DARWINIAN EPISTEMOLOGY: ASSESSING THE IMPLICATIONS FOR RELIABLE COGNITION IN A NON-ADAPTIVE DOMAIN OF BELIEF

by

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ABSTRACT

Charles Darwin and Alfred Wallace departed ways on the implications of evolution for human cognition. While Darwin argued that natural selection affected both the reliability and unreliability of human cognitive faculties, Wallace rejected the idea that natural selection could explain higher order intelligence. If Wallace is right, then Darwinian epistemology seems implausible. However, I argue that this position is false. In Chapter 1 I survey a history of Darwinian epistemology. In Chapter 2 I examine the Scope Objection to Darwinian epistemology: that evolution did not supply us with the natural cognitive capacities for achieving non-adaptive true beliefs. In Chapter 3 I respond to the Scope Objection by assessing Robert McCauley's theory of natural cognition. In Chapter 4 I evaluate two difficulties with my response to the Scope Objection. I conclude that evolution is sufficient for explaining the reliability of human cognitive faculties in non-adaptive domains of belief.

CONTENTS

Chapter 3: The Application and Evolution of Practiced Natural Cognition

Chapter 4: Objections, Responses, and Conclusions

INTRODUCTION

I. THE GENERAL PROBLEM: EVOLUTION AND RELIABLE COGNITION

Charles Darwin's theory of evolution by natural selection is one of the great achievements of western science.[1] Indeed, E.O. Wilson ranks *On the Origin of Species* as one of the most important books ever written.[2] Wilson's high regard for *The Origin* is appropriate not only for understanding biological change, but also for considering human nature.[3] Darwin states in *The Origin* that evolution impacts future domains of inquiry and that psychology will be based on new foundations.[4] In a similar way, Ernst Mayr thinks that "evolution has an impact on every aspect of man's thinking: his philosophy, his metaphysics, his ethics…"[5] More recently Daniel Dennett proclaims that evolution "…eats through just about every traditional concept, and leaves in its wake a revolutionized world-view, with most of the old landmarks still recognizable, but transformed in fundamental ways."[6] Thus, according to many biologists and philosophers, we have reason to think that Darwin's theory will yield new understanding about human nature in general and human psychology in particular.

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[1] Michael Ruse and Joseph Travis, *Evolution: The First Four Billion Years* (Cambridge: Belknap Press, 2009), ix.

[2] E.O Wilson, "Forward," in *Evolution: The First Four Billion Years* (Cambridge: Belknap Press, 2009), vii.

[3] See E.O Wilson, *Sociobiology: The New Synthesis* (Massachusetts: Belknap Press, 1975).

[4] Charles Darwin, *On the Origin of Species: Or the Preservation of Favoured Races in the Struggle for Life* (London: John Murray, Albemarle, 1859), 449. Helen De Cruz argues that this reference to Darwin exaggerates a foreshadowing of a whole new program of Darwinian epistemology. Perhaps this is true, but neither was Darwin fully aware of the implications of his theory for epistemology.

[5] Ernst Mayr, "Interview," *Omni*, March/April 1988, 46.

[6] Daniel Dennett, *Darwin's Dangerous Idea: Evolution and the Meanings of Life* (New York: Simon and Schuster Paperbacks, 1995), 63.

Evolution is a process of change over time within a population of organisms and includes three related ideas.[7] First, evolution refers to descent with modification: all living things are all related and the diversity and relationship of species to one another is the product of a long history of change through genetic inheritance.[8] Second, evolution describes when and where species split from various lineages and the changes that took place.[9] Third, evolution refers to the mechanisms driving biological change, including natural selection, sexual selection, and genetic drift.[10]

Questions arise about the impact of evolution on our cognitive capacities. Karl Popper understood human knowledge and our abilities for rationality a product of natural selection: "The specifically human ability to know, and the ability to produce scientific knowledge, are the results of natural selection."[11] But not everyone shares an optimistic view that evolution delivered reliable cognition. Friedrich Nietzsche argued that our cognitive faculties are unreliable given their evolutionary origin. For Nietzsche the result is a universal scepticism about the human capacity to form true belief. If the evolutionary process for generating knowledge and rational belief is unreliable, whence the evolutionary support for our beliefs? Can we be optimistic about the truth of our

[7] Ernst Mayr, *What Evolution Is* (New York: Basic Books, 2001), 8; Carl Zimmer and Douglas J. Emlen, *Evolution: Making Sense of* Life (Colorado: Roberts and Company Publishers, 2013), 3-5.

[8] Ruse and Travis, *Evolution*, ix; Ernst Mayr, *What Evolution*, 7; Francisco Ayala, "The Evolution of Life," in *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action*, eds., Robert John Russell, William R. Stoeger, S.J. and Fancisco J. Ayala (Berkeley: Center for Theology and the Natural Sciences and Vatican Observatory Publications, 1998), 27.

[9] Ruse and Travis, *Evolution*, ix; Ayala, "The Evolution," 27.

[10] Ruse and Travis, *Evolution*, ix; Ayala, "The Evolution," 27; Stephen Jay Gould, "The Evolution of Life," *Scientific America*, (October 1994): 92. See also Mayr, *What*, 115. Natural selection is only one mechanism driving change. Other mechanisms include sexual selection and genetic drift; see Zimmer and Emlen, *Evolution*, 46-7.

[11] Karl Popper, "Evolutionary Epistemology," in *Evolutionary Theory: Paths into the Future*, ed. J. W. Pollard (London: John Wiley & Sons Ltd, 1984), 239.

philosophical and scientific beliefs when the causal process responsible for these beliefs is unreliable? Nietzsche doesn't think so. Instead, he argues that human beliefs are the product of selected faculties shaped for survival regardless of truth.[12]

Nietzsche is not alone in this skeptical pronouncement. Several contemporary philosophers reject the claim that evolution was able to generate reliable cognitive faculties, either with respect to cognition generally or within specific cognitive domains.[13] While some philosophers and biologists argue that evolution generated reliable cognitive faculties, others argue that evolution precludes cognitive reliability. These opposing views underscore the division between evolutionary supporting arguments (ESAs) and evolutionary debunking arguments (EDAs).[14]

ESAs typically argue that if our ancestral environment included disease, nutrition and predation, then there would have been pressure for organisms to form true beliefs about the environment. Individuals within a population that reliably form true beliefs will likely survive and reproduce, passing their fitness enhancing genes on to future generations. This evolutionary process need not be perfect or optimal insofar as ESAs are concerned as long as sub-optimality does not interfere with the selection of fitness

[12] Friedrich Nietzsche, "Notebook 36, 1885," in *Nietzsche: Writings from the Late Notebooks*, ed. Rudiger Bittner (Cambridge: Cambridge University Press, 2003), 26; Nietzsche, *The Gay Science*, trans. Walter Kaufmann (New York: Random House, 1974), 110.

[13] See Thomas Nagel, *The View from Nowhere* (New York: Oxford University Press, 1986), and more recently Thomas Nagel, *Mind and Cosmos: Why The Materialist New Darwinian Conception of Nature is almost certainly false* (Oxford: Oxford University Press, 2012); Stephen Stich, *The Fragmentation of Reason: Preface to a Pragmatic Theory of Cognitive Evaluation* (MIT Press, 1990).

[14] I have altered the terminology slightly. ESAs typically go by the term evolutionary arguments (EAs). But this is confusing because evolutionary arguments could (in principle) take the form of a debunking strategy. For a summary, see Helen De Cruz, Maarten Boudry, Johan De Smedt, and Stefan Blancke, "Evolutionary Approaches to Epistemic Justification." *dialectica* Vol. 65, no. 4 (2011): 517–535. ESA's and EDA's are also synonymous with the terms "evolutionary supporting strategies" and "evolutionary debunking strategies."

enhancing and reliable cognitive faculties. Consequently, the most promising evolutionary supporting strategies defend the reliability of common-sense faculties because such mechanisms are the most likely to have been selected for by evolution. [15]

EDAs attack ESAs in two ways.[16] The first way distinguishes between adaptive value and true belief. Proponents of this way argue that faculties that typically generate fitness enhancing false beliefs are just as likely to have been selected for as faculties that reliably produce true belief. So, according to the first type of EDA the probability that our cognitive faculties are reliable given evolution by natural selection remains inscrutable. The second way of attack is more limited in scope. According to this second type of EDA, although evolution may have selected for some reliable faculties, faculties divorced from adaptive value remain invisible to selection.[17] Therefore, faculties producing non-adaptive beliefs in the domain of science and philosophy should be treated with suspicion if the mechanisms responsible for these beliefs were to have evolved.[18]

EDAs also target moral and religious beliefs. Richard Joyce argues that the evolution of the belief in objective moral facts diminishes the justification for the belief

[15] See Paul Griffiths and John Wilkins (in press), "When do evolutionary explanations of belief debunk belief?" in *Darwin in the 21st Century: Nature, Humanity, and God*, ed. P.R Sloan (Notre Dame: Notre Dame University Press, forthcoming), 5-7; De Cruz et al., "Evolutionary Approaches," 520.

[16] For a brief introduction, see Guy Kahane, "Evolutionary Debunking Arguments," *Nous*, vol 45, no. 1 (2011): 103–125. I depart from Kahane's schema because at this point our question is about cognitive reliability and not necessarily epistemic justification.

[17] I depart from the traditional understanding of evolutionary debunking strategies that suggest natural selection is of limited importance in shaping cognition, while other evolutionary processes are more liable to have produced unreliable faculties. First, it seems to me that natural selection is of optimal importance in shaping reliable cognition. Second, it also seems that sexual selection plays an important role in shaping cognition; indeed, recent studies affirm cognitive delay in the absence of sexual selection. See Brian Holis and Tadeusz J. Kawecki, "Male Cognitive Performance Declines in the Absence of Sexual Selection," *The Royal Society*, vol. 281, no. 1781 (2014). The point I wish to draw is that EDAs of the second sort are domain specific, unlike the former, universal debunking strategies.

[18] De Cruz et al., "Evolutionary Approaches," 525.

in objective morality. The reason for this is two-fold. First, objective moral facts are not natural facts.[19] That is, objective moral facts do not contribute to natural selection because they do not fall within the purview of natural facts. Second, our belief in objective moral facts would obtain by natural means even if such facts failed to exist. In other words, our moral awareness does not track the truth of moral facts. This implies that human's objective moral intuition is counter-factually insensitive and is therefore unjustified.[20]

Religious facts follow a similar pattern of being counter-factually insensitive. Pascal Boyer argues that the human mind was hard-wired for religion by evolution for holding minimally counter-intuitive beliefs in the existence of supernatural beings.[21] The essential point is that religious concepts are advantageous enough for acquiring cultural transmission, but not overly counter-intuitive to lose appeal. Therefore, humans would hold religious beliefs regardless of whether or not supernatural beings existed. This implies that religious beliefs do not track the truth of religious facts and so religious belief is unjustified.[22]

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[19] Although Joyce presses this point, others reject that moral facts are not natural facts; see especially Scott James, *An Introduction to Evolutionary Ethics* (Oxford: Blackwell, 2011). I'm thankful to Helen De Cruz for raising this point.

[20] See Richard Joyce, *The Myth of Morality* (Cambridge: Cambridge University Press, 2006). Joyce seems to nuance his understanding of moral ontology, in apart from Michael Ruse and E.O Wilson, "Moral Philosophy as Applied Science," *Philosophy*, Vol. 61, No. 236 (Apr., 1986), 173-192. See also S. Street, 2006, "A Darwinian Dilemma for Realist Theories of Value," *Philosophical Studies* 127: 109-66.

[21] Pascal Boyer, *Religion Explained: The Evolutionary Origins of Religious Thought* (New York/London: Basic Books/Heinemann, 2001).

[22] See also Paul Bloom "Religious Belief as an Evolutionary Accident," in *The Believing Primate: Scientific, Philosophical, and Theological Reflections on the Origins of Religion*, eds. Michael Murray and Jeffrey Schloss (Oxford: Oxford University Press, 2010), 119. For response, see Michael Murray, "Scientific Explanations of Religion and the Justification of Religious Belief," in *The Believing Primate: Scientific, Philosophical, and Theological Reflections on the Origins of Religion*, eds. Michael Murray and Jeffrey Schloss (Oxford: Oxford University Press, 2010), 168, 173. Also see Kelly James Clark and Justin Barrett, "Reidian Religious Epistemology and the Cognitive Science of Religion," *Academy of Religion* 79

II. STATEMENT OF THE PROBLEM

If our non-adaptive beliefs, including our systematic theories about knowledge and rational belief, are beyond the scope of our evolved cognition, then epistemology should be treated with suspicion. Darwinian epistemology (hereafter, DE) argues that evolutionary processes are sufficient for explaining the reliability of our cognitive facilities.[23] But debunking strategies undermine DE, since non-adaptive belief is beyond the scope of evolved, cognitive faculties. Consider the following Scope Objection to DE.

A. The Scope Objection

1. DE is plausible only if evolution supplied us with the natural cognitive capacities for achieving non-adaptive true beliefs.
2. Evolution did not supply us with the natural cognitive capacities for achieving non-adaptive true beliefs.
3. So, DE is implausible.

In this thesis I argue that the Scope Objection to DE fails. More specifically, I argue that premise two of the Scope Objection is false. I employ Robert McCauley's distinction between maturationally natural cognition and practiced natural cognition and note how the application and evolution of practiced naturalness supports DE. Moreover, I consider

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(2011): 639-675. It is important to note that debunking arguments also apply to truth and falsity, not only justification. Joyce has recently abandoned his earlier view relating debunking with justification. For this discussion, see Richard Joyce, "Evolution, Truth-Tracking, and Moral Skepticism," (forthcoming), accessed March 1, 2014, http://www.victoria.ac.nz/staff/richard_joyce/acrobat/joyce_evolution.truthtracking.moral.skepticism.pdf; and Ben Foster, "Evolutionary Debunking Arguments and the Reliability of Moral Cognition," (forthcoming), accessed March 1, 2014, https://www.academia.edu/3350289/Evolutionary_Debunking_Arguments_and_the_Reliability_of_Moral_Cognition#.

[23] This does not include all our cognitive mechanisms. Evolutionary processes would likely have supplied faculties that are also unreliable. We explore this position in chapter 2 and 3.

two criteria necessary for the rise of science as an example of practiced naturalness and note how evolution supplied faculties as such. If this is right, then it seems plausible that evolution supplied practiced natural faculties for non-adaptive beliefs more generally, including our theories of knowledge and rational belief.

III. SIGNIFICANCE OF THE PROBLEM FOR EPISTEMOLOGY

As I have noted above, according to some epistemologists the evolution of human cognition leads to a universal skepticism about its capacity to form true belief. But true belief addresses only one aspect of epistemology, because epistemology also considers the question of epistemic justification. Justification refers to the degree of support obtained for true and false beliefs. Therefore, assessing the implications of evolution for epistemology must also consider the impact on epistemic justification.

