjectivity of experience, and seek to make sense of our role in the world.

In endorsing this particular philosophy of education, Barnett's (1997; 2015) idea of criticality integrates a rather broad outlook. He points out that, as human beings, we encounter life with a holistic fervor. We exercise criticality in our everyday lives, not only in our decision-making processes, but also in our knowledge of self, the other, purported knowledge-claims, our actions, and the world in which we live in. They are all inextricably linked - an irreducible part of being human in a world where relationality animates our connection to one another, to our world, and to our selves. Our knowledge of self, the other, and the world we live in is at the very heart of education. Criticality infuses selfhood/being with the insights of vigilant prudence, and, as Peters (1973) declares, invites us to "travel with a different view" (p.63).

Barnett's vision of criticality requires three conditions to be met. First, students have to be exposed to multiple discourses - and not just intellectual ones - but practical and experiential ones too, within their programmes of study. Secondly, they must be exposed to "wider understandings, questionings, and potential impact of [their] intellectual field" (1997, p.168). Thirdly, it requires a "…committed orientation on the part of the student to this form of life… the willingness to see one's own world from other perspectives...the willingness to risk critique (p.169).

Ultimately, Barnett's overarching conception of criticality broadens the scope and range of domains in which critical thinking flourishes. His rich framework provides a new conceptual understanding of the role of criticality in the university and beyond, including a deep understanding of the domains in which it ought to be practised. Being attentive to this new critical orientation allows students to act purposively in their worlds (Barnett, 1997). Arguably, however, what Barnett's (1997) work arguably fails to deliver is a cogent account of the mechanics of the method. This was never his intention of course, but such a situation leaves us ignorant of its theoretical underpinnings, including its performative subtleties. In summary, Barnett's (1997) account, though bustling with insight, fails to inform educators how criticality actually works.

3.6   A Brief Critical Analysis of the Paulian Approach to Critical Thinking

Drawing on the strengths of the various incarnations of criticality evaluated thus far, this penultimate section outlines the most salient features of Paul & Elder's (2009) conception of critical thought. This model has undergone a series of far-reaching iterations, based largely on the work of Linda Elder and Richard Paul in tandem with other scholars such as Gerald Nosich at the Foundation for Critical Thinking (FCT). For this reason, I have taken its most recent iteration as the basis of my analysis.

This theory is referred to in a few ways: as the 'Paulian Approach', the 'Paul/ Elder Framework', 'Foundation for Critical Thinking Theory', or other close-synonyms. Little or no further edification arises by way of an analysis of these iterations, so, for this reason, they shall hereafter be treated as interchangeable.

3.7   The Conceptual Nature of the Paulian Approach

Unlike other theoretical expositions of critical thought originating from the traditions of formal and informal logic, most of which insist on a correct and objectively realizable answer to pre-determined questions, one of the

main strengths of the Paulian approach is that it foregrounds a conceptual approach to the phenomena, as opposed to a rules-based rubric (Paul & Elder, 2009). Loosely put, the Paulian approach focuses on concepts, rather than rules, methods, or procedures. For educators, the main strength of a conceptual approach, over and above a descriptive one, pivots on the freedom it affords critical enquiry for both pedagogues and students. This fluidity helpfully circumvents procrustean enforcements of the general rule.

One way to distinguish the rules-based exhortations over concepts is that the former is designated by full sentences, not by single words. Thus, 'purpose' (an element) is a concept; by contrast, 'identify the author's purpose' is a rule, a command. 'Accuracy' (a standard) is a concept; in contrast, 'check the accuracy of your information' is a guideline, a methodological step. Rules and guidelines are built out of concepts. For this reason, concepts are much more widely applicable, and by extension, more flexibly compatible with thinking critically than the guidelines assembled from them.

In teaching someone to think critically about a peer-reviewed article, a general guideline would be to have students 'identify the author's purpose'. But 'purpose', as a concept - is more widely applicable than the guideline. In looking at the author's purpose, there is a tendency to restrict one's thinking to answering the guideline, often at the expense of other germane questions such as: what is my purpose in reading this article, or what was the lecturer's purpose in getting me to read this article? In contrast, the concept 'purpose' allows more enquiry-based latitude, thereby facilitating a more wide-ranging and incisive series of follow-on questions. Other important questions now emerge, such as:

- Is the author's purpose clear?
- Is it a topic that lends itself to clarity?
- Are the conclusions implicit or explicit?
- How comprehensive is it - does it take into account multiple points of view?

One of the strengths of the Paulian framework is its insistence on a conceptual understanding of the elements of thought. In affording due latitude to these necessary elements of free enquiry, sufficient space is afforded for critical thought to operate within a fluid paradigm, as opposed to a logically informed rules-based rubric.

3.8   Elements of Thought

Elements of thought are a nexus of theoretical constructs within Paul's critical thinking framework. Sometimes they are referred to as the 'elements of thought' or 'structures of thought', or 'parts of reasoning'. Congruent with these, Paul (2009) argues that human thinking, wherever it exists, is composed of, or presupposes, eight elements. These aforementioned elements are all indivisibly interrelated, and often illustrated in the form of a circle to emphasize their non-linear nature, as well as their interdependence. The justification Paul & Elder offer for their position is largely based on the need for fluidity within a functional and cogent conception of critical thought. In their words:

> Each of these structures has implications for the others. If you change your purpose or agenda, you change your questions and problems. If you change your questions and problems, you are forced to seek new information and data. If you collect new information and data, you are forced to change your purpose (Paul & Elder, 2009, p.5).

There is nothing new about this of course, and in many respects, this can be safely declared as self-evident. Still, behind its overt simplicity, lies its efficacy. Fluidity, in contrast to immutability, strengthens the resolve of critical thinkers, especially when it comes to interrogating the cogency of knowledge-claims. At the heart of criticality is a type of enquiry-based evaluative judgment about what to believe or do. Such judgments, should they be affixed with the addendum 'critical', ought to decide which rules (if any) apply to context-specific situations. For this very reason, judgments require concepts, not blindly following rules.

Figure 2: The elements of thought (Paul & Elder, 2007, p.5)

Educators from a series of domain-specific disciplines incorporate these elements in their cultivation of critical thought within constructivist settings. This conceptual tool is used across disciplines and sectors as diverse as government and business, to police forces and intelligence agencies. To reach a broader and deeper explication of the elements of thought, the *Foundation for Critical Thinking* recently collaborated with content area experts to produce deeper critical analyses of specific subjects, ranging from *Thinker's Guides to Engineering Reasoning* (Paul, Niewoehner & Elder, 2007), *Clinical Reasoning* (Hawkins, Elder, & Paul, 2010), and *Historical Thinking* (Elder, Gorzycki and Paul, 2011). Besides the popularity of these texts, there is little data, beyond anecdotal evidence, to make any sort of defensible judgment about their efficacy. On account of this reason, more work is required to provide data for social scientists to critique and evaluate (Paul & Elder, 2009). What is clear is that these works

offer a reasonable footing for critical reasoning within these subjects. Still, there is significant scope for more detailed work, in addition to the insight a series of independent studies would undoubtedly bring. Should these elements of thought play a central role in students' criticality, more detailed empirical research is required to determine its efficacy across subject domains. Similarly, more empirical data are required to establish the optimal means through which one ought to foster the cultivation and internalization of these elements in teaching and learning.

3.9   Intellectual Standards

Consistent critical thought necessitates not just the principles of evaluation, refutation, and stress-testing the reasons for one's beliefs and values, but it also requires the art of critical reconstruction. These intellectual standards, as conceptualized by the *Foundation for Critical Thinking*, are principle-based standards vital to the assessment of thought and quality of intellectual products (Paul & Elder, 2002). Like all principle-informed standards, the list is certainly not exhaustive, and much work is needed to further refine it to maximize its efficacy (Paul & Elder, 2002). On this basis, Elder & Paul (2008) have called for experts to articulate intellectual standards relevant to reasoning within their own disciplines.

Clarity	Could you elaborate further? Could you give me an example? Could you illustrate what you mean?
Accuracy	How could we check on that? How could we find out if that is true? How could we verify or test that?
Precision	Could you be more specific? Could you give me more details? Could you be more exact?
Relevance	How does that relate to the problem? How does that bear on the question? How does that help us with the issue?
Depth	What factors make this a difficult problem? What are some of the complexities of this question? What are some of the difficulties we need to deal with?
Breadth	Do we need to look at this from another perspective? Do we need to consider another point of view? Do we need to look at this in other ways?
Logic	Does all this make sense together? Does your first paragraph fit in with your last? Does what you say follow from the evidence?
Significance	Is this the most important problem to consider? Is this the central idea to focus on? Which of these facts are most important?
Fairness	Do I have any vested interest in this issue? Am I sympathetically representing the viewpoints of others?

Figure 3: Essential intellectual standards (Paul & Elder, 2007, p.9)

Much like the elements of thought, this conceptual canon of intellectual standards has undergone a series of explications in an effort to aid lucidity. In many texts utilized within educational settings, detailed exemplifications pertaining to elements of thought correspond to equally detailed accounts of intellectual standards (see Fisher, 2014; Gilbert, 2014; Halpern, 2014). Building on this, Paul & Elder (2009) have recently significantly expanded this theory in the *Thinker's Guide to the Intellectual Standards*. This guide connects core intellectual standards theory with synonyms (e.g. for

'precise': 'detailed, exact, painstaking, methodical, specific, meticulous, particular'); adds several core standards (e.g. 'feasible', 'consistent', and 'sufficient'); bifurcates the standards into 'macro-' (e.g. 'cogent', 'forceful', 'reasonable') and 'micro-' (e.g. 'clear' and 'accurate'); and elaborates the relationships among the standards. Despite these further refinements, much work remains. There is the problem of contextualization, whereby each standard necessitates further elucidation, mainly because standards require a slightly different meaning, depending on context. Clarity and accuracy, for example, will serve different functions in architecture than in corporate law (Lipman, 1988, p.40). In line with this, these meanings and uses need exploration and documentation.

Leading critical theorists Burbules & Berk (1999) in an analysis of the separate traditions of 'critical thinking' and 'critical pedagogy' write that, in the idea of strong-sense critical thinking, "we see Paul introducing into the very definition of critical thinking some of the sorts of social and contextual factors that Critical Pedagogy writers have emphasized" (Burbules & Berk, 1999, p.5). Some feminist philosophers have also credited Paul for his emphasis on dialogue, fair-mindedness, and empathy - though they often call to for him to stress these elements even more. Thayer-Bacon (2000), for instance, writes that:

> A strength of Paul's theory is that his definition of critical thinking includes what Ennis, McPeck, Lipman, and Glaser are concerned about, as well as aspects of critical thinking that have not been included before...Paul's more nurturing strong-sense critical thinking, in emphasizing the need to understand other people's perspectives and world views, leans in the direction of relationships and caring. It leans toward stressing interconnections and relatedness and toward a more qualified relativist position...one can find the potential of a constructive thinking perspective in Paul's critical thinking theory
>
> (Thayer-Bacon, 2000, pp.61-62).

However, Thayer-Bacon's goes on to reveal, how, in her opinion, Paul's

work falls short of fully celebrating the subjectivity and intersubjectivity of criticality. In her words, "Paul recognizes that there is a thinker and that this thinker is a subjective being. Unfortunately, he recognizes the critical thinker's subjectivity in a negative way..." (Thayer-Bacon, 2000, pp.62-63). Instead of the 'individual', 'solitary' thinker, which she perceives Paul (and the critical thinking movement at large) to be following, Thayer-Bacon proposes a 'quilting bee metaphor', which describes the role of individual quilters as "individuals-in-relation-with-others" (Thayer-Bacon, 2000, p.63).

Philosophers have critiqued Paul's work on the opposite charge - namely that his emphasis on empathetic and dialogical thinking leads to an intellectually subjective epistemology. Harvey Siegel (1988), for example, as we have seen earlier, argues that:

> There are troubling aspects of Paul's conception of 'strong sense' critical thinking as 'dialectical/dialogical,' according to which critical thinkers transcend atomistic analysis and endeavor to comprehend the issue at hand from the point of view, the 'worldview,' of their 'opponents'…This suggests that the criteria of evaluation of informal arguments, and the criteria of critical thinking, are ultimately grounded in world views...[if this is so], we are left with a vicious form of relativism in which all 'rational' disputes boil down to unanalyzable differences in worldview
>
> (Siegel, 1988, pp.13-14).

In truth, both theorists make some good points. Subjectivity and intersubjectivity, whilst legitimate modes of acquiring knowledge (tacit or otherwise) tend to be denigrated by analytical philosophers on account of the indeterminable merits of competing epistemological claims (see Nozick, 1993; Rescher, 2005; Scanlon, 2014). On the other hand, many epistemologists acknowledge the centrality of intersubjectivity and social epistemology, construed here as the systematic reflection on the social dimension in relation to acquiring, justifying, or refuting different accounts of purported knowledge (see Kusch, 2014). Both camps make strong cases.

In the case of the former, it is imperative that critical thought not be reduced to an extreme relativism where all opinions are equally valid. Such a regressive step would effectively extinguish all hope of meaningful progress in human enquiry. In the case of the latter, though the social dimension of acquiring and generating knowledge is well established, for critical thinking to progress, there must be certain objective standards of quality through which one acquires and justifies their claims to knowledge.

Two critical insights emerge from the above analyses. First, critical thinking frameworks need to emphasize that their strength lies in its dialogical and dialectical interface. Part of this entails accepting the wider socio-cultural dimension to criticality than the one characterized as an individualized pursuit for truth. Secondly, criticality requires a framework that permits enough fluidity to appropriately attend to the richness of subjectivity and inter-subjectivity, without comprising the rigor of rational enquiry. Epistemic contextualism is a notable strength of critical enquiry. This understanding allows sufficient scope for particularities to flourish within a sufficiently malleable nomological framework. Regardless of one's position vis-à-vis the above debate, the central tenets of critical enquiry remain the same: it is truth-seeking, error avoiding, interrogative, collaborative, enquiry-based and purposive. In other words, at all times, it strives for truth and avoids error. Implicit within this understanding is that not all enquiries yield conclusions that are equally valid (Siegel, 1988). Some evaluations are closer approximations to truth than others (Scanlon, 2014). For this reason, and on this basis, critical thought strives to achieve the "putative optimum" - the closest approximation to truth given the available data at hand (Rescher, 1988).

3.10   The Siegelian Conception of Critical Thinking

Thus far we have seen that formal logic lacks any real-world application when it comes to deciding what to believe or do. This is not to say that it is not useful in many respects, but rather simply to acknowledge its limitations when it comes to critical enquiry. Ask a formal logician how the rigors of formal logic can tell us whether commercial surrogacy is morally

permissible, or conversely, morally abhorrent, and you will find them wanting. In contrast, when it comes to informal logic, the skills of appraising arguments and avoiding fallacious reasoning, have more immediately obvious application and merit (Halpern, 2014). But it is important to resist overstating its importance. Fallacious reasoning may prove an argument has committed an error in its formulation, but this does not necessarily negate the truth or cogency of the conclusion (Fisher, 2014). Clearly, it is fallacious (though rather counter-intuitive) to say that just because a person tries marijuana, they are more likely to try harder drugs than their non-drug taking counterpart. And yet, even though this is faulty reasoning, in individual cases, this may indeed turn out to be true. They may be more likely to try harder drugs as a result of their initial experimentation. But if does turn out to be the case, it is not because the rules of logical inference made it so. Instead, it comes down to a myriad of different causal factors, including, context, and history, to name but a few. People are different. They sometimes respond to different situations in surprising ways. In the case of the individual in question, context might come into play. They might lose a loved one and decide to experiment to escape. They might equally, just want a thrill. Regardless of the reasons underlying the course of action, one thing is clear: the rules of logical inference have no bearing on the likelihood of the outcomes just described. This is just one of the reasons why informal logic can likewise tell us very little about what to believe or do.

Barnett's (1997; 2015) framework, in addition to social critical theory, delivers a more conceptually fluid and imaginative framework. In so doing, what it makes up for in conceptual fluidity, it lacks in procedural elucidation and mechanics. Pedagogues are no clearer as to how critical thought operates, or how it ought to be practised, what to look for, or indeed, how it ought to be evaluated. Arguably, a more effective framework can be found in the Paulian conceptual framework. Here, sufficient care is afforded to the contextual particularities of our modern world, without comprising on the merits of an overarching commitment to rational enquiry. Educators have something to work with here, a clear framework of sorts to

assist the enquirer in their deliberations. In spite of the obvious strengths of the Paulian framework, it still lacks a refined and concise procedural exemplification.

In contrast, Siegel's "reasons conception" (p.23) offers the most promising overview of the mechanics of critical thought. This 'reasons conception' provides the rigor that is arguably absent in Paulian and Barnettian accounts of criticality. According to Siegel, critical thinkers are "appropriately moved by reasons" (1988, p.23). In his words, a "critical thinker is...one who is *appropriately moved by reasons*...critical thinking is impartial, consistent, and non-arbitrary, and the critical thinker both acts and thinks in accordance with, and values, consistency, fairness, and impartiality of judgment and action" (emphasis in original; Siegel, 1988, p.23). To put it another way, "to be a critical thinker is to be appropriately moved by reasons…to be a rational person is to believe and act on the basis of reasons" (Siegel, 1988, p.32). A critical thinker is hence a rational person, since rational people believe and act on the basis of appropriate reasons. Part of the business of assessing claims, formulating informed judgments, evaluating procedures, scrutinizing evidence, or contemplating alternative actions, involves critical thinkers actively seeking out and aligning themselves with the strongest and most cogent reasons on which to base their assessments, judgments or actions. Consistent with this view, a critical thinker is someone who "appreciates and accepts the importance and convicting force of reasons" (Siegel, 1988, p.33). To appropriately judge the 'convicting force' of reasons, critical thinkers must firstly master the epistemic criteria that reasons must meet in order to be rightly judged to be good reasons, that is, reasons that warrant beliefs, claims, and actions.

Siegel (1988) proposes that students must master certain epistemic criteria that reasons must satisfy in order to be appropriately judged to be good reasons, that is, reasons that warrant beliefs, claims, and actions. To this end, he argues that the process of seeking reasons for one's judgments, beliefs or actions, involves a commitment to principles, which themselves need to be justified (Siegel, 1988, p.33). But, what are principles? And what is the nature of their relationship with reasons? Israel Scheffler (1973)

explains their connection as follows:

> Reason is always a matter of abiding by general rules or principles...reason is always a matter of treating equal reason equally, and of judging the issues in the light of general principles to which one has bound oneself...if I could judge reasons differently when they bear on my interests, or disregard my principles when they conflict with my own advantage, I should have no principles at all. The concept of principles, reasons and consistency thus go together...In fact, they define a general concept of rationality. A rational man is one who is consistent in thought and in action, abiding by impartial and generalizable principles freely chosen as binding upon himself
>
> (Scheffer, 1973, p.76).

To explain the link between reasons, principles and consistency more fully, Siegel draws on an example (1988, p.32-33). Suppose Alice's teacher confiscates her iPhone one day as punishment for browsing Facebook during class. When asked by her parents as to why Alice had her phone confiscated, her teacher replies: "because she was on her iPhone" (the reason), and was therefore "not taking part fully in the lesson". Note here that the teacher's reason for confiscating Alice's iPhone is because she was not taking part fully in the lesson. For this properly to count as a *bona fide* reason, the teacher must show evidence of being committed to some principle, which licenses or substantiates that reason - in this case the principle - "all students who are caught using their mobile phones during class shall have them confiscated for 48 hours". If the teacher were not committed to this principle, her putative reason for confiscating the phone could be justifiably construed as not constituting a genuine reason, and as a result, Alice's parents would be perfectly entitled to challenge the teacher's arbitrary measures in dealing with this particular incident.

Siegel uses a variation of this story to argue for the connection between reason and principles. Principles, to his mind, are "impartial consistent and non-arbitrary, and a critical thinker acts in accordance with, and values,

consistency, fairness, and impartiality of judgment and action" (Siegel, 1988, p.35). There are two types of principles: subject-specific and subject-neutral. Subject-specific principles govern the assessment of particular sorts of reasons in particular contexts, whilst subject neutral principles govern general principles that apply across a wide variety of contexts and types of reasons (Siegel, 1988, p.36). In this respect, principled critical judgment "presupposes a recognition of the binding force of standards, taken to be universal and objective, in accordance with which judgments are made" (Siegel, 1988, p.35). This view of knowledge is heavily externalist - an epistemological stance that, loosely understood, locates the goodness (and putative acceptability) of epistemic reasons outside the person (Siegel, 2017). Truth, according to this epistemic stance is 'out there', and the task at hand lies in aligning judgments with the strongest possible reasons that in some way they bear a verifiable congruence with reality.

There is no doubt that Siegel's (1988) conception of critical thinking is one of the most philosophically robust conceptual frameworks in the literature. His insistence on delimiting subject-specific principles from subject-neutral has promise, but suffers the flaw of locating the latter's principles as being essentially logical constructs, in his own words, "both informal and formal" (p.36). Leaving aside Siegel's views on subject- specific principles; flaws I have already indirectly flagged earlier in the project, for example, the scientific principle of replicability and generalizability, I wish to briefly critique Siegel's views on the principles utilized in the practical domain. More specifically, I challenge his contention that the principles of informal and formal logic are objectively optimal for accurately formulating critical judgments about what we ought to do.

Logical principles, both formal and informal are no match for formulating critical judgments about what to do. The language of logic, as we have seen before, is wholly inadequate for attending to the complexities of particularity that characterize situational knowledge claims in the practical domain. There are no exceptions in logic - it operates on the assumption that each case is alike, that each case ought to proceed on the basis of the same consistent and impartial rules. But the principles of logic (informal

and formal) have feet of clay. Ask a logician whether the best way for people to organize their spices is alphabetically, or in order of frequency of use, and they are left wanting. Each answer has a certain 'logic' to it of course, and yet, the acceptability of the answer depends on the desires of the agent. A logician cannot tell us whether sex robots are morally advantageous or permissible, nor can it shed any light on whether designer babies are a necessary evolution of the human race, or conversely, an abuse of the principles of natural selection. Nor can the principles of informal logic tell us anything meaningful about whether nootropics (cognitive enhancers) should be permitted for teachers and students facing deadlines. In short, logic cannot tell us the optimal way to live or lives, nor can it calculate the rightness or wrongness of any sort of ethical orientation, behavior or action.

A further problem with Siegel's account of the necessity of logical principles in the practical domain hinges on his view about the impartiality and consistency of these principles in the practical domain. Though I agree with Siegel's reasons-assessment explication of critical thought, I take his view of principles as "impartial and consistent" (1988, p.33) to be mistaken. To be consistent in one's reasoning either presupposes that one's feelings and situatedness never change, or moreover, that they do not matter when it comes to determining the strength of reasons supporting a certain belief or action. Principles may change according to circumstance. My principle of 'do not lie' may come under attack when it comes to telling my four-year-old about Santa. My principle of 'do not be unfaithful' may change if my wife is in a vegetative state. Principles, in the practical domain, though important, may, depending on context, be a moveable feast, or at the very least, far more nuanced that originally thought. On this basis, principles ought to evolve to properly attend to particularity and atypical situations. For this reason, there are strong grounds for being skeptical about the immutability often afforded to principles in philosophical discourse. In relation to principles utilized in different domains of enquiry, science for instance, even if the method is ostensibly 'reliabilist', the scientist conducting the research may not be. Scientists are people. They are human.

For this reason, they are open to systemic biases, to confirmation bias, to hubris, to entrenched assumptions, and to error. So, in this way, even if principles are supposedly reliabilist, human beings are still fallible (see Wakefield, 1998). In this regard, principles, though essential elements, cannot guarantee, in and of themselves, the efficacy of critical thought.

A third criticism of Siegel's (1988) reasons-assessment component of critical thought hinges on his failure to identify the types of reasons critical thinkers ought to seek out and evaluate. Animating all forms of human enquiry is a complex nexus of reasons that drive our interactions with the world around us. Until such time as we discern: a) what sort of reasons must critical thinkers be skilled at locating, and, b) how these reasons work together within an epistemic relational framework, including how they ought to be stress-tested for cogency, Siegel's conception (1988) could arguably be characterized as an impoverished, and somewhat linear understanding of "logicality and straitened rationalism" (Williams, 2016, p.42). This 'rationalism', that Williams (2016, pp.42-43) accuses Siegel of advocating, magnifies the role of unaided reason in the acquisition and justification of knowledge.

Over and above this criticism, Cuypers (2004) accuses Siegel of endorsing instrumental practical reasoning, predicated on "normatively and motivationally powerless" reasons (p.75). In his paper *Critical Thinking, Autonomy and Practical Reason*, Cuypers (2004, pp.75-90) attributes to Siegel's conception of critical thought, a "Humean means-ends conception of rationality" (p.83). Humeans contend that, "reason is, and ought to be, slave to the passions" (Hume, 1739/1945, p.415). More generally, desires and passions motivate and provide our ends, whereas *reason* provides the means to attain those ends. On this view, reason can only tell us how best to achieve our ends, but not which ends to take as our own. Cuypers suggests that Siegel's account of critical thought is broadly Humean, and as a consequence, "reason lacks robustly normative as well as robustly motivating power" (p.34).

In his detailed response to Cuypers, Siegel (2005) clears up some of the

confusion regarding his account of criticality. In the first instance he corrects Cuypers, positing that, unlike Humean accounts of practical reason, his conception is based on a dispositional virtue-based "critical spirit," and the normativity of reasons" (p.539). Thus, because of this commitment to normativity, "reasons provide normative support for candidate beliefs/judgments/actions, proportional to their quality" (p.536). Contrary to Humean accounts, Siegel argues, "reason can motivate […] but is not necessary that it does […] and that, "one's good reasons for acting can [but may not] motivate the relevant action" (p.538). Responding further to this, Siegel rejects the Kantian view attributed to him that practical reason always, or necessarily, generates in us pertinent volitions and moves us all the way to action. He explains that in his view, "reasons for action may, but need not, so move us" (p.539). In this respect, at least, he argues, he "parts company with Kant" (p.542). Since no further public exchanges occur between the two, it would appear that Cuypers' criticisms were rooted in a misinterpretation of Siegel's position concerning reasons-normativity. This idea of reasons-normativity I return to in the next chapter.

In summary, Siegel's account of critical thinking, though it has several strengths (most notably his account of the reasons-assessment criteria) his failure to attend to the particularities enmeshed in knowledge claims exercised in the practical domain leave the pedagogue with an impoverished understanding of what reasons critical thinkers ought to excel in scrutinizing (Cuypers, 2004, pp.75-78; Williams, 2016, pp.42-49). As we have seen, the principles of logic can tell us nothing about what the good life ought to be, nor can it tell us about the situational judgments required of pedagogues in their everyday classroom practice. Principles, likewise, ought not to be immune from criticism. Science is, after all, based on principles - 'testability' and 'reproducibility' being two of them. But this raises a further question: are all materialist phenomena directly observable? Is it conceivable that one some phenomena are simply not reproducible? Must knowledge always 'be out there', waiting to be discovered, or are there instances where we create knowledge ourselves? Is self-knowledge something that can be directly measured? Are facts by their very nature

independent of experience? Or should knowledge under Siegel's conception allow for a more nuanced and fluid *a posteriori* account of knowledge?

3.11   The Epistemological Assumptions Underpinning Paulian and Siegelian Frameworks

With the exception of social critical theory, all the paradigms we have examined this far are based on a series of epistemological assumptions. According to these conceptions, knowledge is conceived as "something that one discovers, not something that one makes…knowledge is out there waiting to be found, and [accordingly], the most useful tool for finding it is science" (Eisner, 1985, p.32). This objectivist epistemology states that:

> Existence and fact are independent of belief, knowledge, perception, modes of understanding and every other aspect of human cognitive capacities. No true fact can depend upon people believing it, on their knowledge of it or any other aspect of cognition. Existence cannot depend in any way on human cognition.
>
> (Lakoff, 1990, p.164)

On this view, knowledge is equated with the outcome of the enquiry-based process of discovering, codifying, categorizing, and conceptualizing the facts contained in the objective world. Within this conceptual or theoretical construct, one's rational cognitive process sets forth an objective account of reality, an account that is supposedly independent of the enquirer's point of view or frame of reference. In short, knowledge exists independently of an agent's interaction with the facts, as they understand them (Siegel, 2017, p.218).

As a result of this assumption, the viability or explanatory power of the scheme in question depends on how accurately it corresponds to or captures the essence of the phenomenon observed. Rationality, as posited by the frameworks considered thus far, is considered the perfect tool for this task, since it is value-free and impartial. But is this how knowledge really works?

Are *a fortiori* reasons, the language of rationality, always impartial and value-free? In the next chapter, I argue that they are not, and that criticality requires a new typology of probative reasons to defend it from critics who argue that such models are reducible to the mere application of logical algorithms.

3.12   Conclusion

This chapter sought to provide a clear overview of some of the main conceptual approaches to critical thinking. Formal and informal logic were first analyzed, before I then presented a brief overview of phronêsis, critical social theory and criticality. From there, I critically analyzed the Paulian and Siegelian approaches to critical thinking, including a short exposition of the epistemological assumptions underpinning these models. Though each framework has several notable strengths, critical enquiries based on a 'reasons-assessment' procedure require a clear typology of probative reasons for educationalists to stress-test to reach an informed judgment about what to believe or do. In the next chapter, I look at formulating a fresh conception of critical thought based on stress-testing a specific typology of probative reasons in order to determine what to believe or do.

Chapter Four: The Language and Currency of Argumentation

4.0   Introduction

This chapter critically investigates the language and currency of critical thought. For this purpose, it begins with a brief outline of the nature and anatomy of arguments, including how to distinguish between arguments and non-arguments. From here, it then moves to problematize some of the fundamental flaws in argumentation that rely on inductive, deductive and probabilistic frameworks. Finally, taking into account the vulnerabilities inherent in these forms of 'reliabilist process models' in yielding 'true beliefs', the chapter terminates with a concise examination of some of the evasive tactics interlocutors use to obfuscate the principles of rational enquiry, namely the distortion of the burden of proof and appeal to ignorance.

Through the appraisal of reasons, argumentation hinges on "the expression of ideas, thoughts, feelings, and suppositions, joined together in some sort of logical or quasi-logical sequence, supported by relevant evidence, and sometimes most importantly, the positioning of the student in relation to existing bodies of knowledge" (Andrews, 2015, p.53). Arguments are, of course, the cornerstone of all worthwhile intellectual endeavor (Llano, 2015). They are the means through which someone attempts to convince others that their claims are appropriately justified or substantiated, and therefore, worthy of one's provisional acceptance. Depending on the nature of the issue, arguments may either be relatively straightforward, or conversely, incredibly complex and difficult to follow. Either way, they are (in the form of reasons) the universal currency of critical enquiry (Halpern, 2014; Salmon, 2013; van Gelder, 2015). For every essay students write, their work ought to comprise a series of carefully crafted arguments. The stronger the argument, the better the standard of the work. Now, arguments (reasons) come in varying degrees of strengths, and on this basis, can be categorized as being either good or bad. Suffice to say, not all arguments are perfect - some may contain avoidable defects. Since critical enquiry

takes place within a grand dialectic, a controversial issue of some kind where contradictory beliefs are in play, *a fortiori* reasons must always be the final arbiter in such disputes. To better understand *a fortiori* (stronger) reasons, we must first understand how arguments work.

Central to the role of any argument is the exhortation to give us reasons for accepting its conclusions to be true. Viewed this way, arguments ought to have rational force - a dynamism that moves people in a rational way to be persuaded of its conclusions. Characterizations specifying the property of *giving us good reasons to accept the conclusion* necessitate students recognizing when arguments carry out their function, vis-à-vis, delivering good reasons worthy of provisional acceptance (Gilbert, 2014). To do this, students require the disposition and ability to evaluate arguments logically. This skill must exclude logical concepts such as validity, soundness, and inductive force, since all of these categorizations presuppose that the premises are true (Fisher, 2014). In addition, evaluating certain premises, as dictated by the knowledge state of the enquirer, may be beyond their scope of expertise. Some premises may lie beyond the epistemic ken of the enquirer. At the risk of reductionism, arguments deal with form, whilst reasons are the substance. Arguments are thus akin to cars without engines - it is the engine (in the form of premises/reasons) - that allows the car to travel from A to B. Therefore, whilst a formative grounding in the logic of argumentation is important, it is *reasons* that critical thinkers concern themselves with (Scheffler, 1973; Siegel, 1988, 1997).

4.1   The Basic Anatomy of Arguments

Broadly defined, arguments are "a set of propositions of which one is a conclusion and the remainder are premises, intended as support for the conclusion" (Bowell & Kemp, 2015, p.10). The reasons (premises) are presented in order to persuade the reader that the conclusion is probably true. All arguments are placed in one of two basic groups: those in which the premises (reasons) support the conclusion, and those in which they fail to do so, despite claims to the contrary (Hurley, 2012; Salmon, 2013). The former are said to be cogent arguments, the latter, defective arguments. Part

of the role and responsibility of the critical thinker involves the evaluation of arguments. To do this, critical thinkers require a solid grounding in the methods and techniques that allow us to distinguish good arguments from bad (Copi, Cohen & McMahon, 2014).

All arguments comprise two parts:

1 *a claim* - some statement of fact or opinion; the point of what is being said - this point is usually called the conclusion.
2 *support for the claim* - evidence or reasons to endorse or make the claim acceptable; these supporting lines of reasoning are usually called premises (Tittle, 2011, p.23).

Arguments, in the form of reasons, frequently emerge from some sort of cognitive dissonance - a controversy of some sort, where people are compelled to give their reasons as to why they believe X and Y are the case. Generally speaking, people tend to disagree about some or all of the following:

- **facts**: the facts of the matter
- **interpretation**: what the facts of the matter indicate or imply
- **definition**: how the matter is best defined
- **context**: how context-specific experience and particularities ought to factor into our judgments about what to believe or do
- **evaluation**: how the matter should be judged morally, aesthetically, practically, including how to proceed

(Tittle, 2011, p.50).

Let us look at an example. Suppose I want to persuade you to stay in college until graduation. To convince you, I prepare a series of reasons (premises).

- Premise 1: College graduates earn more money than college dropouts or people who never attended college
- Premise 2: College graduates are healthier (emotionally and

physically), and live longer than those who do not graduate from college

- Therefore: you should graduate from college

(Halpern, 2014, p.233).

One of the benchmarks through which we determine the quality of arguments is the cogency of the reasons offered in support of the conclusion. In this example, the return of more money, being healthier and living longer, may, when considered together, constitute sufficient reasons in order for you to decide to stay in college.

But of course, not all arguments house sufficiently compelling reasons in support of their conclusion. Let us look at another example:

- P1 - Spray paint can be used for tagging
- P2 - Tagging causes damage to private property
- P3 - The sale of anything which causes damage to private property should be regulated
- Therefore: The government should regulate the sale of spray paint

(Bowell & Kemp, 2015, p.25)

There is no issue with premise 1 since spray paint can clearly be used for tagging. Premise 2 is also sound. Premise 3 should be contested though. Spray paint on its own causes no harm to private property. It is only when it is used by people for illicit purposes, such as tagging a neighbor's back wall, that it causes damage to private property. Spray paint has numerous legitimate uses, such as re-spraying cars and motorbikes, upcycling furniture, and so on. If government applied the same logic to what it chose to regulate, markers would be banned in schools (as indeed is the case in certain schools); clothes hangers would be regulated (they can be used to break into cars), and so on and so forth. The main problem with this argument lies in its questionable interpretation about ampliative implications, where ampliative refers to the further conclusions to which such a judgment tends to follow. In this case, banning the sale of anything

that (might) cause damage to private property ought to include what could be reasonably enumerated as an unenforceable and wide-ranging list. Straight away, this approach would include regulating matches (they can cause fires) and so on. Legislating for every trivial causal eventuality of this nature would be absurd in the extreme.

The simplest way of looking at arguments is to view them as the 'giving of reasons'. Harman refers to the purpose of argumentation as invoking a *change of view*, whereby the objective is to change an 'old view' into a 'new view' via the strength (rational force) of the reasons offered in support of this new view (1986, p.3).

Reasoning

Old view or belief ---------> new view or belief

Premises ------ > Conclusion

(Harman, 1986, p.3).

Reasoning, according to this definition, rests on the assumption that stronger reasons for believing or doing something ought to be sufficient to persuade a person to change their mind about their beliefs or actions (Harman, 1986). This is a contested concept, especially since there may be several reasons why a particular person may not want to believe something; for instance, they may have been raised to believe certain things. Moreover, clearly discernible and undefeated objective reasons for alternative beliefs or actions are, for obvious reasons, not always cognitively accessible (Fisher, 2014). Even in the face of compelling evidence to the contrary, people of entrenched persuasions might never be rationally moved by the epistemic force of reasons offered in support of discordant views or experiences about the world (Searle, 2001).

To give a more concrete example, one might conceive of situations where thinking critically *de facto* contravenes our self-interests. Suppose I have cancer and the doctor says the tumor is inoperable. Rather graciously he speculates that I should have (at least) six months left to live. Suppose further, that I am also an oncologist, and when I see the scan, I know, based

on the size of the tumor and its growth patterns, that the six-month estimate is beyond generous; in reality, it ought to be around three months. Back in the literature review, a similar example was drawn upon to explain the distinction between non-epistemic and epistemic justification. Non-epistemic justification refers to the fact that sometimes people forge their beliefs in order to align with some desired goal or end. Scholars refer to this as "prudential justification" (Fumerton, 2002, p.204). Prudential reasons for believing have something to do with the efficacy with which believing will or might achieve certain goals or ends. In the case of my cancer diagnosis, even though my chances of remission remain extremely low in terms of probability, there is a sense that I am *justified* in having this optimistic belief. Nevertheless, though my "belief can be considered *prima facie* rational or justified…"it is not epistemically justified or rational" (Fumerton, 2002, p.204). In keeping with this principle, criticality follows the evidence wherever it leads, even in cases where conclusions diametrically oppose our best interests. Truth exists as the overriding guiding principle of critical thought. Vested interests, entrenched irrationalism and unsubstantiated inferences are the antithesis of criticality (Searle, 2001).

4.2   Recognizing an Argument

For critical thinking to occur, students need to be able to recognize arguments before they can then proceed to evaluate them. To do this, they must be able to distinguish arguments from non-arguments. On the face of it, this might seem an almost intuitive skill, but sometimes arguments are buried deep in complicated prose, and it is often unclear on first glance whether premises are stated or inferred, whilst other times, conclusions may be left unstated (Andrews, 2015, p.52). Not all texts, lectures or discourses contain arguments. For this reason, critical thinkers must be disposed to and skilled at, not only evaluating competing arguments, but also distinguishing arguments from non-arguments (Fisher, 2014).

In general, a passage contains an argument if it purports to prove something; if it does not do so, it does not contain an argument (Copi,

Cohen & McMahon, 2014). Two conditions must be fulfilled for a passage to purport to prove something:

1. At least one of the statements must claim to present evidence or reasons
2. There must be a claim that the alleged evidence supports or implies something— that is, a claim that something follows from the alleged evidence or reasons.

<div align="right">(Tittle, 2011, p.23)</div>

Whatever form they take, reasons are the basic building blocks of arguments. Reasons trump the basic architecture of argumentation. Reasons are what rationally move us to be convinced of certain views (Siegel, 1988, 1997). Reasons are the exchange value of opposing views and that with which critical thinkers scrutinize. They are what move us to believe or do certain things. Reasons, in the "form of claims or premises, are what critical thinkers must be skilled at interrogating and evaluating" (Scanlon, 2014, p.108). Reasons lie at the epicenter of critical enquiry.

To illustrate the difference between arguments and non-arguments, consider the following examples:

- I like Gogglebox better than 'The Blacklist' (value statement - no reasons are given to support this preference)
- Melatonin helps aid recovery from jet-lag (statement which is true - no reasons offered to support this conclusion)
- The best journal in matters philosophy of education is the *Journal of Philosophy in Education* (value statement - no reasons given to support this view)
- Never trust President Donald Trump (no reasons are offered)

In each of the cases above, none of them qualify as arguments. The first example merely states a preference, and since no reason is offered to support my value statement, it is not an argument. The second case is a statement that happens to be true. But again, because there is no evidence to support the claim that melatonin aids recovery from jet-lag, it is likewise

not an argument. The third example, like the first, is a value statement, and hence not an argument, as no reasons are offered to support its conclusion. Similarly, the statement about President Trump does not qualify as being an argument as it does not offer any reasons to support its conclusion. In short, all of the above examples fail to give reasons for their conclusions. This is why none of them qualify as arguments.

One of the easiest ways to recognize arguments for the purposes of evaluation lies in the presence of certain common indicators, certain words or phrases that signal the existence of premises or conclusions within dense and compacted arguments. Logicians refer to conclusion indicators in the following terms:

| Therefore |
| Hence |
| For these reasons |
| Accordingly Consequently |
| As a result |
| Proves that |
| Demonstrates |
| Thus |
| Which shows that Which |
| implies that Which allows us |
| to infer |
| Which points to the conclusion |

(Fisher, 2014, p.24).

Similarly, premises that are the reasons which support a conclusion (the why part of an argument), can likewise sometimes be difficult to locate within a series of dense statements. Occasionally conclusions may be stated first and premises later, or vice versa (Hurley, 2012). Because of this fact, as is the case with conclusion indicators, there are also markers or indicators which typically (although not always) point towards the reasons offered in support of a given conclusion or claim. They include:

| Because |
| For |
| Since |
| As shown by |
| Is evidence of |
| Assuming that |
| Follows from |
| May be inferred |
| The reasons are |
| As indicated by/suggested by |

<div align="right">(Fisher, 2014, p.24).</div>

Some examples of conclusion indicators in use include:

- In summary, An Post must increase postal rates because we can no longer run the postal system on a deficit.

- A&E wards are currently experiencing a flu outbreak. Therefore, visitors are requested to only make strictly necessary visits.

- My Ph.D. thesis submission is due in eight months, hence, I had better get writing fast!

Some arguments contain inferential claims, which are either explicit or implicit. An *explicit* inferential claim is usually asserted by premise or conclusion indicator words of the sort mentioned above. For example:

- Mad cow disease is spread by feeding parts of infected animals to cows. This practice has yet to be completely eradicated. Thus, mad cow disease continues to pose a threat to people who eat beef (Hurley, 2012, p.14).

The presence of a conclusion indicator, in this instance 'thus', expresses the claim that something is being inferred. For this reason, it is right to classify this passage as an argument (Hurley, 2012). In contrast to this, an *implicit* inferential claim exists when there are no indicator words, yet there still exists an inferential relationship between the statements in a passage. For

instance:

- The genetic modification of food is risky business. Genetic engineering can introduce unintended changes into the DNA of the food-producing organism, and these changes can be toxic to the consumer (Hurley, 2012, p.14).

The inferential relationship between the first statement and the other two constitutes an implicit claim that evidence supports something, so we are justified in calling the passage an argument (Hurley, 2012). The first statement is the conclusion, and the other two are the premises.

4.3   How Argumentation Works

There is sometimes a tendency to view argumentation as a solitary enterprise, but of course, this is never really the case. In real-world exchanges, where truth is at stake, and where dissonance and discordance are rife, arguments tend to take the shape of the pragma-dialectical approach (Eemeren & Grootendorst 2004).

In essence, the pragma-dialectical approach comprises four stages:

i.   the confrontation stage, where disagreements are voiced;

ii.   the opening stage, where rules and procedures and common ground are agreed upon (usually tacitly);

iii.   the argumentation stage, "where the actual argument takes place, where reasons are put forward and claims defended, objections are made and answered, and premises and conclusions tracked and followed" (Gilbert, 2014, p.34); and,

iv.   the concluding stage, where the differences that started the whole thing are either resolved, settled, or suspended (Eemeren & Grootendorst 2004, pp. 22-32).

The term pragma-dialectical encapsulates the pragmatic and dialectical conditions of progressive rational discourse and argumentation. By pragmatic, it calls for the process to be transparent, sensible, coherent and

intelligible. By dialectical, it acknowledges that many reasoned debates arise from a place of controversy, where two or more parties are actively seeking a resolution. As a specific approach to argumentation, the pragma-dialectical approach commits itself to four central tenets, namely, "externalization", "socialization", "functionalization" and "dialecticification" (Gilbert, 2014, p.30). Together these principles are conceived as the optimal conditions on which to putatively resolve respectful and reasoned disagreement, be they conceptual or empirical, or alternatively in some cases, reach a new richer understanding of a certain phenomenon. Each of these central tenets necessitates a short justification and explanation.

First, there is externalization. This simply states that arguments must be verbalized and formalized. That which is not verbalized or formalized cannot be questioned (Scheffler, 1973; Siegel, 1988; 2017). To make an argument pragmatic, there must be a standpoint against which an objection or counterargument can be lodged. To establish whether a person's opinions make sense or are cogently justified, he/she must submit them to public scrutiny (Eemeren & Grootendorst 2004). While beliefs, inferences and interpretations underlie argumentation; the way in which the argument is expressed, and ultimately proceeds, is channeled by a submission to public accountability (Siegel, 2017, p.220). Peoples' internal motives for holding a certain position may sometimes be different from the grounds they will offer and accept in its defense. For this reason, argumentation tends not to focus on the psychological dispositions of the disputants, but rather, the positions to which the parties can be held committed to in the discourse (Gilbert, 2014). These positions may be expressed directly or indirectly (Walton, 2008).

Argumentation, for the most part, exists within a socio-cultural backdrop. In contrast to approaches that focus on argumentation as a *product* (major and minor premise, conclusion etc) the pragma-dialectical model focuses on the *communicative process* in which these exchanges are produced. As such, premises are not merely abstractions plucked from an individual's mind, but rather form part of a wider ongoing, and wider, discourse

procedure (Walton, 2008). Process accounts of argumentation rely on the individualist approach to critical thinking - a person, whom, after careful weighing of the evidence reaches an informed judgment about what to believe or do. According to this myopic model, the central task behooving a critical thinker lies in evaluating the cogency of a certain position. But, as is well documented, argumentation rarely consists in a single individual privately drawing a conclusion (Andrews, 2015; Eemeren & Grootendorst 2004; Gilbert, 2014; Siegel, 2017). Instead, it is part of a communal discourse procedure (implicit or explicit) whereby two or more individuals try to arrive at an agreement (tacit or otherwise).

The best way to think of this is to imagine a controversial article in a paper. After reading the article (which attempts to convince you of some opinion or another), you examine the comments section. Here you read some good critiques, some weak ones, and some spurious assertions or inferences. No matter how refined or cogent a person's thinking is, they will not have a monopoly on critical thought. Some good ideas may be buried deep in another person's appraisal. Some new (and better) ideas may emerge based on a conglomeration of other thoughts. Some theses when held up to opposing views (antitheses), may result in a synthesis. In the *Phenomenology of Spirit*, which presents Hegel's (1807) epistemology or philosophy of knowledge, the 'opposing sides' are different definitions of consciousness including the object that consciousness is aware of or claims to know (Hegel, 1807/1976). On this view, critical thought, and the pragma-dialectical method, consist in taking what is good, discarding what is not, and moving toward trying to find a tacit agreement of some kind or another. To adopt Quine (1960, pp. 3-4), this process might involve us trying to rebuild the ship of knowledge by keeping planks that are sufficiently robust and fit for purpose, and discarding pieces of timber that are not. In this way, if we continue to adopt Quine's simile, we are all sailors at sea (enquirers and truth-seekers) whose job is to maintain our ship (knowledge). Viewed this way, critical reasoning is therefore, more often than not, collaborative (Lipman, 1988, pp. 41-42). This is how cognitive enquiry works, especially now in the age the internet where a proliferation

of data makes it increasingly difficult to separate fact from fiction.

How we argue, both as individuals, and collectively within a complex socio-cultural nexus, is central to the development of effective argumentation. This is evidenced by the exploratory way in which protagonists of a certain cognitive persuasion (during a fundamentally dialogical interaction) respond to questions, doubts, objections, and counterclaims raised by an antagonist (Gilbert, 2014). There is no place for *ad hominem* attacks, nor cheap rhetoric - the rules of the dialogical interchange are based on the norms of a progressive society, where listening is afforded equal stature to speaking, where 'truth' trumps vested interests, where one listens not to repeat, but to understand, and where mutual respect is *sacrosanct*.

When it comes to formal and informal logic, argumentation tends to be described in purely structural terms (Fisher, 2014; Hurley, 2012; Walton, 2008). Although structural descriptions have merit, they tend to ignore the functional rationale of the structural design of discourse. Argumentation arises in response to, or anticipation of, discordance or disagreement (Andrews, 2015). Argumentation serves a clear purpose in this regard. Its function is to reach a synthesis or putative optimum based on the best reasons available (Rescher, 2003). To secure good reasons for a position, one must be able to evaluate the merits of competing arguments, which means that we must be in possession of norms and standards of acceptability. On this basis, argumentation, including its structure and the requirements of justification (in the shape of reasons: evidential/undefeated reasons and principles), must be continuously revised to address the specific doubts, objections, and counterclaims that have to be met (Siegel, 2017, p.222). Adequate evaluations of argumentation require context, specifically, the reason for which the argument arose. For this reason, the pragma-dialectical approach concentrates on its specific function in managing and provisionally resolving cognitive dissonance emerging from disagreements. Through this process of critical enquiry, the pragma-dialectical approach aims to unearth fresh understandings, alternative conceptions, *a fortiori* reasons, and, in some cases, conclusions, based on

the strongest reasons available for one's positionality, otherwise defined as the putative optimum. In terms of acceptability, since different people have different thresholds of adequacy when it comes to the types of reasons they accept as rationally moving, "conclusions rest on the basis of data, with their acceptability a matter of optimal overall consonance and conformity with the 'facts' at one's disposal" (Rescher, 2005, p.100).

Descriptive explanations of argumentation fail to tackle the procedures underlying how it ought to occur, should it effectively resolve a difference of opinion. Explanations of this nature focus on where and when argumentation occurs, often at the expense of the procedural rubric that must accompany such exchanges. Dialectifications are instances where the argumentation engenders the reflexivity and phronêsis of an insightful judge. To determine whether this is the case, exchanges are conducted in accordance with a problem-valid and conventionally valid discussion procedure (Eemeren & Grootendorst 2004). Problem-validity largely depends on the argument's adeptness in achieving a resolution to the disagreement and furthering the resolution process, while at the same time, avoiding false or misguided resolutions. Conventional validity is "contingent on the intersubjective acceptability of the procedure" (Gilbert, 2014, p.92). Together these strands provide a set of standards for rational judgment. In short, problem-validity and conventional-validity characterize the dialectical nature of how arguments ought to work, and in this way, are therefore, normative constructs (Gilbert, 2014).

In the pragma-dialectical approach, externalization, socialization, functionalization, and dialectification refer to pragmatic constructs, whose function lies in achieving clarity and resolution of a particular problem (Eemeren and Grootendorst, 2004). Externalization is accomplished by insisting that one's arguments or reasons are made visible in order to enable people to stress-test their cogency. Socialization is a result of putting argumentation in the collaborative context of an interaction between two or more interlocutors. Functionalization is realized by defining argumentation as a complex speech act, whose purpose can only be fulfilled in the event that certain identity and correctness conditions are met. Finally,

dialectification is achieved by viewing argumentation in the perspective of a regulated critical discussion aimed at resolving a difference of opinion.

4.4 Critiquing Deductive, Inductive, Causal, Evidentialist and Probabilistic Arguments

When it comes to appraising deductive, inductive, causal, evidentialist and probabilistic arguments, the first issue at stake is tackling the unwarranted presupposition that the premises used in these frameworks of reasoning, are in fact true. As we have already seen, despite the certainty affixed to deductive reasoning patterns, they still do not tell us anything new about the world. As such, they are of little use in the pursuit of "new knowledge" (Halpern, 2014). At best, "deduction may enable someone to draw out conclusions that were only implicit in their beliefs, but it cannot add to those beliefs" (Evans, 2005, p.170). Like inductive inferences, there are a few notable problems with deductive patterns.

Deductive inferences are by definition truth-preserving, and when understood in this context, they exclusively deal in the procedural mechanics, which lead to valid arguments, as opposed to those which deal with truth. They are also non-ampliative. This means they cannot tell us anything beyond what is already contained in the premises. Given that the truth of the premises is already assumed, deduction cannot derive any new knowledge about the world. Here lies its major limitation for the critical thinker (Hurley, 2012).

Take, for instance, the following example from propositional logic which ascribes several inference patterns to conditional statements of the form *if p then q*. They are shortcuts in deductive reasoning. But, as we shall see for reasons below, they are very limited in scope.

Modus Ponens (MP)	Modus Tollens (MT)
If p then q	If p then q
p	Not – q
Therefore q	Therefore, not –p

Suppose we know that if the switch is down then the light is on. In the event that I notice that the switch is down, then I can obviously deduce that the light is on (MP). On the contrary, if I see that the light is off, I can also validly infer that the switch is not down (MT). One of the difficulties with testing people's logical ability with such arguments, however, is that they can easily form counterexamples that block such valid inferences (Evans et al., 1993). For example, if the light bulb has burned out, neither MP not MT will deliver a true conclusion. That is why, "the instruction to assume the truth of the premises should be part of every reasoning experiment" (Evans, 2005, p.171). More importantly, it exemplifies one of the core reasons why logic has a limited application in real world reasoning.

When it comes to induction, similar problems emerge. To recap, induction is the process that leads us from observations of particular cases (observed) to universal conclusions (unobserved). It is possible for all the premises to be true in an inductive argument, and yet for its conclusion to turn out to be false (Tittle, 2011). Inductive arguments are either strong or weak, unlike deductive arguments where the conclusion *necessarily* follows from the premises (Walton, 2008). An example of an inductive universal conclusion would thus be: 'all bodies fall with constant acceleration' or 'water is necessary for life'.

Unlike deductive processes, inductive reasoning is, for the most part ampliative - its inferences can take us beyond what is contained in the premises. Whether it is direct, predictive, analogous or inverse induction, it brings us from the observed to the unobserved (Carnap, 1962). From the fact that the sun has risen every day thus far, we can reasonably conclude it will rise again tomorrow; from the fact that water boiled at 100c in the past, we conclude it will boil at 100c in the future. Inductive inferences allow us

to make predictions and formulate universal rules. However, though these inductive inferences present a strong *prima facie* argument, they emerge as problematic when stress-tested further.

The philosopher David Hume (1739/1968), as we briefly touched on earlier, sought to explain some of the limitations of induction. He argued that all of our inductive patterns are founded on the relation between cause and effect. It is this relation that takes us beyond our current range of evidence, whether this be in moving from cause to effect, or effect to cause, or from one collateral effect to another. Hume (1739/1968) argues that all examples of inductive reasoning are problematic to the extent that they are based on the presupposition that past experience is a good guide to the future. This, in turn, leads to a difficult question: what are the justificatory grounds for such inductive or causal inferences? Further complications emerge whenever we make inferences from the observed to the unobserved, since to do so, one relies on the uniformity of nature. The basis for our belief that nature is reasonably uniform, is in turn, almost exclusively based on our experience of said uniformity in the past. If we infer that nature will continue to be uniform in the future, we are making an inference from the observed to the unobserved - precisely the kind of inference for which we are seeking a justification. We are thus caught up in a circular argument.

Hume established that it did not matter how much accumulated evidence there was for a given inductive inference since there is always scope for such a conclusion to be refuted by means of a counter-example. What this means is: all the best inductive arguments can do is yield a high degree of probability (never certainty) in their conclusions. Take the example cited earlier of water boiling at 100c for instance. Even though this experiment was performed hundreds of billions of times and more, it wasn't until someone boiled water at high altitude that scientists discovered that water boils at a lower temperature. What was a simple case of enumerative induction, up until this point, would have been a universally accepted scientific principle. In this case, what the principle failed to take into account was the range of causal factors, such as atmospheric pressure,

which, under certain conditions, may causally distort the general principle (adding sodium will raise the boiling temperature is another example).

With reference to the problem of eliminative induction leading to causal inferences, the work of early 17th century Dutch chemist J. B. van Helmont on plant growth, serves as an excellent example of the type of care one must exercise in making inferences of this nature. At the turn of the 17th century, most of van Helmont's contemporaries thought that plants absorb material from the soil and convert it to wood and foliage. To determine the truth, van Helmont performed a quantitative experiment (Harriman, 2010). He filled a large planter with two hundred pounds of dry soil. He then planted a willow sapling, which weighed five pounds, and covered the soil to prevent any accumulation of dust from the air. For five years, he added only distilled water or rainwater to the planter. When he finally removed the willow tree, he found that it weighed 169 pounds, but the soil had lost only a few ounces in weight. van Helmont therefore concluded: 164 pounds of wood, bark, and root have developed from water alone (Harriman, 2010).

The experiment employed a precursor to Mill's (1843) 'method of difference'. In so doing, van Helmont focused on the fact that he had added one factor, specifically, water, which yielded the growth of the willow tree. We now know, however, that only about half of fresh willow wood is water. His error was to reject the possibility that plants absorb material from the air. He failed to consider auxiliary causes for the effect he was trying to trace. Much later, in the 1770s, experiments performed by Joseph Priestley and Jan Ingenhousz revealed that plants in sunlight absorb carbon dioxide and release oxygen. In this way, a large portion of their weight is carbon, which they obtain from the air.

Like all forms of inductive reasoning, evidentialism suffers with certain defects. Evidentialism's dictum maintains that, a "wise man proportions his belief to the evidence" (Hume, 1739/1968: 10.1.4). Put another way, "it is wrong always, everywhere, and for anyone, to believe anything upon insufficient evidence" (Clifford, 1879/1999, p.295). Evidentialists thus directly align their beliefs (or credences) in accordance with claims that are

directly supported by the greatest amount of evidence (Littlejohn, 2011). Ostensibly, this seems to be a plausible position, but when subjected to closer scrutiny, several key objections quickly emerge. Evidence, in the eyes of the philosopher, is typically cast in terms of relevant facts, which, in turn, ought to bear a key role in rendering an informed judgment about what to believe or do (Mittag, 2014; Scanlon, 2014). But this is somewhat of an oversimplification, as we shall see. In what follows, the eight questions below challenge the principle of evidentialism's success rate when it comes to delivering true beliefs.

1) Who decides what is considered relevant evidence? Always a person with expertise in the relevant area? Or can laypersons add something meaningful to this discourse?

2) What criteria does one use in order to reach a verdict about what is appropriately characterized as relevant evidence? Must the reasons for this criterion be rendered visible (externalist) or, can one accept internalist reasons as sufficient justification?

3) Is evidence an objective and factive phenomena that demands a uniformly proportionate response from agents across cultures and contexts? Must the diktats of evidentiation (strength of belief ought to be directly apportioned to one's evidence) presuppose an impartial and context-free enquirer?

4) Evidence is based on known facts. But there may be unknown facts, which, depending on the context of the enquiry ought to have a bearing on our judgments about what to believe or do. The history of science is littered with examples of this case in point. Corresponding with this, how should the evidentialist respond to the concept that, 'absence of evidence is not always evidence of absence?'

5) Is there a limit to the rational force of evidence (as a factive phenomenon), especially when it comes to value judgments in ethics?

6) Is there a hermeneutic dimension to decisions based on evidence? Or must people rely exclusively on the edicts of neutral-free

language and disembedded agents, plucked from their context-specific backgrounds? Must evidentiation distinguish between making 'evidence-based' and 'evidence-informed' decisions? Must evidence always be verifiable and impartial?

7) Must the burden of proof always lie with the claimant?

8) Are there situations where it is still more rational to believe X, even when the weight of contrary evidence compels us to believe otherwise?

For the purposes of edification, only the first of these questions shall be explored here. Imagine you visit an orthopedic surgeon with a view to undergoing shoulder stabilization procedure. After the relevant scans are completed, he calls you into his office to inform you that you satisfy the criteria for the procedure. He asks you a few questions about your lifestyle, gathers your medical history (including any medications you are taking), and then proceeds to explain the procedure. Before you leave, he explains that 99% of procedures go exactly according to plan. Over 20 million stabilization procedures are carried out worldwide, so a 99% success rate, success being characterized as the shoulder being effectively stabilized and the patient not suffering any adverse side-effects.

During the procedure, much to everyone's surprise, an unexpected incident occurs: your BP drops to dangerous levels (60/50) under anesthetic. Following emergency intervention with appropriate measures being put in place, your BP steadily rises and remains within a normal range. Troubled by this, the surgeon cannot account for the sudden (and rather dangerous) drop in your blood pressure. After the procedure, he explains what occurred and adds that you are very lucky to be alive. He asks again if there is any history of heart disease in your family, to which you reply in the negative.

After consulting with the anesthetist, and after carefully investigating the matter in conjunction with a pharmacologist colleague, he still cannot offer an explanation. Eventually after a further debriefing with you, he looks through what you ingested the previous day. Nothing unusual jumps out other than a routine query over a Chinese herbal tea to aid digestion. Later,

closer scrutiny of the tea reveals that, in rare cases, certain compounds within this normally harmless tea react badly with the anesthetic. Here, crucial facts which the surgeon dismissed as irrelevant (he knew you were taking the tea) have almost hastened your demise. In this situation, unknowns facts almost resulted in your death, where, all things being equal, this ought to have never been the case. The surgeon here made the mistake of dismissing facts (your ingested tea - but also a piece of evidence) as having no bearing on the success of your procedure. And so, the question must be posed: what criteria are employed by agents to justify the inclusion of certain pieces of evidence at the expense of others? What reasons are used to substantiate this judgment?

A further challenge to the allure of evidentialism springs from our everyday experiences of trusting someone. Scholars writing about the phenomena of trust broadly agree that it hinges on three central claims: it involves risk; trusters do not necessarily repeatedly monitor those they trust; trust enhances the effectiveness of agency; and trust and distrust are self-confirming (Faulkner, 2011). Accounts of trust divide into three families: risk-assessment accounts, which are indifferent to the reasons why one trusts; will-based accounts, which stress the importance of the motives of those who are trusted, and affective attitude accounts, which claim that trust is a feeling as well as a judgment and a disposition to act. One of the central questions concerns instances where trust is justified, and, in particular, whether 'justified trusting' can outstrip evidence for the belief that the person trusted is trustworthy (Faulkner, 2007). This is why trust is key to evaluating areas such as testimony. Trust is "generally a three-part relation: A trusts B to do X" (Hardin 2002, p.9). Outside the boundaries of evidentiation however, trust is an everyday disposition and judgment. Even though there may be instances where the preponderance of evidence appears to be overwhelming, when it comes to determining a person's guilt or innocence, our trust in them as a person, in their integrity so to speak, one might conceive of situations that provide sufficient reason to overrule the evidentialist's injunction.

For instance, a preponderance of evidence might suggest that one's wife

embezzled a sizable sum of money in work. Her computer was identified as being the source of the money transfer, she was acting 'suspiciously' according to her colleagues for a week or so prior to this discovery, and she was, unbeknownst to you, in serious debt at the time. She therefore had means, motive and opportunity. The cumulative weight of this 'evidence' places her squarely in the frame as being the perpetrator of the crime. Nevertheless, even in the face of this overwhelming evidence to the contrary, your trust in her integrity might outstrip the evidentialist's injunction to directly apportion your belief to the strength of the evidence. At the very least it raises the question of what one ought to define as evidentially relevant and cogent. It also asks critical thinkers to consider the possibility that there might be occasions where it is more rational (stronger reasons in favor of a certain view) to ignore the evidentialist's central tenets when it comes to belief.

Much in the same way as all forms of inductive reasoning, probabilistic inferences likewise exhibit several notable vulnerabilities. Earlier we discussed Bayes' theorem as a means of calculating credences corresponding to states of belief. The common directive stipulates that, initial belief plus new evidence = new and improved belief. According to this view, the plausibility of your belief depends on the degree to which your belief - and only your belief - explains the evidence for it. The more alternative assumptions or explanations (auxiliary assumptions or explanations) there are for the evidence, the less plausible your belief. Probabilistic reasoning allows us to quantify future events and fortify rational decision making - this is one of the reasons why it remains one of the most uniformly utilized process methods in common everyday reasoning tasks (Fitelson, 2001).

As we recall, three distinct kinds of probabilistic reasoning populate the literature. The first kind, otherwise known as classic probability is based on the idea of symmetry and equal likelihood. A die has six sides, a coin has two, a roulette thirty-seven slots. Classic probability is confined to these kinds of well-defined objects that correspond to limited mathematical option ranges. The second type of probability is called frequentist

probability. Determining this second kind of probability necessitates us making observations, or conduct experiments, wherein we quantify the number of times we secure the outcome we want. If we want to determine the frequency of a certain drug curing a specific illness, we administer the drug to the patients and count the proportion of patients for whom the drug worked based on the frequency of the desired outcome.

The third kind of probabilistic reasoning, and the kind that most interests us here, is called Bayesian probability. It concerns itself with subjective probability. Unlike the first two kinds of probability that are based on the principles of replicability and experimentation, Bayesian probability (subjective probability), expresses a degree of belief about how likely a particular event is to occur (Fitelson, 2001; Levitin, 2016). This belief conforms to the probability calculus. Bayesian modeling therefore focuses on, in some cases, unique and nonreplicable events. Here lies its strength. This can be anything from determining the probability of Enda Kenny stepping down as Taoiseach by June, to Barcelona winning the Champions League or Donald Trump sparking a nuclear war. Bayesian probability is heavily utilized in the sciences, where it is frequently heralded as the golden standard of rational decision-making (Fitelson, 2001; Goldman, 1999).

There are two key criticisms of merit worth exploring in relation to the efficacy of Bayesian models which rely on subjective probability. The first criticism derives from equating increased probability with hypothesis confirmation. Assuming that a black raven confirms the hypothesis 'all ravens are black' and that confirmation is not affected by logically equivalent reformulations - it stands to reason that - not only a non-black non-raven, but even more counter-intuitively - a black non-raven confirms it (Hempel, 1945). In everyday terms: the fact that I met Enda Kenny once arguably increases the probability that some day I may be his Tánaiste (as opposed to having never met him at all). Of course, even though probabilistically speaking, this may carry some weight (negligible), few would accept this as confirmatory evidence.

A second criticism of Bayesian models questions the supposition initial subjectivity fades away as evidence accumulates. This washing-out of *priors* is highly questionable, since quantitative data trumps qualitative data in the Bayesian model. When our ability to find new evidence is limited, *the prior*, in other words, the probability of hypothesis *h* before the evidence is not entirely washed out. For instance, apply Bayesian to the phenomenon of love. Suppose further that this is the first time you have fallen in love. Are there priors one can factor into a Bayesian equation (former loving relationships) in order to maximize the chances of making the right decision to marry him/her? One would think not. Part of the allure of Bayesian derives from its fluid understanding of subjective probability. That said, indeterminate subjective probabilities (odds at which you bet hypothesis *h* is true) presuppose we have similar experiences to call upon to help us calculate probabilities based on a certain hypothesis or hypotheses. This is of course not always the case. There is a first time for everything, as the saying goes. This is partly why encounters of this kind frequently defy the metrics of probabilistic determinates. This is why there is no talk of Bayesian formulae calculating the probability of one's happiness following the taking up of a new job, or a new relationship. In summary, the Bayesian model is too crude an instrument for coping with the particularities of human experience when navigating the vagaries of our complex world.

4.5   The Principle of Refutation

Over and above the role of justifying and explaining their conclusions, arguments are, on occasion, also used to refute other arguments. To refute an argument is just a formal way of demonstrating that it is flawed, and therefore, not fit for purpose. Refutation does not simply entail a person dismissing claims. Dismissing claims by denying accusations or otherwise, is inadequate, in and of itself, to successfully refute a claim, a critical thinker must give sufficiently strong reasons to counter a particular claim. And so, the proper use of refutation rests in the effective use of *defeating reasons* (Bergmann, 1997; Pollock, 1987*)*.

In addition, one can refute an argument without necessarily proving that its

conclusion is false. Refutations are sufficient in the event that the reasons offered raise objections that cannot be answered. Broadly speaking, refutations take four main forms: (1) We can argue that some of the premises are dubious or even false. (2) We can argue that the conclusion of the argument leads to absurd results. (3) We can show that the conclusion does not follow from the premises (or, in the case of an inductive argument), that the premises do not provide strong enough support for the conclusion (Armstrong & Fogelin, 2015, p.334).

4.6   Counterexamples

So far, the chapter has examined the flaws inherent in deductive, inductive, causal, evidentialist, and probabilistic reasoning. In what follows, it focuses on the nature and purpose of counterexamples, burden of proof, and appeal to ignorance with regard to the optimal conditions for critical thought to flourish.

Counterexamples serve two main purposes. First, they are used as a tool to expose flaws in arguments. Second, in exposing flaws, the critical thinker may examine ways of fortifying the argument. Conceived of this way, counterexamples are not to be conflated with sophistry or unconstructive critique. The overarching aim of counterexamples is to bring us one step closer to accuracy and truth. This is an important point, and one that is often overlooked in the literatures on the subject (Llano, 2015).

One of the simplest and most frequently used ways of critiquing an argument is to challenge one of its premises. In such instances, critical thinkers look for sufficiently strong or good reasons to accept a particular premise as true. Should the premise in question turn out to not be *prima facie* plausible, then the argument is defective. In other cases, we can argue that the premise is actually false. In this particular case, we refute an argument by repudiating one of its premises (Salmon, 2013).

Premises are refuted by means of counterexamples, the function of which is to prove the original premise was false. For the most part, counterexamples

are typically aimed at universal claims. The reason for this is quite simple: isolating a *single* contrary instance will show that a universal claim is false. For those who claim that *all* snakes lay eggs, pointing out that rattlesnakes bear their young alive is sufficient to refute this universal claim. Equally, it is entirely conceivable (and would need to be verified of course), that some rattlesnakes are infertile.

Pointing this out will necessitate the person retreating to the weaker claim that *most* snakes lay eggs. This is progress. The person has moved from a generalization to a more guarded qualification. To refute their new position, the critical thinker would have to show that the majority of snakes do not lay eggs. As is the case of most burden of proof enquiries based on a positive claim (most snakes lay eggs), it would be up to the claimant to produce the evidence (in the form of an argument) for his/her belief. Here, instead of trying to refute the statement, we may ask the person to produce his argument on behalf of it. We can then contest this argument. Finally, if the person retreats to the further claim that at least *some* snakes lay eggs, then this statement becomes very difficult to refute. Even if it were false (which it is not), to show this we would have to check every single snake and establish that it does not lay eggs (Armstrong & Fogelin, 2015). So, as a general rule, it is safe to say that, the stronger a universal claim is, the weaker it is; the more refined and qualified the claim - the harder it is to refute (Hurley, 2012; Salmon, 2013; Tittle, 2011; Walton, 2008).

Once a universal claim is refuted by a single case, this case denotes a counter-example to the universal claim. To refute a claim that *everything* of a certain kind has a certain feature, we need find only *one* thing of that kind lacking that feature. We have seen this already with respect to universalizations like 'all bread nourishes'. Counterexamples include celiacs (if the bread is made with gluten) or other conditions that prevent the person from deriving nutrients from bread. In some cases, by way of a response to a counterexample, many people retort, 'that is the exception that proves the rule.' To those who maintain this standpoint, it is useful to point out that 'proves' originally meant 'tests,' and so, "when someone generates a true counterexample, the universal claim fails the test"

(Armstrong & Fogelin, 2015, p.333).

In situations where a counterexample can be rejoined with a simple clarification or modification that does not affect the basic force of the original claim, it is a *shallow* counterexample. More interesting are *deep* counterexamples; these require the original claim to be modified in more significant or interesting ways. For instance, ethics is an area where arguments often turn on counterexamples. Consider the traditional moral precept: "Do unto others as you would have them do unto you." This principle that captures an important moral insight, has some equivalent in all of the world religions, including Kantian ethics. But, read through an analytic lens, and therefore taken quite literally, it is also subject to counterexamples. Sadomasochists enjoy inflicting suffering on other human beings, yet on some warped level, desire this destructive behavior to be repeated on them.