A primary significance for this research concerns its contributions to dealing with scepticism. According to evolutionary debunking strategies, evolutionary theory functions like a present-day Cartesian Demon, by undermining the justification for true and false beliefs.[24] Evolutionary supporting strategies draw the opposite conclusion, such that evolution replaces the need for postulating Descartes' God for justifying true belief.[25] Still, it remains unclear exactly how evolution and epistemic justification coincide, especially with respect to the justification of non-adaptive belief. Although I explore the importance of evolutionary justification in the conclusion, I generally ignore the issue. That is because the literature relevant to DE remains unclear about the relationship between evolution and justification. In some cases, philosophers and biologists use

[24] De Cruz, "Evolutionary Approaches," 522.

[25] Sober, "The Evolution," 110.

epistemic concepts differently when discussing the connection between evolution and justification, while at other times epistemic concepts are ignored altogether.[26] Certainly, DE must include viable theories of justification, but only after it defends a plausible view of truth-conducive reliability.

IV. PLAN OF RESEARCH

A. Inquired Study and Philosophical Reflection

The primary focus of this project defends DE from critics who claim that evolution cannot account for reliable cognitive faculties in non-adaptive domains of belief. I argue that ESAs succeed in this way. In defense this claim, I intend to evaluate Alvin Plantinga's evolutionary debunking strategy and Paul Griffiths' and John Wilkins' evolutionary supporting strategy. Although both arguments arrive at different conclusions, they accept the evolution of reliable common-sense faculties, thereby providing the right context for stating the Scope Objection. I then argue that the Scope Objection is false by defending two contentions. First, I reject premise two by nuancing the term "natural" in order to distinguish between two types of natural cognition, one of which overcomes evolved limitations and produces non-adaptive beliefs. Second, I provide an example of the evolution of practiced natural faculties responsible for the rise of science, and note how evolutionary processes are sufficient to explain the reliability of such faculties.[27]

[26] Michael Ruse ignores the topic of justification and focuses only on truth. Richard Joyce, Paul Griffiths, and John Wilkins focus on justification by way of truth-tracking, but define truth-tracking differently than traditional concepts of truth-tracking. This isn't a problem only that it creates some confusion about how evolution relates with justification.

[27] Robert McCauley, *Why Religion is Natural and Science is Not* (Oxford: Oxford University Press, 2012), 107-8, 138.

B. Definitions

Darwinian Epistemology: The claim that evolution supplied reliable cognitive faculties for generating true belief. This is a restricted definition of DE that precludes justification. Moreover, in this case DE includes other evolutionary mechanisms besides natural selection for the development of human cognitive faculties. Perhaps other evolutionary forces (e.g. sexual selection, by-products, biological emergence, and genetic drift) contributed to human cognitive development. Thus, I refrain from using the term "selected for" as much as possible as to not restrict the wide range of evolutionary processes that may have contributed to the reliability of human cognition. Finally, I've chosen the term Darwinian epistemology and not Evolutionary Epistemology, so as to avoid a wide range of distinctions in Evolutionary epistemology and Naturalized epistemology more broadly.

Evolutionary Justification: The view that S's belief that p is justified in degree x if and only if: S believes p, p is true, and p tracks truth. Conversely, negative accounts of evolutionary justification reject condition three, arguing that human cognitive faculties are not truth-tracking.

Truth-tracking (traditional notion): A faculty F is truth-tracking if and only if F does not produce counter-factually insensitive beliefs. S's belief that p is counterfactually insensitive if and only if S would believe P even if P were false.[28]

Cognition. Cognition is the broad understanding of how human minds/brains represent and process information, perception, thought, and action. Natural cognition concerns the invisible and non-reflective part of human's mental lives that operate fast, intuitively, and without effort; in contrast to unnatural cognition that requires reflection, time, and effort.[29]

Maturational Natural Cognition. Maturational Natural cognition represents the immediate, intuitive beliefs and actions in cognitive domains without awareness. Speaking a native language, chewing, belief in naïve physics are all representative of maturational skills.[30] At times, I use the term maturational to coincide with common sense and it never implies the act of "maturing."

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[28] This definition is different than the one given by Griffiths and Wilkins: "Organisms track truth optimally if they obtain as much relevant truth as they can afford, and tolerate no more error than is needed to obtain it." This definition resembles Richard Joyce's. I'm unclear how GW relate truth-tracking with justification but this is irrelevant for establishing the Scope Objection.

[29] See McCauley, *Why Religion*, 4.This includes pre-reflective cognitive modules generating beliefs about physical objects, (e.g. my naïve physics: beliefs that solid objects fall and do not pass through solid objects; naïve biology: beliefs that species give birth to their own kind; and theory of mind: knowledge about other agents, their intentions and desires by using cognitive tools for mind reading. It is generally accepted that this cognitive capability would have incurred selective advantage. McCauley, Why, 76-82; "Theory of Mind," accessed December 14 2013, http://www.iep.utm.edu/theomind/.

[30] McCauley, *Why Religion*, 5

Practiced Natural Cognition. Practiced Natural cognition represents skills that require tools and specialized training in some specific cognitive domain. For example, specializing in engineering requires applying practiced natural cognition, unlike maturational natural cognition.[31]

Non-Adaptive Belief. Beliefs that would have been unnecessary for fitness and survival, including philosophical and scientific beliefs.

Adaptive Belief. These are beliefs that would have been necessary for our ancestors' survival. For example, perceptual beliefs are often cited as holding adaptive value.

C. Chapter Summary

Chapter 1 surveys a brief history of DE, from Charles Darwin and Alfred Wallace, to contemporary accounts like Michael Ruse and Thomas Nagel. The purpose of this chapter provides a context for understanding the relationship between evolution and epistemology. In Chapter 2 I examine Plantinga's EDA and Griffiths' and Wilkins' common-sense ESA in order to state and examine the Scope Objection at the end of the chapter. In Chapter 3 I respond to the Scope Objection by introducing Robert McCauley's theory of natural cognition and his criteria for the rise of science. I focus specifically on McCauley's distinction between maturational naturalness and practiced naturalness, and his criteria for the rise of science. In Chapter 4 I assess two objections to my response to the Scope Objection. First, Plantinga's debunking strategy undermines my solution because he distinguishes between cognitive indication and belief content. Second, Richard Lewontin remains skeptical that theories of cognitive evolution are tenable.[32] If Lewontin is right, then premise two of the Scope Objection remains inscrutable. I consider both objections and note how they fail to undermine my response to the Scope Objection.

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[31] McCauley, *Why Religion*, 5, 20-30

[32] Richard Lewontin, "The Evolution of Cognition: Questions We Will Never Answer," in *An invitation to cognitive science, Volume 4: Methods, models, and conceptual issues*, ed. Scarborough and S. Sternberg (Cambridge, MA: MIT Press. 1998).

V. CONCLUSION

Those who support evolutionary debunking strategies do so by defining natural cognition by way of maturational naturalness, and then argue that such common-sense capacities are incapable of achieving non-adaptive beliefs. This position is true but also neglects the wider complexity of human cognition. A more nuanced assessment of human cognition includes practiced natural faculties, such that humans possess cognitive capabilities for overcoming maturational biases and with the potential to form non-adaptive beliefs. If this is right, then proponents of evolutionary supporting strategies enjoy a wide range of theses describing how evolution supplied faculties necessary for achieving non-adaptive beliefs, including systematic theories of epistemology.

Chapter One

A BRIEF HISTORY OF DARWINIAN EPISTEMOLOGY

In this chapter I map a brief history of DE in order to set the context for my analysis of Chapter 2 and the Scope Objection. A history of DE begins with Charles Darwin, who briefly examined the impact of evolution on human cognitive faculties. Darwin's contemporary Alfred Russell Wallace drew a different conclusion and was sceptical about evolution's capacity for explaining the non-adaptive features of human natural cognition.

I. EVOLUTIONARY SUPPORTING ARGUMENTS: MAPPING THE LANDSCAPE

Darwin affirms that human cognitive abilities reflect their evolutionary origin. But only in the mid twentieth-century is there substantial application of Darwin's theory for epistemology. Konrad Lorenz applies evolution by natural selection with Immanual Kant's synthetic *a priori*, suggesting that Darwin's theory of evolution superseded Kant's theory of knowledge. More recently philosophers of biology express new ways of relating Darwin's theory with epistemology. These theories include assessing non-adaptationist paradigms of evolution, while noting the consequences for theories of truth. In order to appreciate these historical developments, one must begin with Darwin.

A. Darwin's *Origin of Species*

Darwin affirms that the mind is part of the material world and thus prone to selection.[33] The central idea is that belief formation reflects the biological heritage to the

[33] By selection I mean "natural selection." I do not consider whether Darwin attributed the evolution of the mind to sexual selection as well; see Charles Darwin, *The Descent of Man and Selection in Relation to Sex, second edition* (New York: A.L. Burt Company, 1874), 695. See also Geoffrey Miller, *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature* (London: William Heineman,

extent that evolution selected cognition necessary for survival.[34] Hence, the mind is not, following the empiricist John Locke, a blank sheet open to experience, but rather arrives "pre-assembled" with the cognitive hardware necessary for survival.[35] Our "would be" ancestors who failed to apply beliefs necessary for survival would not have reproduced, whereas heritable, fitness-enhancing cognition would be passed to future generations. As a result, Darwin states: "Origin of man now proved – metaphysic must flourish – he who understands baboon would do more towards metaphysics than Locke."[36] Although traditionally within the purview of philosophical reflection, Darwin thinks that belief formation can be understood empirically by describing the cognitive constraints selected by evolution.[37]

According to Darwin, one implication of evolution for epistemology is the employment of evolutionary concepts prior to any philosophical endeavour:

> To study Metaphysic[s], as they have always been studied appears to me to be puzzling Astronomy without Mechanics. Experience shows the problem of the

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2000). I depend mostly on Ruse's introduction to Darwin's epistemology; Ruse, *Philosophy After Darwin*, 18-20; and Ruse, *The Philosophy of*, 136-40; See also Robert Richards, "Darwin's Metaphysics of Mind," in *Darwin and Philosophy*, eds. V. Hoesle and C. Illies (Notre Dame University Press, 2005).

[34] Ruse, *Philosophy After Darwin*, 18.

[35] Ruse, *The Philosophy*, 139; Ruse, *Philosophy After*, 18; Charles Darwin, *The Descent of Man and Selection in Relation to Sex*, 2nd edition (New York: A.L. Burt Company, 1874), chapter 2. See Todd Tremlin, *Minds and Gods: The Cognitive Foundations of Religion* (Oxford: Oxford University Press, 2006), chapter 1. Tremlin argues, "Our minds evolved in conjunction with our ancestral ways of life…All life on earth now exists or survived for its time in the past because it was designed and equipped to exploit a particular environmental niche." Tremlin, *Minds and Gods*, 38. Kim Sterelny's recent view attempts to reconcile the Lockean view, such that our cognitive mechanisms are not "pre-assembled," but rather that humans possess learning mechanisms. See Kim Sterelny, *The Evolved Apprentice* (MIT Press, 2012), xi.

[36] Charles Darwin, "Notebook M84e," August 16, 1838, in *Charles Darwin's notebooks, 1836-1844: Geology, transmutation of species, metaphysical enquiries*, eds. P. H. Barrett, P.J. Gautrey, S. Herbert, D. Kohn, and S. Smith, 1987 (British Museum of Natural History; Cambridge: Cambridge University Press, 1987).

[37] Ruse, *Philosophy After*, 19.

> mind cannot be solved by attacking the citadel itself. The mind is a function of the body. We must bring some stable foundation to argue from.[38]

In other words, Darwin's theory informs other domains of inquiry, including the social sciences and philosophy.[39] While Darwin was not a philosopher, he lays the foundation for supporting DE, a project further undertaken by Konrad Lorenz through his interpretation of and response to Immanuel Kant's *Critique of Pure Reason*.[40]

B. Lorenz's *A Priori*

In his *Critique of Pure Reason,* Immanuel Kant revolutionizes the empiricist and rationalist conceptions of knowledge. Empiricists thought knowledge obtained through the senses, while rationalists thought knowledge was based on the innate principles of pure reason.[41] Kant synthesized both views of knowledge by postulating that human understanding of experience requires identifying its metaphysical categories.[42] In other words, knowledge bears the mark of both experience and reason together.[43]

Kant's theory of knowledge has two implications for DE. First, the *a priori* categories necessary for understanding experience are metaphysical. Kant argues that *a*

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[38] Barrett, et al., *Darwin's Notebooks*.

[39] E.O Wilson, "Sociobiology and the Darwinian Approach to Mind and Culture", in *Evolution: From Molecules to Men*, ed. D.S Bendall (Cambridge: Cambridge University Press, 1983), 545.

[40] Ruse, *Philosophy After Darwin*, 19.

[41] This distinction between empiricism and rationalism is a bit careless. We find convergence between empiricists and rationalists, for instance, between Locke and Descartes. For a summary, see Peter Markie, "Rationalism vs. Empiricism", *The Stanford Encyclopedia of Philosophy* (Summer 2013 Edition), ed. Edward N. Zalta, n.p, accessed August 9, 2013, http://plato.stanford.edu/archives/sum2013/entries/rationalism-empiricism/>.

[42] Rohlf, Michael, "Immanuel Kant", *The Stanford Encyclopedia of Philosophy* (Fall 2010 Edition), ed. Edward N. Zalta, accessed August 10, 2013, http://plato.stanford.edu/archives/fall2010/entries/kant/>. Roger Scruton, *Kant: A Brief Insight* (New York: Sterling, 2010), 26-8. See also Charles Parsons, "The Transcendental Aesthetic," in *The Cambridge Companion to Kant,* ed. Paul Guyer (Cambridge: Cambridge University Press, 1999), 62-92.

[43] Scruton, *Kant,* 26.

priori categories govern experience by providing the basic structure for interpreting experience. For example, one must already assume that every event has a cause in order to understand the experience of causation. Making sense of one's experience of causation requires presupposing the basic metaphysical categories of causation.[44]

The second implication of Kant's theory of knowledge for DE is that we cannot know the world "as it is in itself" since we cannot have knowledge beyond experience. Part of the *Critique* challenges the rationalist assumption that pure reason provides knowledge without appealing to experience.[45]But this is absurd, according to Kant. Pure reason presupposes the point of view of the knower in that awareness of the *a priori* obtains from experiences of the world. Thus, for Kant objective knowledge can be found only within the confines of appearance, whereby the form of appearances requires the employment of *a priori* categories.

Lorenz rejects both of Kant's metaphysical commitments in light of Darwin's theory. He argues that the metaphysical concepts that enable an understanding of experience are physical constraints put in place by evolution and are knowable.[46] Lorenz questions Kant, asking:

> Is not human reason with all its categories and forms of intuitions something that has organically evolved in a continuous cause-effect relationship with the laws of the immediate nature, just as has the human brain?…categories and forms of perception, fixed prior to individual experience, are adapted to the external world

[44] Immanual Kant, *Critique of Pure Reason*, trans. J. M. D. Meiklejohn; accessed Aug 11, 2013, http://www2.hn.psu.edu/faculty/jmanis/kant/critique-pure-reason6x9.pdf, 82; Scruton, *Kant*, 26-8, 33-5.

[45] Scruton, *Kant*, 27-8. See also Paul Guyer, "The Transcendental Deduction of the Categories," in *The Cambridge Companion to Kant* (Cambridge: Cambridge University Press, 1992), 13.

[46] Konrad Lorenz, "Kant's Doctrine of the *A Priori* in the Light of Contemporary Biology" in *Philosophy After Darwin: Classic and Contemporary Readings*, ed. Michael Ruse (New Jersey: Princeton, 2009), 231.

> for exactly the same reasons as the hoof of the horse is already adapted to the ground of the steppe before the horse is born…[47]

Unlike Kant's metaphysical *a priori* categories, Lorenz believes such categories are cognitive constraints put in place by evolution corresponding to the objective world.[48] If this is right, then Kant's metaphysical conception of the *a priori* remains physical and knowledge of the "thing in itself" becomes attainable.

Lorenz's commitment to realism is apparent, suggesting that evolutionary theory provided faculties capable for generating objective knowledge about the world independent of human experience. This is because human cognitive faculties operated according to a truth-tracking mechanism – natural selection, in this case – independent of human perception. But there's a catch. Lorenz's argument requires accepting that *a priori* knowledge remains incomplete, since the process by which we obtain *a priori* knowledge originates through *a posteriority*.[49] Humans could have evolved differently with greater *a priori* awareness or perhaps future evolution will yield an enhanced understanding of *a priori* knowledge. As such, Lorenz states:

> One must realize that this conception of the *'a priori'* as an organ means the destruction of the concept: something that has evolved in evolutionary adaptation to the laws of natural external world has endowed a posteriori in a certain sense, even if in a way entirely different from the abstraction or deduction from previous experience.[50]

This passage implies that human cognitive evolution may provide a different understanding of *a priori* concepts and the "thing in itself," suggesting that human

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[47] Lorenz, "Kant's Doctrine," 231-46; See also Konrad Lorenz, *Behind the Mirror: A Search for a Natural History of Human Knowledge* (Methuen, London, 1977).

[48] Lorenz, "Kant's Doctrine," 233.

[49] Lorenz, "Kant's Doctrine," 235.

[50] Lorenz, "Kant's Doctrine," 232.

knowledge operates as "a working hypothesis in the coping of our species with the absolute reality of the environment."[51]Therefore, unlike knowledge traditionally construed by rationalists, Lorenz's DE implies that human "*a priori*" knowledge remains liable to change if humans were to have evolved.[52]

Lorenz's commitment to realism draws criticism from proponents of DE, since it implies evolutionary adaptationism.[53] This means that evolution selected traits corresponding with the objective world. But recent accounts of DE reject adaptationism, suggesting that DE must focus on non-adaptationist views of evolution.[54]Adaptationist accounts of evolution fail to incorporate the point of view of the organism and fall short of providing a sufficient picture of evolutionary theory. In his article, "The View from Somewhere," Ruse rejects Lorenz's realist and adaptationist approach, and instead applies Hume's sceptical, non-realist philosophy with a non-adaptationist view of evolution.

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[51] Lorenz, "Kant's Doctrine," 235-6.

[52] The *a priori* is simply a mode by which a proposition is justified. I'm thankful to Myron A. Penner for pointing this out, in addition to challenging Lorenz's epistemology more broadly. Penner also suggests that if human faculties responsible for *a priori* modes of justification are by-products of evolution, then Lorenz's criticisms seem unwarranted. This is because it is hard to see why the outputs of such a mode of justification would be "liable to change," especially when considering the justification of analytic truths.

[53] See also Vollmer, "On Supposed Circularities in an Empirically Oriented Epistemology," in *Evolutionary Epistemology, Theory of Rationality, and the Sociology of Knowledge*, eds. G. Radnitzky and WW Bartley III (LaSalle: Open Court, 1987), 163-200.
Franz Wuketits, "The Philosophy of Donald Campbell: A short review and critical appraisal," *Biology and Philosophy*, no. 2, vol 16 (2001), 173.

[54] Ruse, *Philosophy After*, 223-4, See Franz Wuketits, "Evolutionary Epistemology: A Non-Adaptationist Approach," in *Evolutionary Epistemology, Language, and Culture*, ed. N. Gontier, Jean Paul Van Bendegem, Diederek Aerts (Netherlands: Springer, 2006), 33; Franz Wuketits, "Cognition: A non-adaptationist view". *La Nuova Critica* 9-10, 5-15; Paul A. Weiss, "The living system: Determinism stratified." *Studium Generale* 22, (1969): 361-400; Richard C Lewontin, "Organism and environment," in *Learning, development, and culture: essays in evolutionary epistemology*, ed. Henry C. Plotkin (Chichester: Wiley: 1982), 151-170; David Sloan Wilson, "Species of Thought: Some Comments on Evolutionary Epistemology," *Biology and Philosophy*, no. 5 (1990): 37-62. Conversely, De Cruz argues that there is no shift towards non-adaptationist perspectives, but that the broader field is still adaptationism.

C. Ruse's Humean Skepticism

Hume would have rejected Kant's metaphysical certainty. For Hume the rational grounds for judgements about matters of fact, value, causation, and induction remain uncertain and unsettling: "The intense view of these manifold contradictions and imperfections in human reason has wrought upon me, and heated my brain, that I am ready to reject all belief and reasoning, and can look upon no opinion even as more probable or likely than another".[55]

Not only does scepticism dominate Hume's philosophy but any attempt to overcome sceptical biases confronts some insurmountable problems:

> This sceptical doubt, both with respect to reason and the sense, is a malady, which can never be radically cured, but must return upon us every moment, however we may chase it away, and sometimes may seem entirely free from it.[56]

Hume's scepticism also implies non-realist views of the objective world, and, as noted, rejects knowledge beyond experience.[57] Ruse agrees with Hume, and is uncomfortable with acknowledging a world independent of experience.[58]

According to Ruse, non-adaptationist evolution supports Humean scepticism. The non-adaptationist view focuses on change that occurs from the point of view of the

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[55] David Hume, *A Treatise of Human Nature*, ed. L.A Selby-Bigge (Oxford, 1888), 268-9.

[56] Hume, *A Treatise*, 218. See also Richard H. Popkin, "David Hume: His Pyrrhonism and his Critique of Pyrrhonism," in *Hume: A Collection of Critical Essay*, ed. VC Chappel (London: MacMillan, 1966), 56; Robert J. Frogelin, "Hume's Scepticism," in *The Cambridge Companion to David Hume* (Cambridge: Cambridge University Press, 1993), 90-115.

[57] See Jani Hakkarainen, "Hume's Scepticism and Realism: His Two Profound Arguments against the Sense in An Enquiry Concerning Human Understanding," Academic Dissertation, accessed July 28 2013, http://tampub.uta.fi/bitstream/handle/10024/67790/978-951-44-7106-3.pdf?sequence=1. It's possible that Hume's philosophy isn't as dominated by scepticism as typically considered.

[58] Ruse, *Philosophy After*, 225; See also Michael Ruse, "Does evolutionary epistemology imply realism?" in *Evolution, and Realism: Studies in Evolutionary Epistemology*, ed. Rescher N (Lanham, New York, 1990): 101–110.

organism and not solely from the pressure of the external environmental.[59] In fact, according to some, Darwin had already alluded to non-adaptationist views in *The Origin*:

> Naturalists continuously refer to external conditions, such as climate, food, etc., as the only possible source of variation. In one limited sense … this may be true; but it is preposterous to attribute to mere external conditions, the structure, for instance, of the woodpecker, with its feet, tail, back, and tongue, so admirably adapted to catch insects under the back of trees.[60]

The point is that evolution would not have guaranteed the selection of cognitive faculties that would have accurately reflected the external world.[61] Human faculties may have been selected for by the internal perception necessary for survival, regardless of whether those perceptions are reliable. As Franz Wuketits argues:

> From our everyday perspective stones are really stones, trees are really trees, wine-glasses are really wine-glasses, and so on and so forth. Well, but what else should these objects be, if not stones, trees, wine-glasses, etc.? This, however, is not the point. In our everyday life we may believe that all (perceived) things are as they appear to be. What counts is that our perceptions help us to survive.[62]

Wuketits supports Ruse, arguing that living organisms are not puppets that passively accept environmental change, but are active participants inadvertently shaping evolutionary results.

Ruse's DE has two implications for epistemology. First, we should abandon metaphysical realism, and second, we should accept a coherence theory of truth – that is, that beliefs hang together within a coherent structure, with no guarantee that such beliefs

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[59] In a similar way, Richard Lewontin argues that "to understand how much of what is 'out there' is the product of what is 'in here." Richard Lewontin, "Organism and Environment," 169.

[60] Charles Darwin, *On the Origin of Species*. See also, Wuketits, "Cognition: A Non-adaptationist view."

[61] Ruse's account differs considerably from more recent adaptationist accounts supporting the trustworthiness of domain specific beliefs, see Steven Stewart-Williams, "Innate Ideas as a Naturalistic Source of Metaphysical Knowledge," *Philosophy and Biology* 20, (2005):791–814.

[62] Wuketits, "Cognition: A Non-Adaptationist View."

accurately describe the external world.[63] Ruse adopts Hilary Putnam's internal realist view, one that compromises between metaphysical realism and metaphysical idealism, who writes as follows:

> One of these perspectives [on realism] is the perspective of metaphysical realism. On this perspective, the world consists of some fixed totality of mind-independent objects. There is exactly one true and complete description of "the way the world is." Truth involves some sort of correspondence relation between worlds or thought-signs and external things and sets of things.[64]

But metaphysical realism is unintelligible, says Putnam:

> What does it mean . . . to speak of mind independency? Human minds did not create the stars or the mountains, but this "flat" remark is hardly enough to settle the philosophical question of realism versus anti-realism. What does it mean to speak of a unique true and complete description of the world?[65]

Putnam's rejection of metaphysical realism also precludes correspondence theories of truth, in exchange for supporting a coherence theory of truth:

> Truth, in an internalist view, is some sort of (idealized) rational acceptability—some sort of ideal coherence of our beliefs with each other and with our experiences as those experiences are themselves represented in our belief system—and not correspondence with mind-independent of discourse-independent states of affairs.[66]

Putnam's views have changed over time, and more recently adopts a "natural realism" that favours a common-sense approach. Even so, he maintains that a correspondence theory of truth remains deficient. Ruse does not abandon correspondence theory entirely

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[63] Ruse, *Philosophy After*, 225-6.

[64] Hilary Putnam, *Reason, Truth, and History* (Cambridge: Cambridge University Press, 1981), 49. See Maria Baghramian, "Realism back to Realism: Putnam's Long Journey," *Philosophical Topics*, Vol. 36, no. 1, 2008.

[65] Hilary Putnam, *Realism with a Human Face (*Cambridge, Mass.: Harvard University Press, 1990), 31; Hilary Putnam, *Reason, Truth, and History* (Cambridge: Cambridge University Press, 1981), 49-52; See Ruse, *Philosophy After*, 225-6.

[66] Hilary Putnam, *Reason*, 49-50.

but asserts that a contemporary understanding of evolution implies that epistemology should favour a coherence theory of truth.

Ruse's application of Hume requires closer examination. First, DE cannot be extracted from a realist view insofar as evolutionary processes reflected an actual world independent of experience. How else could evolution have taken place? Changes that occur within a population reflect something, even if those changes are not perfect adaptations to the external world.[67] Perhaps a more tempered non-adaptationist view should adopt Donald Campbell's understanding:

> I…can't do better than the example of the salamander's leg: When it regenerates when broken off, does it regenerate until it reaches the ground? No! It regenerates until an internal vicarious monitor for leg length is completed. But if this regularly led to regenerated legs that were, say, too long, then an external selection would select mutations that adjusted that internal selector.[68]

Internal monitors provide the necessary link between environment and adaptation. This means that environmental pressure acts upon external features of an organism but that those external features are controlled by internal monitors. These internal monitors do not always reflect the truth in the objective sense, but more often control physical features that garner adaptability. But even if Campbell is right, it doesn't follow that Humean non-realism is a plausible application of non-adaptationism, nor does it follow that adaptationist theories of cognition are entirely false.

Similarly, David Sloan Wilson argues that a strong argument for adaptationism of mental representations must provide evidence of a phenotype-environment correlation.

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[67] Ruse will agree that one cannot preclude correspondence truth. And it's at this point that I fail to see the degree to which he applies non-realism.

[68] Donald Campbell quoted from W. Callebaut, *Taking the Naturalistic Turn* (Chicago: University of Chicago Press, 1993), 298.

This means that if the environment requires species to exhibit certain phenotypic traits to survive and reproduce, and species within those environments exhibit the right traits, then we possess a strong argument for adaptationism.[69] According to Wilson, the problem with this view is that each ecosystem contains a multitude of different species exhibiting different necessary traits for survival and reproduction. This implies that different species would have perceived the environment in different ways while still exhibiting adaptive behaviour.

Wilson concludes that human mental representations of the world are somewhat analogous to various species' representation of the ecosystem. There are a variety of ways in which humans might perceive their environment – and, thus, behave differently for the purpose of survival and reproduction – without holding a direct mental correlation with the "real world." Adaptive behaviour requires only some instances of "real world" correlation.

Suppose we accept a non-adaptationist approach to DE in support of non-realism, what follows? The answer may lie with distinguishing between maturational and practiced natural cognition. Recall that maturational capacities include pre-reflective skills while practiced natural capacities include more advanced skills. Maturational skills sometimes reflect a common-sense, non-realist picture of the world. For instance, the maturational natural belief that tables are solid objects is mostly false and does not reflect the "real" world.[70] Even still, it doesn't follow that one remains bound by maturational bias. Through practiced naturalness one can overcome the common-sense limitations

[69] Wilson, "Species of Thought," 54.

[70] See footnote 149. By "real" world I mean the atomic world.

about the nature of solid objects and form a more accurate view: that tables are mostly empty space. The success of science is partially due to accurately describing the "real world." The reason doctors can successfully transplant human kidneys is because they know true things about human bodies. This suggests that human cognition and its ability to overcome its evolved limitations is unique. This observation may further suggest that human cognition differs from other species in its ability to correlate knowledge with the real world.

Even if the evolutionary past of human cognitive development is the result of a non-adaptationist paradigm and reflects a non-realist conception of the world, more recent cognitive development provides the capacity to overcome these restrictions and generate truth in the realist sense. Thus, granting Ruse's argument for non-adaptationism, his application of Hume applies only to the distant evolutionary past and fails to incorporate a more sophisticated apparatus of human cognition. Perhaps at this point the non-adaptationist DE no longer applies. Indeed, if humans can overcome maturational biases and employ practiced naturalness, then perhaps the non-realist view of truth becomes more problematic.