One of the most notorious exemplars of counterexamples is known as the Morgenbesser retort. The precise details are debated, since it occurred in 1952, but the salient details remain intact. During the course of a lecture, a rather haughty British philosopher remarked that he knew of several languages in which a double negative means an affirmative, but not one language in which a double affirmative means a negative. From the back of the room came Morgenbesser's retort: "Yeah, yeah" (Armstrong & Fogelin 2015, p.335). To be fair, definitive counterexamples of this nature are few and far between. It would be dishonest to claim otherwise. Nonetheless, at their best, through a series of constant refinements, counterexamples serve to bring us closer to accuracy and truth. They are therefore a crucial skill for critical thinkers (Salmon, 2013; Tittle, 2011; Walton, 2008).

4.7   Burden of Proof

In any form of argumentation, talk of the burden of proof centers on the responsibility for providing proof or supporting evidence of some kind for one's claims. Depending on the nature of the debate, individuals will try to shift this burden in order to make refuting their argument more difficult.

Arguments about the existence of God tend to often end up as a sophisticated shedding of the burden of proof, with theists insisting it is up to atheists to disprove the existence of God, whilst atheists aver that extraordinary claims demand extraordinary evidence; hence theists should bear the burden of proof. This entails that if you believe there is an omniscient and omnipotent God, it is up to you to prove that this is the case. It is intellectually dishonest to say: "Well, there is a God, because no-one has proved definitely contrary." Such a mistake would be an appeal to ignorance (Law, 2004).

Qualifications to the general rule positing the burden of proof lies with the claimant dictate that the person making the *positive* claim has the burden of proof. So if your claim is 'there is no God,' it is up to the person who insists that 'there is a God' to provide the evidence (Law, 2004). The reason for this is simple - "it is generally harder to prove something is *not* the case than it is to prove that it *is* the case" (Blackburn, 2008, p.50). For example, to prove that 'leaves are green' (a positive claim) one need present only one green leaf. But to prove that "leaves are *not* green" (a negative claim), one would have to source and present every known leaf, demonstrating that every single one of them was not green (Tittle, 2011).

Over and above this qualification, generally speaking, scientists and philosophers agree that the more extraordinary the claim, the more extraordinary the proof must be (Sagan, 1980). This, like almost all concepts, remains a topic of much disagreement (see Dawkins, 2006 and Lane Craig, 1994 for two opposing views). More plausible claims like: 'it will most likely snow this winter' tend to require a few simple facts about temperature and snowfall during past winters. Typically a justification of this nature will suffice. However, if you claim that this winter it will drop to-10 degrees Celsius, well then, one would expect a more extensive and robust set of reasons by way of evidentiation supporting such a claim.

4.8   The Appeal to Ignorance

An appeal to ignorance occurs in instances where there is a mistaken

understanding of where the burden of proof lies. Errors of this kind are often unintentional, but during the course of dialogue in the form of a dialectic or round of argumentation, critical thinkers need to be on guard against the manipulation of this construct in pursuit of shutting down rational debate. For argument's sake, suppose someone claims there are aliens in the Atlantic Ocean. You would rightly say to me, 'Prove it!' The person making the claim ought then to provide proof. It is intellectually dishonest to retort, 'Well, prove to me there is not the case.'

Interlocutors of the persuasion that nothing can be proved until it is disproven, ultimately fall victim to an epistemically inverse default position which maintains: 'accept everything until you have good reason not to.' This *ad absurdum* belief confers the likes of spaghetti monsters, fairies, clairvoyance, homeopathy and telepathy with realist qualities, and implores the enquirer to disprove their existence. The natural conclusion of such deliberations entails entertaining a plethora of ridiculous and outlandish claims, all of which one ought to accept until they have been *de facto* refuted. Even more troubling - this scenario doesn't even begin to address phenomena that are unresolvable. How could one prove, for example, that there *isn't* an alien species on some planet far 1 billion light years away from our solar system? To refute such a claim, one ought to be in a position to draw on data from people or machines that visited the planet. Let us suppose, for a moment, that there are such individuals. Even their testimony and data would not necessarily be accepted *unless* they had combed every square inch of the planet and documented everything they found. Even then, the interlocutor could argue - perhaps you just missed them while you were there? As we can see, such an approach is the enemy of rational discourse. That is why the rational person's default position remains: 'do not accept a claim until you have good reason to' (Rescher, 2005). On this basis, rational exchanges, in order to be worthy of the name, place the burden of proof on the person making the claim (Tittle, 2011).

To summarize, just because a claim has not been proven to be false, does not necessarily mean it is true. Conversely, just because a claim has not been proven to be true, does not necessarily mean it is false (Hurley, 2012;

Tittle, 2011). For example, there might not be any proof/evidence that pregnancy reduces the severity of rheumatoid arthritis as of yet, but that does not necessarily mean that pregnancy does *not* reduce the severity of arthritis. After all, it is entirely conceivable that it might be simply because we have not yet conducted enough robust research on the matter. Or, just because there is no evidence to support the view that taking extra vitamins whilst trying to conceive, does not necessarily mean there are no positive benefits to this course of action. Both viewpoints should be treated with scepticism, with the burden of proof placed squarely on the claimant. However, that should not preclude critical thinkers maintaining an open mind (Facione, 2000). Nor should it. When there is insufficient proof one way or the other, one should suspend judgment until such time as sufficiently strong reasons compel you to revise your belief (Dewey, 1910).

The appeal to ignorance represents a pernicious affront to rationality. Uncritical students are especially prone to this error in situations where they do not actually have any evidence or reasons for their beliefs. In summary, in the event that students continuously find themselves shifting the burden of proof during rational discourse, they ought to ask themselves: are they proceeding on this basis because they lack any objective proof/evidence of merit for their claim? Should this be the case, reason dictates that they abandon their claims, or at the very least, set about securing evidence to substantiate, or as Popper (1972) argues in his book Objective Knowledge, refute their beliefs.

4.9   Conclusion

This chapter offered a brief overview of the anatomy of arguments, including ways of distinguishing arguments from statements. The purpose here was not to offer an exhaustive explanation of argumentation, but rather to succinctly sketch their salient features, since argumentation is a particular skill which critical thinkers ought to comparatively excel in. From here, the chapter proceeded to critically evaluate arguments based on reliabilist process accounts, namely, deductive, inductive, evidentialist and probabilistic inferences. In demonstrating the flaws inherent in each

approach, the chapter then moved to examine the principles of refutation and counterexamples, more specifically as they pertain to the language of critical enquiry and rational discourse. To conclude, the chapter focused on two distinct principles, which, unless properly conceived, obfuscate the process of critical enquiry, namely the burden of proof and appeal to ignorance. The next chapter moves to critically examine the evolvement of critical thought, from its earliest incarnation in formal logic, to its current iteration found in the work of Siegel (1988; 1997) and Paul (2012).

Chapter Five: A Neo-Aristotelian Account of Critical Thought

5.0   Introduction

Building on the work of Harvey Siegel and Richard Paul, this chapter first proposes, and then subsequently defends, a neo-Aristotelian conceptualization of critical thought, one that, unlike other definitions in the literature, combines a cogent definition of the concept alongside an explanation of its performative function in determining, through phronetic judgment, undefeated reasons for actions within the practical domain. In so doing, this demarcation specifies, not just what critical thinking is, but rather how it works. My new conceptualization draws on (Siegel's 1988; 2017) 'reasons-assessment' procedure, but also incorporates the importance of background knowledge (including memory), being well-informed, metacognitive calibration, the exploratory nature of enquiry-based deliberations, and the procedures underlying accurate evaluative judgments (Paul, 2009). In drawing on Siegel's reasons-assessment component, I argue that critical thinkers ought to excel at *stress-testing* probative reasons (Dunne, 2015b). To begin, the chapter briefly unpacks and defends this new definition. From here, the justification of normative reasons as "objective grounds to do something" is surveyed (Audi, 2004, p.120). Following this, I propose a new typology of probative reasons on which to form the basis of critical judgments, namely: (i) evidential relevance and force; (ii) undefeated reasons and purported reason defeaters, and, (iii) explanatory and motivating reasons. To avoid the rational force of these reasons being determined by means of a crude aggregation, I argue for the centrality of the concept of deliberative excellence embodied in the *phronimos,* or person of judgment (practical judgment), through which they stress-test reasons in order to reach a prudent judgment about what to do.

5.1   New Definition of Critical Thinking

Building on Siegel's reasons-assessment conceptualization, I propose a new definition of critical thinking, one that, unlike all the other classifications we have looked at thus far, includes all the necessary conditions of critical

thought, in addition to an explanation of its procedural injunction to stress-test the strength of the reasons used to justify a person's belief or actions. Revising a previous definition, I propose critical thinking is:

> An informed, reflective and enquiry-based evaluative judgment which stress-tests the strength of the reasons used in support of a person's beliefs or actions.
>
> (Dunne, 2015a)

Naturally, this definition needs to be carefully justified and unpacked. When it comes to being informed, critical thinkers rely on a type of context-specific background knowledge, including an ability to marshal all *relevant* background information to reach a defensible judgment about what to believe or do. Most theorists view background knowledge as essential for students to demonstrate their critical thinking skills (Case, 2005; Kennedy, Fisher & Ennis, 1991; Willingham, 2007). As McPeck (1990, p.24) puts it: "to think critically, students need something to think critically about". For this reason, domain-specific knowledge is indispensable to critical thinking because the kinds of explanations, evaluations, and evidence that are most highly valued, frequently vary from one domain to another (Bailin et al., 1999a). Facione (1990) offers a more fluid understanding of the importance of background knowledge when he states:

> Although the identification and analysis of critical thinking skills transcend, in significant ways, specific subjects or disciplines, learning and applying these skills in many contexts requires domain-specific knowledge. This domain-specific knowledge includes understanding methodological principles and competence to engage in norm-regulated practices that are at the core of reasonable judgments in those specific contexts...Too much of value is lost if critical thinking is conceived of simply as a list of logical operations and domain-specific knowledge is conceived of simply as an aggregation of information (p.10).

Viewed this way, background knowledge, or experience, is a necessary

condition of critical thought. There is no point asking me to critically evaluate the mathematical principles underpinning the thermal efficiency and properties of my porcelain mug over a ceramic one, if I lack any background knowledge in materials science. Of course, one can learn, but this need not take away from the fact that there are invariably situations where background knowledge is central to the effective operation of critical thought. Similarly, I may know that e=mc2, without necessarily understanding it (Elgin, 1996). Thus, background knowledge is not enough. Background knowledge requires understanding (K-how-K-why & K-that). Background knowledge and understanding are therefore essential for critical thought to flourish.

Secondly, critical judgments must also be reflective, because critical thinking must exhibit a degree of self-regulation (Ennis, 2015; Lau, 2015). For this to occur, all cases of critical thinking should be metacognitive and reflective. By metacognitive, I understand this to mean that critical thinking must attend to a reflective and critical examination of its own methods. There is no point after all being a critical thinker, if one never challenges or revises one's methods or thought patterns (Flavell, 1976, 1979; Lau, 2015). Metacognitive reasoning necessitates *thinking about one's thinking* and protects criticality from becoming a slave to immutable rules-based methods that are never questioned or revised, even in cases where there may be compelling evidence to the contrary. Such an ironic situation, should it ever emerge, would contradict the very idea that an important part of all rational assessment is to determine which rules should be followed in a particular situation. To avoid slipping into logicality, critical thinkers must be metacognitive practitioners, or, as some theorists would put it, critically reflective learners (Schön, 1983; 1991).

Thirdly, enquiry-based evaluative judgments force us to, in the first instance, appropriately frame our enquiries, to carefully consider what the issue at stake really amounts to, so that the enquirer can accurately formulate the right questions. This is crucial, if for no other reason than the quality of the questions directly correlate with the quality of the elicited responses. This is imperative, especially given the significance of the

dialectical and contextual dimensions of reasoning. Once the enquiry is complete, only then can one move to determine the force of all relevant evidence, and thereupon align ourselves with the strongest possible reasons for a certain belief or action. This, as mentioned before, requires *phronêsis* (practical judgment/deliberative excellence) since evidence and reasons are not a simple aggregation. The rational force of probative reasons can be determined by means of qualitative instead of simply quantitative methods. A well-designed qualitative study of 12 might be more rationally forceful than a similar-themed quantitative study of 2,000. This is because the quality of the questions/and research framework directly corresponds to the quality, insight, and putative acceptability of the answers. To discern which reasons carry the most rational force, critical thinkers require the disposition and ability to carefully carry out the performative duties associated with theoretical and practical reason (Siegel, 1988).

Fourthly, stress-testing probative reasons requires a deep understanding of the rational force of reasons. Effectively this is a plausibility test - a test to determine how plausible a given knowledge claim actually is (Levitin, 2016). To effectively stress-test the force of probative reasons justifying what we believe or do, critical thinkers should have an expert understanding of the epistemic force of reasons. For this task, there is a need to look beyond reason as a noun. Instead, we should start with the relation - reasons are reasons *for* something: the primary datum is relational (Blackburn, 2010, p.6). Of course, the field of the relation is less clear, or rather, more diffuse.

Propositions are reasons for propositions, facts are reasons for intentions and desires, and some intentions are reasons for others. Actions have reasons and one action may be another person's reason for a different action. But corresponding to each of these and other relations, "there is a potential movement of the mind, a movement *guided* by the first mental state, and *issuing* in the second, when the reason is accepted or operative" (Blackburn, 2010, p.6). So, on this view, talk of one proposition being a reason for another, or a fact being a reason for a norm or decision, necessitates the field of critical enquiry integrating a series of abstract

representations corresponding to potential movements of a mind. What this means is that when evaluating the rational force of probative reasons, we need to have a deep understanding of the person's inner and outer states of mind (see Kornblith, 2001). This is no easy feat, since a subjective reason for one person, might be considered an objective reason for another (BonJour, 2002). In some respects, it is a Sisyphean task, but there is room for hope. Aside from the fact that there are some reasons which may lie beyond the understanding of externalists (people who insist that reasons are visible and objective), most human endeavor can safely fall back on the normativity of reasons, a concept that stipulates there are objective and realist standards and thresholds that certain reasons must meet in order to be considered rationally forceful (Scanlon, 2014; Siegel, 1988, 2017).

When it comes to reasons for action, reasons may be either subjective or objective. A subjective reason is a consideration an agent understands to support a course of action, whether or not it actually does. An objective reason is one that does support a course of action, regardless of whether the agent realizes it (Scanlon, 2014). The most important evaluative reasons are normative reasons - objective standards that rationally move someone to believe or act a certain way (Audi, 2004; Davidson, 1963). Normative reasons may be context-specific, person-specific, or overriding, depending on the situation - a reason to don a coat in a room where it is 22 degrees may be sufficient given the person is running a fever and is cold. Reasons for action enter practical thinking as the contents of beliefs, desires, and other mental states (Audi, 2004; Raz, 2003; 2007). However not all reasons motivate a corresponding behavior. I may recognize an obligation to pay my mortgage, yet only do so for fear of punishment. If this is the case, my fear is the sole explanatory reason for my action.

Though Siegel's (1988) conception is the most philosophically robust of critical thinking frameworks, his 'reasons conception' requires much further work in order to attend to more complex situations that cannot be solved via simple logic, a myopic understanding of the rational force of reasons based on externalism, Humean instrumentalism, or superficial evidence-based thinking frameworks (Cuypers, 2004, p.75). What Siegel's

conception arguably misses is a robust philosophy of mind, where motivating reasons, subjective and objective reasons, explanatory reasons, and all-things-considered-judgment (*phronêsis*), against the background of normativity, are forensically stress-tested to evaluate what one ought to do in context-specific situations.

Before looking at the normativity of reasons and the standards against which critical thinkers ought to scrutinize judgments about what to believe or do, value or disvalue, a crucial conceptual clarification is required. This hinges on the nature of the relationship between *Reason* and *reasons*. Reason, in this instance, is interpreted as, "the capacity to reflectively recognize and [appropriately] respond to reasons" (Raz, 2007, p.2). A *reason*, according to epistemologists, is a "consideration that counts in favor of [a belief or action]" (Scanlon, 1998, p.17). Possessed epistemic reasons count in favor of a belief, whilst practical reasons and motivating reasons figure in the explanation of actions performed with an intention or purpose. In some cases, reasons for belief may overlap with reasons for an action (Audi, 2004; McDowell, 1998).

5.2   The Normativity of Reasons

Reasons play a dual role. They are both normative and explanatory. They are normative in as much as they guide decision and action, and form an objective basis for their evaluation. They are explanatory, in that, when an action for a purpose occurs, the reason for the action as the agent sees things, explains its performance. They are also relational - reasons are not simply inert nouns. Their primary datum is relational. Because of this, reasons ought to be considered in their relational context-in the space between guiding one's mind (mental states-the point of apprehension/ability to understand) to the point of putative assent (when the reason is accepted or operative), and from here, to the point of deliberative action (Blackburn, 2010).

When we are evaluating whether a belief amounts to knowledge, we can ask two different sorts of normative questions. On the one hand, we can ask

whether the belief is *subjectively appropriate*, where subjective appropriateness has to do, roughly, with whether the belief "fits" with the rest of the person's evidence. Evidence under this rubric might incorporate the person's experiences and existing beliefs. On the other hand, we can ask whether someone's belief is *objectively appropriate*, where objective appropriateness has to do, roughly, with whether the belief is, as a matter of fact, reliably oriented to the truth (Greco 2000; Fogelin 1994). Typically epistemologists argue that both sorts of appropriateness are required for a belief to amount to knowledge.

For epistemologists, the normativity of reasons rests on the principle that, reasons, should they be appropriately classified as 'good', ought to meet certain levels of acceptability in order to justify or warrant particular beliefs or actions. On this view, "normative reasons are reasons (in the sense of objective grounds) to do something" (Audi, 2004, p.120). Conceived this way, they are "reasons for anyone…to do certain things…to wear coats in a cold wind [or] make amends for wrongdoing" (Audi, 2004, p.120). Some normative reasons are "person-relative; for instance, the fact that it will help my friend *can be a reason* for me to do an errand" (Audi, 2004, p.120).

Similarly, taking insulin after a meal constitutes a good reason [only if the person in question is a diabetic]. For non-diabetics, injecting insulin after a meal could result in cardiac arrest. In this way, normativity need not be construed as a blanket term universalizing the particular, or a measure demanding an indisputable conformity, regardless of context or circumstances. Normative reasons attend to the richness of context; they do not necessarily treat every situation alike; they remain sensitive to the human person's complex relationship with others and with themselves, and finally, they rarely advocate procrustean applications of the general rule (Raz, 2007; Scanlon, 1998; 2004; 2014).

5.3 Justifying Normative Models

How then can normative models be justified? This is a difficult question. In one sense, the justification emerges through the imposition of an analytic

scheme (Baron, 2000). Good and bad reasons for belief and action are, as one would expect, decidedly difficult to decipher. Straightforward answers which unassailably guide us through the murky waters of contested ethical standpoints or frameworks, especially where such beliefs and actions permeate one's relations with others, are equivalent to chasing unicorns - they often do not exist. Somewhere along the line, one person's view of the world is privileged over another's; in some cases, cultural norms, or the virtue of expediency reigns supreme, with the rightness or wrongness frequently determined with reference to the short-term discernible effects of such a belief or action. And yet, there are still (objectively speaking), normative reasons for belief and action (Raz, 2007; Scanlon, 2014). Normative reasons include: putting a sun hat on my one-year-old toddler in 30 degree heat, administering Calpol when there is a fever present, taking paracetemol for a headache or avoiding caffeine if you suffer with palpitations.

Though normative reasons present a strong *prima facie* appeal, not all scholars agree with their supposed 'majesty' and exalted pride of place in philosophy (Blackburn, 2010, pp.6-9). More often than not, one person's view of normativity may clash violently with another person's view. As one critic puts it, "cows say Moo and philosophers say norm" (Fodor, 1990, p.137). But rather than see this as an impasse, I view this as an opportunity to discern which rules, if any, apply to situations where the normativity of reasons are at stake.

One way of explaining the justification of reason-normativity can be illustrated by looking at an example from arithmetic. The claim that 1+1=2 directly results from imposing an analytic frame, (number theory in this case), on the world. This much is clear. However, when we add two drops of water by putting one on top of the other, we get one big drop, not two (Baron, 2004, p.4). In this case, we do not say that arithmetic has been disconfirmed. Instead, rather than conceding to a form of naïve falsificationsim where one counterexample usurps our belief in arithmetic, (a kind of throwing the baby out with the bathwater scenario), we say that this example does not fit our framework. We maintain the simple structure

of arithmetic by carefully defining when it applies, and how. Once we accept the framework, we reason from it through principles, evidential force and the rational convicting force of motivating and explanatory reasons (themselves the result of an imposition of a framework) to formulate an evaluative judgment about what to believe or do. On this view, no claim to, "absolute truth is involved in this approach to normative models" (Baron, 2004, p.5). Essentially, "it is a truth relative to assumptions" (p.5). But, these assumptions, I argue, are unavoidable given our cognitive limitations.

In summary, normative reasons are objective reasons predicated on facts that present a compelling explanatory case for believing or doing something. Explanatory reasons may, or may not, also include motivating reasons, which set forth the grounds on which an agent forms a belief or engages in an action. Good reasons, objectively speaking, warrant particular beliefs and actions, whilst bad ones fail to meet the appropriate standards (Raz, 2007; Scanlon, 1998; 2014). Good reasons are based on explanatory power and evidential force; bad reasons lack a robust evidential base. Good reasons look to motivating reasons and stress-test their cogency. Good reasons are always held *pro tem*, and critical thinkers are both cognitively and ontologically obliged to seek out stronger reasons for alternative beliefs or courses of action. To discern in the practical domain which reasons carry the most weight, the critical thinker requires *phronêsis* - interpreted here as "the capacity to reflectively recognize and [appropriately] respond to reasons" (Raz, 2007, p.2).

Following on from the normativity of reasons argument, I propose the *phronimos* is ideally placed to attend to the reasons assessment component of critical thinking (Siegel, 1988). My proposition seeks to build on Siegel's reasons-conception of critical thinking by urging the stress-testing of the following types of reasons: (i) evidential relevance and force; (ii) undefeated reasons and purported reason defeaters, and (iii) motivating and explanatory reasons. To establish the individual and collective force of these reasons, an informed and evaluative judgment must be made. When it comes to the field of practical reason (responsiveness to reasons governed by certain normative principles) and practical reasoning as a mental process

in which reasons figure as premises, and, from these premises, a practical conclusion is formed" (Audi, 2004, p.119) evaluative judgments of this nature are discerned in accordance with the "all-things- considered" judgment issued via *phronêsis*. I will now explicate each of these reasons-categories in turn.

5.3.1 Evidential Relevance and Force

Several concerns emerge from interrogating the concept of evidential relevance and force. First, evidence comes in a variety of forms. Depending on the mode and purpose of enquiry, the presence of a fingerprint, witness testimony, experimental data, primary source data in the form of a diary from an executioner living 300 years ago or X-ray results, these data are all pieces of evidence (McGrew, 2014). Even though these pieces of evidence are from diverse domains of enquiry, they share a few common characteristics:

- Evidence is always evidence *for* or *against* something (Williamson, 2000).

- Evidence comes in a range of strengths. Sometimes we are in a position to determine whether some piece of evidence is stronger or better evidence for a hypothesis than some other piece is, or that a piece of evidence is a better fit for one hypothesis over another (Littlejohn, 2011).

- Evidence can be either direct or indirect. Eyewitness testimony of a murder is direct evidence (assuming all things being equal, no cognitive impairment; no serious credibility issues etc.). On the contrary, testimony from a witness post-murder stating that the defendant despised the deceased, is indirect evidence of culpability (Lackey, 2014).

- Evidence can permeate domains of enquiry, depending on the nature of topic under investigation. For instance, neurologists are interested in the science of learning. But so too are educationalists, many of whom scorn the idea of learning being a pre-determined and one-size-fits-all phenomenon.

- Seemingly small pieces of evidence can give us strong evidence for surprising, previously improbable facts. When Robinson Crusoe had spent over twenty years as a castaway without seeing any signs of another human being, he had "excellent reason to believe he was alone on the island. Despite this excellent reason, the sight of a single footprint (that couldn't have been his) overturned all his evidence to the contrary" (McGrew, 2014, p.59).

- Pieces of evidence can be combined or opposed. A clinical diagnosis may be confirmed or disconfirmed by a hispathological examination; a will may be called into question by the presentation of a signed and witnessed document revoking it (McGrew, 2014).

- Different people have different thresholds when it comes to the acceptability or sufficiency of evidential claims. The level of proof (evidence) for a scientific hypothesis is based on the principles of replicability, deductivism, undefeated conclusions, suitably rigorous design structure, and provisional acceptance from the scientific community. Despite all this, some scientists may disagree with some of the conclusions of the study. This shows the range of epistemic thresholds in play. In contrast, the level of proof (evidence) required for believing a person's testimony is low if it is your lifelong friend, and high if you are the detective who finds him with blood matching the victim on his hands during the course of a homicide case.

- Pieces of evidence may be weakened in several distinct ways: "by being opposed by contrary evidence (same experiment, with out of step or unpredicted results); by being undermined (article finding objective flaws in design structure of research); or by the introduction of new relevant alternatives" (McGrew, 2014).

- Evidence depends, not just on the totality of evidence at one's disposal but also on one's defensible interpretation of the evidence (Mittag, 2014).

For clarity, I examine three of these main concerns here. Firstly, we survey the challenges facing critical thinkers when it comes to establishing

evidential relevance. From there, we look to the issue of interpretation, before finally terminating our deliberations with an analysis of determining evidential force. I begin first with the thorny issue of relevance. When scrutinizing evidential relevance, agents first discern which pieces of evidence are actually *relevant* to their purposive mode of enquiry. To do this successfully, there needs to be a level of agreement about what exactly constitutes evidence.

Take for instance the example of a woman writing to an agony aunt about her emotionally distant husband. She desperately wants to know what caused this change in behavior. Despite not consciously wanting to do so, she has interpreted these recent episodes as evidence that all is not well in their relationship. However, an equally plausible explanation would be that her husband is experiencing a depressive episode, or perhaps has a thyroid problem, or is angst-ridden about something, or simply just fatigued due to stress at work. As it turns out, his behavior may be the result of an indeterminable combination of each of these explanations. The point here is that evidence, for or against something, calls for agents to first make a determination about its nature, before looking to establish its relevance, culminating in determining its epistemic force. In accordance with this process, epistemic values are ascribed to germane pieces of evidence, and as part of this calculation, certain normative standards are in play. What these standards are can vary from person to person - hence the difficulty in securing a cogent and defensible normative framework. After all, what one person characterizes as being epistemically crucial, another person may discard as being irrelevant to their enquiries.

Equally, as we shall see from the example below, what one person deems sufficiently compelling evidence to do X, someone else may hold sufficient *not* to do X. A lack of conceptual and procedural uniformity through which pieces of evidence are adjudged to be worthy of inclusion or exclusion, is in part, what makes critical thinking such an elusive concept, since it is inexorably tied to the field of enquiry in which it is being conducted. At the time of writing, scholars have yet to provide any defensible account of the inclusion/exclusion principle. This is to be expected, as explicating a robust

inclusion/exclusion principle for evidence is akin to taking a 32 inch waist on a pair of trousers and expecting everyone to fit snuggly into them. It is absurd in the extreme. Inclusion and exclusionary criteria may at times be domain-specific, depending on the subject matter under investigation, but may also be domain neutral depending on the nature of the matter under examination (Siegel, 1988). Either way, evidence is intimately tied to the domain and expertise of the person conducting the enquiry. This explains why, when getting your bloods checked, a haematologist is more reliable than a teacher. Expertise matters. It matters when making informed judgments about what constitutes evidence; how relevant the evidence is; how it ought to be interpreted, and finally, how compelling the evidence is, including what response it demands of us as human beings. In the case of the haematologist, when analyzing bloods, crucial pieces of evidence which require domain-specific expertise are quickly triaged and (ideally speaking):

    a.   screened for relevance;

    b.   interpreted correctly,

    c.   a cogent determination made on what epistemic force these pieces of evidence provide, either leading to a justified inference of some sort, or, in the case of insufficient data, a suspension of judgment.

The point here is the primacy of expertise and domain-specific knowledge. Expertise is (often, though not always), required to formulate accurate judgments about what evidence is; how it should be interpreted, and what its epistemic force (the reasons) require an agent to believe or do. Precisely what level of expertise is required is impossible to quantify. Experts of comparable cognitive calibers frequently disagree about important matters, even in domains such as science, and often with no uniformly accepted victor (Baghramian, 2008).

The inclusion/exclusion dilemma to determine the relevance of evidence is worth exploring in more detail. To illustrate this in greater depth, allow me to draw on a short hypothetical situation. Suppose you are due to undergo

an elective procedure on your back. As part of your research you identify three leading surgeons in Ireland: Mr Byrne, Mrs Boyle, and Mr Shevlin. Mr Byrne has pioneered the surgery and been practising for 25 years; Mrs Boyle has been practising for 10 years, and Mr Shevlin has been practising for 8 years. Mr Byrne has successfully completed over 2000 surgeries; Mrs Byrne over 700; and Mr Shevlin 600. Based on your research, you conclude that Mr Byrne is the best choice. However, your wife thinks either Mrs Boyle or Mr Shevlin are better (she doesn't mind which). Her reason for not choosing Mr Byrne stems from the fact that one of his patients successfully sued him for damages arising from medical malpractice. As it turns out, this incident is not new to you, and as it happens, came up during your preliminary enquiries. Based on the findings of the medical tribunal (and later civil court), there was nothing wrong (clinically speaking) with the procedure. Instead the fault lay in the consultant's inadequate notekeeping and paperwork. Following the verdict, the consultant was instructed by the Medical Council to undergo extensive retraining in taking contemporaneous medical notes and pay a fine of 100,000 euro.

In line with the particulars of this story, you reason that this fact (piece of evidence) compelling Mr Byrne to retrain, coupled with the sting of the extensive fine, negate the previous medical oversight. In fact, you see this recent court case (it happened a year ago) as providing you with excellent reasons to suppose such an eventuality will never happen again. This fact (piece of evidence), combined with his extensive experience, makes him your preferred choice.

Though your wife understands your reasons, she considers the former conviction as a reason (evidence) for not availing of his services. She reasons that the fact that malpractice has taken place makes it all the more likely to happen again. The trouble is that, what she sees as being an excellent reason (piece of evidence) for not doing X (allowing consultant to perform surgery on you), you identify as being the exact opposite (an excellent reason/evidence) for letting him operate on you. As we can see, in the absence of any cogent inclusion/exclusion guidelines or rubrics, what constitutes evidence can sometimes lead to an impasse. In the final analysis,

which set of reasons are stronger?

What this hypothetical scenario confirms is how problematic it is to formulate standards for including or excluding pieces of evidence. Further, it clearly explicates the importance of being able to reliably determine the relevance of different pieces of evidence. Until such time as a defensible conceptual account of this inclusion/exclusion problem emerges, there will always be a vigorous debate regarding what circumstances (evidence X) should be considered as something that counts in favor of conclusion Y. In summary, until such time as an agent can reliably determine (objectively speaking) what evidence is *relevant* to their mode of purposive enquiry, it will always be disputable to what extent one can reliably determine the evidential force of a claim.

Experts disagree a lot about evidence. The disagree about what constitutes evidence; they disagree about what the threshold should be to reliably say you 'know' something, and they disagree about interpretations of evidence. Questions of interpretation, vis-à-vis, evidence, are closely linked to the questions of inference, and these represent some of the most interesting problems in education and philosophy (McGrew, 2014, p.62). Take scientific evidence for example. Where inference is concerned, there is almost always a measured amount of interpretation in play. Boyle's Law is a case in point. In pouring measured amounts of mercury into a J-shaped tube, Boyle was able to obtain data on the compression of the air trapped in the short end. Based on this data he extrapolated that the pressure and volume vary inversely, that is to say, P and 1/V are in a linear relationship. However, as Boyle was fully aware, data plotted with P and 1/V for axes, do no fall on this line. In fact, a dot-to-dot charting of the points looks a little bit like the Mississippi river. Boyle dismissed the variations between his measurements and his theoretical values as being the result of error. Modern mathematical regression analysis vindicates his judgment (within bounds - when the pressure is great enough to liquefy the air, the relationship between P and 1/V ceases to be approximately linear). Nonetheless, the fact remains that, "the data do no quite speak for themselves" (McGrew, 2014, p.63). Rather than view this as a naïve form

of falsificationism where the slightest mismatch between theory and evidence suffices to overturn a theory, careful readers will resist throwing out the baby with the bathwater and pay more attention to the conditions under which such inferences are made.

Once relevance has been firmly established (and as we have seen, this is rarely an uncontested or clear-cut matter), evidential force then grounds belief or action in accordance with the principle of sufficient evidence. As mentioned, such evidence must be relevant and germane to the situation under consideration. Acting on this principle compels agents to align their beliefs and actions in accordance with the strongest evidence at their disposal. When evaluating evidential warrant, critical thinkers look to scrutinize and establish the rational convicting force of evidence, before then proceeding to stress-test the evidence which supports a given belief or action. Evidential relevance and force deals in 'facts' - it fights the world of 'alternative facts' with the sobering reality of verifiable facts that correspond to reality. Reasons predicated on evidential warrant insist on the facts and nothing more. Reasons under are thus facts or pieces of evidence (Audi, 2004; Littlejohn, 2012). Non-facts or 'alternative facts' carry no currency in this framework. If facts were gold, critical thinkers would feel obliged to scratch-test the metal in order to investigate the veracity of this hypothesis.

Evidential force is not merely the aggregation of evidence - to be a critical thinker is not to blindly follow the aggregation or quantification of evidence, but rather to look to the quality of evidence in support of, or contradicting given views (Audi, 2004; Blackburn, 2010; Dancy, 2000). Tempting though it may seem, this can sometimes be reduced to a quality over quantity judgment, which, ostensibly speaking, has some merit. What it forgets however is that, in some instances, quantity may in fact be correct. Ultimately what is important here is that quantity is not intuitively sidelined. There are occasions where quality should trump quantity, and equally, there may be situations where quantity should trump 'ostensive' quality. This is why I use the term evidential force and relevance. Force need not be confined to weight or aggregation. Seemingly minor evidential

facts may wield a greater force than their larger counterparts. Viewed this way, what may appear to be smaller pieces of evidence, may, in fact, exert a stronger "rational convicting force" than their seemingly larger counterparts. At the end of the day, the final arbiter for this determination is the *phronimos*.

To summarize, evidential reasons must meet the following preconditions in order for any sort of meaningful enquiry to flourish. First there is falsifiability, which states that any evidential reason must allow the possibility of evidence that could disprove one's original claim. Secondly there is comprehensiveness whereby evidence offered in support of a claim must be exhaustive, to the extent that it takes into account all the *available relevant evidence* at one's disposal. Thirdly there is integrity that requires evidence offered in support of any given claim to be critically evaluated in an impartial manner. Fourthly, with regard to findings from the sciences, including psychology, there is the notion of replicability that insists on evidence for claims based on empirical data which could otherwise be explained by means of coincidence, must be repeated in subsequent experiments or trials. The fifth and final precondition for evidential claims is based on the principle of sufficiency. According to this principle, evidence offered in support of a claim must be appropriate to establish the truth of that claim, with the following stipulations: (a) the burden of proof for any claim lays with the claimant; (b) extraordinary claims (typically) demand extraordinary evidence; (c) evidence based upon authority and/or testimony is always inadequate for an extraordinary claim (Lett, 1997).