Summary:

Evolutionary supporting strategies argue that natural selection is sufficient for explaining the nature of human cognitive capabilities, including non-adaptive belief. Darwin and Lorenz understood evolution as shaping natural cognition, such that faculties producing true belief resulting in survival would be passed down to future generations. According to Ruse, a flourishing DE should adopt a non-adaptationist view of evolution, implying that epistemology focus on coherence theories of truth and a rejection of

metaphysical realism. In the next section, I summarize and evaluate several popular debunking strategies and some reasons for affirming the Scope Objection's second premise.

II. EVOLUTIONARY DEBUNKING ARGUMENTS: MAPPING THE LANDSCAPE

Alfred Russell Wallace thinks that ESAs are insufficient for explaining the nature of human cognitive capacities and non-adaptive beliefs. Others in the history of philosophy stress a similar hesitation for accepting the reliability of evolved faculties, most notably Friedrich Nietzsche and Thomas Nagel. Nietzsche argues that all human cognitive faculties are unreliable as a consequence of evolution. Nagel's argument is more similar to Wallace's than Nietzsche's in that the cognitive capacities responsible for non-adaptive belief are beyond the scope of natural selection.

A. Wallace's Darwinism

Wallace initially supported natural selection as the sole mechanism for the evolution of the human brain.[71] Indeed, Darwin approved Wallace's initial claim that eventually the brain would have become the chief target of selection and primary vehicle for incurring human survival and reproduction.[72]

Wallace eventually rejected his thesis.[73] In his book *Darwinism*, Wallace denies

[71] A.R Wallace, "The Origin of Human Races and the Antiquity of Man Deduced from the Theory of Natural Selection," *Anthropological Review*, 1864, accessed July 28, 2013, http://people.wku.edu/charles.smith/wallace/S093.htm.

[72] Charles Darwin, Letter to J. Hooker, May 22. Darwin Correspondence Project Database, accessed July 28, 2013, http://www.darwinproject.ac.uk/entry-4506. For an in depth look, see Gross, "Alfred Russell," 499.

[73] Gross, "Alfred Russell," 499. There are subtleties here. Some historians have argued that Wallace's views are more continuous, that there isn't a radical shift in opinion. See Martin Fichman, "Science in Theistic Contexts: A Case Study of Alfred Russell Wallace on Human Evolution," in Science

that natural selection explains the "special faculties" possessed by humans,[74] and attacks Darwin's universal application of natural selection for explaining human cognition.[75] By "special faculties" Wallace has in mind cognitive capacities responsible for spiritual, moral, and intellectual beliefs:

> …the existence in man of a number of his most characteristic and noblest faculties, those which raise him furthest above the brutes and open up possibilities of almost indefinite advancement. These faculties could not possibly have been developed by means of the same laws which have determined the progressive development of the organic world in general, and also of man's physical organism.[76]

In support of his scepticism, Wallace argues:

> …as far as we yet know, of the pre-historic races, we have an organ so little inferior in size and complexity to that of the highest types (such as the average European), that we must believe it capable, under a similar process of gradual development during the space of two or three thousand years, of producing equal average results. But the mental requirements of the lowest savages…are very little above those of many animals. The higher moral faculties and those of pure intellect and refined emotion are useless to them, are rarely if ever manifested, and have no relation to their wants, desires, or well-being. How, then, was an organ developed so far beyond the needs of its possessor? Natural selection could only have endowed the savage with a brain of little superior to that of an ape, whereas he actually possess one but very little inferior to that of the average members of our learned society.[77]

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in Theistic Contexts: Cognitive Dimensions. *Osiris*, 2nd Series, Vol. 16, (2001): 227-250. I'm thankful to Helen De Cruz for raising this point.

[74] A.R. Wallace, *Studies scientific & social*. Vol. 2. New York: Macmillan, 1900. Cited from Gross, "Alfred Russell," 502.

[75] A.R. Wallace, "Darwinism Applied to Man," in *Darwinism* (London: Macmillan, 1889). The manuscript is online at: http://people.wku.edu/charles.smith/wallace/S724CH15.htm. See also Michael Shermer, *In Darwin's Shadow: The Life and Science of Alfred Russell Wallace* (Oxford: Oxford University Press, 2002).

[76] A.R. Wallace, "Darwinism," accessed July 26/13, http://people.wku.edu/charles.smith/wallace/S724CH15.htm. Also see Shermer, *In Darwin's,* 174-5.

[77] Alfred Russell Wallace, 1869a. Sir Charles Lyell on geological climates and the origin of species, Reviews of principles of geology (10th ed.), 1867–68, and Elements of geology (6th ed.) 1865, both by Sir Charles Lyell]. Q Rev 126:359–394. This quotation was cited from Charles Gross, "Alfred Russell Wallace and the evolution of the human mind," *Neuroscientist*, 16 (2010): 500; Stephen Jay Gould, "Wallace's fatal flaw." *Natural History* (1980): 89:26–40

Although a contemporary reading of Wallace would reject his appraisal of the human race, S.J. Gould notes that Wallace's arguments are noteworthy and beyond his time; Gould notes:

> Wallace advanced several arguments for the uniqueness of human intellect, but his central claim begins with an extremely uncommon position for his time, one that commands our highest praise in retrospect. Wallace was one of the few nonracists of the nineteenth century. He really believed that all human groups had innately equal capacities of intellect.[78]

Wallace thinks that every human shares innate capacities for generating non-adaptive beliefs. But unlike Darwin, to Wallace this observation seemed at odds with his understanding of human evolution. Thus, Wallace concludes that, "while admitting to the full extent the agency of the same great laws of organic development in the origin of the human race as in the origin of all organized beings, yet there seems to be a Power which has guided the action of those laws (of organic development) in definite directions and for special ends."[79]

Wallace often appealed to spirituality; indeed, he was a committed dualist and Mesmer.[80] But Wallace did not consider his spirituality at odds with natural science. Rather, spiritual truth could provide explanation where science failed.[81] Whether for a commitment to spirituality or a lack of scientific evidence, Wallace departed from Darwin and rejected the universal application of natural selection.[82]

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[78] Gould, *"Wallace's."*

[79] Cited from Stephen E. Glickman, "Charles Darwin, Alfred Russell Wallace and the Evolution/Creation of the Human Brain and Mind," *Gayana* 73 (2009): 36.

[80] Alfred Russell Wallace, *On miracles and modern spiritualism. Three essays* (London: J. Burns, 1875).

[81] Gross, "Alfred Russell," 502.

[82] See J. Schwartz, "Darwin, Wallace, and the Descent of Man," *Journal of the History of Biology 17,* no. 2 (1984): 271-89; Shermer, *In Darwin's*, 22.

Wallace rejects the explanatory scope of natural selection and thus challenges DE, since the causal belief-forming mechanism responsible for producing DE would have been invisible to selection. Wallace expounds an early debunking strategy in that many scientific and philosophical faculties would not have been within the selective purview of evolution and therefore attempting to ground the reliability of these non-adaptive faculties in evolutionary theory remains unsupported.

Wallace sets the stage for a future line of evolutionary scepticism. But unlike Wallace, Nietzsche's scepticism goes beyond non-adaptive belief, and criticizes the reliability of human cognitive faculties more generally.

B. Nietzsche and *The Gay Science*

Lorenz was not the only one to contemporize Kant insofar as evolution impacted human cognitive faculties. Nietzsche argued that evolution replaces the Kantian question about knowledge, arguing that truth and our modes of justification are the result of cognitive mechanisms operating for incurring survival:

> It is high time to replace the Kantian question, 'How are [*a priori* moral judgements] possible?' by another question, 'Why is belief in such judgements necessary?' – and to comprehend that such judgements must be believed to be true, for the sake of the preservation of creatures like ourselves; though they might of course be false judgements for all that![83]

In *The Gay Science*, Nietzsche argues that true belief does not correspond to the objective world, but represents belief that comes with age, "on the degree to which [knowledge] has been incorporated, on its character as a condition of life."[84] Thus, Nietzsche's

[83] Friedrich Nietzsche, *Beyond Good and Evil: Prelude to a Philosophy of the Future* (Leipzig: Neumann, 1886), I, II, 3); Ruse, *Philosophy After*, 23.

[84] Friedrich Nietzsche, *The Gay Science*, trans. Walter Kaufmann (New York: Random House, 1974), taken from Ruse, *Philosophy After*, 32-3.

epistemology adopts Darwinian overtones:

> Over immense periods of time the intellect produced nothing but errors. A few of these proved to be useful and helpful to preserve the species: those who hit upon or inherited these had better luck in their struggle for themselves and their progeny. Such erroneous articles of faith, which were continuously inherited, until they became almost part of the basic endowment of the species, include the following: that there are enduring things; that there are equal things; that there are things, substances, bodies; that a thing is what it appears to be; that our will is free; that what is good for me is also good in itself.[85]

Nietzsche's epistemology is not reassuring for generating true belief. As such, he draws the opposite conclusion to Lorenz and more closely resembles Hume. One commentator notes:

> Nietzsche insists that there is no such thing as absolute truth, and argues instead that all thinking and perception comes from a particular perspective, and that different perspectives will produce different views of truth. There are *only* these views of truth, or interpretations; there is no objective reality beneath them, no independent standard that they refer to.[86]

> Nietzsche's view does not entail that all beliefs are false, only that we lack the support (i.e. the justification) for their truth and falsity. Nietzsche articulates his skepticism clearly in the following passage:

> It is unfair to Descartes to call his appeal to God's credibility frivolous. Indeed, only if we assume a God who is morally our like can "truth" and the search for truth be at all something meaningful and promising of success. This God left aside, the question is permitted whether being deceived is not one of the conditions of life.[87]

This means that without a theistic ontology, natural forces would not guarantee the reliability of human cognitive faculties. Nietzsche seems to suggest that the implications

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[85] Nietzsche, *The Gay Science,* taken from Ruse, *Philosophy After*, 32-3.

[86] Clare Carlisle, "Beyond Good and Evil: Why Insist on Truth?" *Richmond Journal of Philosophy 4* (2003): 1.

[87] Friedrich Nietzsche, "Notebook 36, June-July 1885, 26," in *Nietzsche: Writings from the Late Notebooks*, ed. Rudiger Bittner (Cambridge: Cambridge University Press, 2003).

of evolution for epistemology are that all truth becomes unsupported if our faculties were to have evolved. This is a radical view, and one not necessarily shared by contemporary debunking strategies.

C. Nagel's Darwinian Scepticism

Similar to Wallace, and more charitable than Nietzsche, Thomas Nagel has long been sceptical about the explanatory force of reductive science in general and evolutionary theory in particular.[88] His reason for doubting DE derives from the conviction that in order to ascertain DE, one must postulate an evolutionary story explaining the development of non-adaptive faculties, and one must already assume a concept of reason that is independent of biological origin. But unlike Wallace, Nagel does not appeal to spirituality but rather postulates a naturalized teleology within biological processes.

In his earlier work, Nagel figures that evolutionary accounts of non-adaptive belief face problems similar to those noted by Wallace: "The question is whether not only the physical but the mental capacity needed to make a stone axe automatically bring with it the capacity to take each of the steps that have led from there to the construction of the hydrogen bomb….I see absolutely no reason to believe that the truth lies within a [Darwinian explanation].[89] Rejecting arguments of this sort is common for Nagel, dating back to his previous work "What is it like to be a bat?" by which he rejects a scientific (and a materialist reductionist) explanation for subjective experience.[90] Nagel's recent

[88] Thomas Nagel, "What is it like to be a bat?" *The Philosophical Review*, vol. 83, No. 4. (1974); Thomas Nagel, *The View from Nowhere* (Oxford: Oxford University Press, 1986), 79-81.

[89] Thomas Nagel, *The View from Nowhere* (Oxford: Oxford University Press, 1986), 79-81.

[90] Thomas Nagel, "What is it like to be a bat?" *The Philosophical Review*, vol. 83, No. 4. (1974).

work, *Mind and Cosmos*, raise similar concerns. Although Nagel expresses doubt about the scope of evolutionary theory in general, he considers the implications of evolution for human cognition more specifically.[91]

According to Nagel, a successful DE must overcome two obstacles.[92] The first is that evolution did not generate faculties for non-adaptive belief: "that natural selection should have generated creatures with the capacity to discover by reason the truth about a reality that extends vastly beyond initial appearance – as we take ourselves to have done and continue to do collectively in science, logic, and ethics."[93] The second obstacle is attempting to explain the faculty of reason responsible for non-adaptive belief in a naturalistic way.[94]

Nagel illustrates the first obstacle by summarizing a common "just so" story about evolution and the positive impact on human cognitive faculties:

> [Proponents must]…explain how innate mental capacities that were selected for their immediate adaptive value are also capable of generating, through extended cultural evolutionary history, true theories about a law-governed natural order that there was no adaptive need to understand earlier.[95]
>
> Even in the wild, it isn't just perception and operant conditioning that have survival value. The capacity to generalize from experience and to allow those generalizations, or general expectations, to be confirmed or disconfirmed by subsequent experience is also adaptive. So is a basic disposition to maintain logical consistency in belief, by modifying beliefs when inconsistencies arise. A further, very important step would be the capacity to correct individual

[91] Nagel also addresses these questions in Nagel, *The Last Word* (Oxford: Oxford University Press, 1997), chapter 7.

[92] Thomas Nagel, *Mind and Cosmos: Why The Materialist New Darwinian Conception of Nature is almost certainly false* (Oxford: Oxford University Press, 2012), 74.

[93] Nagel, *Mind and Cosmos*, 74.

[94] Nagel, *Mind and Cosmos*, 74.

[95] Nagel, *Mind and Cosmos*, 76.

> appearances not only by reference to other conflicting appearances of one's own but also by reference to how things appear to other perceivers. That requires recognition of other minds, an ability with obvious adaptive potential. The reach of these capacities can be greatly extended and deliberately exercised with the help of language, which also allows knowledge to be collectively created, accumulated, and transmitted. With language we can hold in our minds and share with others alternative possibilities, and decide among them on the basis of their consistency or inconsistency with further observations. Complex scientific theories that entail empirical predictions are therefore extensions of the highly adaptive capacity to learn from experience – our own and that of others.[96]

He thinks such accounts are improbable, especially when they include the manifestation of non-adaptive belief. Nevertheless, he's willing to grant the argument and proceeds to the second obstacle. He argues that reason is beyond the scope of evolutionary theory since reason is presupposed by an understanding of the process itself.

For the present purpose, the relevant objection is the first one. How does Nagel know that evolutionary processes lack the potential for producing faculties in non-adaptive domains of belief?[97] Caution should be taken before dismissing a scientific hypothesis as evidentially exhausted. This does not imply that science explains everything; indeed, perhaps explaining the evolution of such faculties is beyond the scope of scientific explanation. But then Nagel must demonstrate that either the evolution of non-adaptive faculties can never be evidentially supported or that such explanations lie beyond the domain of science. Nagel fails to address either question. He concedes such evolutionary story-telling and then proceeds to his second objection.