5.3.2   Undefeated Reasons & Reason Defeaters
First, to stress-test the cogency of beliefs, knowledge-claims or actions, critical thinkers intuitively ask themselves the following question: are there undefeated reasons for this claim? This is a necessary condition of critical thought since enquiries or deliberations of any kind must seek to address this question in its fullness. What constitutes an 'undefeated reason,' will, depending on the domain of enquiry, often be heavily contested. This is healthy in some cases and to be expected. Thought, understood in this instance, as the pursuit of 'truth' (putative optimum), can lead to a range of

diametrically opposed views. Again, this is both healthy and normal. Even in matters like nutrition, one will find a range of different diet plans each claiming to be the best way to lose weight. The claim that there is one universally accepted way to achieve weight loss is mistaken since it fails to factor in the interplay between the enmeshed particularity of the person dieting, alongside the consequences of following a diet of this kind. A low carb diet is not suitable for a diabetic; equally a high fat diet is not suitable for a person with a fatty liver or heart disease. Both may lead to weight loss, or more serious health problems. Thus, the 'one size fits all ends-means model' must be discarded. Regardless of one's thinking on the subject, experience must test the theory underpinning the matter under investigation, in the same way theory must test our experience of its implementation. Together a more fluid and integrated approach in search of undefeated reasons supporting one's claims is advised for critical thinking to flourish.

Why must critical thinkers concern themselves with undefeated reasons? The answer is quite simple. So long as a person holds undefeated reasons for their beliefs or actions, these reasons carry a *prima facie* weight and rational force until such time as stronger reasons for a contrary belief usurp them (Audi, 2015; Pollock, 1987). In this way, undefeated reasons share some common ground with the principle of falsifiability. In short, falsifiability in the form of the refutability of a statement, hypothesis, or theory, is the inherent possibility that the same statement, hypothesis or theory can be proven false. Owing to this fact, undefeated reasons are always held *pro tem*. Given that critical thought thrives on questions that spring from the contestability of knowledge-claims, one of the central tasks behooving thinkers who think critically can be framed as follows:

1) When and under what conditions are there undefeated reasons for X and Y?
2) Are there defeater reasons, which sufficiently overpower one's previously held undefeated reasons for believing X or Y?
3) Are these defeater reasons powerful enough to warrant a revised

belief/action or conceptual/theoretical/practical correction?

Like all of these conceptual meanderings, they are best illustrated with reference to an example. In the 1960s the drug Thalidomide was used to treat insomnia, gastritis, and then later, morning sickness in expectant mothers. In treating these particular ailments, it was very effective. But within a short space of time, soon there was a disproportionately large population of mothers giving birth to children with birth defects. Other babies reaching full term were born with phocomelia (malformation of the limbs) or other debilitative conditions such as deafness or malformation of the chambers of the heart.

In 1961 under pressure from the public at large and a cohort of outspoken scientists and doctors, the drug was eventually withdrawn from over-the-counter dispensaries. Up until this evidence emerged (point *t*), our previously undefeated reasons for believing this drug was safe to use were rational and warranted. Now, however, they must be cast aside. These newly defeated reasons are now replaced with more cogent reasons, which prove the direct causal link between the drug and birth defects. The end result is the exhortation to never take the drug if you are pregnant. This is now the strongest reason for one's belief and action, because it is based on evidential force and relevance, undefeated reasons, the rational force of motivating and explanatory reasons, and the deliberative excellence and insight afforded by practical judgment (*phronêsis*).

I propose the term 'defeasibility thresholds' to encapsulate the ease or difficulty with which reasons for belief or action are rebutted or undercut. When it comes to reasoned argument, there exists a taxonomy of defeaters (reasons which defeat other reasons) that corresponds to two different categories. These are types of reasons that critical thinkers must be in *possession* of, and furthermore, utilize properly in order to discharge their epistemic duties correctly. Pollock (1987) distinguishes two kinds of defeaters: *rebutting defeaters*, which are themselves "*prima facie* reasons for believing the negation of the conclusion", and *undercutting defeaters*, which "provide a reason for doubting that *q* provides any support, in the

actual circumstances, for *r*" (p.484). Augmenting this taxonomy is a *no-reason defeater* which is a reason for supposing that it is no longer reasonable to believe *p* given that (a) one has no reason for believing *p* and (b) the belief that *p* is the sort of belief that it is reasonable to hold only if one has evidence for *p* (Bergmann, 1997, pp.102-103).

A *rebutting defeater* is a reason for rebutting a previously held belief. Six months ago, during a conversation with my wife, I mistakenly believed George Michael had died in 2014. Soon enough, my error was exposed when my spouse showed me the death notice on the internet, as well as the newspaper headlines from the day in question. In this instance, I acquired what is commonly designated a *rebutting defeater* for my belief that George Michael died in 2014 (he actually died on 25th December, 2016). This *rebutting defeater reason* now gives me grounds for revising my previously held false belief (Pollock, 1987).

An *undercutting defeater* is a reason for supposing that one's grounds for believing *p* are not sufficiently indicative of the truth of the belief. Suppose a person enters a factory and sees an assembly line on which there are a number of porcelain teacups that appear red. Appearing to be 'red', the person believes that there are red teacups on the assembly line. The manager then informs the person that the teacups are being irradiated by an intricate set of red lights, which allow the detection of hairline cracks otherwise invisible to the naked eye. Here the person loses his reason for supposing that the teacups are red, rather than acquiring a reason for supposing that they are not red (Pollock, 1987).

A *no-reason defeater* is a reason for supposing that "it is no longer reasonable to believe *p* given that (a) one has no reason for believing *p* and (b) the belief that *p* is the sort of belief that it is reasonable to hold only if one has evidence for *p*" (Bergmann, 1997, pp.102-103). Suppose a student tells you that they believe Trinity College Dublin is the best place to study for a PME qualification. When asked why, the student cannot locate any reasons as to why they hold this belief. Upon reflection, the student comes to realize that this sort of opinion ought to be supported by some particular

evidential reason. Otherwise, objectively speaking, his/her opinion does not qualify as being rational since it is not grounded in appropriately strong reasons.

In each of these three cases, the acquisition of a *defeater* renders it epistemically inappropriate to continue holding a particular belief *B,* given that:

   a. there is sufficient evidence against *B*,
   b. reasons for *B* have become neutralized, or
   c. there is a recognition that one has no reasons at all for
      holding *B* though one ought to have such reasons (Bergmann, 1997).

When it comes to critical thought, the presence of one or all of these defeaters proves that a person's belief is no longer appropriately justified, since it fails to provide sufficiently strong reasons for one's beliefs. Since knowledge entails justification in the form of sufficiently strong and cogent reasons, each of these kinds of defeaters has the potential to defeat knowledge (Bergmann, 1997; Pollock, 1987).

5.3.3   Determining the force of explanatory and motivating reasons

Theorists often emphasize the centrality of impartiality in critical thought (Bowell & Kemp, 2015; Paul & Elder, 2009; Siegel, 1988, 1997). In doing so, scholars of this persuasion nullify, or at the very least, underplay the role of affect in determining what one ought to believe or do. The centrality of emotion, hereafter referred to as 'affect', can, and often does, play a key role in thinking critically (Brookfield, 1987; de Bono, 1983; Moon, 2004). Affect is an irreducible and fundamental part of being human, and because of this, "emotions often play a significant role in decision-making and choice" (Hastie and Davies, 2001, p.206). To attend to this reality, I argue for the inclusion of motivating and explanatory reasons-assessment as an integral part of reflectively appraising critical thought. It is only through discerning the force of the intricate relationship between these reasons that critical thinkers can then determine whether (i) a reason *favours* an action;

(ii) whether a reason *motivates* an agent; and (iii) whether a reason sufficiently *explains* an agent's action (Audi, 2004; Scanlon, 2014).

Explanatory reasons are essentially true answers to why questions. They take the form 'a reason why P is Q'. Why do plants normally grow towards the sun? Well, science tells us that this is to help them make food - this is what we call phototropism. Why do hot drinks cool you down? Because they make your body think you are hotter than you really are so you sweat more and that leads to heat loss. Why do I have a headache right this second? There might be a few interrelated reasons: I might be dehydrated, or I might have a tension headache from looking at a screen all day. It may be, as of yet, an undetermined combination of both reasons. When we evaluate explanatory reasons, we recognize that they come in a variety of strengths. Because of this, they ought to be evaluated in terms of their explanatory and unifying power (Bird, 2014). The better the explanatory reasons proffered, in conjunction with the capacity for this explanation to cohere with your existing body of knowledge (tacit or otherwise), the stronger the epistemic claim. Explanatory reasons attend to context - they lay bare the situatedness and particularity of a given event, belief or action.

Motivating reasons are a subclass of explanatory reasons that cast light on why people believe, feel, intend, and act as they do by serving "as the reasons for which they believe, feel, intend and act" (Dancy, 2000, p.24). A motivating reason can always explain the action it motivates, whereas an explanatory reason may, or may not be able to do so. This is not to say they should be treated separately. On the contrary, this simply tells us that they provide different information in response to our questions. Together, both are vital to the overall judgment of a critical thinker.

Motivating reasons are predicated on what epistemologists' term, the Humean Theory of Reasons (HTR). Though Hume (1739/1945, p.416) himself had little to do with the modern interpretations and iterations of the concept, it has since become synonymous with his name. According to a contemporary account of the Humean Theory of Reasons:

> If there is a reason for someone to do something, then a person
> must have some desire that would be served by her doing it.
>
> (Scanlon, 2014, p.3)

In this way, desires are necessary and beliefs sufficient for motivation. We have reasons, only if we have certain desires, but further, we have those reasons because we have those desires (Davidson, 1963). I take this concept a little further. Desires, leading to reasons based on a purposive goal to bring about a certain state of affairs, are what issue from the antecedent interplay between one or more of a human being's full range of motivating concerns. These concerns might include, but are certainly not limited to: curiosity, pride, wonder, disgust, fear, sloth, sadness, duty, surprise, joy, happiness, self-interest, sorrow, rage, terror, anxiety, shame, anger, contempt, distress, paranoia, guilt, and so on. My anger over losing a tennis match to a neighbor may issue a desire to practise more, so as to beat him next time. Desires, leading to fully formed or latent reasons for or against something, are caused (directly or indirectly, knowingly or unknowingly, individually or by communal discordance/agreement) by the complex interplay between these motivationary concerns in our own, individual, yet still inextricably linked worlds of lived experience.

Desires spring from concerns - in other words - things that matter to us. What turns a concern into a desire may be the result of deliberation based on either external or internal factors, or a combination of both. In an external sense, my desire to clean the house and do the laundry may be borne out of a recent argument with my wife. To make my wife happy, I now have a desire to clean the house. Similarly, my desire to be a professional footballer when I was younger was mostly the result of my father living vicariously through me. Clearly, desires are not always clear-cut, nor are their causes easily identifiable. I once desired to be a professional footballer, but to what point that desire was mine or my father's (implanted in my consciousness) is unclear. Because of this, desire might move a person's mind to act a certain way, but their origin is decidedly difficult to source because we are inter-relational beings with

complex motivating concerns stemming from our interaction with other people in the world around us. For this reason the phenomenology of deliberation centers on a jumble of our concerns operating, consciously or otherwise in their varying strengths, until eventually we exercise a judgment about what to do.

Desires may also spring from internal concerns. Since I am thirsty now, I desire a bottle of water. Because my hair has gotten too long, I desire a hair cut. When we talk of desires however, it is wrong to state that they are always based on what people most want to do (Blackburn, 2009). I may most want to watch the football tonight, but am resigned to doing the ironing. Desires are in this way triaged depending on a complex nexus of environmental, internal and external factors. Sometimes pragmatism wins out. I might desire a bottle of wine tonight, but realize this makes the idea of teaching the next day a hellish prospect. Because of this, "sometimes we act not so much in ways that we want to act, but in ways we feel we have to act" (Blackburn, 2009, p.123).

When it comes to critical thinkers evaluating the strength of motivating and explanatory reasons favouring an agent's course of action, they need to evaluate why it is that I am doing the ironing instead of watching the football, or drinking tea instead of quaffing a bottle of wine. For someone to know why I am doing the ironing instead of watching the football, they must find that aspect of doing the laundry that concerns me, and formulate a defensible judgment about whether these reasons ***objectively favor*** my course of action. So, my giving a sugary drink to my four-year-old is an objectively good reason in the event she has a hypoglycemic episode and needs sugars to regulate her blood sugars again. Conversely, giving a four-year-old a sugary drink before mass is not a good idea (not an objectively strong reason) if you want her to remain quiet during the service. This is where context is crucial. This is the reason why the idealized critical thinker must always show a deep sensitivity to context (Lipman, 1988, p.40). Context, and by extension the deliberations of the *phronimos*, determine when and under what conditions motivating and explanatory reasons are rationally forceful. In doing so, the *phronimos* (person of judgment)

determines whether they are *reasons* that "count in favor of [a belief or action]" (Scanlon, 1998, p.17).

Sometimes there is a tendency to confine desires to the inner states of an agent. This argument posits that there are no 'external' reasons for an agent to believe or act a certain way. In other words, there cannot be any desire-independent reasons for action (Williams, 1981). This is a mistake since not all desires lead to reasons for believing or acting a certain way. I may "desire a beer, but may not desire paying for it" (Searle, 2001, p.27). In this case, my internal reason for not wanting to pay my dues is not sufficient to warrant my unwillingness to settle my bill.

When analyzing motivating reasons, we must remember to extricate them from mere motivations. A motivating reason is broadly construed as a consideration that an agent takes to favor a particular course of action (Scanlon, 1998; 2014). This reason or reasons justify the action to some degree. Agents are, more often than not, motivated to act by more than one reason: I may load the dishwasher early in the morning because I won't have time to do it later in the day; additionally, doing so is more fiscally responsible because it runs on the night time meter, and finally, operating the dishwasher at this time makes it less likely to wake the baby in the middle of the night. Moreover, a fact will only seem a reason for me to act when combination with other facts (Scanlon, 1998; 2004; 2014). The fact that I won't have time to load the dishwasher later will seem a reason to do it now only if I have run out of clean dishes and cutlery. Here my reason is, arguably, a combination of at least two facts: that the dishes need washing, and that I won't be able to do it later (Blackburn, 2009).

Suppose you inherit 80,000 euros and duly invest this sum in a privately managed investment fund. For argument's sake, assume the portfolio is progressing nicely and you are comfortably exceeding your projected 6% annual return. Now, imagine you want to release some liquid from your portfolio. You consult with your advisors and they inform you which fund to cash out on. You listen to what they are saying and sit down that night to make sure the figures add up. After some basic calculations you realize that

given the nature of the fund, even though disposing of this fund is prudent financially (from the point of the private investment managers), what they have failed to take into account (or do not care about), is your tax liability. Disposing of the fund they suggest leaves you open for a much larger tax bill than disposing of a comparable fund. In this case, what would result in more profit for the investment firm (they are on commission - a percentage of the fund's performance), would ultimately negatively impact on your overall financial situation.

Cost-benefit analyses, though in principle based on mathematical formulae, are occasionally tainted by the short-term expected utility, and underlying assumptions of the person crunching the numbers. This is why it is imperative for critical thinkers to seek out and stress-test the probative force of explanatory and motivating reasons. The investors have based their judgment on which fund to dispose of based on its expected utility (to them). Their explanation for this course of action is that it will yield a higher return from the portfolio. This is true. This is why stress-testing explanatory reasons is not sufficient for critical thinkers to make an informed and evaluative judgment about what the most appropriate course of action is to take. Thus, when you look to the motivating reasons for their chosen course of action, it becomes clear that they stood to gain more from this transaction than you (as a client) did. Though your end of year returns may be higher, disposing of the funds they suggest has increased your tax liability, resulting in greater losses overall for you in that fiscal year. In the final analysis after thinking critically about the situation, you determine that, because of *a fortiori* reasons, disposing of another fund is the more rational (and financially sound) course of action.

Explanatory reasons offer a certain persuasive force as to why one ought to believe or do something, whilst motivating reasons guide us through the motivation underpinning one's judgments about what they believe or do. Explanatory reasons offer us a chance to piece together the jigsaw of belief states and actions, whilst motivating reasons give us an insider view of context and particularity. Together, a deep understanding of both

typologies, are central to the success of the reasons-assessment component of critical thought. Motivating reasons especially, furnish us with context, with a salient overview of particularity, of 'qualia', of irreducible context-dependent specificity, and most importantly, the gap between insider and outside perspectives. Accordingly, a deep sensitivity and attentiveness to both types of reasons are crucial to the operation of any defensible critical judgment.

5.3.4 Phronêsis (Practical Judgment)

So far, we have argued for a new reasons-assessment typology for the operationalization of critical thought. This new approach is developed in response to the myopic scientism of rational thought where a premium is placed on "detachment and objectivity, suppressing the context-dependence of first-person experience in favor of a third-person perspective which yields generalized findings in accordance with clearly formulated, publicly agreed procedures" (Dunne & Pendlebury, 2003, p.195). Science, as an externalist type of knowledge, aims to establish nomological knowledge. With this, it privileges replicability and control; *technê* over *praxis*; generalized findings derived from hypothetic-deductive models over irreducible particularity; interpretation-free language over nuance, verificationism over the indeterminable, and an unassailable objectivity characterized by an ironclad reliability. Up until this point, these types of knowledge-claims have been the primary focus of our deliberations. We have seen that even with this ostensibly reliable and objective form of knowledge *par excellence*, it is still susceptible to robust challenges from the critical thinker. Outside this habitat, there is a world that lies beyond the purview of the sciences. Indeed, few can forget that outside of this predictive approach to atomized knowledge with its law-like explanations and reliabilist rhetoric, there lies a field of human endeavor that challenges the mathematician's idea of objective proof and certainty. This is the type of practical knowledge at stake here. To explicate this more fully, we now turn to *phronêsis* under the rubric of practical judgment. To further focus my argument, I draw primarily on Book VI of Aristotle's (340BCE/2011) *Nicomachean Ethics* (N.E.).

Most of our everyday encounters require us to act. Our encounters are therefore often beyond the limits of scientific verificationism and irreducibly complex. In transient or variable practical matters, there are no clearly formulated road signs to guide us along our way. Within this liminal space, *phronêsis* operates in the practical domain of human endeavor. In what follows, I argue for a reconceptualization of *phronêsis* - a role where deliberative excellence (in the form of a sensitivity and attentiveness to the normative force of reasons) explicates the overarching function it plays in a) stress-testing evidential reasons, undefeated reasons/reason defeaters, and explanatory/motivating reasons, with the purpose of b) determining what one ought to do.

Practical reason, according to Aristotle, is a "true and reasoned state of capacity to act with regard to the things that are good or bad for man" (N.E. VI.5). From this definition, we can derive that practical reason equips an individual with the ability to distinguish between what is good and bad and the capacity to act on such knowledge. Practical knowledge, as distinct from theoretical knowledge, is defined by most of our everyday encounters with the world. The advantage of *phronêsis* (practical judgment) over *sophia* (wisdom) and *technê* (craft) is that it grasps not only the *means* but also the *ends* of practical deliberation (Dunne, 1993). Decision and deliberation are not about ends *per se*, but about the 'things promoting ends' (*ta pros ta telé*). *Phronêsis* is a faculty for good practical reasoning. The person with *phronêsis* has the disposition, inclination, and ability to make good judgments (Dunne, 1993; Eikeland, 2008; Wiggins, 1980). She, therefore, has a general knowledge, not only of what ends are good for her, but also of what means are good for promoting or producing those ends.

Theoretical and practical knowledge differ concerning ends pursued - the theoretical discerns differences/similarities and truth/falsity by affirming and denying (katáphasis-apóphasis), whilst the practical is concerned with what to do (NE1139a21-b6). Though it is an oversimplification, practical judgment can be characterized in terms of knowing how to live well, whilst theoretical reason is the explanatory knowledge and deep understanding of the fundamental truths derived from the principles utilized across various

domains of enquiry. Practical judgment concerns itself with areas of human endeavor, which are in flux (an internalist/first person account of knowledge), whilst theoretical judgment focuses on domains of enquiry that are externalist and third-person/objective accounts of knowledge (Dunne, 1993, p.305). For critical thought to operate effectively, a deep understanding of both theoretical and practical judgment is required. But for now, we confine our analysis to practical reasoning and judgment.

Phronêsis is not rhetoric, nor technical reasoning or mere calculation (Eikeland, 2008). It is also not to be conflated with cleverness (deinótês) - conceived here as the ability to deliberate about any goal, good or bad (N.E. 1144a, 23-29). At all times, *the phronimos* acts in harmony with a symbiotic fusion between ethical virtues (álogoi), and intellectual excellences (nous/diánoia) (Zagzebski, 1996, p.211). Virtue then, whether it is intellectual or ethical, embodies an acquired ability, skill, habit or internalised disposition and inclination to act and feel a certain way. This disposition and inclination is the result of practise, exercise or habituation (N.E. 1103a16 26, 1103b22, 1114a10). Tempting though it may be to conceive *phronêsis* as a purely intellectual virtue, this is not the case, since it embodies an ethical orientation to pursue and live the good life (*Eudaimonia*) (Eikeland, 2008; Irwin, 1999). At all times, virtues are guided (though not directly controlled) by reason (*logos* interpreted here as the capacity to reflect on and respond to reasons in a thoughtful, sensitive, understanding and prudent manner (Blackburn, 2010; Raz, 2007).

5.4   Practical Judgment Based on Reasons-Assessment

To be clear, I take *phronêsis* to deal with knowledge, not simply as an inert possession (a kind of dead capital), but rather as an ongoing investment in the deliberative excellence leading to appropriate action. Practical knowledge, conceived this way, speaks of knowledge applied not in the abstract, but in the concrete. Such situations frequently defy categorization, and with it, the temptation to subject such deliberations to pre-ordained responses. In this way, judgment, then, is in the first instance an ability to recognize the atpyicality of cases and situations where no immediately

apparent application of procrustean rules will suffice (Wiggins, 1980, p.223). Thus the *phronimos* is tasked with bringing this "particularity into some relationship, albeit one yet to be determined, with established norms or procedures in the area" (Dunne & Pendlebury, 2003, p.197).

For this task, I argue that the *phronimos* draws on the new reasons-assessment component of critical thought. In bridging the gap between the general and the particular, and moreover, not allowing the general to overpower the particular, the *phronimos* takes the enmeshed agent in his/her irreducibly context-rich situation and forms a defensible evaluative judgment about what they ought to do. This is no easy task of course. It requires insight; it requires patience and understanding (*sunesis*); a certain reflective quality with regard to one's lived experience; character; virtue (intellectual and ethical); fluency; a deep sensitivity to context; ontological suppleness (which is not always easily identifiable); openness; courage and perseverance. Animating this process at all times is a commitment to the big picture with an unfailing attentiveness to the gift that experience bestows upon us in revealing the significance of new situations that in some way require the lessons of our past lived experiences (Dunne, 1993, p.305). The culmination of this phronetic process is a kind of deliberative excellence (*euboulia*) guided by the dialectic between experience and insight (N.E. VI). In short, *phronêsis* cannot be taught, it presupposes a certain wisdom (attentiveness to that which matters) on the part of the agent, an insight and wisdom which allows him/her to see which reasons are most forceful, depending on the context of the enquiry. Insight is the precursor of wisdom leading to the ends-means practical judgment/action of the *phronimos*. Here I take insight, not in the English use of the term, but in the German (*Einblick*) where it is a verb. Lonergan (1960/1992) helpfully identifies five properties of insight:

- It comes as a release to the tension of inquiry
- Comes suddenly and unexpectedly
- Is a function not of outer circumstances but inner conditions
- Pivots between the concrete and the abstract, and
- Passes into the habitual texture of the mind (pp.72-77).

For Lonergan (1960/1992), insight (great or ordinary) is the culmination of a series of unnoticed insights, a product of a *Eureka* moment where all the pieces of a puzzle finally come together. From insight, our conceptual, ontological and epistemic horizons are broadened, and based on this new vantage point, the *phronimos* carefully sifts through the reasons for and against a certain course of action, including evidential force and relevance; undefeated reasons and reason defeaters, and finally, explanatory and motivating reasons. Each reason is not stress-tested in isolation, but instead placed within the web of belief, where the interplay between the web of reasons is forensically scrutinized. The *phronimos* then, metaphorically speaking, casts dew on the web (the roadmap to *eudaimonia*) to see where it is strongest, where there are any gaps if any, where it is loose and so on. The purpose of this investigation is not simply to identify any weaknesses within the web, but to see how each strand weaves together, to understand the nature of the web so to speak, so that a person can truly understand it before they proceed to investigate the means/end consequences of plucking or removing a strand of the web. After a period of careful discernment, a determination is made about how these reasons factor into the *phronimos'* overall judgment about what one ought to believe or do.

5.5 Stress-Testing Reasons Using Phronêsis

What does it mean to stress-test reasons? Stress-testing is a simulation technique often used in the banking industry, more often than not employed on asset and liability portfolios to determine their reactions to different financial situations. They are also used to gauge how certain stressors will affect a company, industry or specific portfolio. In structural engineering, stress-testing refers to the principle of establishing critical mass in an element of some type or another (alloy or otherwise). This transfers to their deliberations about whether a bridge or support beam is fit for purpose and under what conditions it will begin to fail.

I import this term to my conception of critical thought because, in my view, stress-testing determines whether something (a belief or action) is strong

enough to withstand interrogation from contradictory evidence, an imaginative counterfactual thought experiment, a relevant counterexample or reason defeater, outright refutation/reason undercutter, or indeed, a real-life scenario. In imaginatively conceiving of stressors to see how a concept/idea/reason/inference reacts, critical thinkers stress-test the strength of reasons supporting what a person believes or does. Stress-testing determines the weakest point of reasons, and tells us at what point (and under what conditions) these reasons break and are no longer fit for purpose. If reasons are structural beams holding up a ceiling, critical thinkers tell us when and under what conditions different ceilings, of different ages, some made with straw and lime plaster, others made with plasterboard, may topple down on us.

A second purpose lies in not only determining at what point a reason is no longer fit for purpose, but in so doing, critical thinkers also devote themselves to strengthening said reason or reasons. There is no point in baking a cake and tossing it aside because it doesn't taste nice. One must sit down and thoughtfully ponder what ingredients would make it more palatable. Similarly, if there is a leak in your house, it is easy to identify where the wet patch in the ceiling is. Harder still is the task of discovering the source given that the area affected may not be the precise source of the leak. Water finds its own level after all, and because of this, it will invariably seep through the path of least resistance. And so, the critical thinker must metaphorically pull up the floorboards and look for signs of a leak in the pipes. When the source of the metaphorical leak has been revealed, the critical thinker needs to think of the best way of mending the crack. This is not a one-size-fits-all judgment since pipes (human thought) come in a variety of shapes, forms and materials. Depending on the nature of the leak, the *phronimos* must decide the most effective way of repairing the pipe; copper for instance can be repaired by sawing off the defective length and using a sharkbite connector to refit a new piece of pipe.

Thirdly, the *phronimos* always shows a deep attentiveness to the particularity of situations. In forming a wise or prudent judgment about what to do, they consider the totality of the situation - not just isolated

propositions divorced from the agent's interaction with them. They move beyond the assumptive world in this way, beyond the universalization of the particular, beyond the limits imposed by procrustean applications of general rules (Wiggins, 1980). This is only made possible through a deep attentiveness to context- dependent situatedness (Dunne, 1993, p.280). After all, in the practical domain - a prudent judgment must be made by a person in a situation, in a moment in time, within a context, for a purpose, based on reasons. I refer to this attentiveness as *reason empathy*, since to understand a person's reasons correctly, the *phronimos* must get under the skin of the agent before she can make an accurate judgment about the objective and rational force of their/your reasons favouring a certain course of action. Reason empathy, conceived this way, can be understood as a bridge between third person verifiable 'knowledge' and first person irreducibly complex 'lived experience'.

Rather than this being a process of weighing the aggregation of evidence based on the interactions between this typology of reasons, the *phronimos* determines the most prudent course of action based on which reasons carry most weight or force at a given time. Phronêsis is more than a critically reflective epistemic policeman cracking a whip to ensure compliance in the form of following the rule of reason and reasoning. Similar to Kantian judgment that argues for the faculty of judgment as the means of understanding which rules apply and when, the *phronimos* relies on 'deliberative excellence' and 'prudence' to determine which reasons are strongest at a given time.

Suppose you are a secondary school teacher. You have a strict mobile phone ban in your class. This rule is based on tried and tested approaches over a period of fifteen years' teaching. Failure to obey this ban results in the phone being confiscated for a period of two weeks. One day, during you history class, you catch a student on their phone. As per your behavior policy (rules which stipulate the consequences of certain infractions), you confiscate her phone. You notice the student is visibly upset, but do not think anything of it because this is normally the case in these situations. However, later in the day you notice she is still risibly upset. Attentive to

the particularity of the situation, as any *phronimos* is, you speak to the student after class. During the course of the conversation the student informs you that she was on her phone because she was texting a friend who was in hospital as a result of an overdose. She even offers to show you the text in question by way of proof.

Teachers, of course, are tasked with making situational judgments every day of the week. Principles ground thoughts and actions, but they are not immune to dialectical insight and adjustment. In this situation, you decide that giving the student back the phone is the correct thing to do. Phronetic insights in this context have urged you to exhibit a certain fluidity and plasticity, to thereby admit an exception to your rule. Insight on this level is augmented with critical self-reflection, where one displays a deep sensitivity to the force of reasons in favor and against a certain course of action. To do so, the *phronimos* stress-tests the relationship between those reasons, and thereupon reflects critically on the reasons guiding what one ought to do. This culminates in a prudent judgment - a determination aligned with the insight of lived experience, character, prudence and deliberative excellence.

In summary, in reaching an informed judgment about what to do, the *phronimos* brings together the perspectives from the following:

- A witness - who through their reason, experience and imagination observes and presents the data
- A detective - who investigates the data, frames questions and searches for the facts of the matter, but also looks to how propositions relate to one another in the web of belief
- A lawyer - who formulates the relevant insights and communicates what has been understood to the jury (people around them)
- A judge - who directs the pursuit of truth, scrutinizes what is relevant, and draws upon their lived wisdom to render a fair and accurate judgment about what to do
- A juror - who judges what the truth amounts to, based on the facts at their disposal (putative optimum)

Each of these elements in the mind of the *phronimos* plays quite a distinct and irreducible role in the pursuit of truth. Since each of us has different strengths and limitations, there is a sense that we may perform these roles with varying degrees of success. Someone could make an extremely good witness, but be unmistakably inept at raising the relevant questions. Equally, someone could be extremely intelligent, but a very poor judge of, for instance, character or unravelling disputed facts. The fact of the matter is that each of us interacts with the world in accordance with our cognitive dispositions and abilities. Sometimes cognitive biases and blindspots render us unsuitable to ascertain the facts (Kahneman, 2011). For this reason, there is a need to combine our own limited perspectives and operationalize these collective insights when making judgments about atypical situations and circumstances in the world. For sure, the pursuit of truth is really a social and inter-subjective process where the *phronimos* looks to stress-test the cogency of the relevant reasons to reach a wise and prudent judgment about what to do.

5.6 Kristjánsson Vs. Dunne: Phronêsis and Particularism

In the field of philosophy of education, neo-Aristotelian accounts of phronêsis have enjoyed somewhat of a revival since the publication of Joe Dunne's *Back to the Rough Ground* in 1993. Taking the theory-praxis nexus as its starting point, scholars such as Dunne (1993) and Carr (2004) have tried to reclaim the importance of the phronêsis-praxis nexus in identifying and appropriately responding to irreducibly complex particularities in educational settings, not just within formal sites of learning but within every educative encounter. Kristjánsson (2005) refers to this as an attempt to "reconfigure, eliminate or transcend" the uneasy relationship between educational theory and practice (p.456) In this section, instead of looking at Kristjánsson's four-part critique, I confine myself to his rejection of 'particularism', which has since become synonymous with, the PPP (phronêsis-praxis-perspective). More specifically, I examine his reasons for rejecting the particularist interpretation of phronêsis

championed by PPP advocates. From here, I then move to show how a carefully calibrated and habituated attentiveness to experience and particularities need not (and does not in Aristotle's writings) displace the normativity of reasons in determining undefeated reasons for what one ought to do in the practical domain (Dunne, 1993, pp.275-281).

Phronêsis is a heavily contested topic in philosophy of education. Philosophical debate tends to operate on two scholarly levels, "among Aristotelian exegetes, on the one hand, and Aristotelian reconstructors, on the other" (Kristjánsson, 2015, p.300). This debate has led scholars such as Sarah Broadie (1991) to designate phronêsis as involving a "rougher terrain" than most other Aristotelian concepts, one "densely thicketed with controversy" (p. 179). This is unsurprising given the plurality of conceptualizations in the literature (Dunne, 1993; Kristjánsson, 2005; 2015). Phrases such as 'illative sense' 'particularist discernment', 'intuitive discrimination', 'perceptual capacity', and 'situational appreciation' all tend to populate the literatures on the subject (Kristjánsson, 2015, p.311), often offering little in the way of conceptual edification or progressing neo-Aristotelian scholarship in any meaningful way.

In his article, Kristjánsson (2005) argues that theorists attempting to retrieve "Aristotelian insights" (p.456), regarding the primacy of irreducibly rich first-person-practitioner experience within education, need to acknowledge the difficulties of locating such activities as being beyond what "a spectator, a third person theorist, could analyze and evaluate (p.458). This 'prominent anti-foundationalist stance' (p.457) whose aim is to transcend the traditional theory-practice dichotomy leaves theorists with a reductionist perspectivist epistemology, one in which *a priori* knowledge is, at best sidelined, and at worst disregarded. Such a stance also precludes any kind of meaningful critique from outside one's first-person closed circle of experience. The implications of such a view are clear: only teachers engaged in their practice are equipped to theorize about it properly. On this account, PPP (phronêsis-praxis-perspective) supplants theory with a

'knowing practice,' leaving PPP proponents with the tricky task of skating on ice that is "neither that of crystalline technicist purity, nor the soft melting ice of postmodernism" (Dunne, 1993, pp.377-8).

Kristjánsson goes on to argue that though Aristotle is quick to point out that *phronêsis* is not only about universal values since it is concerned with action and action is about particulars (NE 1141b) - misreading *phronêsis* as a form of insider-practitioner perspectivism which operates outside the guiding principles of reasons-normativity - is a mistake (p.466). This "practice-embedded theory of participant knowledge" (*to hoti eidenai* – 'knowing the that') (p.457), which in many respects I argue is a form of 'standpoint epistemology', represents a gross distortion of Aristotle's corpus of work, and risks presenting *phronêsis* as an exclusive (and in some senses inaccessible) form of *a posteriori* first-person knowledge. I agree with Kristjánsson here. One of the consequences of PPP is, despite the wealth of textual evidence to the contrary (NE VI.7 1141b14-16), it unavoidably renders phronetic judgment beyond the scope of external rational evaluation. In so doing, PPP says that theory (from theorists outside the practice or *technê* being deliberated) has nothing to over the situational judgments required by agents.

Central to Kristjánsson's argument is his rejection of Dunne's view that experience is a comprehensive situating process of which knowledge and virtue are specific moments and to which *phronêsis* contributes 'an eye'. *Phronêsis* is, in Dunne's view, the eye of moral experience-the discernment of particular situations (VI.7 1141b14-23) that enables us to "see aright" (NE 1143b9-15) every time, but which remains ultimately experiential rather than universal "since the universals within its grasp are always modifiable in the light of its continuing exposure to particular cases" (Dunne, 1993, p.361). Here Kristjánsson takes issue with Dunne's emphasis on the purported superiority of particularities over universals. Though knowledge of particulars and universals are grounded in Aristotle's texts (NE 1141b), Kristjánsson argues a reductionist particularist interpretation

"radically diverges from essential elements of Aristotle's system" (p.466).