There is no reason to accept Nagel's first objection, especially when his evolutionary story is contingent on accepting both natural selection as the primary vehicle for shaping cognition, as well as upholding an adaptationist view of evolutionary

[96] Nagel, *Mind and Cosmos,* 76.

[97] I'm thankful to Phillip H. Wiebe for raising this point.

processes. But as noted, it is possible that both of these evolutionary concepts lack the proper nuance for explaining the subtleties of cognitive evolution.

Summary:

Wallace, Nietzsche and Nagel think that evolutionary supporting strategies are overly optimistic about evolution and its explanatory scope. Darwin and Wallace parted ways on the issue, while Nietzschean scepticism attacks the reliability of all human faculties. For Nagel, the essential problem for DE is that evolutionary processes cannot explain the development of human faculties responsible for non-adaptive beliefs, and in order to postulate an evolutionary account of reason, one must already assume reason independent of evolutionary forces.

Although this summary serves as only a basic analysis for understanding debunking strategies, it is hard to identify the problem. What exactly is the argument that undermines the descriptive process by which evolution generated reliable cognitive faculties responsible for non-adaptive beliefs? Both Nietzsche and Nagel hint that evolutionary processes would have provided reliable cognitive mechanisms for incurring fitness and reproductive advantage. And both argue that non-adaptive domains are beyond the scope of evolutionary processes. But it is hard to identify their reasons for asserting this position. Wallace's skepticism relates with his observation of the diversity of the human race. But why exactly was natural selection (or perhaps other evolutionary mechanisms) incapable of supplying reliable mechanisms for higher intelligence across the human race.

Thus, it seems that prima facie debunking strategies do not offer much by way of argument and therefore it remains difficult to assess the strength of the Scope Objection.

III. CONCLUSION

A brief history of DE raises conflicting accounts about evolution and the implications for epistemology. ESAs affirm that evolution supplied cognitive faculties for generating true belief while EDAs deny this conclusion. More recently, evolutionary supporting strategies articulate their defense by way of linking non-adaptive beliefs with common-sense cognition. Evolutionary processes were sufficient for producing reliable common-sense cognition and from this fact proponents of ESAs postulate the manifestation of non-adaptive belief. In the next chapter, I consider two conflicting arguments: Plantinga's evolutionary debunking strategy and Griffiths' and Wilkins' evolutionary supporting strategy. Plantinga grants that evolution was sufficient for generating common-sense mechanisms but lacks the scope for including faculties in non-adaptive domains. Griffiths and Wilkins defend a common-sense ESA and then argue that such capacities are sufficient for including non-adaptive domains. The point is to navigate both arguments to establish a common ground: evolutionary processes are sufficient for explaining the development of common-sense faculties. And from this we can infer the main point of contention: that evolution did not supply us with reliable faculties in non-adaptive domains of belief.

Chapter 2

The Scope Objection to Darwinian Epistemology

In this chapter I consider arguments by Alvin Plantinga, Paul Griffiths, and John Wilkins. Plantinga's evolutionary argument against naturalism (EAAN) claims that the probability that human cognitive faculties are reliable given naturalism and evolution is low. Griffiths and Wilkins argue that evolution selected reliable common-sense faculties and that this reliability supports scientific beliefs. My aim is to acquire details from both arguments in order to suggest that evolution supplied reliable cognitive faculties in common-sense domains. From this we can properly outline the Scope Objection at the end of the chapter.

I. PLANTINGA'S EVOLUTIONARY DEBUNKING ARGUMENT

In this section I summarize EAAN, noting the particulars that are relevant for understanding the Scope Objection. Plantinga doesn't reject evolutionary theory – guided or unguided – nor does he attack the position that evolution results in cognitive unreliability. Rather, Plantinga's aim is to argue against metaphysical naturalism by way of evolution. But in the process, Plantinga argues that unguided evolution results in a universal scepticism about true belief.

A. The Evolutionary Argument Against Naturalism

EAAN attacks naturalism generally and materialism in particular by raising a conflict between naturalism and evolution. More precisely, although it is possible to believe that either naturalism or evolution is true, one cannot rationally believe both positions in conjunction. Plantinga's EAAN can be summarized as follows: where the proposition R represents the claim that human cognitive faculties are reliable, N is the

claim that naturalism is true, and E is the claim that human cognitive faculties are the product of evolution by natural selection.[98]

1. P(R/N&E) is low.
2. Anyone who believes N&E and sees that P(R/N&E) is low has a defeater for R.
3. Anyone who has a defeater for R has a defeater for any other belief she thinks she has, including N&E.
4. If anyone who accepts N&E thereby acquires a defeater for N&E, N&E will be self-defeating and can't rationally be accepted.
5. So, N&E can't rationally be accepted.

1. Premise One: Darwin's Doubt

The first premise states that the probability that human cognitive faculties are reliable given naturalism and evolution is low. Plantinga supports premise one by citing Darwin, who doubts the reliability of human cognitive faculties given their evolutionary origin; Darwin states, "With me the horrid doubt always arises whether the conviction of man's mind, which has been developed from the mind of the lower animals, are of any value or at all trustworthy. Would anyone trust in the convictions of a monkey's mind, if there are any convictions in such a mind?"[99]

Expanding on "Darwin's doubt," Plantinga then considers the contemporary philosopher Patricia Churchland and her description of the four "F's":

> Boiled down to essentials, a nervous system enables the organism to succeed in the four F's: feeding, fleeing, fighting and reproducing. The principal chore of the

[98] Plantinga, *Where the Conflict,* 317, 344-5.

[99] Charles Darwin, "Letter to William Graham, Down, July 3rd, 1881," in *The Life and Letters of Charles Darwin Including an Autobiographical Chapter,* ed. Francis Darwin *(*London: John Murray, Albermarle Street, 1887), vol. 1, 315-16.

> nervous system is to get the body parts where they should be in order that the organism may survive…Improvements in sensorimotor control confer an evolutionary advantage: a fancier style of representing is advantageous so long as it is geared to the organism's way of life and enhances the organism's chances of survival. Truth, whatever that is, definitively takes the hindmost.[100]

Churchland argues that evolution forged cognition for the purpose of adaptive behaviour – that is, the nervous system getting the right parts in the right place for increasing survival – and thus evolution does not make true belief probable.[101] In support of Churchland's claim, Plantinga examines both reductive and non-reductive conceptions of belief and concludes that neither conception provides sufficient reason for denying the first premise.

i. Reductive and Non-reductive Materialism

The materialist argues that a belief is an event in the brain and nervous system.[102] More specifically, a belief is built on the neurophysiological properties (hereafter, NP properties) of the brain that interact with the nervous system providing adaptive behaviour.[103] Beliefs also include propositional content. The belief that "all men are mortal" includes the propositional content that "all men are mortal" and it is the content of a belief that is true or false. So, a belief according to the materialist has two properties, one physical and one mental: the NP properties affecting the nervous system providing adaptive behaviour and the propositional content determining the truth or falsity of the belief.

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[100] Patricia Churchland, "Epistemology in the Age of Neuroscience," *Journal of Philosophy* 84 (October 1987), 548.

[101] Churchland, "Epistemology," 548.

[102] Plantinga, *Where the Conflict*, 321.

[103] Plantinga, *Where the Conflict*, 321.

The reductive materialist thinks that beliefs are reduced to NP properties; that is, a belief is just the NP properties that constitute the belief. Conversely, non-reductive conceptions of belief argue that beliefs supervene on NP properties. This acknowledges the dependency relation between beliefs and their correlated NP properties and reductionism is precluded altogether. Either way, Plantinga argues that both reductive and non-reductive conceptions of belief are determined by their correlated NP properties.[104]

ii. Materialism and EAAN

Both reductive and non-reductive materialists accept that NP properties determine the content of belief. But is this content true? Plantinga answers this question by considering the C. elegans worm.[105] If Churchland is correct, then the survival of C. elegans depends on the adaptability of its NP properties to a given environment.[106] C. elegans also generates propositional content reduced to or supervening on its NP properties. But why should we think that this propositional content is true? We shouldn't, according to Plantinga. The content of C. elegans' belief is irrelevant for achieving adaptive behaviour. The propositional content could be true but it's just as likely to be false. In the least, the probability that C. elegans' faculties are reliable in forming true belief given evolutionary processes remains low or inscrutable.

[104] Plantinga, *Where the Conflict*, 324.

[105] Plantinga randomly selects C. elegans as an example of an organism with sufficient neural complexity for generating propositional content. If this false, then simply move up the evolutionary scale until arriving at an organism with sufficient neural complexity.

[106] Plantinga, *Where the Conflict*, 327.

A helpful example illustrating Plantinga's claim is the hyper-sensitive agency detection device (HADD, for short).[107] HADD is a cognitive tool with the purpose of triggering belief that agency is present within one's environment. You're walking down a dark alley and hear a noise behind you. In this case HADD triggers a reflex of fear, causing you to either fight or flee. Thus, HADD is a form of protection useful for survival and thus under the power of selection. The upshot is that false positive triggers are also a cheap form of protection: the noise in the dark alley is just the wind, yet HADD triggers nonetheless. Why do false positives occur? They occur because nature selected affordable mechanisms that provide adaptive behaviour.[108] So HADD's trigger does not depend on the truth of the propositional content– i.e. according to the content that "it is true that there is a predator behind me" – but rather according to the NP properties getting the right parts in the right place in forming the reflexive reaction. In this case, the formation of HADD does not depend on propositional truth but just adaptive behaviour.

If the formation of human cognitive faculties isn't contingent on the content of true belief, then why think that our cognitive infrastructure is reliable? According to Plantinga, we should favour that P(R/N&E) is low or inscrutable. That is to say, like Nietzsche and Darwin, we should doubt the reliability of human belief-forming faculties given their evolutionary origin.[109]

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[107] Justin Barrett, "Finding agents everywhere," in *Why would anyone believe in God?* (AltaMira Press: Walnut Creek, 2004).

[108] Richard Dawkins, *The Blind Watchmaker* (London: Penguin Books, 1986), 9.

[109] For more discussion, see Alvin Plantinga's "A New Argument Against Materialism," *Philosophia Christi*, vol. 14, No.1 (2012): 9-27; and Alvin Plantinga and Michael Tooley, *Knowledge of God* (Oxford: Blackwell, 2008).

2. Remaining premises

Suppose the naturalist accepts that P(R/N&E) is low or inscrutable, what follows? The second premise indicates that if premise one is true, then one acquires a defeater for R. Suppose there is a toxic drug called XX that after consumption results in unreliable cognitive faculties. Suppose that Mary consumes XX. The result is that she now faces a defeater that undermines the reliability of her cognitive faculties: that is, she faces a defeater for R. As such, accepting premise one is analogous to consuming XX. Mary is in a state such that she cannot trust the reliability of her cognitive faculties.

Premises three and four state that if one acquires a defeater for R, then one also acquires a defeater for all beliefs produced by R. But if this is true, then one should doubt the belief that both naturalism and evolution are true.[110] In other words, according to Plantinga naturalism in conjunction with evolution provides reason to doubt that both naturalism and evolution are true. It follows that if the premises are true, then the conclusion must be true and naturalism cannot be rationally accepted. As Ruse comments, if Plantinga is right, then everything "collapses into a contradictory mess, the whole Darwinian epistemology ends in a reductio ad absurdum."[111]

3. Responses to EAAN

In what follows, I consider some objections to EAAN and responses to these objections and then bring EAAN into sharper focus with the Scope Objection.

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[110] Plantinga, *Where the Conflict*, 343-5.

[111] Ruse, *The Philosophy*, 149. This isn't quite right. It's not DE that ends up in a contradictory mess but rather metaphysical naturalism. DE does not imply that naturalism is true. DE is a research program that examines the descriptive properties responsible for reliable cognition and assesses their implications for epistemology. Plantinga's EAAN is perfectly consistent with the evolution of reliable cognitive faculties (although Plantinga himself remains skeptical as such), provided God directs the genetic mutations according to a good design plan aimed at truth.

i. Thomas Crisp's weaker EAAN

One criticism to EAAN is that it is likely that evolution would have supplied reliable faculties in common-sense domains.[112] For example, individual organisms within a population applying reliable perception are likely to survive and reproduce. In light of this objection, Thomas Crisp defends a weaker version of EAAN. Crisp attacks naturalism by assigning a low probability to the reliability of recondite philosophical faculties.[113] His argument can be formulated as such: P(Rr/A&E) is inscrutable, where Rr is the probability that recondite philosophical faculties are reliable, A is atheism, and E is the fact that human cognitive faculties are the product of evolution.[114]

Why think that P(Rr/A&E) is inscrutable? According to Crisp, it is inscrutable because human faculties result from the blind, unguided forces of evolution. How does a blind process responsible for the selection of adaptive traits within a population favour abstract philosophical faculties?[115] Or suppose that human philosophical faculties are by-

[112] Evan Fales, "Darwin's Doubt, Calvin's Calvary," in *Naturalism Defeated? Essays on Plantinga's Evolutionary Argument Against Naturalism*, ed. James Beilby (Ithaca, N.Y.: Cornell University Press, 2002), 43-60; Brandon Fitelson and Elliot Sober, "Plantinga's Probability Arguments Against Evolutionary Naturalism," *Pacific Philosophical Quarterly* 79:2 (1998): 115–129; Jerry Fodor, "Is Science Biologically Possible?" in Beilby, *Naturalism Defeated?*, 30-42; William Ramsey, "Naturalism Defended," in Beilby, *Naturalism Defeated?*, 15-29. Ernest Sosa also hints at this form of response but in support of the weaker argument for EAAN, by distinguishing Descartes' notion of reflective knowledge. According to Sosa, Plantinga's aim is similar in that Descartes underwrites his epistemology by virtue of the reliability in God's epistemological provision, unlike naturalism. Ernest Sosa, "Plantinga's Evolutionary Meditations," in *Naturalism Defeated? Essays on Plantinga's Evolutionary Argument Against* Naturalism ed. James Beilby (Ithaca: Cornell University Press, 2002), 100-2.

[113] Thomas M. Crisp, "An Evolutionary Objection to the Argument from Evil," in *Evidence and Religious Belief* (eds. Kelly James Clark and Raymond Van Arragon; Oxford: Oxford University Press, 2011), 123-4.

[114] Crisp, "An Evolutionary," 116.