To his mind, no one doubts Aristotle warned about looking for the same precision in moral judgment as in mathematics, nor did he contest that the *phronimos* is concerned with situated particularities that are difficult to capture in a general account. But this is not enough, according to Kristjánsson, to warrant an exclusively particularist reading of *phronêsis*. For the primacy of a particularist interpretation of *phronêsis* to be established, theorists must demonstrate where in Aristotle's writings he states that priority must be given to particular truths over general ones, and where priority must be given to particular perceptions (*phantasia*) over universal beliefs (p.467). Universals, he goes on to argue are not reducible to "mere summaries of such particularities" (p.467). After all, one example of a deformed wingless chicken does not discount the universal norm that 'all chickens have wings'. 'Chickens have wings' is a norm with a certain scope (*ceteris paribus)* and the identification of isolated cases where this is not the case does not necessarily nullify the norm under consideration. If they did, it would be a reductive form of naïve falsificationism (p.461). All of this makes perfect sense and it is hard to disagree with what Kristjánsson is saying. But I also think there is a certain amount of talking past one another here.

Dunne is intrigued by the particularities of the *phronomoi* lived experience in accurately determining the right thing to do in order to flourish. But he is also clear that he does not equate *phronêsis* with deductivism (pp. 304-310). In talking about the openness of the phronetic approach and how it differs from deductivism, Dunne sees *phronêsis* as a "perfected form of experience in that it is a virtue which makes the experience of some people (the *phronomoi*) not just the accumulated systemization of past actions and impressions, but a dynamic orientation which brings this systemization into play and allow it to be tested by present circumstances, to draw from it what is relevant and to see where it does not fit - in the former case consolidating it, and it in the latter, extending or modifying it" (p.305). For

Dunne, "character is experience" (p.305), and *phronêsis* is a "habit of attentiveness that makes the resources of one's past experience flexibly available to one" (p.306). In contrast to deductivist approaches, with their reliance on practical syllogisms, phronetic approaches "take as [their] point of departure the *problematicity* of minor premises" (p.308). On this view, the "hardset thing about being virtuous … is just being able to see what is really significant in different situation" (p.308). Though this is a complex issue, I think Dunne here subscribes to an epistemic view whereby propositions are not, in and of themselves, necessarily true or false independent of the person (p.308). For instance, take the seemingly general principle 'poisoning another person is blameworthy'. This has a strong *prima facie* appeal. But one can quickly conceive of situations where this is not the case. A doctor administering chemotherapy is effectively poisoning another person. A doctor adminstering a lethal injection to euthanise a person in chronic pain is another. And yet one would not always readily identify the doctor as being blameworthy for such actions.

Here is where context is key. And here is why I think we need to closely examine the normativity of reasons, not only within a universal normative framework (for there are general principles which we ought to live by, subject to pruning and dialectical adjustment based on our experience and other peoples' experiences of the world), but also normative reasons which are person-specific, reasons which objectively speaking count in favour of something (Raz, 2009; Scanlon, 1998). It is only then that the reasons on which we argue count in favour of a belief or action will make sense.

5.6.1 Can Normative-Reasons be Person-Specific?

Earlier I presented a definition of critical thought that relies on the *phronimos* stress-testing reasons to accurately determine undefeated reasons for acting in the practical domain. In the debate between Kristjánsson and Dunne above, there appears to be a level of disagreement about the place of particulars in our knowledge of universals. Kristjánsson accuses Dunne of jettisoning universals in favor of particulars. But how does this affect my conception of critical thought? Firstly, let me review

again what I have argued for throughout this chapter: reasons count in favour (or against) something (Scanlon, 1998, p.17). This is a generally accepted principle in epistemology (Broome, 2013, p.54; Dancy, 2000, p.1; Parfit, 2011, p.31; Raz, 2009, p.18; Scanlon, 1998, p.17). Normative reasons are reasons that bear on whether to ϕ. Motivating reasons are your reasons for ϕ-ing or the reasons for which you do, while explanatory reasons are the reasons why you did ϕ'd. Reasons, therefore, can be taken to be ordinary facts or true propositions that stand in a certain relation to an agent and a type of response that the agent can give. On this basis, to ask the normative question, is not to necessarily ask whether there is some standard according to which some course of action counts as irrefutably correct (Raz, 2009, pp. 19-23). Instead it is to ask whether a given standard is authoritative or binding for a person given the available reasons they have access to at the moment in time in which they reach a decision about what to do. Once such reasons are given and accepted as decisive reasons for issuing a certain response, the normative question is answered. In this thesis I take the first-personal deliberative dimension of normativity to be fundamental. On this account, any claim to normative authority must ultimately be grounded in reasons that matter in first-person deliberation. But unlike Dunne who might arguably locate *phronêsis* in this category (see p.314), my conception also incorporates (necessarily so) the second-personal dimension of 'advice' and the third-personal dimension of 'criticism'.

Dunne claims the *phronimos* "never slips into thinking that the perspective of the third person analyst (or theoretician) can replace this standpoint or obviate the need for insights of the kind which only it can provide" (p.314). Here is where I diverge from Dunne. I agree that a third personal perspective based on reasons need not necessarily obviate the first-personal insights of the *phronomoi*. But rather than deem these insights from third-personal perspectives to be an impediment to critical thought and practical wisdom, I consider them to be necessary virtue of the *phronimos*. As I have argued before, phronetic judgment determines undefeated reasons for action through dialectical discussion of reputable opinions (*endoxa*) (Cooper,

1975, pp.66-70), and prudent deliberation based on atypical situations, which require a deep sensitivity to, and robust understanding of particularities (Wiggins, 1980; McDowell, 1998). Like Kristjánsson, I think there might be a danger in conceptualizing the *phronimos* along the lines of an infallible evidence internalist whereby evidence [phronetic experience] is "driven toward the purely phenomenal" (Williamson, 2000, p.173). In such a case, all meaningful reasons-based external advice and critique are automatically ruled out since the *phronimos* only considers evidence in the form of phenomenal experiences or propositions about such experiences. The ramifications of this position are clear: only people who have experienced racism are qualified to theorize about it; only those who have experienced loss are qualified to pronounce on such matters. Finally, in terms of education, the same principle applies: only those who have taught or are teaching are properly positioned to theorize about teaching and learning. It is this insider perspectivism and experiential particularism that Kristjánsson takes issue with (p.458).

Contrary to this insider perspectivism and evidence internalism however, my conception of phronetic judgment, determined through stress-testing the strength of reasons, incorporates the necessary condition that the *phronimos* actively engage in second-personal advice and third-personal criticism. Deliberative excellence is only possible when all *relevant* and *available* cogent reasons are stress-tested. For a variety of reasons, relevant and available reasons are not always within the immediate grasp or understanding of the cognizer. There is no excuse for the *phronimos* through the distinct cognitive states in which they grasp the world around them, namely, perception (*aisthêsis*), representation (*phantasia*), and intellect (*nous*) or thought (*dianoia*), for not actively seeking out *a fortiori* contrary reasons (outside their circle of experience) when it comes to deliberation. Failure to do so is tantamount to assuming that one's individual circle of experience is a) unintelligible to anyone but the agent, b) superior to other circles of experience, c) superior to the collective circle of experience. If such a position is adopted, all meaningful progress is effectively ruled out from the outset. What is more, such a stance suggests

that no learning or wisdom can come from other people's experiences. For these reasons, I argue for the importance of the *phronomoi* stress-testing the normative force of all relevant and available reasons so that they can accurately determine the right thing to do.

5.6.2   Phronêsis and Avoiding the Spectator Theory of Knowledge

In his paper *Ever Since Descartes,* Hilary Kornblith (1985, pp.264-276) offers a promising way of overcoming Dewey's (1960, p.196) incisive critique of the 'spectator theory' of knowledge. These are worth considering since they directly bear on the epistemic status of phronêsis. For Kornblith, there are two different objects of epistemic evaluation, and these objects may each be evaluated from either of two perspectives, specifically subjectively or objectively (p.273). Evaluating the epistemic status of beliefs or actions therefore requires answering the following questions: 1) "was the belief arrived at by way of an objectively correct, that is, a reliable process?; 2) was the belief arrived at via a subjectively correct process? [right motivations & desires]; 3) were the actions which were performed objectively correct, i.e., did they induce reliable belief acquisition 4) were the actions which were performed subjectively correct i.e., were they regulated by a desire for the truth?" (p.273). In this account Kornblith moves beyond reliabilism and instead looks to a virtue led form of knowledge, one which fits with the reliabilist virtue approach extended by the Aristotelian model of phronêsis. Kornblith thus suggests the knowing state must satisfy both internal and external criteria of evaluation. This combined internalist/externalist account fits nicely with considering practical knowledge as knowing "what one should do" (Anscombe, 1957, p.13). Further, it emphasizes the importance of being attuned to the significance of deliberating the comparative merits (through advice and criticism) of *a fortiori* contradictory reasons, which, may or may not, change the course of the ultimate decision. On this basis, I frame phronetic knowledge as follows:

> I know that I should do φ, *ceteris paribus*, *iff*
>
> φ is *actually* the right thing to do (given the decisive or *pro tanto*

reasons available to the agent at time *T*)

ii) I believe that (i) is true

iii) I am *strongly* justified (through stress-testing the normative force of relevant reasons), and as a consequence, now have undefeated reasons for believing that (i) is true at time *T*

In my account, I consider advice and criticism to be a necessary condition of both the deliberative excellence and decision of the *phronimos*. After all, in some respects, "who we are and who we become is [in some way] determined by the things both said to us, and importantly, said about us" (Blake, Smeyers, Smith & Standish, 1998, p.13). Moreover, as Aristotle points out, an individual's happiness must also involve the good of fellow members of a community (1097b8-11, 1169b16-19). Thus, failure to engage in a meaningful collaborative process might potentially render each *phronimos'* decision (*proairesis*) beyond reproach. It might also locate this decision as an exclusively individualistic pursuit where individual agents' pursuit of flourishing trumps other competing concerns. This is neither healthy nor desirable since it shuts down all meaningful rational debate from the outset. Aristotle, as we know, locates the virtues within the individual. I view these virtues of the *phronimos* not as unassailable excellences (*aretē*) incapable of refinement as Aristotle did (1122b15, 1141a12).

Instead I see these virtues as being enriched, pruned and refined through the advice and criticisms springing from the collective lived experience of other *phronimoi'*s critical perceptions and insights, which together, move beyond understanding knowledge, in Dewey's terms, as a passive, "beholding" relation between the knower and the object known (Dewey, 1938/2003, p.19). When it comes to the deliberative aspect of phronêsis as inquiry, there are several parallels with John Dewey's (1938/2003) rejection of the 'spectator theory of knowledge'. Dewey (1960) in his later work, *The Quest for Certainty*, maintained that most of the intractable complications connected with the problem of knowledge spring from a single root. As he

puts it,

> They spring from the assumption that the true and valid object of knowledge is that which has being prior to and independent of the operations of knowing. They spring from the doctrine that knowledge is a grasp or beholding of reality without anything being done to modify its antecedent state-the doctrine which is the source of the separation of knowledge from practical activity. If we see that knowing is not the act of an outside spectator but of a participator inside the natural and social scene, then the true object of knowledge resides in the consequences of directed action (Dewey, 1960, p.196).

Dewey's dismissal of the spectator theory of knowledge is based on his denunciation of the contemplative theorist who, through some sort of passively received Augustinian illumination and privately formulated systemization in the recesses of their minds, acquires knowledge, not as a fallible rational belief open to scrutiny, but rather as a proposition or propositions based on a relative degree of certainty (Putnam, 2010, p.37-38). Here knowledge is to be acquired in the Platonic sense, as opposed to being actively generated by agents pursuing a line of enquiry. On this view, the knower is envisioned as a kind of voyeur; their objective is come to know the world from a practically disengaged and disinterested standpoint. In contrast, Dewey's 'anti-intellectualist', much like in our account of phronêsis, sees the knower or enquirer as an active pursuer of practical wisdom; a dynamic agent enmeshed in a particular situation seeking the right thing to do in the given circumstances. In many respects this necessitates the *phronimos* being conceived as a kind of experimenter, not merely an aloof contemplative theorist who reaches Cartesian-like certainty from the comfort of their armchairs (Putnam, 2010, p.39). Thus knowledge of what one should do is a social product, an accumulation of common intellectual property, made up of what Dewey (1960) refers to as "funded experience" (p.249), a kind of phronetic experience on which all may draw to help decipher what one should do. This avoidance of spectator accounts of knowledge leaves the *phronimos* better placed to seek counsel, to seek

contradictory reasons, to allow for the textured immediacy of an irreducibly complex situation, before they then move to deliberate, and thereupon execute, judgment in the practical domain.

5.7   Conclusion

This chapter provided a new definition of critical thought, one that combines a clear definition of the concept along with an explanation of its performative function with in accurately determining what one ought to do. This makes it clear what critical thinking amounts to as a noun, and just as importantly, what it amounts to as a verb. From here, the justification supporting the normativity of reasons is scrutinized in order to demonstrate that, there are (on occasions) objectively discernible 'good and bad reasons' for belief and action respectively. Following this, a typology of necessary, but not always sufficient reasons central to the optimal functioning of critical thinking were formulated to determine what types of reasons critical thinkers ought to consider when making their deliberations. These include: (i) evidential force and relevance; (ii) undefeated reason and reason defeaters, and, (iii) explanatory and motivating reasons. Given the complexity of the types of reasons with which critical thinkers ought to be intimate with, I argue for the determination of reasons that 'count in favor of an action' being conducted by a *phronimos*. I further argue that the *phronimos'* character, attentiveness to particularity and reasons, and capacity to intelligently reflect on lived experience under the umbrella of deliberative excellence, make them the ideal candidate to determine, and subsequently stress-test, which reasons, on which occasions, merit consideration as probatively forceful. From here I then consider some of the key criticisms of particularism advanced by Kristjánnson (2005), which relate to my neo-Aristotelian conception of critical thought based on reasons-normativity. To conclude, I briefly examine the merits of phronêsis in avoiding a spectator approach to knowledge, one where a disinterested and disengaged agent is the gatekeeper of what we can rightly classify as knowledge.

Chapter Six: The Dispositions of Critical Thinkers

6.1   Introduction

Most theorists agree that, in addition to skills or abilities, criticality also involves dispositions (Barnett, 1997; Ennis, 2015; Norris, 1992; Passmore, 1967; Siegel, 1988; 1997). Going back to Gilbert Ryle (1949) with his knowing-how and knowing-that distinction, the reason behind this is as follows - it is not enough to be able to do something - one must likewise be disposed to doing it. There is no point having the ability to do something, should one not be disposed to carry out its performative function. Accordingly, the ability to think critically is distinct from the disposition to do so. Dispositions thus comprise the DNA of a critical thinker, engendering, "consistent internal motivations to act toward or respond to persons, events, or circumstances in habitual, yet potentially malleable ways" (Facione, 1990, p.64). To effectively teach critical thinking therefore, educationalists must first develop a deep understanding of dispositions - in other words - the attitudes or habits of mind, otherwise referred to a "critical spirit" (Passmore, 1967, p.28). Building on the work of the theorist Ennis (2015) with his original list of twelve dispositions embodied in the idealized critical thinker, this chapter adds, or substantively revises, a further ten necessary dispositions to the taxonomy (duly marked with an asterisk to avoid confusion: see Figure 4 below). To avoid explicating these dispositions *in abstracto*, this short chapter draws upon a murder trial to demonstrate the central role dispositions play in critical thinking (Ennis, 2015, pp.31-45).

Never block the path of enquiry *

Question Framing: What is at issue here?

Always make reasoning visible (*Nihil sine ratione*) *

Stress-test all knowledge claims *

Try to be well-informed

Seek credible sources and evidence to defend assumptions and substantiate conclusions *

Take into account the total situation

Identify & discard unwarranted assumptions *

Focus on context within which judgment is situated

Scrutinize the cogency of alternative hypotheses

Be open and fair-minded

Avoid confirmation bias *

Suspend judgment when evidence and reasons are insufficient

Adopt a defensively rational position based on the strongest reasons possible *

Strive for as much precision as the situation permits

Strive for accuracy in detail and judgment Employ metacognitive / self-regulatory awareness *

Employ Metacognitive / Self-Regulatory Awareness *

Absence of evidence does not mean evidence of absence *

Avoid conflating correlation with causation *
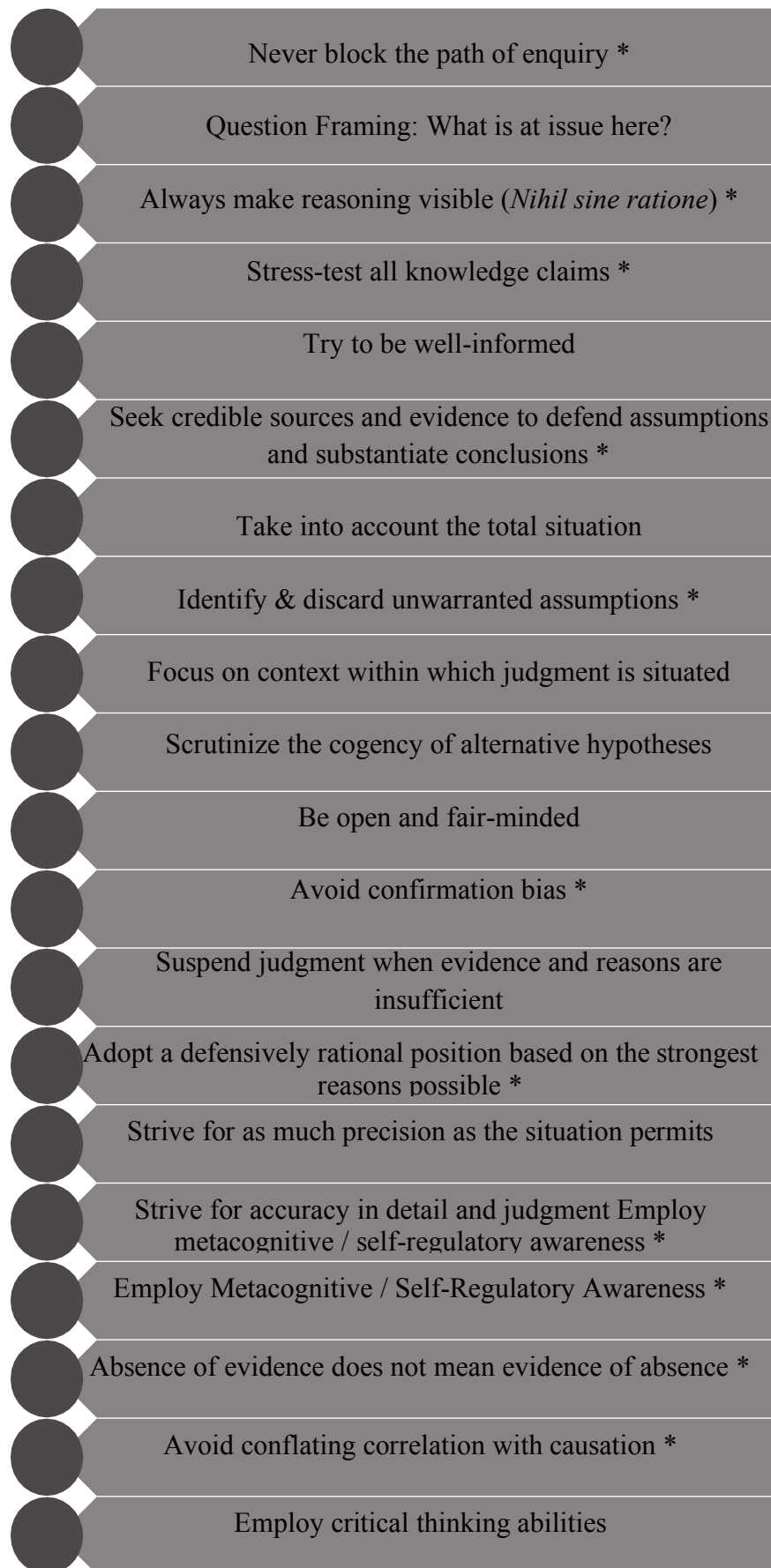
Employ critical thinking abilities

Figure 4: The Dispositions of Critical Thinkers

6.2   The Murder Trial

Here the defendant, Arlene, is charged with murder and voluntary manslaughter resulting in the death of her companion, Al, late one night in her parents' kitchen. Having spent the evening together, Arlene and Al drove back to Arlene's parents' house, where she was living at the time. The prosecutor argued that Arlene was jealous of Al's alleged relationship with another woman and lured him into the dining room where she stabbed him in the heart with a kitchen knife. There were no witnesses to the stabbing.

Soon after the stabbing, Arlene went to her parents' room and woke them, whereupon they immediately called an ambulance. The victim was dead when the ambulance arrived. No-one except Arlene witnessed the events leading up to the killing, or indeed, the killing itself.

Though the defendant was charged with voluntary manslaughter as well as murder, it is easier to deal with the charge of murder as it was rigorously defined for the jurors.

During the trial, the judge instructed the jurors that, in order to sustain the charge of murder, the state must prove the following propositions:

1. The defendant performed the acts which caused the death of the victim;
2. That when the defendant did so, she intended to kill or do great bodily harm to the victim, or she knew that her acts would cause death or great bodily harm to the victim, or she knew that her acts created a strong probability of death or great bodily harm to the victim;
3. That the defendant was ***not justified*** in using the force which she used.
4. If you find from your consideration of all the evidence that each of these propositions has been proved beyond reasonable doubt, then you should find the defendant guilty.
5. Should you, on the other hand, find from your consideration of all the evidence that any of these propositions has not been proved beyond a reasonable doubt, then you should find the defendant not guilty (Ennis,

2015, p.34)

6.2.1 Never Block the Path of Enquiry (Peirce, 1958) *

The first disposition can be summarized as follows: never adopt a methodological stance that would prevent the discovery of something that could turn out to be true. With reference to the case above, any juror who states that one cannot prove factual theses 'beyond all reasonable doubt', immediately falls victim to a form of radical scepticism. Radical skeptics embrace the 'never accept anything' principle, and consequently do nothing but block all meaningful progress from the very outset. What should prevent the acceptance of a factual claim is the discovery of its falsity through the detection of some other factual claim that is incompatible with it (Rescher, 2012). Further, any juror who argues that it is impossible to prove 'beyond reasonable doubt' that the defendant is guilty, risks their default position being unassailably fixed on a 'not guilty' verdict in all prosecution cases.

In this scenario, the burden of proof lies with those attempting to prove a given conclusion beyond 'reasonable doubt'. According to this flawed approach, it is up to the lawyers to refute the radical skeptic's methodological stance. Here, the lawyers must prove matters beyond 'reasonable doubt'. This, of course, is an impossible task for anyone trying to prove an identified fact, since my methodological stance (radical scepticism) precludes the discovery of anything that may contradict its stance, and by extension, any conclusion that falls outside this domain.

6.2.2 Question Framing: What is at Issue Here?

In relation to the trial, the second disposition embodied in critical thinkers calls for them to seek out and offer clear statements of the question with which they are seeking an answer. This includes a deep knowledge and understanding of the methodological framework employed and conclusions reached (Bailin & Battersby, 2015). To successfully carry out this function, critical thinkers must be skilled in the art of enquiry-based interrogative and forensic questioning. This mode of questioning refers to the art of asking the right questions, at the right time, in the right way, and in the right order.

Such questions might explore plausible alternatives, probe causes, explore different viewpoints or perspectives, or simply, seek clarification (Paul & Elder, 2009). Forensic questioning of this nature is akin to a scalpel painstakingly slicing through non-salient information and data to clarify the precise nature of the problem at hand. Correspondingly, the quality of the answers generated as a result of the given enquiry, will only be as good as the caliber of the questions used to elicit said responses.

There are three distinct yet inter-related parts to this important disposition. Taking the example of the court case, it becomes clear that the ideal critical thinker must seek and establish clarity about the issue at stake. For this purpose, there is an urgent need to understand context, especially the legal framework and parameters within which we are asked to reach a decision (Ennis, 2015). For proposition 1, murder does not require intent to kill. To prove/disprove this proposition, jurors are instructed to determine beyond reasonable doubt whether "the defendant performed the acts which caused the death of the victim". This is ultimately a decision reached by means of determining the evidential force of the reasons given by the pathologist in relation to the following question: "did the knife wound cause the death of the deceased?"

The business of proving/disproving proposition 2 is a far more complicated matter. Here the jurors must establish whether the defendant "intended to kill" or "do great bodily harm", or if she "knew that her acts created a strong probability of death or great bodily harm" (Ennis, 2015, p.35). Proving intention on the part of the defendant to "kill" or "do great bodily harm" requires forging a sharp distinction between, on one hand, there being a strong *probability* of great bodily harm, and on the other, the defendant's *knowing* that there was such a probability.

This crucial point requires further elucidation. Suppose a person called John is at his stag party. By way of a prank, his friend Michael decides to scare him by changing his fiancé's number on his phone,. Now, Michael's number corresponds to the man's fiancés number. Then, during the celebrations, he sends a text to the man posing as his fiancé saying he can't

go through with the wedding because she is in love with a different man. In an inebriated state, the stag fails to cop this is a ruse. Devastated, he goes into cardiac arrest and dies. This scenario illustrates is the importance for critical thinkers to forge a clear distinction between 'a strong probability of great bodily harm', and the man *knowing* there was such a probability. In this case, the deceased stag's friend, clearly didn't know he had a pre-existing heart condition and therefore, his actions, whilst foolish and ill-considered, could not be characterized as him *knowing* there was a probability of great bodily harm.

6.2.3 Always Make Reasoning Visible (Nihil sine ratione) *

Thirdly, since 'nothing is without a reason', critical thinkers are disposed to seek out and uncover the reasons for a person's given beliefs/thoughts or actions (Leibniz, 1695/1989). Since all our beliefs/thoughts and actions are based on reasons, critical thinkers need to be expert at making all forms of reasoning visible. They furthermore subscribe to the principle that nothing can be so without there being a reason/s why it is so. This is otherwise known as the principle of 'sufficient reason' (Leibniz, 1695/1989). Simply put, it states that:

- For every entity X, if X exists, then there is a sufficient explanation for why X exists.
- For every event E, if E occurs, then there is a sufficient explanation for why E occurs.
- For every proposition P, if P is true, then there is a sufficient explanation for why P is true (Leibniz, 1695/1989).

To investigate worthy explanations of entities, events or propositions, critical thinkers seek out and offer clear reasons for a person's beliefs and actions. As a disposition, they strip away the unnecessary adornments that sometimes cloud arguments. Taking the example of the court case above, they ask: what reasons support a guilty/not guilty verdict? Since jurors express different opinions regarding the verdict, it is imperative to make each person's *reasons* explicit, because without these, it is impossible to make an informed judgment on the *sufficiency* and *acceptability* of the

conclusions proffered.

In short, this disposition can be summarized as follows: maintain nothing substantive without good reason, and "always be in a position to give cogent reason for every doctrinal contention you maintain" (Rescher, 2012, p.5).

6.2.4 Stress-Test all Knowledge Claims *

Once reasons in support of a given belief, action or conclusion are isolated, critical thinkers are then disposed to scrutinize the cogency or convicting force of these reasons. This requires subjecting reasons to a stress-test to determine which set of reasons are strongest. By subjecting reasons to stress-tests, the critical thinker exposes their flaws and weakest points. This process puts us in an ideal position to make an informed judgment as to which set of reasons, are in fact, strongest, and by extension, worthy of provisional acceptance. Similarly, this also provides us with the precise location of the weakest link/s that require urgent revision or removal. In addition, the process of stress-testing the cogency of the reasons clearly exposes whether these reasons (links), for a given belief and action, are warranted.

A critical thinker is analogous to an engineer whose job is to determine whether a bridge can hold the weight of a car. Imagine the car is what a person believes or does, and the bridge is the reasons on which they base their judgment. The task of the critical thinker is to determine whether the bridge (reasons) are strong enough to stop the car (beliefs/actions) from dropping into the sea below. By exposing the weakest points on the bridge, the critical thinker shows the engineers (teachers, students) precisely where they need to improve their reasoning, so that the bridge (reasons) can be fortified or improved in order to sustain their beliefs or actions.

To stress-test reasons, critical thinkers look to the principle of 'sufficient reason'. Does X provide a sufficient explanation for why X exists, occurs, or why it is true? Are there better explanations for these phenomena? Can we conceive of exceptions to generally-held rules? Does context dictate,

and if so, to what extent, what we putatively accept as a sufficient explanation? Are there any situations that defy the majesty of language and thought in terms of their explicability? Is it conceivable that what is accepted as a sufficient explanation in one domain of thought/experience, might not necessarily transfer into another? These are the sorts of questions with which critical thinkers ought to frame their enquiries. Outside the domain of logical reasoning, these sorts of questions move critical thinkers to consider the merits of particularities over universalities, and situations where the ineffability of experience (individual/relational, or both) in the shape of *qualia* are at stake.

6.2.5   Try to be Well-Informed

This case requires that the jury arrive at an informed judgment on whether the defendant is guilty or not guilty. Such an evaluative judgment requires carefully sifting through expert testimony and marshaling relevant information pertinent to the case. Principally this means satisfying the principle of informative adequacy (Rescher, 2012). Put simply: do I have enough relevant information in order to reach an informed, reasoned conclusion?

The example of the court case raised requires the critical thinker to make an informed judgment on whether:

1) The defendant performed the acts which caused the death of the victim; and

2) That when the defendant did so, she intended to kill or do great bodily harm to the victim, or she knew that her acts would cause death or great bodily harm to the victim, or she knew that her acts created a strong probability of death or great bodily harm to the victim.

Proposition 1 asks jurors to judge whether the defendant 'caused the death' of the victim and also reach a conclusion as to whether the defendant 'intended to kill' or 'do great bodily harm' to the victim. For purposes of legal exactitude and integrity, two conditions must be satisfied in order to warrant a murder charge: *causality* and *intentionality*.

This decision is predominantly based on the testimony of the expert witnesses (the pathologist). The two key questions in play are: did the knife wound cause the death of the victim, and did the defendant *know* that the act of stabbing the victim would likely lead to great bodily harm or death? To answer this question, jurors need to measure the force of the knife attack and decipher if the defendant knew that the force exerted was sufficient to bring about great bodily harm or death. This is a key feature in judging whether the last sub-condition of the second condition for murder had been satisfied.

6.2.6 Seek Credible Sources and Evidence to Defend Assumptions and Substantiate Conclusions *

In the context of the trial, the pathologist's expert testimony was pivotal in reaching a reasoned conclusion. Her testimony gave the jurors sufficient grounds on which to correctly adjudge the strength of the knife wound. The scientific observations on which she based her conclusion were also deemed credible and rationally convincing. In this case, there was no conflicting or contradictory testimony. The acceptability of the conclusions were straightforward and scientifically sound.

6.2.7 Take into account the total situation.

This disposition demands that the critical thinker take into account the totality of the case put in front of them. To determine if the defendant had an alterative to stabbing Al, it is first important to establish if the defendant had a viable and alternative course of action. This is problematic, given that the altercation leading to the death of the victim happened so quickly. Occasionally there is a tendency (which the critical thinker must avoid) to allow hindsight to cloud their judgment.

6.2.8 Identify & Discard Unwarranted Assumptions *

On this occasion, however, the jurors were satisfied that, even if he had threatened her, she still had the option of fleeing to her parents' room. What is curious about this deliberation is that the "flight reflex" which is deeply embedded in each of us on an evolutionary level, often tends to be privileged over the "fight reflex", and in keeping with this line of reasoning,

ultimately deemed the more rational course of action. At all times, critical thinkers must exhibit an unwavering determination to carefully sift through and recognize unwarranted assumptions. Only then, can these assumptions be excavated and discarded (Brookfield, 1995).

6.2.9 Focus on Context within which Judgment is Situated

Though not every decision we must make asks us to select between two narrowly defined options, critical thinkers must keep in mind the issue at stake, especially within the context-specific particularity of the situation they are asked to scrutinize. For the most part, this involves triaging the importance of the questions that need to be tackled. In this instance, the main question, "Is she guilty of murder?" was in danger of being obfuscated by the sub-question of whether she knew that her acts created a strong probability of great bodily harm to the victim. Some jurors argued as if they thought the question was whether her acts *actually created a strong probability* of great bodily harm, rather than whether she *knew* this. To clarify matters, "they needed to be reminded again of the actual wording" (Ennis, 2015, p.35).

6.2.10 Scrutinize the Cogency of Alternative Hypotheses

It is imperative that critical thinkers not only remain alert to possible alternatives, but that they also remain disposed to weighing up the convicting force and merits of said alternatives (Willingham, 2007). Here the judge requires the jurors to make a judgment on whether the defendant fleeing to her parents' room was a viable alternative or not. To make a cogent decision with regard to the above, each alternative course of action must be rigorously scrutinized to ascertain if, it was in fact, a viable alternative. The jurors' eventual conclusion found that, this alternative, was in fact, a viable option after all. Such a conclusion resulted in them finding her guilty of voluntary manslaughter (Ennis, 2015, p.36).

As one would expect, the conclusion reached by the jurors is contentious. There was an assumption on the part of a few of the jurors that a nonviolent alternative was a more appropriate and justified course of action. The central assumption is that fleeing, rather than engaging in forceful

213

resistance, was a more viable and justifiable course of action. In this particular case, one could argue that, since Arlene was threatened with violence, she would have been justified in stabbing the victim, and therefore, should have been found innocent on the counts of both murder and voluntary manslaughter.

6.2.11 Be Open and Fair-Minded

It is often remarked that the mark of an educated mind is to be able to entertain a thought without accepting it. In keeping with this suggestion, critical thinkers must be skilled at determining the merits of different opinions, possibilities, and alternative explanations of phenomena. However, before this, they must be genuinely open-minded (Facione, 1990, 2000; Willingham, 2007). Openness to diverse viewpoints is a positive disposition, but only if this openness is accompanied by a sense of fair-mindedness (Paul, 2012).

In the case of the trial, the jurors unfortunately did not give sufficient thought to the legitimacy of engaging in forceful resistance. They simply "just did not think of it" (Ennis, 2015, p.36). Instead, they determined that escaping to her parents' room was an option the defendant should have taken. Of course, the gap between 'should' and 'could' in this case is quite the jump. Arguably, a stronger argument could be made for the defendant resorting to forceful resistance.

6.2.12 Avoid Confirmation Bias *

Human nature often predisposes us to only consider evidence that already confirms our implicit or explicit hypotheses or conclusions (Kahneman, 2011). Confirmation bias is a type of cognitive bias that involves a selective favouring of data, which confirms previously existing beliefs or biases. For example, consider a person who believes that left-handed people are more creative than right-handed individuals. Whenever they meet a left-handed individual who happens to also be creative, they make the mistake of deeming this to be evidence that supports the view that left-handed people are more creative than right-handed people. Such people tend to discount counterexamples and avoid any data that might disprove or refute their

original views or conclusions (Groopman, 2007).

Confirmation bias can manifest itself in the work of medical professionals such as doctors. Frequently doctors formulate diagnostic judgments about a certain patient during their consultations. To confirm their original diagnosis, they ask questions and seek evidence that fits with this theory. Sometimes this disposition results in clinicians overlooking evidence, which disconfirms their original diagnosis. Confirmation bias presents a problem for the critical thinker. The first step for the critical thinker is to be aware of its existence. To immunize against its effects, it is crucial for the critical thinker to weigh all evidence carefully, including evidence that might disconfirm or refute a position he or she might be heavily invested in (Bird, 2014). In the case of the clinician, a good diagnostician will test his or her initial hypothesis by searching for evidence that directly contradicts it (see Popper, 1972).

6.2.13 Suspend Judgment when Evidence and Reasons are Insufficient
There is no shame in suspending one's judgment in the event that the reasons and evidence supporting a given belief, action or conclusion are deemed insufficient. Such a course of action is merely an exercise in prudence and good judgment (Dewey, 1910). In relation to forced choices, sometimes it is wise to opt for the least unacceptable alternative. Drawing attention to the limitations of alternative positions represents a legitimate means of arriving at the most unacceptable alternative. Demonstrating that a given alternative faces fewer difficulties than its ancillary counterparts, thereby deserving our provisional acceptance (until a better alternative comes to light), exemplifies the performative virtues of rationality (Searle, 2001). With regard to the case, the jurors did consider the possibility that the defendant lured the victim into the house by taking his keys and putting them in her purse (where they were found). After careful consideration of the facts however, they eventually concluded that they held insufficient evidence to prove it was a premeditated act.