[115] Crisp doesn't seem to provide an argument for why this is true, however. Crisp merely rehearses the same sort of support common with this rebuttal; namely, that our philosophical faculties are unreliable because they are disconnected from the reliability attributed to adaptive advantage.

products of evolution – faculties existing on the basis of other adaptive traits.[116] Crisp grants the possibility, but suggests there is no good argument supporting this claim.[117] Crisp's version of EAAN is important for articulating Plantinga's weaker EAAN. But first, there is an important objection to both Plantinga and Crisp that requires attention.

ii. Michael Bergmann and Common-sense Naturalism

Michael Bergmann criticizes both accounts of EAAN. Bergmann argues that even if the naturalist accepts that P(R/N&E) is low, this does not amount to a defeater for R. The naturalist may draw upon non-propositional evidence following Thomas Reid's common-sense epistemology to support N. This move justifies R even if one holds that P(R/N&E) is low or inscrutable.[118] In support of this rebuttal, Bergmann appeals to Plantinga's response to the problem of evil.[119]

In responding to the problem of evil, Plantinga argues that even if we have good circumstantial evidence against a belief that p, we may rationally hold p so long as we obtain additional non-propositional evidence. Suppose there's good circumstantial evidence claiming that you stole a letter from work. You respond to the charges with an

[116] Stephen Jay Gould and Richard Lewontin, "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Program," *Proceedings of the Royal Society of London*, Series B, Vol. 205, No. 1161 (1979): 581-598. Crisp allows this possibility, and yet seems to think that we have no good argument for supporting this claim. As we have seen, Sober and Ruse reject this line of thought.

[117] Myron A. Penner raises an important point here. Suppose that the faculties responsible for non-adaptive beliefs are simple by-products of evolution, as Crisp grants. Isn't this fact sufficient to undermine premise 2 without explicating the evolution of practiced naturalness? If so, then this would be another way to reject premise 2 of the scope objection. This point may raise additional questions about whether spandrel accounts of non-adaptive cognition satisfy externalist accounts of justification for non-adaptive beliefs. But these questions are beyond the scope of this project.

[118] Michael Bergmann, "Commonsense Naturalism," in *Naturalism Defeated? Essays on Plantinga's Evolutionary Argument Against Naturalism* (ed. By James Beliby; Cornell University Press, 2002), 82-8.

[119] Alvin Plantinga, "Epistemic Probability and Evil," in Daniel Howard-Snyder, ed., *The Evidential Problem of Evil* (Bloomington: Indiana University Press, 1996), 69-96.

alibi: you remember walking in the woods at the time of the theft. Your colleagues disagree; they doubt that you were walking in the woods at the time of the theft and maintain that the circumstantial evidence overrides your alibi. Consider then the following: P (W/k) is low, where W represents you walking in the woods at the time of the theft, and k is the circumstantial evidence claiming that you stole the letter. Suppose that both you and your colleagues agree that P(W/k) is low. Even if this is true, Plantinga argues that you have access to non-propositional evidence unavailable to your colleagues, such as your memory. If your memory provides a sufficient and reliable experience, then you are rational to believe that W is true despite the fact that P(W/k) is low.[120] Plantinga responds to the problem of evil in a similar way. Despite the circumstantial evidence from evil against God's existence, theists may support belief that God exists provided they obtain sufficient, non-propositional evidence.

Bergmann applies Plantinga's response to the problem of evil to criticize EAAN. Even if the naturalist accepts premise 1, they may appeal to their non-propositional common-sense beliefs in support of naturalism. Following Thomas Reid's definition of common sense, Bergmann considers the faculty responsible for generating the emotion of ridicule; Reid says:[121]

> We may observe that opinions which contradict first principles are distinguished from other errors by this; that they are not only false, but absurd: and, to discountenance absurdity, nature has given us a particular emotion, to wit, that of ridicule, which seems intended for this very purpose of putting out of countenance what is absurd, either in opinion or practice.[122]

[120] Plantinga, "Epistemic," 89. See also Thomas M. Crisp, "An Evolutionary Objection to the Argument from Evil," in *Evidence and Religious Belief*, eds. Kelly James Clark and Raymond Van Arragon (Oxford: Oxford University Press, 2011), 123-4.

[121] Thomas Reid, *Essays on the Intellectual Powers of Man* (Cambridge: MIT Press, 1969), 593, 630; also see Bergmann's interpretation of Reid, "Commonsense," 593, 630.

[122] Thomas Reid, *Essays*, 606.

According to Bergmann, the atheist may appeal to non-propositional common-sense beliefs to support their recondite philosophical belief. Plantinga replies to Bergmann, but more relevant for the present purpose is Crisp's response:

> Why don't *I* have such non-propositional evidence for my belief that *my* philosophical faculties are reliable? I don't experience any emotion of ridicule when I entertain the possibility that my cognitive faculties are unreliable with respect to obtuse philosophical matters far removed from the everyday concerns of life. That possibility doesn't strike me as crazy or ridiculous. I don't notice any powerful seeming or seeing to be true when I consider the proposition that my philosophical faculties are reliable; it doesn't strike me as just *obvious* that they are. In fact, when I consider the multitude of crazy views philosophers have defended over the centuries and the rampant disagreement among philosophers over almost of everything of substance, I find it wholly *unobvious* that we humans, myself included, have reliable philosophical faculties.[123]

Crisp asks how the faculty responsible for the emotion of ridicule (or any common-sense faculty) could substantiate the warrant for recondite philosophical beliefs. It is unclear why appealing to common sense warrants beliefs beyond the scope of common-sense domains. Bergmann must defend this explanatory gap.

4. Plantinga's weaker EAAN

Plantinga's recent version of EAAN grants Crisp's weaker argument:

> Perhaps those faculties that produce beliefs that appear to be relevant to survival and reproduction are more likely to be reliable than those faculties that produce beliefs of other kinds. For example, one might think that perceptual beliefs are often more likely to be relevant to adaptive behaviour than beliefs about, say, art criticism, or postmodernism, or string theory.[124]

Consider the following argument by Plantinga: P(MR/N&E) is low, where MR is the proposition that metaphysical faculties (and philosophical faculties generally) are formed in a reliable way and generate true belief. Even in this case, naturalism in conjunction

[123] Crisp, "An Evolutionary," 124-5.

[124] Plantinga, *Where the Conflict*, 348.

with evolution undermines MR. So, according to Plantinga the probability that philosophical faculties are reliable given naturalism and evolution remains low or inscrutable.

Summary:

Plantinga allows Crisp's version of EAAN for argument's sake, accepting the reliability of common-sense faculties. Thus, Plantinga's weaker EAAN – that P(MR/N&E) is low – grants that adaptive, common-sense faculties deliver true, common-sense beliefs. But why think that Plantinga's weaker argument is true? Why think that evolution accounts for reliable, common-sense faculties at all? Plantinga only grants the argument. Establishing the evolution of reliable common-sense cognition requires additional support.

II. GRIFFITHS AND WILKINS' EVOLUTIONARY SUPPORTING ARGUMENT

Paul Griffiths and John Wilkins (hereafter, GW) argue that evolution would have selected reliable common-sense cognition. GW then argue that common-sense reliability substantiates scientific beliefs but not moral and religious beliefs. My purpose for the Scope Objection is to focus on the first part of GW's argument regarding the selection of common-sense faculties.

A. True Belief and Pragmatic Success

GW defend their evolutionary supporting strategy by focusing on the link between true belief and pragmatic success. Before defending this claim, GW respond to two challenges of evolutionary skepticism, outlined in the following argument:[125]

[125] Griffiths and Wilkins, "When do evolutionary"; See also Paul Griffiths and John Wilkins, "Evolutionary Debunking Arguments in Three Domains: Fact, Value, and Religion," (forthcoming) In *A New Science of Religion*, eds. James Maclaurin Greg Dawes (Routledge).

6. Evolution did not select for truth-tracking unless truth-tracking coincides with fitness.
7. The fittest belief forming mechanisms are not always those designed to produce the largest proportion of true beliefs, or the most accurate beliefs.
8. Therefore, we should not have a general expectation that evolved organisms will track truth.

GW focus on premise seven, suggesting that: (i) fitness-tracking and truth-tracking coincide, even though (ii) evolution also selected unreliable cognitive faculties. These two claims require closer examination.

In support of (i), GW describe the evolution of frog communication. Although frogs normally use vocalization to communicate with their conspecific, they have also developed communication by leg-waving.[126] There are two advantages to leg-waving. First, leg-waving is quiet, thereby increasing the avoidance of predators. Second, leg waving is advantageous in noisy environments because of its visual cue. But what was the target of selection, quiet leg-waving or visible leg-waving? Even if the target of selection was one feature over another, this does not imply that each target is an alternative to fitness. That is, it makes no sense to say that evolution selected for visible leg-waving or fitness. Both targets of selection, jointly or individually, have the potential for contributing to the overall fitness of frogs. In a similar way, truth-tracking is not an alternative to fitness but remains a property for contributing to fitness. Even if another feature was selected over truth-tracking, this does not preclude truth-tracking and does not imply that evolution selected for fitness over truth.

[126] Griffiths and Wilkins, "Evolutionary Debunking."

The main point is that truth-tracking and fitness tracking are not alternative targets of selection; and, thus, truth-tracking coincides with fitness. Truth-tracking is a measure of ecological interaction exhibited by an organism in correlation with its environment.[127] If an organism tracks truth more effectively than its conspecific, change within the population would have been more likely to favour truth-tracking. Thus, (i) is probably true.

The second claim is that evolution was more likely to have selected unreliable cognitive faculties. But according to GW, even if this is true, it doesn't follow that evolution failed to select for truth-tracking. That is because truth-tracking is a property of fitness, as (i) contends, and that fitness determines the degree to which truth-tracking applies. That is, truth-tracking is under the constraint of overall fitness. Consider GW's argument in support of (ii):

9. If our evolved cognitive mechanisms were not selected for tracking truth, then either they are not adaptations, or they were selected for some other, substantial ecological benefit.
10. The hypothesis that human cognitive mechanisms are not adaptations is highly implausible because they are so expensive.
11. So, our evolved cognitive mechanisms are probably adaptations.
12. If they are not adaptations for truth-tracking, then they must be adaptations for something else.

[127] Griffiths and Wilkins, "Evolutionary Debunking."

13. But it's hard to see what cognition could be selected for other than tracking truth.[128]

14. So, our evolved cognitive machinery has evolved for truth-tracking."

GW defend premise ten by detailing the cost of the human brain. One fundamental constraint to selection is cost. The human brain is only 2% of total body mass, yet it requires 20% total oxygen to function. Thus, following premises nine and ten, human cognitive mechanisms are costly and are therefore adaptations. Premises twelve and thirteen support truth-tracking as the only viable explanation for why human faculties are adaptations. In order to reject these premises, critics must suggest another reason why human cognitive mechanisms are adaptations. So, the conclusion follows.

The argument suggests that evolution selected for truth-tracking faculties in order to maximize fitness, provided this selection was not overly disadvantageous. If that is right, then it becomes easier to understand why (ii) is true, but does not preclude the selection of reliable cognitive faculties, since fitness constrains truth-tracking.

Therefore, even if premise eight is true, it doesn't imply that evolutionary processes failed to select cognitive capacities that track truth. This latter claim is perfectly consistent with both objections from evolutionary skepticism, provided fitness constrains truth-tracking and both modes of tracking coincide

B. Common-sense Beliefs and Pragmatic Behaviour

According to GW, a precise definition of a truth-tracking cognitive faculty includes the following: "Organisms track truth optimally if they obtain as much relevant

[128] Some find this premise controversial. But GW already state that its controversy hinges on critics demonstrating that truth-tracking was necessary for some other cognitive advantage. Until critics provide such an account, premise thirteen seems prima facie true.

truth as they can afford, and tolerate no more error than is needed to obtain it."[129] Common-sense beliefs follow suit. Common-sense beliefs may be false in certain domains since they are the product of faculties forged in the struggle for survival. Hence, common-sense faculties generated true belief only insofar as fitness required.[130]

In support of GW's claim, consider again Reid's common-sense epistemology in relation to cognitive science. Reid argues that common-sense faculties should be considered reliable unless shown otherwise. According to cognitive scientist Justin Barrett, Reid's common-sense faculties resemble non-reflective beliefs in naïve physics: belief in other minds and that biological species give birth to their own kind.[131]

The problem with naïve physics is that they are restricted to specific domains, producing false beliefs beyond the scope of their design.[132] Anthropologist Scot Atran argues,

> By nature, human minds everywhere are endowed with common sense. They possess universal cognitive dispositions that determine a core of spontaneously formulated representations about the world. The world is basically represented in the same way in every culture. Core concepts and beliefs about the world are easily acquired . . . yet they are restricted to certain cognitive domains and are rather fixed.[133]

In short, non-reflective, common-sense faculties that include naïve physics generate true

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[129] Griffiths and Wilkins, "Evolutionary Debunking."

[130] See also John Maynard Smith, "Optimization Theory in Evolution," *Annual Review of Ecology and Systematics 9* (1978): 32.

[131] Justin Barrett, *Cognitive Science, Religion, and Theology: From Human Minds to Divine* Minds (PA: Templeton Press, 2011), 87-95; Barry Smith, "Formal Ontology, Commonsense, and Cognitive Science," accessed December, 2012, http://ontology.buffalo.edu/focscs.pdf; Reid, "An Inquiry," 23; Clark and Barrett, "Reidian," 8.

[132] Boulter, "The evolutionary argument," 376; Scot Atran, *Cognitive Foundations of Natural History: Towards an Anthropology of Science* (Cambridge: Cambridge University Press, 1990), 263-4.

[133] Scot Atran, *Cognitive Foundations,* 263-4.

belief, but remain defective in various circumstances beyond the scope of their proper function.[134] But this seems to be enough to defend GW's claim.

Although naïve physics generate false beliefs in certain domains, this does not preclude their truth-tracking potential.[135] Moreover, true beliefs delivered by naïve physics would have resulted in pragmatic behaviour. Consider perceptual faculties. Although fallible, perception tracks truth in domains necessary for enhancing fitness (e.g. navigating uneven terrain, night vision, and so forth.) Even if perceptual faculties function in unreliable ways (say, by creating optical illusions), they still track truth within the normal environment for which they were designed. So, evolution selected faculties responsible for common-sense naïve physics so long as those faculties generated pragmatic beliefs and were not adverse to overall fitness.

Summary:

GW argue that evolution selected reliable common-sense faculties that function according to the overall fitness of an organism. In defense of this claim, GW clarify the false distinction between truth-tracking and fitness-tracking such that truth-tracking is a property contributing to fitness and not an alternative to fitness. Correcting the distinction between the two forms of tracking solves the second problem of unreliable cognition. Evolution would have selected some unreliable cognitive faculties only when truth-tracking interfered with overall fitness. With these details in place, consider the Scope Objection in detail.

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[134] Steven Boulter argues that common sense gets it wrong when we attempt to solved questions about the intricate laws of the universe; but this is not the domain of common sense. All that is required for common sense to function properly is to form true belief about space and time – two conditions necessary for us to study the intricate laws of the universe. See footnote 164.

[135] Helen De Cruz notes that naïve physics can still generate false beliefs within their proper domain. This is true, but does not undermine the main point that at least some common-sense mechanisms like naïve physics do function reliably.

III. The Scope Objection

Plantinga grants that evolution supplied reliable common-sense faculties while GW support this weaker claim. The point of contention is whether evolution accounts for the reliability of faculties in non-adaptive domains of belief. Consider now the Scope Objection to DE.