6.2.14 Adopt a Defensibly Rational Position based on the Strongest Reasons Possible *
What is meant by a rationally justified position? To adopt a rationally

justified position means aligning one's position with the strongest reasons possible (Rescher, 1988). This position is largely based on the compelling and convicting force of probative reasons and evidentiation (Rescher, 1988). Given that situations require judgments when there is insufficient evidence to warrant a uniformly accepted conclusion, the critical thinker needs to ensure that their reasons are aligned with the best or strongest reasons available (Dewey, 1910; Ennis, 2015; Rescher, 1988). Central to this process is that these reasons are always provisional, and thereby always held on the condition that stronger reasons for an alternative view or judgment may become apparent at any time. Where refutation of one's position emerges as a result of a cogent counterexample being posited, critical thinkers must always remain open to changing their minds (Willingham, 2007).

6.2.15 Strive for as much Precision as the Situation Permits

Considering the parameters of the court case, the pathologists' testimony played a key part in proceedings. Her re-enactment of the strength of the knife stroke, as she reconstructed it based on the measurements and shape of the entry wound was of great help to the jurors in formulating their judgments vis-à-vis whether the defendant knew her acts (the force used) created a strong probability of great bodily harm or death (Ennis, 2015).

6.2.16 Strive for Accuracy in Detail and Judgment

Where there is the task of establishing the truth of the matter, critical thinkers ought to set about appropriate frames of enquiry to accurately determine it. For the purposes of the trial, the jurors carefully examined the testimony of the pathologist, and in particular, her re-enactment of the force exerted by means of the knife wound. Further examination resulted in jurors visiting the scene of the crime and making careful notes based on the layout of the cabinets in the kitchen. This confirmed the pathologist's conclusions about the angle and velocity used in inflicting the knife wound on the deceased (Ennis, 2015).

6.2.17 Employ Metacognitive/Self-Regulatory Awareness *

There is an onus on critical thinkers to be critical of their own reasoning

and judgments (Ellerton, 2015; Lau, 2015). This metacognitive or self-regulatory epistemic dimension is akin to a professional pianist playing a piece of classical music. He/She has been trained to be critical of their playing, their interpretation, tempo and so on. Critical thinkers are likewise attuned to see the weakness in the judgments they make, because these judgments are based on reasons (Siegel, 1988; 1997). The critical thinker is rationally moved by the *strongest set of reasons* in favor of a given position (Siegel, 1988). That said, they also know that sometimes these reasons may not be strong enough to sufficiently warrant a given belief or action. New better reasons may present themselves, which necessitate a contrary position being taken. As such, critical thinkers need to remain open to their judgments being discarded or revised, as and when conflicting evidence and reasons emerge that rationally move the thinker to formulate a different opinion.

The example of anti-virus software might illustrate this better. Think of an antivirus software programme running on your computer in the background. As of today, it protects you against all 1,00000 known viruses, Trojan horses, spyware and adware. But this database must be updated on a daily basis to account for the latest threats to your computer security. A critical thinker must approach the world in this way - their arguments, judgments and actions are governed by the rational endurance of the reasons offered in support of their arguments, judgments or actions. Reasons need to be sufficiently strong in order to rationally move a critical thinker (Siegel, 1988). The reasons which we used to support a given judgment or action are temporally confined to the best available evidence we have at a given moment in time. These reasons should not be stagnant; accordingly, there is a pressing need for these reasons to be continuously re-evaluated, questioned, and stress-tested to determine whether they are sufficient to warrant our beliefs and actions.

6.2.18 Absence of Evidence does not mean Evidence of Absence *
Evidence plays a central role in any form of rational reasoning and enquiry (Mittag, 2014). However, the question of what can rightly adjudged to be worthy of the name remains a contentious issue in education. Whilst there

are no doubt instances where absence of evidence points toward evidence of absence, it is crucial to protect this sort of inference from tumbling into an unwarranted generalization (Hurley, 2012).

Take for instance the view that there is no evidence to support the view that there are harmful effects from GMOs on the environment. Whilst there is currently no cogent evidence to support the argument that GMOs negatively impact on the environment, such a judgment fails to taken into account that causation may take time to occur. To measure crops over a short period of time after introducing GMOs and infer that there are no negative consequences to the environment is the equivalent of deciding a house is completely watertight after just one storm. Determining the house is watertight after just one storm is based on the absence of evidence suggesting otherwise (a wet patch in the ceiling). Of course, it might take several storms to find a small gap in the lead flashing, or find its way under some defunct silicone. In other words, "causation may take time to manifest itself" (Mumford and Anjum, 2013, p.53). Critical thinkers must be vigilant to the fact that what might appear as a lack of evidence for a given claim, *may not always mean* that this lack is *evidence itself* that it does not exist.

6.2.19   Avoid Conflating Correlation with Causation *

It is sometimes tempting to fall victim to fallacious reasoning such as *post hoc, ergo propter hoc* (after the event, therefore because of it). Other problems emerge when critical thinkers fail to consider the complexities of causality, either by means of failing to consider a common cause; failing to consider additional causes; reversing cause and effect, or failing to consider a reciprocal causal relation (Mumford & Anjum, 2013). To avoid this, one must always guard against fallacious inferences of this nature. For example, we often see this type of causal error on a daily basis when it comes to trying to determine what diets, healthy eating regimes and exercise routines are most beneficial. This somewhat humorous narrative thus captures a common causal reasoning error:

> the French eat a lot more fat and suffer fewer heart attacks than
> Americans and the British. The Japanese eat less fat and suffer

fewer heart attacks than Americans and the British. The Italians drink a lot of red wine, and suffer fewer heart attacks than the Americans and the British. Koreans drink little red wine and suffer fewer heart attacks than the Americans and the British. So it seems you can eat and drink what you like - it is speaking English that kills you!

For the last forty years or so, a causal relationship has been assumed between dietary fats (specifically saturated fats) and coronary heart disease (CHD) - known as the "lipid hypothesis". This theory suggests that eating saturated fats causes heart disease, and that low fat diets or those replacing saturated fats with polyunsaturated vegetable oils would cure or prevent coronary heart disease. Conflating causation with correlation, and ultimately failing to consider additional causes, this deeply flawed theory, attributes one significant cause (saturated facts) to one effect (coronary heart disease). For this reason, critical thinkers need to proceed carefully when it comes to determining causation.

6.2.20 Employ Critical Thinking Abilities.

The final disposition on our list relates to the importance of critical thinkers employing their critical thinking abilities. This may seem self-evident, but sometimes it suits us not to be critical of certain inferences or situations, especially those that we are heavily invested in, either emotionally or intellectually (Kahneman, 2011). Herein lies the importance of motivational dispositions; they maximize the chances of critical thinkers utilizing their cognitive abilities, not in just selected instances for instrumental gains, but rather, in *all* of their intellectual endeavors as 'critical beings' (Barnett, 1997).

6.3   Conclusion

Dispositions are central to the development of any cogent and defensible concept of critical thinking (Ennis, 2015; Norris, 1992). In many ways they overlap, but are also interdependent. As key motivational and cognitive traits, dispositions signify the first step on the road to developing a more

complete understanding of what it means to be a critical thinker (Facione, 1990). In line with this objective, the purpose of this chapter was to demonstrate the centrality of dispositions in critical enquiry. Drawing on an example cited in (Ennis, 2015 pp.27-45), the chapter drew on the narrative of an actual murder trial to explicate the importance of dispositions in relation to the performative function of a critical thinker, that being, stress-testing the strength of probative reasons supporting what one believes or does.

Chapter Seven: Barriers to Critical Thought

7.0   Introduction

This final chapter critically examines some of the primary barriers to critical thought. To begin, it analyses the principle of 'bounded rationality', specifically its relationship, vis-à-vis, System I (fast) and System II (slow) thinking (Kahneman, 2011). From there, the chapter demonstrates how a series of pervasive cognitive biases stultify the quality of critical thought (Kahneman, 2011; Tversky & Kahneman, 1974). Though these cognitive impediments predominately draw upon empirical studies to substantiate their findings, the focus of this chapter falls on judiciously synthesizing routine explications of their conceptual insidiousness. To conclude, the chapter critically explores the seminal work of Brookfield (1995) on the nature of assumptions. Specifically, it examines how different types of assumptions (namely, paradigmatic, prescriptive and causal) pose serious challenges to the optimal functioning of critical thought in higher education.

7.1   Defining Bounded Rationality

Broadly speaking, the concept of 'bounded rationality' maintains that, when individuals make decisions, their "rationality" is limited by the tractability of the decision problem, their cognitive limitations, incomplete information about viable alternatives at hand, and the time available to make the decision (Simon, 1957). We are thus bound by "cognitive limits" (Simon, 1957, p.95). For this reason:

> The principle of bounded rationality [is required because]…the capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world - or even for a reasonable approximation to such objective rationality.
>
> (Simon, 1957, p.198)

In an earlier paper, the economist Simon (1955), lists the common constraints of individual rationality, (which themselves are the objects of rational calculation) as follows: (1) incomplete information about alternatives open to choice; (2) the relationships that determine the pay-offs (satisfactions/goal attainment, (3) time, (4) discordance over what ought to be pursued in terms of goals, (5) limited processing abilities, and, (6) vying theories of expected utility or optimization (pp.100-114).

Despite these obvious constraints, individuals are still faced with making a rational decision. At its most basic level - a choice is a selection of one from several possible alternatives. Every choice involves a selection of this kind, be it conscious or not (Simon, 1955; 1972). A decision is a process through which this selection is performed. Rationality is therefore a "criterion used in the decision that is theoretically grounded on the presupposition that the agents are *intendedly* rational" (Barros, 2010, p.2). This, in turn, is based on the presupposition that agents *value* rationality as a criterion of choice (Simon, 1957, 1972; Barros, 2010).

Under these conditions, for wholly understandable reasons, individuals seek something that is 'good enough', something that is satisfactory (Simon, 1957; 1972). When shopping, for example, one might be tasked with buying a roast chicken for dinner, but when pressed for time, end up purchasing chicken kievs instead. In this way, we often settle for something we deem *good enough* or *acceptable,* though, not necessarily optimal. This real-world behavior is what Simon (1957) called "satisficing" - the decision to pursue a course of action that will satisfy the minimum requirements (some pre-established criteria) necessary to achieve a particular goal (pp.204-5).

'Satisficing' attends to the reality of judgments, which must be made under certain real-time conditions. Unlike classical understandings of rationality (see Searle, 2001), which examine how one ought to proceed under ideal conditions (where time is not a factor) this principle argues that most people settle for something that is 'good enough' rather than 'optimal'. This is an obvious strength of the principle since it attends to the mechanics of how

people really act, as opposed to how they should ideally act (Sternberg, 1986). But in forfeiting the putative optimum (the best we can achieve under the circumstances) and supplanting it with something that is 'good enough', but not necessarily the best we can achieve under the circumstances, *cognitive quality* is sacrificed for the more appealing benefits of *cognitive economy*.

This explains why many of us succumb to the allure of 'bounded rationality' (Kahneman, 2003). As we are limited capacity information processors, reliant on low-effort strategies to reduce our complex world into digestible cognitive chunks, we often choose the path of least resistance when making judgments about what to believe or do (Halpern, 2014). 'Satisficing' compels decision makers to search for alternatives that are good enough to meet some pre-established criteria (subjectively ordered) instead of trying to maximize values in a given choice. In so doing, the decision maker 'satisfices' if he or she chooses an alternative that "attends or exceeds a set of minimal acceptability criteria, or if he or she chooses a satisfactory alternative, but one that is not necessarily the best" (Barros, 2010, p.4). In sacrificing optimization, and embracing *cognitive economy* over *cognitive quality*, 'satisficing' leaves us with a heavy price to pay; it jettisons our critical faculties and leaves us open to systematic biases and errors (Halpern, 2014). The effects of this approach emerge in two key areas, namely System I and System II thinking, and cognitive biases (Kahneman, 2011).

Cognitive biases are a series of delineated deviations from prototypical decisions grounded in rationality. Kahneman (2011) argues there are two traditional modes of thinking, specifically: (i) System I, intuitive or automated thinking (fast); and (ii) System II, thoughtful, conscious and deliberate thinking (slow). System I is the type of thinking characterized by 'bounded rationality' where agents make decisions based on, in some cases, expediency and the path of least resistance. System II thinking, conversely, involves a slow and thoughtful weighing of viable options and utility values. In a world where time is often our enemy, people sometimes operate out of a System I approach. What makes System II more desirable though,

is perhaps also the reason why it often tends to be overlooked - it requires time, patience and perseverance, and it requires attention to detail, context, and careful deliberation (Halpern, 2014; Simon, 1972).

Unfortunately, in a world where occasionally one must make time-sensitive decisions in real time, System II thinking is frequently sidelined (Frederick, 2005). One possible reason for this is that System II thinking requires an excessive level of processing that is not always conducive to the rhythm of living, especially given our need to perform everyday tasks such as washing and ironing, which themselves require background processing. More than 100 cognitive, decision-making, and memory-related biases have been documented in the literature, with research in cognitive and social psychology continuously revising and identifying new biases (Kahneman 2011). The review that follows critically examines a selection of some of the most entrenched cognitive biases that stultify critical thought. To further narrow the selection, I focus on biases most often encountered in mainstream experiences of students and lecturers alike.

7.2   The Difference between System I and System II Thinking

Before we begin, we must first clarify the distinction between System I and System II thinking. An easy (and fun) way of forming a distinction between System I and System II thinking is to subject ourselves to three questions put forward in the Cognitive Reflection Test (Fixx, 1978, p.50).

1. Suppose the following:

   1. A bat and a ball cost 110
   2. The bat cost 100 more than the ball.
   3. How much does the ball cost? (Kahneman, 2011, p.44)

Intuitively, most of us will calculate the answer to be 10 cents. But this is wrong. According to this answer, the bat is 1 euro and the ball is 10 cents. However, this makes the bat 90 cent more than the ball. Remarkably, over half the students at Harvard, MIT, and Princeton answered this question incorrectly (Frederick, 2005).

The answer can be laid out as follows:

Two equations:

Bat + Ball = 1.10

Bat - Ball = 1.00

Combine the equations:

2*Bat = 2.10

Bat = 2.10/2 = 1.05

Answer: Ball = 1.10 - 1.05 = **.05** (Kahneman, 2011, p.44)

2. It takes five machines five minutes to make five widgets, how long would it take 100 machines to make 100 widgets?

Some people give the answer of 100 for this. Again, this is incorrect. The answer is five. What this illustrates is how frequently we respond to problems intuitively, without care and adequate consideration. It demonstrates how often we use system 1 thinking in our everyday lives. We have become accustomed to using system 1 thinking to approach our world to the detriment of system 2 (Halpern, 2014; Kahneman, 2011).

3. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the lake?

To solve this puzzle, it is best to work backwards. Perhaps a hint is a good idea at this stage. If the lake is covered on the 48th day and the area covered by the lilies doubles each day, how much of the lake is covered on the 47th day? The answer is half. By working backwards, the answer becomes slowly apparent (Fixx, 1978).

These examples demonstrate the frequency with which we approach seemingly simple problems with a System I approach. More pointedly, they show us that our first thought is not necessarily our best thought. Cognitive psychologists have devoted a huge amount of time and effort to devising reproducible experiments that demonstrate the conditions under which we

succumb to cognitive biases when forming beliefs and overt behaviors (Kahneman, 2003; 2011; Tversky & Kahneman, 1974).

7.3   Confirmation & In-group Bias

Confirmation bias is the tendency to seek and interpret information that confirms pre-existing beliefs, either consciously or unconsciously held (O' Brien, 2009). Frequently referred to as 'my-side bas', it emphasizes the tendency to prefer evidence that supports what they believe to be true (Stanovich & West, 2008). Evidence of this bias are evident on social media, say twitter for example, where people are far more disposed to tweet articles that in some way correspond to their own views on politics or social issues. Not only do they seek out articles that confirm their previously held beliefs, they tend to ignore narratives or arguments, which contradict their entrenched cognitive positionality.

Relatedly, there is the issue of in-group bias, or "groupthink" (Janis, 1972). This can be seen when you trawl through your Facebook contacts and look for examples of friends who post articles or updates which are the antithesis of your own privately held views. For example, on a typical 22-year-old 'liberal' girl's account, it will be unlikely to find any of her friends who share articles that rigorously oppose same-sex marriage. This is because we are predisposed to seek out and enjoy the company of those who agree with us. This is the same reason why we tend to visit websites that align with our own political opinions, and why we socialize with circles of friends who hold similar views and tastes. In truth, many of us find it deeply uncomfortable to be in the presence of, (either physically or digitally) individuals, groups, and news sources that make us feel uncomfortable or insecure about our views. Not only is this a deeply ingrained trait, but it is also actively reinforced by virtue of algorithms designed to feed you exactly what you want to see and hear. Facebook and Twitter are both based on this simple business model. So sophisticated are their algorithms, they can predict with reasonable accuracy what articles you would like to read, diet plans you would like to try, photos you would like to see and so on. To all degrees and purposes, these social media platforms are

incubating groupthink and confirmation biases.

Similar biases propagate websites utilized by academics to disseminate research, namely, www.researchgate.net and www.academia.edu. Again, in both cases, algorithms data mine your areas of expertise, and show you content directly related to this field. Rarely will you come across articles from different domains of expertise that diametrically oppose your viewpoints. Rarely will you search for articles that vehemently oppose your positionality. This brings us back to Popper (1953) and his idea of what a good scientific theory amounts to: one that is easy to refute or disconfirm, rather than one easy to find multiple confirmations of. Likewise, academics (some, certainly not all) are inclined to seek out authors whom agree with them, far quicker than those who do not (Nickerson, 1998).

Take another example of an evangelical Christian from the southern states in the US. It is again unlikely to see her Facebook friends' list contain any hardened atheists. What you will invariably see are friends who share similar religious values. When we live according to the diktats of confirmation bias, we willingly confine ourselves to an echo chamber where all we hear are views that confirm our own original opinions or beliefs, over and over again. Such behavioral patterns are in part because we are afraid of, what the behavioral psychologist Leon Festinger (1957) calls "cognitive dissonance". Avoiding cognitive dissonance may stem from several interwoven causes, but one possible cause might derive from us lacking the cognitive capacity to disagree agreeably. We may also find such views distasteful or offensive. Alternatively, we might choose to go to extraordinary lengths to avoid contrary evidence or opinions, largely because we have already made our decision about what to believe or do.

Consider a version of the classic experiment known as the Wason Card Task (Wason, 1966) in which participants are presented with four cards on a table. Participants are told that each card has a letter on one side and a number on the other. They can see one vowel, one consonant, one odd number and one even number facing up on the cards (e.g., A, B, 3, and 4).

Their task is straightforward - they must test the following hypothesis: "if a card has a vowel on one side, it has an even number on the other." They are to turn over only the cards that are necessary to determine whether the hypothesis is true.

Logically, the correct answer is to turn over the vowel (which must reveal an even number, for the rule to be valid), and the odd number (which must NOT reveal a vowel, in order for the rule to be valid). When it came to the original experiment, including myriad replications, few people complete the task correctly, a fact Wason attributes to confirmation bias (Wason, 1966). As expected, the bias compels participants to turn over cards that confirm the rule, rather check the card that could prove the rule false. Such behavior exemplifies the extent to which individuals will seek evidence to confirm the theory in question, even at the expense of evidence that could directly prove it to be false. More recent research points to confirmation bias being even stronger when people are evaluating a theory that they actually believe in, or wish to be true (Dawson, Gilovich, & Regan, 2002).

7.4   Gambler's Fallacy

Another bias that stultifies students' abilities to engage in critical thought is the gambler's fallacy. This fallacy arises from a misplaced understanding of probability. People who exhibit this bias tend to think that the past dictates the future, believing that past events somehow influence future outcomes (Copi, Cohen & McMahon, 2014). Consider the example of a roulette wheel. If you imagine yourself sitting there at the table and watch it land on red 100 times in a row without fail, some people believe (mistakenly) that there is a better chance of the ball landing on black on 101th occasion. This is, of course, a misplaced understanding of how probability works (Salmon, 2013). The odds are exactly the same as they were before - there is an equal chance of it falling on either black or red. Another example of this is coin tossing. After flipping heads, say, ten consecutive times, our inclination is to predict an increase in likelihood that the next coin toss will be tails. However, in reality, just as in the case of the roulette wheel, the odds are still 50/50 (lower again, if you include the probability on it landing on its

side). Statistically the outcomes in different tosses are independent - with the probability of each outcome still 50%.

The gambler's fallacy is exemplified when people believe that, "a certain outcome is due." (Halpern, 2014, p.369) This is why people of this persuasion tend to be overly confident that deviations from long-term averages will counterpoise in the short term. Relatedly, there is also the positive expectation bias - a bias that often fuels gambling addictions. At the center of this bias is the sense that our luck has to eventually change, and that good fortune is on the way. Walk into any bookies in the world and you will see plenty of examples of desperate gamblers convinced their luck will change over the course of the next bet. The underlying cause of the gambler's fallacy is the representativeness heuristic (Tversky & Kahneman, 1974) to which I now turn.

When making probabilistic judgments, people tend to frequently overstate the extent to which a single case or example is representative of a particular category, group or stereotype. Examples of this bias were captured in a pioneering 1973 study, where participants were asked to read about a person who was described as "very shy and withdrawn, invariably helpful, but with little interest in people, having a need for order and structure, and a passion for detail" (Tversky & Kahneman, 1974, p.3). Participants were asked on the basis of this data to infer the person's occupation by assigning probabilistic estimations to each particular job from a list comprising: farmer, salesman, librarian, and physician. Researchers found that participants tended to assign the highest probability to the librarian, chiefly because the description provided aligned with their preconceptions of the stereotypical librarian. Curiously, when the participants were told that the fictitious individual was drafted from a sample of 95 physicians and 5 librarians, there was no significant change to their assessments of probability (Tversky & Kahneman, 1974, p.4). Of course, this flies directly in the face of the evidence, which logically entails that the base rate probability that a member of the sample is a physician should increase the probability estimation of a given individual being a physician. Overall, this example shows us the power of the representativeness heuristic to distort

our reasoning through neglecting new and pertinent information.

7.5   Untested Statistical Inference Bias

Statistics are part of our everyday lives. They are impossible to escape. Turn on any television or radio and you will invariably be bombarded with statistical evidence attempting to convince you that 80% of mothers choose Pampers over other brands. Because statistics are numbers expressed in equations and complicated formulae, many people are either deeply impressed by their mathematical cogency, or lack sufficient expertise to critically evaluate their cogency (Dennett, 2013). Sometimes statistics are putatively correct; other times, they are plainly false. It is a mistake to refer to statistics as facts; they are "simply interpretations" (Levitin, 2016, p.3). It is important not to forget that people choose what to count, how to count it, and which statistics they share with the public domain. Statistics sometimes lack context too, because to count something, we count it within a certain context-specific sphere of influence.

Untested statistical inference biases are situations where individuals or groups accept a statistical inference on face value without interrogating its truth-value or cogency. Part of this may be borne out of fear based on a lack of expertise, or a reluctance to probe further, or perhaps, an unwillingness to argue with the precise computations of mathematics.

Regardless of the reason for the bias, students should remember that all statistical inferences should be subjected to a basic plausibility check before being subjected to further more detailed and forensic stress-tests. Let us look at one short examples from the US.

> In the thirty-five years since marijuana laws stopped being enforced in California, the number of marijuana smokers has doubled each year.
>
> (Levitin, 2016, p.4)

On first reading, this may seem to be at the very least plausible. That said,

of course, it warrants further investigation. To begin, let us assume there was only one marijuana smoker in California thirty-fie years ago, (a very conservative estimate as there were over 500,000 marijuana arrests for possession nationwide in 1982). When we start making our calculations, it quickly becomes clear that by year 20, the numbers are as high as (1,048,576). In total, when we double the number ever year for thirty-five years, we arrive at a number exceeding 17 billion. And yet, there are 7 billion people on the planet in 2017, so clearly this "erroneous statistic" is wildly false, untrue, and misleading (Levitin, 2016, p.4).

7.6   Post-hoc Rationalization

Post-hoc rationalizations occur when we do something, and rather than admit that we did the right thing for the wrong reasons, or the wrong thing at that moment in time, we compose a series of elaborate justifications to support our decisions. These types of *post hoc rationalizations* frequently lead us to the point where we end up convincing ourselves that whatever we did was rational (executed in light of the right reasons). If we have false beliefs based on ignorance, it may of course be 'rational' to act in accordance with these beliefs. However, in such cases, these are not reasons for action, they are only apparent reasons (Parfit, 2011). Such reasons are irrational. But why do *reasons* matter, as opposed to just reaching the right outcome?

In a maths exam, suppose one of the questions is 2+2. When correcting the exam, I rightly determine the answer to be correct. But should I ask the student later as to why he gave the answer of 4 to that question, suppose he informs me that he was stuck, and since 4 is his lucky number, he thought he would give it a shot! From this, we can conclude that, even when answers (beliefs or actions) are correct, they may only be true via sheer luck. It is therefore accurate to say that such instances are not examples of knowledge. In accordance with this principle, the reasons we base our beliefs and actions on are vitally important (Conee and Feldman, 2004; Dancy, 2000; McDowell, 1998; Scanlon, 2014; Siegel, 1988).

We can all excavate *post hoc* reasons to justify our actions after the fact, but this does not make them the right reasons for belief or action (Nickerson, 1986). Social psychologists suspect that *post hoc* rationalizations are caused by our deeply ingrained psychological desire to stay consistent with our own deeply embedded preconceptions of knowledge, instead of admitting we were wrong and exacting a change in our behavior (Flannelly & Flannelly, 2000).

7.7   Neglecting Probability

Another common bias affecting everyday reasoning is that of neglecting probability. All of us use probabilistic reasoning in our everyday lives, yet very few of us understand the intricacies of being able to formulate informed judgments based on the parameters of predictability invoked in making probabilistic inferences. We often overestimate the risk involved in certain probabilistic categorizations. For instance, very few of us have a problem getting into a car and driving to a play date, but many of us experience trepidation when setting foot on a plane to embark on a journey at 45,000 feet. Somehow, the risks associated with flying mutate into a hazardous activity. On one level however, most of us acknowledge that the probability of dying in a car accident is significantly greater than dying in a plane crash. The actual statistical probability is clear - we have a 1 in 84 chance of dying in a vehicular accident, as compared to a 1 in 5,000 chance of dying in a plane crash. Depending on the actuarial formulae used, the odds of a plane crash work out at 1 in 20,000 (Halpern, 2014, p.341).

This same phenomenon makes us worry about our children developing brain injuries from accidents while jumping on a trampoline, as opposed to something far more probable, like a simple collision resulting in a superficial bump on the head. The psychologist Cass Sunstein calls this "probability neglect" (2002, p.4). This cognitive bias represents our inability to accurately formulate a proper sense of risk. Repeatedly this failure leads us to underestimate the risks of habitual harmless activities, while forcing us to overestimate ones that are more dangerous. Whichever activity the bias manifests itself in, the result is the same: "our risk

assessments are wildly inaccurate due to our emotional response to the mere possibility of the more dangerous outcome becoming reality" (Sunstein 2002, p.5).

At the time of writing, the Irish Cancer Society caused uproar by producing an advert that stated by 2020, one in two of us will get cancer in our lifetime. For this statistical inference to be true, in three years time (2020), 1 in 2 of the sample population (n = 4.8 million) will have contracted cancer. However, this is extremely unlikely based on current data. By 2020, unless there are 2.4 million people living with cancer, this probabilistic inference shall be proved incorrect. As expected, this advert was devised to provoke a response from the public and get people talking about the risks of cancer. However, on a detached and less emotive level, the statistics provided were endemic of a deeper problem: they are baseless, inaccurate and untrue. Though anyone with a critical eye would dispel their statistics as grossly erroneous, the broadsheets at the time were bursting with letters from disgruntled cancer survivors, their families, and even those who were left unaffected by cancer, all pointing out how blatantly false these statistics were, and moreover, how irresponsible it was to engage in such grotesque scaremongering. Others uncritically accepted the statistics as being true and immediately set about contacting their GP to arrange a screening. Regardless of which side of the fence one found themselves on (believers or disbelievers), the advert effectively proved one thing: statistics need to be questioned, contextualized, and never accepted at face value (see Levitin, 2016). In this instance, many people naively accepted the statistic as being true, without recourse to relevant medical data.

7.8   Observational Selection Bias

Moving on from the bias of neglecting probability, observational selectional bias occurs when a certain phenomena of which we were previously unaware of, suddenly leads to a person assuming the prevalence of this increased frequency within their immediate sphere of experience. Suppose you buy a new car, a 2017 Kia Carens. Upon purchasing the car, you suddenly begin to notice more and more Kia Carens on the roads. This bias,

the observational selection bias, occurs when we *incorrectly assume* that the frequency of these models on the roads has increased. All that has happened is that we are now attuned to seeing this model, whereas before, we would not have necessarily noticed the frequency of our sightings of these cars on the road. A similar effect happens to pregnant women who suddenly notice many other pregnant women around them.

In some cases, this bias might manifest itself in what you perceive to be enforcement of unstated gender quotas. Suppose for instance, over the course of the past six months, the last ten people in work promoted were women. This may be the case, but statistically, the number of women promoted in this year may be far smaller than previous years. For some reason, you have become more inclined to consciously notice the sex of the promotees due to being passed over for one these positions in the past. The fact of the matter however is that, in 2017, the total numbers of promoted candidates were 80% male and 20% female. Bar some small percentage points, the numbers have not changed in five years. Trouble is, in your mind, this may be an example of gender quotas, and try as you might not to see it this way, it is simply an example of selectional bias at play (Berk, 1983). Though you may really believe these items or events are happening with increased frequency, this is not the case at all. This particular cognitive bias also leads us to believe that the frequency of events occurring could not be simply mere coincidence, even though when one looks at it impartially, and in its proper context, it clearly is nothing other than that.

7.9   Status-Quo Bias

The status-quo bias is particularly evident in the field of curricular reform, and particularly in attempts to conceptualize or implement innovative practices in the classroom. Often apprehensive or suspicious of change, many people avoid it by means of holding on to habitual, familiar practices (Kahneman, 1992). This is partly a need to control our environment in conjunction with deluding ourselves into thinking that avoiding change will somehow copper fasten the status-quo. Such habitual practices have far reaching ramifications for not just education, but any form of organizational

change carried out in areas such as: economics, politics and healthcare, to name but a few. These deep-seated habitual practices are testament to why many of us afraid to try a new dish in a restaurant or takeaway or likewise, whenever a new venture is proposed in a staff meeting, our immediate System I response is to greet it with a wry smile, coupled with the fervor of an immovable skeptic. Deep down, many of us assume it is doomed to fail from the outset.

Part of the perniciousness of this bias lies in the faulty logic of the unwarranted assumption that 'if it isn't broke, don't fix it'. On the face of it, this flawed assumption has merit, and that is what makes it so deeply pernicious. Let me explain. Part of the driving test now involves a short test on the mechanics of the car. The candidate must open the bonnet and answer a few simple questions. One of the questions focuses on the role of engine coolant. Most candidates are informed that the coolant cools down the engine and prevents it from overheating and malfunctioning. This is true. What they are also told is that water can be added to the coolant. This is also true. But what they are often not told is that this is a short-term solution with water vastly inferior to the chemical coolant that should be used.

Oblivious to this fact, the 'if it isn't broke don't fix it' principle carries on. Hundreds of miles are clocked each week. Eventually though, the inferior capacity of water to effectively regulate the temperature will lead to engine trouble in the future. There are two lessons here. First, the "if it isn't broke" principle is a recipe for disaster, because it automatically rules out improvement, or greater efficiency. The engine in this case would run more efficiently, and cost less to maintain, should proper coolant be used. The second lesson is subtler. Not everything that breaks, breaks immediately. Causal effects, as we have seen already, can take time to emerge (Mumford and Anjum, 2013). Electronic devices have circuits, just like educational systems, are comprised of context-dependent human beings, equipped with the inimitable capacity for agency and change. In complex systems such as these, if we adopt 'if it isn't broke' approach, we run the unacceptable risk of damaging our systems beyond repair. That is why - when educationalists

talk about 'evidence-based practice,' or the 'what works approach', as opposed to 'evidence-informed practice,' critical thinkers must be on guard because invariably there will be times when causality takes time to properly emerge.

When constructing a house, a questionable builder might use a cheap steel beam (RSJ) to reinforce the wall he has just demolished. After the beam is encased in a plaster mold and the second-fix completed, the house will, no doubt, look pristine. The evidence at the time (our observations) will confirm this. But, later, upon further investigation, it will quickly become evident that the steel joist was inferior, and never meant to reinforce a structure of that weight. Hence, even though on the surface the evidence may suggest the builder did a good job, this may not be the case when one forensically evaluates their work. This is one of the reasons why the status-quo bias impedes the quality and optimal functioning of critical thought.

7.10   Herd Mentality

This bias is effectively what Nietzsche (1887/2009) refers to as "the herd mentality" (p.352). Though Nietzsche (2009) utilizes this term to disparagingly denote his notion of morality - this somewhat pervasive in substance yet subtle in essence bias, neatly captures what is meant by an unconscious yearning to go with the flow of the crowd. Standing on the edge of a circle is quite lonely, and in some respects, this is partly why many of us acquiesce to a form of groupthink (Marsh, 1985). This herd mentality need not confine itself to large groups; many examples of it are found in smaller factions. They can be smaller research groups, where secretly one may harbor serious doubts about the findings of a particular paper, or conversely, more large-scale efforts where the acceptance of a particular idea has become so normalized, few dare to challenge it, in light of its popularity. Typically, the herd mentality or bandwagon effect is one of the decisive factors in social norms, behaviors, and memes propagating amongst groups of individuals, irrespective of the evidence or motives in support of their views. Much of this bias has to do with one's innate desire to fit in and conform, yet in spite of its simplistic causes, where the critical

thinker is concerned, it is very difficult to immunize against fully (Nietzsche, 1887/2009).

7.11 Projection Bias

Instinctively we tend to over-exaggerate the extent to which other people think like us. Due to the private nature of many of our inner thoughts, most of us assume that others share our beliefs and preferences (Hardman, 2009). This may be one of the reasons why so many people found the recent election of Donald Trump to the office of President to be so grossly wrong. This assumption that others think like us, or share our views is still held despite there being no justification for such a view (Kahneman, 1992). This cognitive shortcoming can lead to a false consensus bias, wherein one tends to believe that people not only think like us, but moreover, also agree with us. To our minds, we are the gatekeepers of consensus and normalcy. More importantly, we incorrectly assume far more people occupy our safe haven of normalcy than is ever really the case. As a bias, it is akin to a virus that affects both sides - both opposing sides defend their conception of normalcy in the shape of consensus thinking. However, it stands to reason that both sides cannot be equally correct.

7.12 Recency

This is a bias we often see in educational research (Lavrakas, 2008). The recency bias occurs when we afford the latest information or data a much greater weight than older data or findings. For instance, when writing a Christmas report for a student, a teacher may express their dissatisfaction at a routinely 'A student' only receiving a 'D' in their Christmas exam. When penning the report, the teacher may couch the comment in a negative way, instead of looking at the bigger picture. This is in spite of the student achieving over 90% in every class test since September.

In initial teacher education, when students are writing essays, sometimes they rely more heavily on the most recent research in a given field. This is of course understandable, but nevertheless still based on the assumption

that the most recent research contains insights that are superior to papers published beforehand. Evidently, the benchmarks for inclusion should be quality and insight, not how recently it was published. Of course, a qualification is needed here, for there are clearly other domains of expertise, nano-technologies for instance, where papers from 15 years ago are more or less defunct now. Thus, like all judgments, the critical thinker is attentive to the fact that context is key.

7.13   Bias Blind Spot

The comedian George Carlin once quipped: "Have you ever noticed that anybody driving slower than you is an idiot, and anyone going faster than you is a maniac?" Admittedly, our initial response to this insightful observation may be one of awkward laughter, but in truth, this question highlights our natural tendencies to view our beliefs, attitudes, and behaviors as being untainted and free from error or bias. For anyone who makes a judgment, based on the understanding that it is perfectly impartial, unbiased, thoughtful and reasoned, such individuals are undoubtedly missing their own bias blind spot. There are always assumptions, disguised biases that may impact on our judgments (Brookfield, 1995; Halpern, 2014). In an added twist of irony, this bias blind spot is so prevalent that we view people with differing opinions as being prone to bias (Ehrlinger, Gilovich, & Ross, 2005).

In part, this bias stems from a form of naïve realism, an overriding belief that one's own judgments and understandings of the world, including the decisions, preferences, and priorities that engender those understandings, are "direct and unmediated reflections of objective reality or the way things are" (Ross & Ward, 1996, p.110). The natural consequence of this renders any judgment which does not align with our own entrenched views being characterized as naïve and uninformed - an epistemic vice of sorts, resulting from a distorted motivational, ideological, or cognitive bias (Kahneman, 2011).

7.14   Assumptions as Barriers to Critical thought

Cognitive biases all share a common theme: they are all based on assumptions (Kahneman, 1975; Kahneman, 2011). On this view, one of criticality's primary tasks features process-accounts of:

- discovering assumptions that guide our decisions, actions and choices
- checking the accuracy of these assumptions by exploring as many different perspectives, viewpoints, and sources as possible
- making informed decisions that are based on these researched assumptions…[based on evidence we can trust, can be explained to others, and stands a good chance of achieving the effect we want] (Brookfield, 2012, p.160).

To this end, individuals tease out and thereupon challenge the basic assumptions underpinning our professional and personal encounters. At their most basic level, assumptions are those taken for granted beliefs about the world, our understanding of how knowledge works; our beliefs and actions; our role and place within society; our duties to others and ourselves, and so on (Brookfield, 1988; 1995). They are pernicious because, on the surface, they appear to be self-evident and hardly worthy of probing or questioning. In many respects, they are so blatantly obvious that to state them explicitly could be considered, at best, unnecessary, or at worst, embarrassing. On a more ontological level, we embody our assumptions (Brookfield, 1995). They imbue us with a false sense of purpose and affix assurance to contexts that defy certitude.

There are two steps in dispelling implicit assumptions. Firstly, we must be *disposed* to identify the assumptions that characterize our thoughts and actions (Brookfield, 1995; Ennis, 2015). Secondly, once we have identified them, we must exercise great skill in evacuating those assumptions which are unwarranted, and furthermore, those which prevent us from being critical of our own beliefs and actions (Brookfield, 1995; 2012). All of this is of course easier said than done of course; assumptions (implicit or

explicit) can be comforting, safe and pragmatic. Instinctively we may resist weeding them out, for fear of what we might discover. There may be assumptions we have carried with us throughout our lives; there may be assumptions which make the day to day task of living substantially easier; there may be assumptions that shield us from the vagaries of habitual states of uncertainty.

Building on the seminal work of Stephen Brookfield (1995) in this area, this final section considers three categories of assumptions, namely: paradigmatic, prescriptive, and causal. To ground our argument, these assumptions shall be examined alongside types of assumptions student teachers may make, from time to time, in their professional practice.

7.15 Paradigmatic Assumptions

These are decidedly difficult to isolate given their compelling ostensive truth-values. They are the assumptions we use to impose structure and order on our world to make sense of it. Part of this structuring of reality comprises assigning fundamental categories to our conceptual cogitations and inferences. For the most part, we do not even recognize such phenomena as being assumptions, even after they have been pointed out to us (Brookfield, 1995). As a form of umbrella cognitive bias, we insist they are objective renderings of reality. As a teacher, I have held several paradigmatic assumptions during my career. On occasion, I have incorrectly assumed that an effective teacher never strays from the lesson plan; I have overestimated the power of children's curiosity and penchant for critical enquiry; I have assumed that subjects taught well will enthuse almost every student; I have assumed that apathy is only a temporary road bump, and I have assumed that every parent realizes on some level that there is more to education than grades.

Later in my university teaching, I assumed that adults are self-directed learners; that adults are more receptive to the transformative (instead of instrumental) power of education; that criticality is more prevalent in adults who have experienced more of life's trials and tribulations; that students

prize "Truth" more than all other intellectual enterprises, and that students instinctively privilege knowing over not knowing. On each and every occasion, these assumptions have been stress-tested by experience and eventually (after much jostling) tossed in the bin of mistaken beliefs. Like all biases, these types of assumptions linger until such time as a significant body of contrary evidence and disconfirming experiences persuade us that our previously held position is no longer tenable. But when we challenge these assumptions and change our behaviors, "the consequences for our lives are explosive" (Brookfield, 1995).

7.16   Prescriptive Assumptions

These are assumptions about what we deem ought to be case. They are assumptions about what we think should be happening in particular contexts and situations. In the case of teachers, they may be assumptions about what teachers should look like; how they should dress; how they should conduct themselves; how personable they ought to be; how knowledgeable they are; how they teach the gifted and struggling alike; what obligations (if any) there are between student and teacher; the ideal student-teacher relationship for optimal learning; how teachers engage in professional development, and so on and so forth. Predictably, these prescriptive assumptions are grounded in, and extensions of, our paradigmatic assumptions. For example, if you believe that adults are naturally critical, then by extension you assume that they will question whatever they find in scholarly articles or in popular media, and stress-test the strength of the reasons offered in support of such beliefs or actions. This assumption then results in teachers not offering the staples of informal logic and cogent argumentation; spotting fake news; separating fact from fiction; scrutinizing inferences and discarding unwarranted assumptions.

Prescriptive assumptions hinge on our normative view of the world. Many of us are hardwired to believe that life is based on reciprocity. There is a sense of injustice if one eats well, exercises regularly, is a loving father to three wonderful children, and yet still develops an aggressive cancer. There is a sense of injustice when a student who does next to nothing all year

secures an 'A' in their leaving cert, whilst several of her classmates fare poorly, despite having worked incredibly hard all year. There is a deep sense of injustice when a colleague secures a promotion, when you were the better candidate in most people's eyes. All of these injustices stem from our assumption that life is a high yield private fund; the more you put in, the more you reap the reward. Take the example of a student teacher in Trinity College Dublin. They may be an A student, work diligently, be courteous and kind, but yet still not secure gainful employment post qualification. Another student who happened to have connections in a certain school managed to secure a post ahead of this unfortunate student. As a lecturer, there is a sense of injustice - this talented student should surely somehow be rewarded for all their hard work. But this is often not the way our world works. It occasionally favours the connected, the lucky, often to the detriment of the more suitable and deserving candidate. The fact that I use the term 'deserving' is of note here. Deserving suggests we have balance sheet in our minds, and that those who do X and Y, ought to be rewarded. But of course, this is an unwarranted assumption, and therefore should be critically evaluated when it creeps into our thinking.

7.17   Causal Assumptions

Causal assumptions taint our understanding about how different interventions work, and the conditions under which these can be changed (Brookfield, 1995). Typically they are stated in predictive terms. In each and every case, they are assumptions that X will change Y. Teaching is littered with causal assumptions. One such assumption is that if I develop a good rapport with my students, their self-reported learning gains will increase. This may seem intuitively true but there is plenty of compelling evidence to suggest that this is wildly overstated at best, and at worst, students themselves produce distorted self-reported gains which have no bearing on reality. In essence, students frequently state that they learn more from a 'sound' teacher than a more ostensibly strict or aloof teacher. But this is not necessarily the case. Their fondness for the teacher in question may cloud their objectivity. Another example of a causal assumption would

be the old mantra of initial teacher education programmes (ITEs): 'do not smile until Christmas'. Yet again, this has no bearing on reality. Teachers can be human beings and share a laugh and a joke on occasion with their class. This does not necessarily negatively impact on their efficacy as incubators of learning.

There are several more examples worth mentioning here. Learning contracts would certainly be one. Learning contracts are, in and of their own accord, useful constructs but their efficacy tends to be over-exaggerated. When I worked in the favelas in Brazil, we used these with students. What we had not factored into the equation was that these students may not have eaten any breakfast, were in some instances high on glue; came from families where domestic abuse was rife, and could earn more in a day selling drugs than in a month working full-time. Learning contracts were just pieces of paper with a series of unrealistic promises on them. And so they were for us too after time. They had little bearing on students' self-directedness or achievement. Moving from discovery of these deeply embedded assumptions to a more critical mode of being requires: care, reason and an open mind. Only then can we move to effective unearth and discard these pernicious assumptions that stultify critical thought (Brookfield, 1995).

7.18 Conclusion

This final chapter critically examined some of the main barriers to critical thought. To begin, it demonstrated how the principle of "bounded rationality" sacrifices cognitive quality in exchange for cognitive economy. This principle of 'satisficing', though necessary at times, (due to time-sensitive decision parameters), acts as kind of heuristic (shortcut), where accuracy is sidelined in favor of 'what will do for now'. The perniciousness of this heuristic is elucidated by means of examples where System I thinking overpowers System II thinking. From here, the chapter moved to exemplify how this heuristic, as a barrier to critical thought, infiltrates our thinking and reasoning skills. To exemplify this more succinctly, the chapter draws on a series of predominant cognitive biases that often subvert

many people's cognitive architecture, processing, and decision-making faculties. To conclude, the chapter analyzed how deep- seated assumptions, namely, paradigmatic, prescriptive and casual, pose a series of assiduous challenges to the operational success of critical thought.

Chapter Eight: Conclusion

This research project commenced with a critical review of some of the seminal issues derived from heterogeneous conceptualizations of critical thinking. From the literature review, it quickly emerged that, though several extant accounts of critical thinking exist (Bailin & Battersby, 2015; Ennis, 2015; Siegel, 1988; 1997), it is still very much an elusive term. This lack of conceptual clarity has far-reaching ramifications for policy and curricula. Until such time as educators are clear as to what critical thinking amounts to, they cannot teach it nor assess it. If they cannot teach it, students are unlikely to learn it as part of their formative higher education experience. Thus, educators require a cogent conception of critical thinking, alongside a perspicuous account of the characteristics or qualities necessary for being a critical thinker.

On this basis, I argue for neo-Aristotelian account of critical thinking. This views critical thought to be conceived as a kind of phronetic determination which occurs when we formulate enquiry-based evaluative judgments about what one ought to do. To evaluate the cogency of a certain claim to knowledge, we look to the *reasons* that support such claims. Critical thinking occurs when we *stress-test* the strength of these reasons supporting one's beliefs, actions, or claims to knowledge.

In order to avoid a radical phenomenal subjectivist approach, I argue for reason-normativity, that is, objective standards by which we determine the strength of reasons supporting a given belief or action (Scanlon, 1998; 2014). I further argue for the inclusion of a new taxonomy of reasons, reasons with which critical thinkers ought to concern themselves with, both in the theoretical and practical domain. These reasons comprise: (i) evidential force and relevance; (ii) reason defeaters and undefeated reasons, and, (iii) motivating and explanatory reasons. To accurately determine the strength/force of these reasons in guiding us toward what we ought to believe or do, I draw on the concept of practical wisdom or judgment, under the rubric of *phronêsis*.

This new reasons taxonomy builds on Siegel's (1988, p.23) "reasons-assessment" component to critical thought, wherein critical thinkers are *ipso facto* moved to determine the quality and rational force of reasons underpinning their own, and other people's beliefs and actions.

Guided by three research questions, the study sought to understand:

- What is the most cogent normative conceptualization of critical thinking in the literature?

- What abilities, skills, dispositions and actions/judgments (cognitive skills) are characteristic of critical thinkers?

- What are the main impediments or barriers to critical thought?

In keeping with these parameters, the following provisional conclusions are drawn:

- To understand critical thinking fully, agents need to understand the nature, scope and limits of claims to knowledge. At the center of critical thought is the question: can a person reliably say they *know* X and Y to be the case? In order to determine whether they are justified in saying they have "a right to know" X and Y (Ayer, 1947, p.29), students need to uncover the reasons supporting a person's views. In doing so, **students need to *stress-test* the strength of reasons used in support of a given knowledge claim**. Depending on the force and strength of these reasons, critical thinkers can then determine whether these reasons meet a certain threshold of sufficiency, relevance and acceptability (Gilbert, 2014).

- Though reliabilist argumentation models afford a certain degree of *prima facie* acceptability in generating knowledge, they are still prone to several key vulnerabilities. Deductive inferences assume that the premises are true. This renders all premises beyond the scrutiny of the critical thinker. Meanwhile, enumerative inferences assume that what has occurred in the past (time and time again) will occur in the future (Hume, 1748/1975). When it comes to eliminative induction, inferences of this nature assume that we know

of a suitably small range of plausible hypotheses whereby rival hypotheses are progressively eliminated by new evidence. Evidentialism argues that a wise person always directly proportions their belief to their evidence. As we have seen however, this assumes that every belief or knowledge claim should be based on the sum total of one's evidence. This approach undermines common everyday experiences of trust and testimony (not always based on determinable evidence) in addition to the question of: what exactly constitutes evidence? Should evidence always consist of verifiable facts? Are there inner states, which are facts that supersede external facts? Are there situations where one's total evidence might point in one direction, but one might rationally (for stronger reasons) choose otherwise? Finally, probabilistic reasoning assumes that all our decisions and judgments ought to conform to the probability calculus. Again, this assumes that only propositions that have a strong likelihood of being true (probabilistically speaking) should be accepted as *prima facie* plausible. If this were the case, cancer survivors who faced extremely low odds, and even the formation of planet Earth, ought not to be believed as being true.

- Critiquing arguments for purposes of fortification, necessitates a thorough knowledge of how arguments work, not so much in the sense of structure, but more so in terms of the *reasons* which support conclusions. Argumentation is not a solitary exercise divorced from reality. Rather it occurs as part of a dialectical exchange, exemplified in this project in terms of the pragma-dialectical approach. There are rules to argumentation, to the extent that, rational enquiry and discourse can only flourish once certain ground rules are established. To do so, dialectical exchanges require clarification on the matters of burden of proof and appeal to ignorance, two issues which tend to obfuscate rational discourse (Tittle, 2011).

- Critical thinking dispositions are just as important as critical thinking abilities (Ennis, 2015; Passmore, 1967). Should a thinker not be disposed to think a certain way, they are unlikely to meet the

requirements of thinking critically (Facione, 1990). In an Aristotelian sense, I argue for dispositions to be viewed as 'habits of mind', whereby these habits further refine and hone the capacities of critical thinkers. On this basis, no account of critical thinking is complete without a thorough examination of the role and nature of critical thinking dispositions.

- The literature occasionally conflates critical thinking and informal logic (see Bowell & Kemp, 2015). Though there are several overlaps, critical thinking transcends the boundaries of informal logic. Formal and informal logic rely on pre-established rules - rules based on the principles of logical inference. Logic, as we have seen, is limited, insofar as it treats each identical case alike, it rarely allows exceptions, and it fails to account for complex issues where several viable alternatives present themselves for consideration.

- The term critical thinking requires a new definition, one that incorporates a clear definition of the concept along with an explanation of its performative function in determining undefeated reasons for what one ought to do. For this reason, I argue for the inclusion of a new provisional term, one that incorporates this provisional designation together with the performative function of the concept. Thus, I argue for critical thinking to be defined as: an "informed, reflective and enquiry-based evaluative judgment which stress-tests the strength of the reasons used to support a person's beliefs or actions" (Dunne, 2015a).

- To be sufficiently informed, critical thinkers rely on background knowledge, including an ability to marshal all *relevant* background information to reach a defensible judgment about what to believe or do. Most theorists view background knowledge or experience as essential for students to demonstrate their critical thinking skills (Case, 2005; Kennedy et al., 1991; Willingham, 2007). For this reason, domain-specific knowledge is indispensable to critical thinking because the kinds of explanations, evaluations, and evidence that are most highly valued, frequently vary, from one domain to another (Bailin et al., 1999a).

- Secondly, critical judgments must also be reflective, because critical thinking must exhibit a degree of self-regulation (Lau, 2015). For this to occur, all cases of critical thinking should be metacognitive and reflective. By metacognitive, I argue that critical thinking must attend to a reflective critical examination of its own methods (Schön, 1983; 1991). There is no point after all in being a critical thinker if one never challenges or revises one's methods or thought patterns (Flavell, 1976, 1979; Lau, 2015).

- Thirdly, enquiry-based evaluative judgments insist that we appropriately frame our enquiries, to carefully consider what the issue at stake really amounts to, so that the enquirer can accurately formulate the right questions. This is crucial, if for no other reason than the quality of the questions directly correlate with the quality of the elicited responses.

- Fourthly, stress-testing reasons requires a deep understanding of the rational force of reasons. Effectively this is a plausibility test - a test to determine how plausible a given knowledge claim actually is (Levitin, 2016). To effectively stress-test the strength of reasons justifying what we believe or do, critical thinkers must be proficient at discerning the varying strengths of reasons. For instance, the reason to turn the wheel of a car is a stronger reason than the reason to go on listening to music, because "avoiding hitting the pedestrian is more important than interfering with one's enjoyment of music on the radio" (Scanlon, 2014, p.3).

- This dissertation argues for the inclusion of a specific typology of reasons, which critical thinkers ought to concerns themselves with. This newly devised typology includes: (i) evidential force and relevance; (ii) reason defeaters and undefeated reasons; (iii) motivating and explanatory reasons. To avoid the force of these reasons simply being determined by means of a crude aggregation, I argue that the *phronimos*, or person of judgment, needs not only sensitivity to reasons, as they emerge, one at a time, but a capacity to amalgamate them, weigh them, prioritize them, and finally, stress-test them to determine their cogency. The better he/she does

this, the more reasonably they act.

- To conclude the project, I critically examine four of the main barriers to critical thought. I further demonstrate how the principle of 'bounded rationality', more specifically, 'satisficing', surrenders cognitive quality for unreliable heuristics, best exemplified in the shape of (ii) System I and System II thinking, (iii) cognitive biases, and (iv) unwarranted assumptions, namely, paradigmatic, prescriptive and causal (Brookfield, 1995). Rather than focus on rationality as an atemporal, context-neutral and value-free principle, I emphasize how cognitive limitations and time-constraints jettison our critical faculties and negatively impact on the quality of our judgments. This concept of 'satisficing' is linked to the types of judgments that issue from System I (rash and impulsive) thinking, which in turn, manifests itself in the form of cognitive biases, coupled with a marked inability to uncover the types of unwarranted assumptions that frequently taint our judgments.

In summary, the conceptual discoveries of this project do not lend themselves to the seamless integration of criticality in educational policy or teaching and learning. That was never my intention. Knowledge, as is well documented, is messy, inter-relational, inter-subjective, and sometimes culturally and experientially bound (see Taylor, 1995; Williams, 2016). Thus, in a sense, to think critically about the relative merits of competing claims to knowledge, critical thinking models, (if such a thing exist), need to be comfortable going down rabbit holes. To think critically about our irreducibly complex world, the *phronimos* requires a deep sensitivity to the force and strength of certain types of reasons animating our enquiries. Further, the *phronimos* needs to know which rules, if any, apply to certain situations. Over and above this reorientation of *Phronêsis* as the model through which critical judgments ought to be made: if this thesis offers anything to the literature, it endeavors to demonstrate the centrality of stress-testing probative *reasons* in order to reach an informed judgment about what to believe or do.

References

Abrami, P. C., Bernard, R. M., Borokhovski, E., Wade, A., Surkes, M. A., Tamim, R., & Zhang, D. (2008). Instructional interventions affecting critical thinking skills and dispositions: A stage 1 meta-analysis. *Review of Educational Research, 78(4),* 1102–1134.

Adams, J. C. (1845/1896–1900). *The Scientific Papers of John Couch Adams*, 2 Vols. Edited by W. G. Adams & R. A. Sampson. London: Cambridge University Press.

Adler, J. E. (2005). William James and what cannot be believed. *The Harvard Review of Philosophy. Vol. 13*(1), 65-79. DOI: 10.5840/harvardreview20051314.

Anderson, L. W. & Krathwohl, D. R. (eds.) (2001). *A taxonomy for learning, teaching and assessment: A revision of Bloom's taxonomy of educational objectives.* New York: Longman.

Andrews, R. (2015). Critical thinking and/or argumentation in higher education, in M. Davies & R. Barnett (Eds.) *The Palgrave Handbook of Critical Thinking in Higher Education,* (pp. 49-62). New York: Palgrave MacMillan.

Anscombe, G. E. M. (1957). *Intention*. Oxford: Blackwell.

Aristotle (1984). *The complete works of Aristotle Vol. 1-XII.* The Revised Oxford Translation. Ed. J. Barnes. Princeton University Press.

Aristotle (2011). *Nicomachean Ethics*. R. Crisp edition. Cambridge: Cambridge University Press.

Armstrong, W. S. & Fogelin, R. J. (2015). *Understanding arguments: An introduction to informal logic.* 8th Edition. Belmont, CA: Wadsworth Cengage Learning.

Arum, R. & Roksa, J. (2011). *Academically adrift: Limited learning on college campuses.* Chicago and London: University of Chicago Press.

Audi, R. (1983). Foundationalism, epistemic dependence, and defeasibility. *Synthese 55*(1), 119-39.

Audi, R. (1985). Rationalization and rationality. *Synthese 65*(2), 159-184.

Audi, R. (ed.) (1999). *The Cambridge Dictionary of Philosophy.* 2nd edition.

Cambridge: Cambridge University Press.

Audi, R. (2002). The sources of knowledge. In P.K. Moser (ed.), *The Oxford Handbook of Epistemology* (pp. 71-94). Oxford: Oxford University Press.

Audi, R. (2003). *Epistemology*. 2nd edition. London: Routledge.

Audi, R. (2004). Reasons, practical reason, and practical reasoning. *Ratio 17*(2), 119-149.

Audi, R. (2013). Knowledge, justification, and the normativity of epistemology. *Epistemology 90*(2), 127-145.

Audi, R. (2015). *Reasons, rights and values.* Cambridge: Cambridge University Press.

Ayer, A. J. (1947). *The problem of knowledge.* Harmondsworth, London: Penguin.

Ayer, A. J. (1956). What is a law of nature? *Revue internationale de philosophie 2*(36). Reprinted in Ayer 1963.

Bacon, F. (1620). *Novum Organum*. Retrieved from http://www.earlymoderntexts.com/assets/pdfs/bacon1620.pdf

Baghramian, M. (2008). Relativism about science. In M. Curd, S. Psillos (eds.), *The Routledge Companion to Philosophy of Science.* London: Routledge.

Bailin, S. (2002). Critical thinking and science education. *Science & Education, 11*(4), 361–375.

Bailin, S. & Battersby, M. (2009). Inquiry: A dialectical approach to teaching critical thinking. In H. V. Hansen, C. W. Tindale, J. A. Blair, & R. H. Johnson (eds.) *Argument Cultures* (pp. 1-10). Windsor, ON: OSSA.

Bailin, S. & Battersby, M. (2015). Teaching critical thinking as inquiry. In M. Davies & R. Barnett, (eds.) *The Palgrave Handbook of Critical Thinking in Higher Education* (pp.123-138). New York: Palgrave MacMillan.

Bailin, S. & Siegel, H. (2002). Critical Thinking. In N. Blake (Ed.), *The Blackwell guide to the philosophy of Education* (pp.181-192). Wiley-Blackwell.

Bailin, S., Case, R., Coombs, J. R., and Daniels, L.B. (1999a). Common misconceptions of critical thinking. *Journal of Curriculum Studies, 31*(3), 269-283.

Bailin, S., Case, R., Coombs, J. R., & Daniels, L. B. (1999b). Conceptualizing critical thinking. *Journal of Curriculum Studies, 31*(3), 285–302.

Barnett, R. (1997). *Higher education: A critical business.* Milton Keynes: Open University Press.

Barnett, R. (2015). A curriculum for critical being. In M. Davies, & R. Barnett, (eds) *The Palgrave Handbook of Critical Thinking in Higher Education* (pp.63-76). New York: Palgrave MacMillan.

Baron, J. (2000). *Thinking and deciding*. 3rd edition. New York: Cambridge University Press.

Baron, J. (2004). Normative models of judgment and decision making. In D. J. Koehler & N. Harvey (eds.). *Blackwell Handbook of Judgment and Decision Making* (pp. 19–36). London: Blackwell.

Barros, G. (2010). Herbert A. Simon and the concept of rationality: Boundaries and procedures. *Brazilian Journal of Political Economy, 30*(3), 455-472.

Barrow, D. J. (2002). *The Book of nothing: Vacuums, voids, and the latest ideas about the origins of the universe.* New York: Vintage Books.

Bayes, T. (1764). An essay towards solving a problem in the doctrine of chances. *Philosophical Transactions of the Royal Society of London*, 53, 37–418, reprinted in E.S. Pearson and M.G. Kendall (eds.) (1970). *Studies in the history of statistics and probability*. London: Charles Griffin.

Bergmann, M. (1997). Internalism, externalism, and the no-defeater condition. *Synthese, 110*, 399-417.

Berk, R. A. (1983). An introduction to sample selection bias in sociological data. *American Sociological Review 48*(3), 386-398.

Bird, A. (2005). Abductive knowledge and Holmesian inference. In T. S. Gendler & J. Hawthorne (eds.) *Oxford Studies in Epistemology* (pp.1-31). Oxford: Oxford University Press.

Bird, A. (2014). Inductive knowledge. In S. Bernecker & D. Pritchard

(eds), *The Routledge Companion to Epistemology,* (pp. 271-282). New York: Routledge.

Bird, A. (2016). Evidence and inference. In *Philosophy and Phenomenological Research,* (pp.1-19). Doi:10.1111/phpr.12311.

Blaauw, M. & Pritchard, D. (2005). *Epistemology A-Z.* Edinburgh: Edinburgh University Press.

Black, M. (1946). *Critical thinking.* New York: Prentice Hall.

Black, C., Kaye, J. A. and Jick, H. (2002). Relation of childhood gastrointestinal disorders to autism: nested case-control study using data from the UK General Practice Research Database. *British Medical Journal 325*(7361), 419-21.

Blackburn, S. (2008) *Oxford Dictionary of Philosophy.* Oxford: Oxford University Press.

Blackburn, S. (2009). *Ruling passions.* Oxford: Oxford University Press.

Blackburn, S. (2010). The majesty of reason. *Philosophy 85*(1), 5-27.

Blake, Nigel, Paul Smeyers, Richard Smith and Paul Standish. (1998). *Thinking Again: Education after Postmodernism.* Bergin & Garvey.

Bloom, B. (1956). *A taxonomy of educational objectives.* New York: Longmans Green.

Bok, D. (2006). *Our underachieving colleges: A candid look at how much students learn and why they should be learning more.* Princeton, NJ: Princeton University Press.

BonJour, L. (1985). *The structure of empirical knowledge.* Cambridge, MA: Harvard University Press.

BonJour, L. (2002). *Epistemology: Classic problems and contemporary responses.* New York: Roman and Littlefield.

BonJour, L. (2014). A priori knowledge. In S. Bernecker & D. Pritchard (eds.), *The Routledge Companion to Epistemology* (pp.283-293). New York: Routledge.

Boole, G. (1854) *An investigation of the laws of thought on which are founded the mathematical theories of logic and probabilities.* London: Macmillan.

Bowell, T. & Kemp, G. (2015). *Critical thinking: A concise guide.* 4th

edition. Oxford: Routledge.

Bradley, D., Noonan, P., Nugent, H. & Scales, B. (2008). *Review of Australian Higher Education: Final report (Bradley Review)*. Canberra: DEEWR Retrieved from: http://hdl.voced.edu.au/10707/44384

Brady, H. (2011). Causation and explanation in social science. In R. E. Goodin (ed.), *The Oxford Handbook of Political Science* (pp. 1-65). New York: Oxford University Press.

Brahe, Tycho (1913–1929). J. Lewis & E. Dreyer (ed.), *Tychonis Brahe Dani Opera Omnia (Collected works of Tycho Brahe the Dane)* 15 Vols. Copenhagen: Libraria Gyldendaliana.

Broadie, S. (1991). *Ethics with Aristotle*. New York: Oxford University Press.

Broadie, S. and Rowe, C. J. (2002). *Aristotle, Nicomachean Ethics* (transl. with historical introd. by Christopher J. Rowe; philosophical introd. And commentary by Sarah Broadie). Oxford: Oxford University Press.

Brookfield, S. (1987). *Developing critical thinkers: Challenging adults to explore alternative ways of thinking and acting.* 1st Edition. Jossey-Bass Higher Education Series. San Francisco: Jossey-Bass.

Brookfield, S. (1988). *Training Educators of Adults: The Theory and Practice of Graduate Adult Education*. London: Routledge.

Brookfield, S. (1995). *Becoming a Critically Reflective Teacher.* San Francisco: Jossey-Bass.

Brookfield, S. (1998). Critical Thinking Techniques, in M. Galbraith, *Adult Learning Methods*, (pp.317-336). Malabar: Kreiger Publishing.

Brookfield, S. (2012). *Teaching for critical thinking: helping students question their assumptions.* San Francisco: Jossey-Bass

Broome, J. (2004). Reasons. In R. J. Wallace (ed.), *Reason and value: Themes from the moral philosophy of Joseph Raz*, (pp. 2004-28). Oxford: Oxford University Press.

Brown, H.I. (1995). Rationality. In T. Honderich (ed.), *The Oxford Companion to Philosophy* (pp. 744-768). Oxford: Oxford University Press.

Burbules, N. C. & Berk, R. (1999). Critical thinking and critical pedagogy: Relations, difference, and limits. In T. S. Popkewitz & L. Fender (eds.), *Critical theories in education: Changing terrains of knowledge and politics,* (pp.45-64). New York: Routledge.

Burnyeat, M. (1992). *Plato: Theaetetus.* Indianapolis: Hackett Publishing Company.

Carnap, R. (1962). *The logical foundations of probability*. Chicago: University of Chicago Press.

Case, R. (2005). Moving critical thinking to the main stage. *Education Canada, 45(2),* 45–49.

Casner-Lotto, J., & Benner, M. W. (2006). Are they ready to work? Employers' perspectives on the basic knowledge and applied skills of new entrants to the 21st Century US workforce. In *The Conference Board, Corporate Voices for Working Families, the Partnership for 21st Century Skills, and the Society for Human Resource Management*. Retrieved from: http://www.p21.org/storage/documents/FINAL_REPORT_PDF09-29-06.pdf

Cassam, Q. (2014). *Self-knowledge for humans*. Oxford University Press.

Cassam, Q. (2016). Epistemic vices. *The Monast*, *99*, 159-180.

Chalmers, A. (2013). *What is this thing called science?* 4th edition. Maidenhead: Open University Press.

Chappell, T. (2005). *Reading Plato's Theaetetus*. Cambridge, MA: Hackett Publishing Company.

Clifford, W. K. (1879/1999). *The ethics of belief.* New York: Prometheus Books.

Comesaña, J. (2014). Reliabilism. In S. Bernecker and D. Pritchard (eds.), *The Routledge Companion to Epistemology*, (pp. 176-186). London: Routledge.

Conee, E. & Feldman, R. (1985) Evidentialism. *Philosophical Studies 48*, 15-34.

Conee, E. & Feldman. R. (1998). The generality problem for reliabilism. *Philosophical Studies 89*, 1-29.

Conee, E. & Feldman, R. (2004). *Evidentialism: Essays in epistemology.* Oxford: Oxford University Press.

Cooper, John M. (1975). Reason and Human Good in Aristotle. Harvard University Press.

Copi, I. M., Cohen, C. & McMahon, K. (2014). *Introduction to logic.* 14th edition. London: Pearson Education Ltd.

Copernicus, N. (1543). *On the revolutions of the heavenly spheres.*

Retrieved from:

http://www.geo.utexas.edu/courses/302d/Fall_2011/Full%20text%2

0-20Nicholas%20Copernicus,%20_De%20Revolutionibus%20(On%2

0the%20Revolutions),_%201.pdf

Cornford F. M. (1935). *Plato's theory of knowledge.* London: Kegan Paul, Trench, Trübner & Co. Ltd.

Craig, W. L. (1994), *Reasonable faith: Christian truth and apologetics.* Wheaton, IL: Crossway.

Cuypers, S. E. (2004). Critical thinking, autonomy, and practical reason. *Journal of the Philosophy of Education, 38*(1), 75-90.

Dancy, J. (2000). Practical reality. Oxford: Oxford University Press.

Davidson, D. (1963). Actions, reasons and causes. *Journal of Philosophy, 60*, 685–7.

Davies, B. (2004). *Philosophy of religion: A guide and anthology*. Oxford: Oxford University Press.

Davies, E. B. (2014). *Why beliefs matter: reflections on the nature of science.* Oxford: Oxford University Press.

Davies, M. (2012). Computer-aided argument mapping and the teaching of critical thinking (Part 2). *Inquiry: Critical thinking across the disciplines 27*(3): 16-28.

Davies, M. (2015). A model of critical thinking in higher education. *Higher education: Handbook of theory and research, 30*, 41-92.

Davies, M. & Barnett, R. (2015). Introduction. In M. Davies, & R. Barnett, (eds) *The Palgrave Handbook of critical thinking in higher education,* (pp. 1-25). New York: Palgrave MacMillan.

Dawkins, R. (1986). *The blind watchmaker*. W. W. Norton & Co., Inc.

Dawkins, R. (2006). *The God delusion.* Ealing: Bantam Press.

Dawson E., Gilovich T. and Regan D. T. (2002). Motivated reasoning and performance on the Wason selection task. *Personality and Social Psychology Bulletin*, *28*(10), 1379-1387. Sage Publications.

Dearing, R. (1997). *Higher education in the learning society,* Report of the National Committee of Enquiry into Higher Education, HMSO, London. Retrieved from http://www.educationengland.org.uk/documents/dearing1997/dearing1997.html.

de Bono, E. (1983). *Practical Thinking*. Harmondsworth: Penguin.

Dennett, D. C. (2013). *Intuition pumps and other tools for thinking*. London: Penguin.

Dewey, J. (1910/1997). How we think. New York: Dover Publications.

Dewey, John. (1938). *The Later Works of John Dewey*. 1925-1953. Volume 12. 1938, Logic: The Theory of Inquiry. Edited by Jo Ann Boydston and Larry A.

Dewey, J. (1960). *The quest for certainty*. New York: Capricorn.

DiSalvo, D. (2011, 3 January). Power balance scam shows again that the pseudoscience song remains the same. *Psychology Today.* Retrieved from: http://www.psychologytoday.com/blog/neuronarrative/201101/power-balance-scam-shows-again-the-pseudoscience-song-remains-the-same

Dunne, J. (1993). *Back to the rough ground: Practical judgment and the lure of technique.* Notre Dame: University of Notre Dame Press.

Dunne, J., Pendlebury, S. (2003). Practical reason. In Blake, Smeyers, Smith, Standish (eds.), *Blackwell guide to the philosophy of education*, (pp. 194-211). Oxford: Blackwell Publishing.

Dunne, G. (2015a). What is critical thinking? *The Learning Teacher Magazine*, *3*, 14-15. The Learning Teacher Network.

Dunne, G. (2015b). Beyond critical thinking to critical being: Criticality in higher education and life. *International Journal of Educational Research*, *71*, 86-99.

Durkheim, E. (1893/1997). *The division of labor in society*. New York, NY:

Free Press.

Earman, J. (1992). *Bayes or bust? A critical examination of bayesian confirmation theory.* Cambridge, Mass.: MIT Press.

Earp, B. D. & Trafimow, D. (2015). Replication, falsification, and the crisis of confidence in social psychology. *Frontiers in Psychology, 6*(621), 1-11.

Earp, B. (2016). Science cannot determine human. *Think, 15*(43), 17-23.