15. DE is plausible only if evolution supplied us with the natural cognitive capacities for achieving non-adaptive beliefs.
16. Evolution did not supply us with the natural cognitive capacities for achieving non-adaptive beliefs.
17. So, DE is implausible.

The Scope Objection concludes that DE is implausible since evolution did not supply reliable cognitive faculties for producing non-adaptive beliefs. Consider each premise more closely.

Premise twenty-three states a necessary condition for the plausibility of DE. In order to achieve DE, evolution must have supplied the right cognitive faculties for non-adaptive belief. This seems uncontroversial since DE requires non-adaptive beliefs. That is, if evolution did not supply faculties responsible for non-adaptive beliefs, then how could the non-adaptive application of DE ground itself within evolution?

Premise twenty-four is more controversial. It denies that evolution supplied the required belief-forming faculties for achieving DE. That is to say, evolution only supplied reliable faculties in common-sense domains, not faculties responsible for systematic theories of epistemology. If this is right, then the conclusion follows. But why think that this premise is true? Why think that evolutionary processes cannot account for the

reliability of faculties in non-adaptive domains? As we shall see, there are two ways to respond to this premise. The first way is to postulate scientific hypotheses that support the evolution of such faculties, while the second way includes assessing whether or not such a process is even logically possible.[136]

IV. Conclusion

In this chapter, I briefly examined Plantinga's EDA and Griffiths' and Wilkins' common-sense ESA. Although these authors argue beyond my respective claims, my purpose is to establish a general consensus that evolution supplied reliable, common-sense cognition. Thus, we can present the Scope Objection to DE: that evolution did not supply us with the natural cognitive capacities for achieving non-adaptive true beliefs. In the next chapter I reject the Scope Objection by nuancing the term natural cognition and by offering reasons for thinking that evolution supplied faculties responsible for non-adaptive beliefs

[136] I will consider the importance of logical possibility in the next chapter. In particular, the claim that logical possibility is a weak standard for truth.

Chapter 3

The Evolution of Practiced Natural Cognition

In this chapter I respond to the Scope Objection by denying its second premise: that evolution did not supply us with the natural cognitive capacities for achieving non-adaptive true beliefs. I evaluate Robert McCauley's distinction between maturationally natural cognition and practiced natural cognition and note how the application and evolution of practiced naturalness is sufficient for defending the plausibility of DE. My response to the Scope Objection requires defending two contentions. First, I nuance the term "natural" in order to distinguish between two types of natural cognition, one of which overcomes evolved limitations. Second, I assess two criteria necessary for the rise of science as an example of practiced natural cognition and note how evolution supplied faculties as such.[137] If this is true, then it seems plausible that evolution supplied the natural cognition responsible for non-adaptive beliefs more generally, including systematic theories of epistemology.

I. Natural Cognition and the Scope Objection

In this section I examine McCauley's definition of natural cognition and then consider the implications for the Scope Objection. McCauley notes that evolution would have supplied common-sense cognition, but that these capacities are insufficient for generating non-adaptive beliefs.[138] If natural cognition only specifies maturational naturalness, then the Scope Objection succeeds. But limiting the definition of natural cognition in this way is false, according to McCauley. Humans also possess practiced

[137] McCauley, *Why Religion*, 107-8, 138.

[138] McCauley, *Why Religion*, 106-7.

natural capacities that provide cognitive abilities beyond common-sense domains.[139]

A. Natural Cognition

Natural cognition generates skills non-reflectively. This means that humans can apply cognitive abilities without the need for deliberation, unlike reflective skills that operate slowly and require deliberation. The primary mode of reflective development is through the process of reading off already instilled mental tools responsible for non-reflective beliefs. A man runs out of a retail store with a large bulge in his shirt knocking over the store clerk. Several non-reflective mental tools participate to create a single reflective belief: that the man is shoplifting.[140]

According to McCauley, non-reflective skills divide into two natural types: maturationally natural and practiced natural. Maturational natural skills include walking, chewing, and speaking, as well as believing in naïve physics. These types of skills are universal across cultures, since they require almost no specialized training. Conversely, practiced natural capacities include driving a car and playing the piano, as well as believing and applying advanced logic and math, extracting DNA and so forth.[141] Practiced skills differ across cultures, since they require specialized training and support.

1. Maturational and Practiced Naturalness

Maturational natural skills generate considerable knowledge about the environment and it is likely that humans possess these common-sense capacities because of their adaptability. But these common-sense faculties remain limited in scope since

[139] Although McCauley seems skeptical that evolution could have supplied faculties as such; see McCauley, *Why Religion*, 107-8.

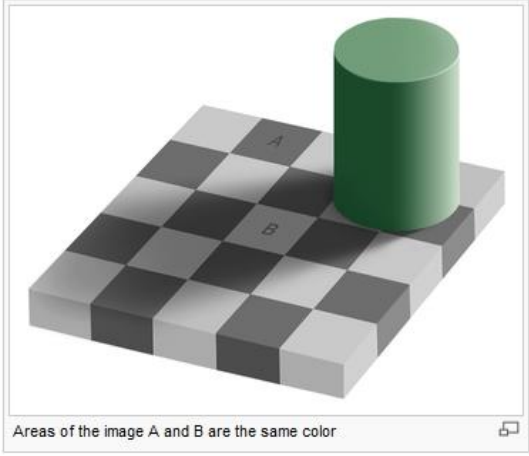
[140] Barrett, "Cognitive Science," 77-80.

[141] I'm thankful to Helen De Cruz for clarifying some factual errors about the nature of practiced naturalness.

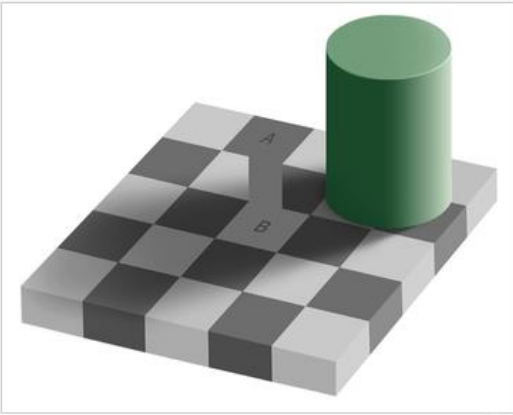
their reliability operates within specific domains. This limitation carries significant implications for the Scope Objection. According to the second premise, evolution did not supply us with the natural capacity to form non-adaptive true belief. If by "natural" one delineates only maturational naturalness, then the second premise is true. To see this, consider the implications for perceptual and inferential faculties. Both sets of faculties function well within their respective domains but fail to generate true belief beyond the scope of their design. In other words, they fail to function in a reliable way in non-adaptive domains of belief.

i. Maturational Natural Perception

According to McCauley, the limitation of perceptual faculties is clear by considering a variety of optical illusions. In many cases, we cannot overcome optical illusions without additional tools and support. Take for example the Adelson checkerboard illusion. In figure 1.1 below, the picture on the left hand side displays two boxes A and B with slightly different shades of grey. The second figure on the right hand side illustrates that A and B are in fact identical shades of grey.



Areas of the image A and B are the same color

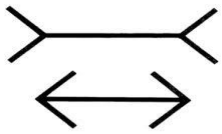


A rectangle of the same color has been drawn connecting the two areas of the image

Overcoming the illusion requires attaching A and B with a grey line, since maturationally natural cognition requires additional support. We must utilize independent tools in order to overcome these common-sense biases.

McCauley considers the Muller-Lyer Illusion. Figure 1.2 illustrates a similar common-sense deficiency: that we are unable to overcome the persistence of certain optical illusions without independent support.

Figure 1.2



The bottom line appears shorter than the top line; while measuring both lines establishes their equal length. McCauley notes that the Muller-Lyer Illusion provides two conflicting beliefs: we perceive one line longer than the other while simultaneously believing that this observation is false.[142]

Optical illusions do not imply that all perceptual faculties are unreliable. In fact, some optical illusions can be overcome by closing one's eyes and changing environments. This fact presupposes some basic reliability.[143]Nevertheless, it is clear that perceptual faculties generate false beliefs when operating in environments beyond the scope of their design. This observation shouldn't be surprising, since these faculties were

[142] McCauley, *Why Religion*, 3.

[143] McCauley, *Why Religion*, 43. See also Jerry Fodor, *The Modularity of Mind* (Cambridge: MIT Press, 1983); and also Robert McCauley and J. Henrich, "Susceptibility to the Mull-Lyer Illusion, Theory Neutral Observation, and the Diachronic Cognitive Penetrability of the Visual Input System." *Philosophical Psychology* 19, (2006): 79-101.

forged within a particular environment for adaptability.[144] When these faculties operate in environments foreign to their design, optical illusions persist.

Suppose we defend an evolutionary supporting strategy for perceptual cognition. That is, we attempt to ground the reliability of perceptual faculties within an evolutionary story. If by "natural" we imply maturationally natural, then the result is an effective debunking argument, since evolution also supplied unreliable perceptual faculties. More specifically, one might postulate a Scope Objection against the reliability of evolved, perceptual faculties given their evolutionary origin.[145] Thus, an ESA supporting human perceptual faculties delineating only maturationally naturalness is found wanting.

Consider now non-adaptive beliefs more specifically. Similar to perception, McCauley notes that the maturational, common-sense capacity for logical inference suffers a similar deficiency.

ii. Maturational Natural Logic

The Scope Objection to DE becomes clear when assessing logical and inferential abilities. In support of this claim, consider the Wason Selection Task Experiment.[146] Leda Cosmides and John Tooby illustrate the inability for accurately inferring conditionals presented in abstract ways. Consider the following:

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[144] Evolutionary psychologists identify mental modules that would have been selected by evolution for their domain specific functions. As discussed in chapter two, common-sense faculties like naïve physics are not always perfect or optimal. Still, they function reliably within domains relevant for our evolved ancestors. McCauley, *Why Religion,* 54; See also Tremlin, *Minds and Gods,* 37-9.

[145] This type of argument raises other limitations of our perception. Our evolved perception does not provide true belief about many counter-intuitive theories accessed by science. Authur Eddington's "two tables" illustrates the point. The everyday solid table described by common sense is actually mostly empty space. See McCauley, *Why Religion*, 109. I doubt this would amass to a powerful debunking argument. But the point is that some debunking arguments assume that evolved, natural cognition only includes maturationally naturalness.

[146] McCauley, *Why Religion*, 56-7.

A	B	2	3

"If a card has a vowel on one side, then it has an even number on the opposite side. Assuming that each of these cards has a letter on one side and a number on the opposite side, indicate only those cards(s) that you definitely need to turn over in order to ascertain that this conditional is true."[147] The correct answer is A and 3. Now consider a second example:

Drinking Beer	Drinking Coke	25 years old	16 years old

"If a person is drinking beer, then he or she must be over 20 years old. Assuming that each of these cards has information about what a person is drinking on one side and about his or her age on the other, indicate only those card(s) that you definitely need to turn over in order to ascertain if any of these people are breaking this law."[148] Both tests share the same logical form. And yet participants are more successful with the second test. They answer correctly by flipping the cards "drinking beer" and "16 years old."

Wason's test reveals the limitations of maturational, common-sense faculties such that they operate correctly only within their proper domain. Participants score higher on the second test because the description is in sociological terms, conducive to human common-sense outputs. This observation fits well with understanding the nature and limitations of evolved minds, since evolution supplied cognitive adaptability and not

[147] I adopt McCauley's version of the test; see McCauley, *Why Religion,* 56-57.

[148] McCauley, *Why Religion*, 57.

abstract reflection.[149] Moreover, the test exposes the limits of common-sense inferences applied in non-adaptive ways. When the test describes abstract scenarios, applicants commit logical fallacies like affirming the consequent. Thus, the scope of maturationally natural skills remains limited, and therefore we have a Scope Objection against the reliability of logical inference.

If by "natural" we imply only maturational capacities, then the non-adaptive practice of DE remains implausible. But we needn't limit the definition of "natural" in this way. According to McCauley, humans possess practiced natural cognition capable of overcoming maturational biases.

iii. Practiced Natural Logic

If the term natural cognition includes practiced naturalness, then maturational limitations can be overcome. Consider again Wason's experiment. In order to successfully answer both tests, participants must apply the inference modus ponens (i.e. if p then q, p, therefore, q) and modus tollens (i.e. if p then q, not ~q, therefore, not ~p), as well as to avoid committing the logical fallacy of affirming the consequent (i.e. if p then q, q, therefore, p). By practicing these rules of deductive inference, humans are able to overcome maturational natural biases about logic and form true beliefs in abstract domains. Therefore, even if human natural cognition suffers from evolved constraints and is unreliable in certain domains, this does not preclude the ability to overcome and generate true non-adaptive beliefs.

The main point is that there are obvious cases in which practiced natural applications of deductive inference are reliable. This does not imply that a full-blown epistemology of practiced natural knowledge succeeds. Indeed, human faculties continue

[149] McCauley, *Why Religion*, 106-7.

to generate false beliefs even after the application of reliable deductive inference occurs. Nevertheless, rejecting the Scope Objection only requires a sound picture of practiced natural reliability and not a robust theory of practiced natural epistemology.[150]

Summary

It is clear that maturationally national cognition and its common-sense outputs remain limited in scope. Although these cognitive faculties generate true belief within their respective domains, they are unreliable beyond the scope of their design. If by "natural cognition" the second premise delineates only maturational naturalness, then the Scope Objection succeeds. However, my first contention clarifies the term "natural cognition" to include practiced naturalness. If humans possess practiced natural skills, then maturational biases can be overcome.

The first contention provides minimal support for DE, since an evolutionary account of practiced naturalness remains essential. I proceed then to examine the strength of my second contention that grounds practiced natural cognition and skills within human evolution.

II. The Evolution of Practiced Natural Cognition

In this section I argue that evolution supplied practiced natural cognition and skills. By way of example, I assess two criteria listed by McCauley as necessary conditions for the rise of science and then figure how recent theories of cognitive evolution satisfy these conditions. This does not suggest that these conditions are sufficient. Perhaps future scientific discovery will yield new evidence for strengthening (or weakening) the proposal. However, if current theories from cognitive evolution are accurate, then we shouldn't be surprised that evolution forged cognitive capacities for

[150] I'm thankful to both Helen De Cruz and Myron A. Penner for clarifying this issue with me.

non-adaptive beliefs. If this is right, then it seems plausible that evolution supplied faculties responsible for non-adaptive beliefs more generally, including systematic theories of epistemology.

A. Preliminaries

Some preliminaries are required. First, there is divergence over whether theories of cognitive evolution succeed. Lewontin remains skeptical, while others continue to project "hypotheses" for describing cognitive evolution, both with respect to biological organisms generally and human faculties in particular. Second, critics undermine adaptationist theories of cognitive evolution as nothing more than "Just so" stories.[151] But this objection is irrelevant for my purpose. Recall that affirming the weaker form of DE does not require defending epistemic justification. Perhaps it is nothing short of a lucky fluke that evolutionary processes generated reliable faculties for non-adaptive beliefs. Indeed, perhaps the truth of this claim is forever inscrutable. Either way, it is not logically impossible for evolutionary processes to succeed in producing faculties as such, in conjunction with the fact that skeptics lack any obvious undercutting defeater for my objection to premise two.