Cambridge University Press.

Ehrlinger, J., Gilovich, T., Ross, L, (2005). Peering into the bias blind spot: people's assessments of bias in themselves and others. *Personality & Social Psychology Bulletin* May, *31*(5), 680-92.

Eikeland, O. (2008). *The ways of Aristotle. Aristotelian phronêsis, Aristotelian philosophy of dialogue, and action research.* Bern: Peter Lang.

Eisner, E. D. (1985) *Learning and teaching the ways of knowing.*

University of Chicago Press.

Elder, L. & Paul, R. (2008). *The thinker's guide to intellectual standards.*

Foundation for Critical Thinking Press.

Elder, L., Gorzycki, M. & Paul, R. (2011). *Student guide to historical thinking.* California: Foundation for Critical Thinking.

Elgin, C. Z. (1996). *Considered judgment.* Princton, NJ: Princeton University Press.

Ellerton, P. (2015). Metacognition and critical thinking: Some pedagogical imperatives. In M. Davies & R. Barnett (eds.), *The Palgrave handbook of critical thinking in higher education,* (pp.409-426). New York: Palgrave MacMillan.

Ennis, R. H. (1985). A logical basis for measuring critical thinking skills.

Educational Leadership, 43(2), 44–48.

Ennis R. H. (1987). A taxonomy of critical thinking dispositions and abilities. In J. B. Baron and R. J. Sternberg (Eds.) *Teaching thinking skills: Theory and practice,* (pp. 9-26). New York: W. H. Freeman

and Company.

Ennis, R. (1996). *Critical thinking*. New Jersey: Prentice-Hall.

Ennis, R. H. (2011). Critical thinking: Reflection and perspective (Part 1). *Inquiry: Critical Thinking across the Disciplines 26*(1), 4-18.

Ennis, R. H. (2015). Critical thinking: A streamlined conception. In M. Davies & R. Barnett (eds.), *The Palgrave handbook of critical thinking in higher education*, (pp.31-48). New York: Palgrave MacMillan.

Evans, J. St. B. T. (2005). Deductive reasoning. In K. J. Holyoak and R. G. Morrison (eds.) *The Cambridge handbook of thinking and reasoning*, (pp.169-184). Cambridge: Cambridge University Press.

Evans, J. St. B. T. (2011). Reasoning is for thinking, not just arguing.

Behavioral and Brain Sciences, 34(2), 77-78.

Evans, J. St. B. T., Newstead, S. E., Byrne, R. M. J. (1993). *Human reasoning: the psychology of deduction*. Hove, UK: Psychology Press.

Facione, P. A. (1990). *The Delphi Report: Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction.* Millbrae, CA: The California Academic Press.

Facione, P. A. (2000). The disposition toward critical thinking: Its character, measurement, and relation to critical thinking skill. *Informal Logic, 20*(1), 61–84.

Facione, P. A. (2011). *Critical thinking: What it is and why it counts*. Retrieved from
http://www.student.uwa.edu.au/data/assets/pdf_file/0003/192250
2/Critical-Thinking-What-it-is-and-why-it-counts.pdf

Faulkner, P. (2007). A genealogy of trust. *Episteme, 4*(3), 305-321.

Faulkner, P. (2011). *Knowledge on trust.* Oxford: Oxford University Press.

Feldman, R. & Conee, E. (1985). Evidentialism. *Philosophical Studies 48*, 15-34.

Festinger, L. (1957). *A theory of cognitive dissonance.* Evanston, IL: Row-Peterson.

Fisher, A. (2014). *Critical Thinking: An introduction*. 2nd edition. Cambridge: Cambridge University Press.

Fisher, A. & Scriven, M. (1997). *Critical thinking. Its definition and assessment*. Norwich UK: University of East Anglia Centre for Research in Critical Thinking.

Fitelson, B. (2001). A Bayesian account of independent evidence with applications. *Philosophy of Science, 68*(s3), s123-S140.

Fixx, J. F. (1978). *Solve it.* New York: Doubleday.

Flannelly, L.T. & Flannelly, K. J. (2000). Reducing people's judgment bias about their level of knowledge. *Psychological Record, 50*, 587-600.

Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The nature of intelligence,* (pp. 231-235). Hillsdale, NJ: Lawrence Erlbaum.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive- developmental inquiry. *American Psychologist, 34*(10), 906–911.

Fodor, J. (1990). *A theory of content*. Cambridge, MA: MIT Press.

Fogelin, R. J. (1994). *Pyrrhonian reflections on knowledge and justification*. Oxford: Oxford University Press.

Forfás (2009). *Tomorrow's Skills: Towards a National Skills Strategy*. Retrieved from https://careersportal.ie/mce/plugins/filemanager/files/Towards%20a%20National%20Skills%20StrategyEGFSN2007.pdf

Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives, 19*(4), 25-42.

Freire, P. (1970). *Pedagogy of the oppressed*, trans. Myra Bergman Ramos. New York: The Seabury Press.

Fumerton, R. (2002). *Theories of justification.* In P. Moser (ed) *The Oxford handbook of epistemology,* (pp. 204-233). Oxford: Oxford University Press.

Gardner, M. (2001). *The colossal book of mathematics.* New York: W. W. Norton & Company.

Gettier, E. (1963). *Is justified true belief true knowledge*? Retrieved from:
http://fitelson.org/proseminar/gettier.pdf

Gilbert, M. A. (2014). *Arguing with people.* Toronto: Broadview Press.

Glaser, E. (1941/1972). *An experiment in the development of critical thinking.* New York: AMS Press.

Goldberg, D. T. (1994). 'Introduction: Multicultural Conditions.' In D. T. Goldberg (ed)., Multiculturalism: A Critical Reader (pp. 1-41). Oxford: Blackwell.

Goldman, A. I. (1979). What is justified belief? In G. S. Pappas (ed.) *Justification and Knowledge*, (pp.1-25). Dordrecht: D. Reidel.

Goldman, A. I. (1980). The Internalist Conception of Justification. In P. Friend et al. (eds.), *Midwest Studies in Philosophy, Vol. 5, Studies in Epistemology,* (pp. 27-52). Minneapolis: University of Minnesota Press.

Goldman, A. I. (1999). *Knowledge in a social world.* New York: Oxford University Press.

Goldman, A. I. (2004). Epistemology and the evidential status of introspective reports 1. *Journal of Consciousness Studies, 11*(8), 1-16.

Goldman, A. I. (2011). Toward a synthesis of reliabilism and evidentialism. In T. Dougherty (ed.) *Evidentialism and its discontents*, (pp. 254-290). New York: Oxford University Press.

Greco, J. (1999). Agent reliabilism. In J. Tomberlin (ed.), *Philosophical Perspectives, Vol. 13, Epistemology,* (pp.273-296). Atascadero, CA: Ridgeview Press.

Greco, J. (2000). *Putting sceptics in their place*. New York: Cambridge University Press.

Groopman, J. (2007). *How doctors think*. New York: Houghton Mifflin.

Habermas, J. (1962/1991). *The structural transformation of the public sphere: An inquiry into a category of bourgeois society.* Cambridge, MA: The MIT Press.

Hacking, I. (2006). *The emergence of probability: A philosophical study of*

early ideas *about probability, induction and statistical inference.* Cambridge: Cambridge University Press.

Halonen, J. S. (1995). Demystifying critical thinking. *Teaching of Psychology, 22*(1), 75–81.

Halpern, D. F. (1998). Teaching critical thinking for transfer across domains: Dispositions, skills, structure training, and metacognitive monitoring. *American Psychologist,* 53(4), 449–455.

Halpern, D.F. (2014). *Thought and knowledge: An introduction to critical thinking.* 5th edition. Mahwah, NJ; Lawrence Erlbaum Associates.

Hamby, B. (2015). Willingness to inquire: The cardinal critical thinking virtue. In M. Davies & R. Barnett (eds.) *The Palgrave handbook of critical thinking in higher education,* (pp. 77-88) New York: Palgrave MacMillan.

Hardin, R. (2002). *Trust and trustworthiness.* New York: Russell Sage Foundation.

Hardman, D. (2009). *Judgment and decision making: psychological perspectives.* Chichester: Wiley-Blackwell.

Harman, G. (1965). The inference to best explanation. *The Philosophical Review, 74*(1), 88-95.

Harman, G. (1986). *Change in view: Principles of reasoning.* Cambridge, MA: MIT Press.

Harriman, D. (2010). *The logical leap: Induction in physics.* New York: New American Library.

Hastie, R. & Davies, R. (2001). *Rational choice in an uncertain world.* London: Sage.

Hawkins, D., Elder, L. & Paul, R. (2010). *The thinker's guide to clinical reasoning.* California: Foundation for Critical Thinking

Hegel, G. W. F. (1807/1976). *The phenomenology of spirit.* Trans. A. V. Miller. New York: Oxford University Press.

Heidegger, M. (1993). *On the essence of truth,* trans. John Sallis, London: Routledge and Keegan Paul

Hempel, C. G. (1945). Studies in the logic of confirmation. *Mind, 54*(213), 1-26.

Higher Education Authority (2011). *National strategy for higher education*

to 2030. Dublin: HEA. Retrieved from
http://hea.ie/assets/uploads/2017/06/National-Strategy-for-Higher-
Education-2030.pdf

Honda, H., Shimizu, Y., Rutter, M. (2005). No effect of MMR withdrawal
on the incidence of autism: a total population study. *Journal of
Child Psychology Psychiatry, 46*(6), 572-9.

Hookway, C. (2003). How to be a virtue epistemologist. In M. DePaul and
L. Zagzebski, (eds.), *Intellectual virtue: perspectives from ethics
and epistemology*, (pp.183-202). New York: Oxford University
Press.

Horkheimer, M. (1972). *Critical theory: Selected essays.* University of
Michigan.

Hume, D. (1739/1968). *A treatise of human nature.* L. A. Selby-Bigge
(ed.). Oxford: Oxford University Press.

Hume, D. (1748/1975). *Enquiries concerning human understanding and
concerning the principles of morals.* 3rd edition. P.H. Nidditch (ed.).
Oxford: Oxford University Press.

Hurley, P. (2012). *A concise introduction to logic*. 11th edition. Boston:
Wadsworth Cengage Learning.

Husserl, E. (1970). *Logical investigations (J. Findlay, Trans.). London:
Routledge & K. Paul.*

Illari, P. M., Russo, F. & Williamson, J. (2011). *Causality in the Sciences*.
Oxford: Oxford University Press.

Irwin, T., (1999). The Nicomachean Ethics, Hackett Publishing

James, W. (1909/1997). *The meaning of truth*. New York: Prometheus
Books.

Janis, I. L. (1972). *Victims of groupthink: A psychological study of foreign-
policy decisions and fiascos.* Boston, MA: Houghton Mifflin.

Jones, V. (2016). *Rebel prods: The forgotten story of protestant radical
nationalists and the 1916 Rising*. Dublin: Ashfield Press.

Johnson, Stephen, and Harvey Siegel. (2010). *Teaching Thinking Skills*.
(2nd Ed). Key Debates in Educational Policy. Ed. by Christopher
Winch. Continuum.

Kahneman, D. (1975). Effort, recognition and recall in auditory attention. In P.M.A. Rabbitt & S. Dornic (eds.), *Attention and performance V,* (pp.65-80). New York: Academic Press.

Kahneman, D. (1992). Reference points, anchors, norms, and mixed feelings. *Organizational Behavior and Human Decision Processes, 51,* 296-312.

Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. *The American Economic Review, 93*(5), 1449-1475.

Kahneman, D. (2011). *Thinking: Fast and slow*. New York, NY: Farrar, Strauss and Giroux.

Kahneman, D. & Tversky, A. (1996). On the reality of cognitive illusions. *Psychological Review, 103*(3): 582-591.

Kant, I. (1781/2002). *Critique of pure reason*. London: Everyman.

Kaplan, L. D. (1991). Teaching intellectual autonomy: The failure of the critical thinking movement. *Educational Theory, 41*(4): 361-370.

Kennedy, M., Fisher, M. B., & Ennis, R. H. (1991). Critical thinking: Literature review and needed research. In L. Idol & B.F. Jones (eds.), *Educational values and cognitive instruction: Implications for reform,* (pp. 11-40). Hillsdale, New Jersey: Lawrence Erlbaum & Associates.

Kepler, J. (1621/1995). *Epitome of Copernican Astronomy & Harmonies of the World*. New York: Prometheus Books.

Keynes, J. M. (1921/2010). *Treatise on Probability.* Maryland: Wildside Press.

Kieran, M. (2014). Aesthetic knowledge. In S. Bernecker & D. Pritchard (eds.) *The Routledge Companion to Epistemology* (pp. 369-379). New York: Routledge.

King, P.M. & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults.* San Francisco: Jossey-Bass.

King, P. M., & Kitchener, K. S. (2002). The reflective judgment model: Twenty years of research on epistemic cognition. In B. K. Hofer &

P. R. Pintrich (eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing,* (pp. 37-61). Mahway, NJ: Lawrence Erlbaum.

Kitcher, P. (1993). *The advancement of science.* New York: Oxford University Press.

Kneale, W. C. & Kneale, M. (1962). *The development of logic*. London: Clarendon Press.

Kornblith, Hilary (1985). Ever Since Descartes. *The Monist* 68 (2):264-276

Kornblith, H. (2001). Epistemology: Internalism and externalism. Massachusetts: Wiley-Blackwell

Kristjánsson, Kristján. (2005). 'Smoothing It: Some Aristotelian misgivings about the phronêsis-praxis perspective on education'. *Educational Philosophy and Theory* 37 (4): 455–473.

Kusch, M. (2014). Social epistemology. In S. Bernecker & D. Pritchard (eds.), *The Routledge companion to epistemology,* (pp.873-884). New York: Routledge.

Kvanig, J. L. (2014). Epistemic justification. In S. Bernecker & D. Pritchard (eds.), *The Routledge companion to epistemology,* (pp.25-36). New York: Routledge.

Lackey, J. (2014). Testimonial Knowledge. In S. Bernecker & D. Pritchard (eds.), *The Routledge companion to epistemology,* (pp.316-325). New York: Routledge.

Lakoff, G. (1990). *Women, fire and dangerous things*: *What categories reveal about the mind*. Chicago IL: University of Chicago Press.

Laplace, P.S. (1812/1951). *A philosophical essay on probabilities.* New York: Dover Publications, Inc.

Lau, J. Y. F. (2015). Applying cognitive science to critical thinking among higher education students. In M. Davies, & R. Barnett (eds.), *The Palgrave handbook of critical thinking in higher education,* (pp.391-408). New York: Palgrave MacMillan.

Lavrakas, P.J. (2008). *Encyclopaedia of survey research methods*. California: Sage Publications.

Law, S. (2004). *The philosophy gym: 25 short adventures in thinking*.

London: Headline Review.

Leibniz, G. W. F. (1695/1989). *Philosophical essays.* Indianapolis: Hackett Publishing.

Lett, J. (1997). *Science, reason and anthropology: The priniciples of rational inquiry.* Lanham MD: Roman & Littlefield Publishers.

Levitin, D. (2016). *A field guide to lies and statistics.* London: Penguin Random House.

Lewis, A., & Smith, D. (1993). Defining higher order thinking. *Theory into Practice, 32*(3), 131–137.

Lim, L. (2011). Beyond logic and argument analysis: critical thinking, everyday problems and democratic deliberation in Cambridge International Examinations' Thinking Skills Curriculum. *Journal of Curriculum Studies, 43*(6), 783-807.

Lipman, M. (1988). Critical thinking – what can it be? *Educational Leadership, 46*(1), 38–43.

Lipman, M. (1991). *Thinking in education.* Cambridge, MA: Cambridge University Press.

Lipton, P. (2004). *Inference to the best explanation.* 2nd edition. London: Routledge.

Littlejohn, C. (2011). Reasons and belief's justification. In A. Reisner & A. Steglich-Petersen (eds.), *Reasons for belief,* (pp. 111-31). Cambridge: Cambridge University Press

Littlejohn, C. (2012). *Justification and the truth-connection.* Cambridge: Cambridge University Press.

Llano, S. M. (2015). Debate's relationship to critical thinking. In M. Davies & R. Barnett (eds.), *The Palgrave handbook of critical thinking in higher education,* (pp.139-152). New York: Palgrave MacMillan.

Locher, J. G. (1614/2017). *Mathematical disquisitions: The booklet of theses immortalized by Gallileo,* trans. C. M. Graney. Notre Dame: University of Notre Dame Press.

Lonergan, B. (1960/1992). *Insight: A study of human understanding, Vol. 3 (Collected Works of Bernard Lonergan).* F. Crowe & R. Doran (eds.). Toronto: University of Toronto Press

Ludlow, P. (2014). Semantic knowledge. In S. Bernecker & D. Pritchard

(eds.), *The Routledge Companion to Epistemology,* (pp.335-344). New York: Routledge.

MacIntyre, A. (1988). *Whose Justice? Which Rationality?* Notre Dame Press

MacIntyre, A. (1989). 'Relativism, Power and Philosophy.' In M. Krausz (ed.), *Relativism, Interpretation and Confrontation* (pp.182-204). Notre Dame Press

Macrone, M. (1998). *A little knowledge: What archimedes really meant and 80 other key ideas explained*. London: Ebury Press.

Malpass, A. & Marfori, M. A. (2017). *The history of philosophical and formal logic: from Aristotle to Tarski.* London: Bloomsbury Academic Press

Marcuse, H. (1937). *Philosophy and critical theory.* Retrieved from: http://www.autodidactproject.org/quote/marcuse4.html

Marcuse, H. (1968). *Negations: Essays in critical theory.* Mayfly Books.

Marsh, C. (1985). Back on the bandwagon: The effect of opinion polls on public opinion. *British Journal of Political Science, 15,* 51–74.

McDowell, J. H. (1998). *Mind and world.* Cambridge, MA: Harvard University Press.

McDowell, John (1998). 'Some issues in Aristotle's moral psychology'. *Ethics* 4:107.

McGrew, T. (2014). Evidence. In S. Bernecker & D. Pritchard (eds.), *The Routledge companion to epistemology,* (pp.58-67). New York: Routledge.

McGuinness, C. (1993). Teaching Thinking: new signs for theories of cognition. *Educational Psychology, 13*(4), 305-316.

McPeck, J. (1981). *Critical thinking and education.* New York: St. Martin's Press.

McPeck, J. (1990). *Teaching critical thinking: Dialogue and dialectic.* New York: Routledge.

Merleau-Ponty, M. (1968). *The visible and the invisible,* trans. by A. Lingis. Evanston: Northwestern University Press.

Mill, J. S. (1843/2012). *A system of logic.* Createspace Publishing.

Mittag, D. M. (2014). Evidentialism. In S. Bernecker & D. Pritchard (eds.), *The Routledge companion to epistemology,* (pp.167-175). New York: Routledge.

Modjeski, R. B. & Michael, W. B. (1983). An evaluation by a panel of psychologists of the reliability and validity of two tests of critical thinking. *Educational and Psychological Measurement, 43*, 1187-1197.

Monk, R. (2005). *How to read Wittgenstein.* London: Granta Books.

Moon, J. (2004). *Critical thinking: An exploration of theory and practice.* London: Routledge.

Moore, G. E. (1939). Proof of an external world. *Proceedings of the British Academy*, *25,* 273-300.

Moser, P. K . (1985). *Empirical justification.* Dordrecht: Reidel.

Mulnix, J. W. (2012). Thinking critically about critical thinking. *Educational Philosophy and Theory, 44*(5), 464-79.

Mumford, S. & Anjum, R. L. (2013). *Causation: A very short introduction.* Oxford: Oxford University Press.

Nagel, T. (1970). *The possibility of altruism.* Oxford: Oxford University Press.

National University of Ireland Maynooth (2012-2017). *Strategic Plan 2012-2017*. Retrieved from https://www.maynoothuniversity.ie/about-us/university-strategic-plan

Newman, H. J. (1852/1996). *The idea of the university*. Yale University Press.

Nickerson, R. S. (1986). *Reflections on reasoning*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology, 2*(2), 175-220

Nicod, Jean (1930). The foundations of geometry and induction. *Journal of Philosophical Studies, 5*(19), 455-460.

Nietzsche, F. (1887/2009). *On the genealogy of morals*. Oxford: Oxford University Press.

Norris, S. P. (1992). Testing for the disposition to think critically. *Informal Logic: Reasoning and argumentation in theory and practice*, *14*(2). ISSN: 0824-2577

Nosich, G. (2009). *Learning to think things through*. Upper Saddle River: Prentice Hall.

Nozick, R. (1993). *The nature of rationality.* Princeton University Press.

Nusche, D. (2008). *Assessment of learning outcomes in higher education: A comparative review of selective practices.* OECD Education Working Paper No. 15.

O'Brien, B. (2009). Prime suspect: An examination of factors that aggravate and counteract confirmation bias in criminal investigations. *Psychology, Public Policy and Law, 15*(4), 315-334. DOI:10.1037/a0017881

Oakeshott, M. (1989). *The voice of liberal learning*. Yale University Press.

OECD (2011-13). *Assessment of higher education learning outcomes AHELO feasibility study report, vol. 3: Further Insights*. Retrieved from http://www.oecd.org/edu/skills-beyond-school/AHELOFSReportVolume3.pdf

Parfit, D. (1997). Reasons and motivation. *Proceedings of the Aristotelian Society, 71*, 99-130.

Parfit, D. (2011). *On what matters.* Oxford: Oxford University Press.

Passmore, J. (1967). On teaching to be critical. In R. S. Peters (ed.), *The concept of education.* (pp.192-212). London: Routledge and Kegan Paul.

Paul, R. (1992). *Critical thinking: What every person needs to survive in a rapidly changing world.* Santa Rosa, CA: The Foundation for Critical Thinking.

Paul, R. (2011). *Critical thinking movement: 3 waves*. Retrieved from: http://www.criticalthinking.org/pages/critical-thinking-movement-3-waves/856.

Paul, R. (2012). Reflections on the nature of critical thinking, its history,

politics, and barriers, and on its status across the college/university curriculum part 1. *Inquiry, 26*(3), 5-24.

Paul, R. W. & Elder, L. (2002). *Critical thinking: Tools for taking charge of your professional and personal life.* Upper Saddle Hill, NJ: Prentice Hall.

Paul, R. W. & Elder, L. (2005). *The thinkers guide to the nature and function of critical thinking.* Dillon Beach, CA: The Foundation for Critical Thinking.

Paul, R. W. & Elder, L. (2006). *Critical thinking: Learn the tools the best thinkers use.* Concise edition. Dillon Beach, CA: The Foundation for Critical Thinking.

Paul, R. W. & Elder, L. (2007). *The thinker's guide to the art of Socratic questioning, based on critical thinking concepts & tools.* Dillon Beach, California: The Foundation for Critical Thinking.

Paul, R. W. & Elder, L. (2009). *The miniature guide to critical thinking – concepts and tools*. Dillon Beach, California: The Foundation for Critical Thinking.

Paul, R., Elder, L., Bartell, T. (1997). *California teacher preparation for instruction in critical thinking: Research findings and policy recommendations*. State of California, California Commission on Teacher Credentialing.

Paul, R. W., Niewoehner, R. & Elder, l. (2007). *The thinker's guide to engineering reason*. Dillon Beach. California: Foundation for Critical Thinking.

Peirce, C. S. (1958). *Collected papers of Charles S. Peirce, Vol.VII: Science and Philosophy.* Edited by Arthur W. Burks.. Cambridge, MA: Harvard University Press.

Peters, R. (ed.) (1973). *The philosophy of education*. Oxford: Oxford University Press.

Plato (1997) *Plato Complete Works* Ed. by John. M. Cooper. Hackett Publishing Company

Pollock, J. L. (1987). Defeasible reasoning. *Cognitive Science, 11,* 481-518

Popper, K. (1953). *Science: Conjectures and refutations.* A lecture delivered at Peter House, Cambridge, Summer 953. Retrieved from:

http://philosophyfaculty.ucsd.edu/faculty/rarneson/Courses/popperp hil1.pdf

Popper, K. (1959). *The logic of scientific discovery*. London: Hutchinson.

Popper, K. R. (1970). 'Normal Science and Its Dangers.' In I. Lakatos and A. Musgrave (eds)., *Criticism and the Growth of Knowledge* (pp. 51-58), Cambridge University PressPopper, K. (1972). Objective knowledge. Oxford: Clarendon Press.

Power Balance (2010). *Energy balance and systemic harmony are the keys*. Retrieved from: http://www.balanceband.com/technology/

Pritchard, D. (2005). *Epistemic luck*. New York: Oxford University Press.

Pritchard, D. (2007). Anti-luck epistemology. *Syntese,* 277-97.

Pritchard, D. (2013). *What is this thing called knowledge?* London: Routledge.

Putnam, R. A., 2010. Dewey's epistemology. In: Cochran, M., ed., *The Cambridge Companion to Dewey*, Cambridge: Cambridge University Press, pp. 34–54.

Quine, W.V.O. (1960). *Word and object*. Cambridge, MA: MIT Press.

Quine-Duhem, (1953/1998). The Duhem Thesis and the Quine Thesis. In M. Curd & J.A. Cover (eds.), *Philosophy of Science: The Central Issues*, (pp.302-319). New York: Norton.

Ramsey, F. P. (1926/1978). Truth and probability. In H. Mellor (ed) *Foundations: Essays in Philosophy, Logic, Mathematics and Economics* (pp. 58-100). London: Routledge.

Ramsey, F. P. (1931). *The foundations of mathematics and other logical essays*. London: Harcourt, Brace & Company.

Raz, J. (1975). *Practical reasoning and norms*. London: Hutchinson and Company.

Raz, J. (2003). Engaging reason. *Philosophy and Phenomenological Research, 66*(3), 745-748.

Raz, J. (2007). Reasons: Practical and adaptive. *Oxford Legal Studies Research Paper, 12*.

Redmond, B. (2006). *Reflection in action: Developing reflective practice in health and social services*. Dublin: Ashgate Publishing.

Rescher, N. (1988). *Rationality: A philosophical inquiry into the nature and the rationale of reason*. Oxford: Clarendon Press.

Rescher, N. (2003). *Epistemology: An introduction to the theory of knowledge.* Albany: State University of New York Press.

Rescher, N. (2005). *What if? Thought experimentation in philosophy*. New Brunswick, NJ: Transaction Books.

Rescher, N. (2012). *Philosophical dialectics*. New York: SUNY Press.

Rescher, N. (2014). *Metaphilosophy*. New York: Lexington Books

Rorty, R. (1982). Consequences of Pragmaticism. Minneapolis: University of Minneapolis Press.

Rorty, R. (1989). 'Solidarity or Objectivity?' In Michael Krausz (ed.) Relativism: Interpretation and Confrontation (pp. 35-50), Notre Dame Press.

Rorty, R. (1989). Two meanings of "Logocentrism": A reply to Norris. In R. W. Dasenbrock, *Redrawing the lines: Analytic philosophy, deconstruction and literary theory*, (pp.204-216). Minneapolis: University of Minnesota Press.

Ross, L. & Ward, A. (1996). Naïve realism: Implications for social conflict and misunderstanding. In T. Brown, E.S. Reed, E. Turiel (eds.), *Values and Knowledge,* (pp.103-132). Mahwah, NJ: Lawrence Erlbaum Associates.

Du Sautoy (2016). *What we cannot know.* Rumsfeld, D. (2009). Quoted in du Sautoy (2016). *What we cannot know*. HarperCollins Press.

Russell, B. (1912). *Problems of philosophy.* Oxford: Oxford University Press.

Russell, B. (1921). *The analysis of mind*. London: George Allen and Unwin.

Russell, B. (1924). *Our knowledge of the external world as a field for scientific method in philosophy*. Chicago: Chicago University Press.

Russell, B. (1950). *Unpopular essays*. London: George Allen and Unwin.

Russell, B. (1956). *Logic and knowledge: Essays 1901-1950*. R. C. Marsh (ed.). London: George Allen and Unwin.

Russell, B. (1958). *Understanding history and other essays*. New York: Philosophical Library.

Ryle, G. (1949). *The concept of mind.* New York: Barnes & Noble.

Ryle, G. (1953). *Dilemmas.* Cambridge: Cambridge University Press.

Sagan, C. (1980). *Cosmos*. New York: Ballantine Books.

Salmon, M. H. (2013). *Introduction to logic and critical thinking*. 6th edition. Wadsworth: Cengage Learning.

Sandis, C. (2012). *The things we do and why we do them*. New York: Palgrave Macmillan.

Scanlon, T.M. (1998). *What we owe each other*. Cambridge, MA: Harvard University Press.

Scanlon, T. M. (2004). Reasons: A puzzling duality? In R. J. Wallace, P. Pettit, S. Scheffler, and M. Smith, (eds.), *Reason and value: Themes from the moral philosophy of Joseph Raz,* (pp.231-46). Oxford: Oxford University Press.

Scanlon, T. M. (2014). *Being realistic about reasons.* Oxford: Oxford University Press.

Scheffler, I. (1973). *Reason and teaching*. London: Routledge.

Scheffler, I. (2005). An interview with Michael F. Shaughnessy. *International Journal of Thinking and Problem Solving, 12*(3), 1-14.

Schön, D. A. (1983). *The reflective practitioner*. San Francisco: Jossey-Bass.

Schön, D. A. (1991). *The reflective practitioner: How professionals think in action.* London: Ashgate.

Searle, J. R. (2001). *Rationality in action.* Cambridge, MA: The MIT Press.

Sellars, W. (1956). Does empirical knowledge have a foundation? In H. Feigl & M. Scriven (eds.), *Empiricism and the philosophy of mind*. Minnesota Studies in the Philosophy of Science, (Vol. 1, pp. 293-300). Minneapolis: University of Minnesota Press.

SFI (2009). Powering the Smart Economy: *The Science Foundation Ireland Strategy 2009-2013.* Retrieved from http://www.sfi.ie/research-news/publications/organisational-publications/English%20SFI%20Smart%20Economy.pdf

Siegel, H. (1988). *Educating reason: Rationality, critical thinking, and education.* New York: Routledge.

Siegel, H. (1997). *Rationality redeemed? Further dialogues on an*

educational ideal. New York: Routledge.

Siegel, H. (2003). Cultivating reason. In R. Curren (ed.). A Companion to the Philosophy of Education (pp.305-317). Oxford: Blackwell.

Siegel, H. (2005). Neither human nor (fully) Kantian be: Reply to Cuypers. *Journal of Philosophy of Education, 39*(3), 535-547. DOI: 10.1111/j.1467-9752.2005.00452.x

Siegel, Harvey. (2017). *Education's Epistemology: Rationality, Diversity, and Critical Thinking*. Oxford University Press.

Siegel, H. (2017). Epistemology in excess? A response to Williams. *Journal of Philosophy of Education, 51,*193-213. DOI: 10.1111/1467-9752.12229

Simon, H. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics, 69*, 99–118.

Simon, H. (1957). *Models of man, social and rational: Mathematical essays on rational human behavior in a social setting*. New York: John Wiley and Sons.

Simon, H. (1972). Theories of bounded rationality. In C. B. McGuire & R. Radner, (eds.), *Decision and organisation,* (pp. 161-176). Amsterdam: North-Holland Publishing Company.

Skyrms, B. (2014). Grades of inductive skepticism. *Philosophy of Science, 81*(3), 303-312.

Standish, Paul. (2007). 'Rival conceptions of the philosophy of education'. *Ethics and Education 2*, no. 2: 159–171.

Stanovich, K. E. & West, R. F. (2008). On the failure of cognitive ability to predict myside and one-sided thinking biases. *Thinking & Reasoning, 14*(2), 129-167. DOI:10.1080/13546780701679764

Sternberg, R. J. (1986). *Critical thinking: Its nature, measurement, and improvement.* National Institute of Education. Retrieved from: http://eric.ed.gov/PDFS/ED272882.pdf.

Sunstein, C. (2002). Probability neglect: Emotions, worst cases, and law. *Yale Law Journal, 112*, 61–107.

Taylor, C. (1995). *Overcoming epistemology in philosophical arguments.* Mass: Harvard University Press.

Thayer-Bacon, B. J. (2000). *Transforming critical thinking: Thinking*

constructively. New York: Teachers College Press.

Thompson, R. P. (2011). Causality, theories and medicine. In P. K. Illari, F. Russo & J. Williamson eds.), *Causality in the Sciences,* (pp.25-44). Oxford: Oxford University Press.

Tittle, P. (2011). *Critical thinking: An appeal to reason*. Routledge, New York.

Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology, 5,* 207-232.

Tversky, A. & Kahneman, D. (1974). Judgments under uncertainty: Heuristics and biases. *Science*, *185*(4157): 1124-1131. PMID 17835457, DOI:10.1126/scince.185.4157.1124

Unger, P. (1975). *Ignorance*. Oxford: Oxford University Press.

U.S. Department of Education (2006). *A test of leadership: charting the future of U.S. higher education.* Washington, DC: U.S. Department of Education.

Vahid, H. (2014). Externalism/internalism. In S. Bernecker & D. Pritchard (eds.), *The Routledge companion to epistemology,* (pp. 144-156). New York: Routledge.

Van Eemeren, F.H., & Grootendorst, R. (2004). *A systematic theory of argumentation: The pragma-dialectical approach.* Cambridge: Cambridge University Press.

Van Gelder. T. (2001). *How to improve critical thinking using educational technology*. Retrieved from http://www.ascilite.org.au/conferences/melbourne01/pdf/papers/van geldert.pdf

Van Gelder, T. (2005). Teaching critical thinking: Some lessons from cognitive science. *College Teaching, 53*(1), 41–48.

Van Gelder, T. (2015). Using argument mapping to improve critical thinking skills. In M. Davies & R. Barnett (eds.), *The Palgrave handbook of critical thinking in higher education,* (pp. 183-192). New York: Palgrave MacMillan.

Wakefield et al (1998). RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children retracted article. *Lancet, 351*(9103), 637-641. DOI:

http://dx/doi.org/10.1016/SO140-6736(97)11096-0.

Walsh, J., & Loxley, A. (2014). The Hunt Report and higher education policy in the Republic of Ireland: An international solution to an Irish problem? *Irish Educational Studies*, *40*(6), 1128-1145.

Walton, D. (2008). *Informal logic: A pragmatic approach*. 2nd edition. Cambridge: Cambridge University Press.

Wason, P. C. (1966). Reasoning. In B. Foss (ed.), *New horizons in psychology,* (pp. 135–151). Harmondsworth: Penguin Books.

Weber, M. (1922/2013). *Economy and society*. California: University of California Press.

Whitehead, A.N. & Russell B. (1910/2011). *Principia Mathematica. Volume 1*. Oregan: Rough Draft Printing

Wiggins, D. (1980). Deliberation and practical reason. In A. O. Rorty (ed.), *Essays on Aristotle's ethics*. California: University of California Press.

Williams, E. (2016). *The ways we think.* Chicester: Wiley Blackwell Classics.

Williamson, T. (2000). *Knowledge and its limits*. Oxford: Oxford University Press.

Willingham, D. T. (2007). Critical thinking: Why is it so hard to teach? *American Educator*, 8–19.

Winerman, L. (2012). Tracking the scent of information. *Monitor on Psychology, 43(3),* 44-47. Washington, DC: American Psychological Association.

Wittgenstein, L. (1922). *Tractatus Logico-Philosophicus*, trans. Ramsey and Ogden, Keegan Paul.

Wood, D. (2002). *Thinking after Heidegger.* Oxford: Polity Press.

Yáñez, C.S. (2012). Mercier and Sperber's argumentative theory of reasoning: From the psychology of reasoning to argumentation studies. *Informal Logic, (32)*1, 132-159

Zagzebski, L. (1996). *Virtues of the mind: An inquiry into the nature of virtue and the ethical foundations of knowledge*. Cambridge: Cambridge University Press.

Zagzebski, L. (2014). Religious knowledge. In S. Bernecker & D. Pritchard (eds.), *The Routledge companion to epistemolo*gy, (pp.393-400). New York: Routledge.