B. Two Criteria for the Rise of Science

McCauley credits the first criterion for the rise of science to Aristotle's claim that "All men by nature desire to know."[152] Aristotle argues the search for knowledge is the fulfillment of human nature. Humans not only possess faculties for practical reasoning,

[151] See Stephen J. Gould, "Evolution: The Pleasures of Pluralism," *New York Review of Books* (1997); for response, see Ernst Mayr, "How to Carry Out an Adaptationist Program," *The American Naturalist*, Vol. 121, no. 3. (1983): 324-334.

[152] McCauley, *Why Religion*, 107.

but, according to Aristotle, possess a rational mind for theoretical reflection.[153] In order for human beings to flourish, they must apply intellectual virtue, by learning to "plan and deliberate, to ponder alternatives and strategize, and generally to chart courses of action."[154] Similarly, scientific reflection requires that its practitioners apply cognitive abilities above adaptive means. More precisely, science requires abstract thought beyond the scope of common-sense faculties.

The second criterion necessary for the rise of science is external media, including tools, writing, and symbolic notation. External media is necessary for recording counter-intuitive data and providing criticism of non-adaptive beliefs. Moreover, external media allows scientific theories to be publicly accessible. Public awareness and accessibility provides a means for peer review and accountability, safeguarding against poorly devised theories.[155] Hence, in order for science to emerge and succeed, humans rely on the embeddedness of human cognitive outputs.[156]

The two necessary conditions required for the rise of science are faculties for theoretical reflection and faculties responsible for external media. I argue that these two conditions are rooted within human cognitive evolution. For brevity, I'll define the former as theoretical faculties and the latter as outsourcing faculties.[157]

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[153] Aristotle, *Nicomachean Ethics*, trans. David Ross (New York: Oxford University Press, 2009), vi 8 1143a35-b5.

[154] Christopher Shields, "Aristotle's Psychology", *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, accessed September 20, 2013, http://plato.stanford.edu/archives/spr2011/entries/aristotle-psychology/

[155] McCauley, *Why Religion*, 140.

[156] McCauley, *Why Religion*, 94-5.

[157] McCauley refers to the former as "speculative" faculties; see McCauley, *Why Religion*, 101.

1. The Evolution of Practiced Naturalness

Recent theories that support the evolution of practiced naturalness include a family of hypotheses, such as: environmental complexity, external media, niche construction, social living, and theory of mind. I briefly consider each hypothesis and then figure how each contribute to my second contention. I'll then summarize and assess Sober's evolution of rationality thesis to show that the evolution of practiced naturalness is not logically impossible. Although logical possibility establishes very little, it becomes more relevant when operating in conjunction with a no-defeater clause, whereby we possess no good reason for denying such possibility.

i. Environmental Complexity Thesis

In order to postulate the evolution of practiced natural cognition, it is necessary to state the conditions required for the evolution of theoretical faculties. One necessary condition for the rise of science includes possessing cognitive faculties capable of overcoming common-sense bias. Maturationally natural capacities deliver true belief within their limited scope but are in conflict with the scientific capacity to form non-adaptive beliefs. The environmental complexity thesis states that some organisms possess cognitive flexibility for dealing with environment change. That is, organisms possess faculties with greater plasticity for responding to environmental pressure. If this is right, then it is possible to imagine environmental complexity as a foundation for future developments of human cognition operating in non-adaptive ways.[158]

Peter Godfrey-Smith argues that organisms display first and second order behaviour. First order behaviour is an organism's response to their environment in a fixed

[158] Godrey-Smith argues just this, but is careful to state that the environmental complexity thesis is only a general foundation for developing future theories of cognitive evolution.

way, while second order behaviour profiles the ability to learn from experience.[159] Individuals within a population that exhibit the ability to adjust to the complexity of their environment may have garnered advantage over those lacking the ability. Environmental complexity includes behaviour within a species, seasonal changes, disease and predation that force individuals to respond in specific ways. The implication is that over time evolution may have selected organisms with an assorted cognitive tool kit with a diversity of behavioural responses.[160] Analyzing human cognitive evolution requires exploring this type of cognitive tool kit, one that is not fixed or closed in shaping cognition but rather open and flexible for allowing greater plasticity.[161]

We might extend the idea of cognitive plasticity with Ernst Mayr's closed and open behaviour program.[162] According to Mayr, a closed program is one innately acquired and cannot be altered by experience. Organisms possess a nervous system that instills a variety of behaviours determined by its genetic makeup. The closed genetic program states that nothing can be inserted into the organism's behavioural outputs. This implies that animals will react to their environment in a rigid way, since the genotype

[159] Peter Godfrey-Smith, *Complexity and the Function of Mind in Nature* (Cambridge University Press, 1998), 26. For his more recent work, see: "Environmental Complexity and the Evolution of Cognition," In *The Evolution of Intelligence*, eds. R. Sternberg and J. Kaufman Lawrence (Erlbaum Associates, 2001).

[160] See also Stephen Boulter, "The Evolutionary Argument the Metaphilosophy of Commonsense," *Biology and Philosophy* (2007): 375.

[161] Ernst Mayr, "Behavior Programs and Evolutionary Strategies," *American Scientist Vol. 62*, no. 6 [November 1976]: 3-11. See also Ernst Mayr, *Evolution and the Diversity of Life* (Cambridge, Mass.: The Belknap Press, Harvard University Press, 1976), 2.

[162] It's important to note that Mayr was at odds about the evolution of human cognition, thinking the probability of such an event was astronomically low. See Mayr, "Can SETI Succeed? Not Likely." *Bioastronomy News*, vol. 7, no. 3 (1995): 3-11. Helen De Cruz argues that the gosling example does not support my second contention, since the gosling's mapping abilities does not illustrate practiced naturalness. It is true that the gosling does not reflect practiced naturalness, but this isn't the point. Rather, the idea is to demonstrate the building blocks necessary for practiced naturalness to be realized.

responsible for shaping the nervous system determines the type of behavioural program they will possess.[163] In other words, a closed program determines behaviour that includes cognitive capabilities lacking any plasticity.

Mayr defines the open behaviour program to include input to the organism from the external world. This means that new information inserts into the behavioural program of the nervous system. A certain species of goose exhibit an open program when goslings consider the first moving object they hear as the biological parent.[164] This experience affects the gosling's nervous system, leading to altered types of behaviour that include abandoning the biological parent. In this case, the gosling's behaviour follows external indicators rather than innate instinct.[165] This process of imprinting new information into the behavioural program of the organism incurs advantage over the closed, genetic program that remains fixed.[166]

Applying Mayr's thesis to the evolution of the human mind, Popper argued that an open program includes the possibility for personal reflection, especially about one's environment. As such, Popper speculates into the rudimentary evolution of decision making; he states:

> Ecological conditions like those that favor the evolution of *open behavioral programs* sometimes also favor the evolution of the beginnings of consciousness,

[163] Mayr, "Behavior Programs," 3-11

[164] See also Konrad Lorenz, Evolution *and Modification of Behavior* (Chicago: University of Chicago Press, 1965); and Lorenz, *The Year of the Graylag Goose* (Hardcourt Brace Javanovich, 1979).

[165] Mayr, "Behavior Programs," 3-11.

[166] Mayr, "Behavior Programs," 3-11.

> by favoring conscious choices. Or in other words, consciousness originates with the choices that are left open by open behavioral programs.[167]

Although Popper argues that decision making (and consciousness more specifically) reflects an emergent property, the rudimentary building blocks are indeed evolutionary. Here Popper cites Richard Dawkins, who argues that natural selection would have favoured organisms that simulate hypothetical scenarios. By postulating counter-factual intuitions, organisms create mechanisms for avoiding danger.[168] Evolution may still have determined a probabilistic outcome, but the open program allows the input of information independent from the organism's innate restrictions.[169]

One final consideration is Kim Sterelny's thesis of decoupled representation. Following the work of Godfrey-Smith, Sterelny focuses on organisms' ascending grades of belief. Initial grades include beliefs necessary for survival – beliefs responsible for navigation, for example – and trigger reflexive behaviour without any deliberation.[170] The final grade of belief Sterelny calls "decoupled representations": that is, "…internal states that track aspects of the world, but which do not have the function of controlling particular behaviors."[171] These functions are not fixed but allow for reflective awareness

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[167] Karl Popper, "Natural Selection and the Emergence of Mind," in *Evolutionary Epistemology, Rationality, and the Sociology of Knowledge*, eds. Gerard Radnitzky and W.W. Bartley (Illinois: Open Court: 1987), 150-1.

[168] Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1976), 62. Keith Ward makes a similar point about the nature of consciousness, that is "the carrier of possibilities;" see Keith Ward, "God as the Ultimate Informational Principle," in *Information and the Nature of Reality: From Physics to Metaphysics*, eds. Paul Davies and Niels Henrik Gregersen (Cambridge: Cambridge University Press, 2010), 287.

[169] Popper, "Natural", 150-1.

[170] Kim Sterelny, *Thought in a Hostile World: The Evolution of Human Cognition* (Oxford: Blackwell, 2003). 14.

[171] Sterelny, *Thought*, 29.

of one's environment, particularly one's social environment. He goes on to argue that applying decoupled representations as a way of forming complex behavior only appears late in the evolutionary process, specifically with primates. And although it is not explicit that decoupled representations form actual beliefs, it is reasonable to infer that they are "belief like".[172]

The environmental complexity thesis supports the development of non-adaptive beliefs. These types of beliefs originate from cognitive flexibility and may have contributed to human cognitive evolution. If human ancestors possessed the cognitive capacity for reflecting about the environment, then this may account in part for the evolution of theoretical faculties. Of course these hypotheses remain speculative and do not assume that such behaviour programs would instill reliable faculties. Nevertheless, the evolution of practiced natural skills would require some rudimentary capabilities beyond closed programs. As Godfrey-Smith argues, perhaps these "open" evolutionary trajectories provide a foundation for understanding cognitive evolution.

As already noted, however, possessing theoretical faculties remain insufficient for the rise of science. As indicated by McCauley, science requires the embeddedness of cognitive outputs, contingent on tools and technology. Without the outsourcing of theoretical reflections to the objective world, science would be impossible.

ii. External Media Thesis

According to McCauley, science requires extending non-adaptive theories to the objective world by external media in order for those theories to receive criticism. Within

[172] See Wayne Christensen, "The decoupled representation theory of the evolution of cognition– a critical assessment," *British Journal of Philosophy of Science* (2009); H. Dreyfus, "The Return of the Myth of the Mental," *Inquiry* 50 (2007): 352-365; J McDowell, "What Myth?" *Inquiry* 50 (2007): 338-351.

the past thirty-thousand years Homo sapiens have dominated more than any representative in their genus, largely because of mastering tools and technology.[173] Archeologists have discovered tools and forms of communicative art dating back to the late Pleistocene era, suggesting that humans orchestrated forms of communication through external media.[174]

A good example illustrating the human ability to outsource maturational knowledge is temperature.[175] According to Helen De Cruz et al., human bodies generate reliable thermoreception necessary for regulating body temperature. But experience of temperature does not always provide an accurate reading because the sensitivity of human receptors varies across the body. For example, the human scalp is sensitive to cold in order to protect the brain from excessive cooling; but the scalp is not a reliable source of detecting temperature.[176] This type of thermoreception is sufficient for survival but remains unreliable when operating beyond its domain. Overcoming thermoreceptive bias requires outsourcing maturational experience of temperature to independent external media like thermometers. Thermometers placed in a fixed position detect temperature independent of maturational bias. The point is clear: humans output their maturational knowledge to the external world by way of tools and technology, thereby allowing greater control of the environment.

Tools and technology allow humans to control their environment. Control of the environment ensures theoretical activities divorced from adaptive struggles: activities like

[173] Tremlin, *Minds and Gods*, 21-3.

[174] De Cruz et al., "Evolutionary Approaches," 532.

[175] De Cruz et al., "Evolutionary Approaches," 532.

[176] De Cruz et al., "Evolutionary Approaches," 532.

philosophy, art, and scientific theorizing.[177] This type of cognitive niche, along with applying methods of external media, may have provided the right conditions for theoretical and outsourcing faculties to flourish and, thus, responsible for realizing the growth of scientific inquiry.

There are good reasons for grounding theoretical and outsourcing faculties within an evolutionary story. This does not imply that all such faculties would have generated true beliefs. Indeed, in many cases practiced natural faculties would have generated false beliefs. As already noted, however, this observation needn't interfere with the fact that some practiced natural capacities function reliably in tracking truth, even if such mechanisms operate in a more rudimentary sense.[178]

With these details in place, Steven Pinker's recent thesis about the evolution of cognitive faculties in non-adaptive domains is relevant because he considers both conditions respectively. The general idea is that Homo sapiens evolved within a cognitive niche: an environment shaped by hominid cognitive abilities.

iii. Pinker's Niche Construction and Metaphorical Abstraction Thesis

Pinker outlines his ESA for non-adaptive belief by assessing two hypotheses. The first hypothesis is niche construction. It is not uncommon for species to improve their environment for increasing survival and changing their evolutionary trajectory.[179] Pinker

[177] Tremlin, *Minds and Gods*, 23.

[178] I'm thankful to Helen De Cruz for correcting this essential part of the argument.

[179] See also K.N Laland and G.R. Brown, "Niche Construction, Human Behavior, and the Adaptive-Lag Hypothesis", *Evolutionary Anthropology*, 15, (2006): 95–104; De Cruz, "Evolutionary Approaches," 531; See also Kim Sterelny, "Externalism, Epistemic Artefacts and the Extended Mind," in *The Externalist Challenge. New Studies on Cognition and Intentionality*, ed. by Richard Schantz (New York: de Gruyter, 2003).

argues that the same type of environmental change occurred with Hominids. He inquires into Wallace's skepticism about the explanatory force of natural selection, stating:

> …Nonetheless it is appropriate to engage the profound puzzle [Wallace] raised; namely, why do humans have the ability to pursue abstract intellectual feats such as science, mathematics, philosophy, and law, given that opportunities to exercise these talents did not exist in the foraging lifestyle in which humans evolved and would not have parlayed themselves into advantages in survival and reproduction even if they did?[180]

In response to Wallace, Pinker argues that humans evolved within a cognitive niche. A cognitive niche is a mode of survival characterized by humans' control of their environment through reasoning and social interaction.[181] Niche construction alters a species' environment and therefore affects the selective pressure attributed to that species.[182]

Pinker's niche construction thesis is important because it suggests that human

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[180] Steven Pinker, "The cognitive niche: Coevolution of intelligence, sociality, and language," see also Steven Pinker, *How the Mind Works* (New York: WW Norton and Company, 1997), 186-90.

[181] Pinker, "The cognitive." Pinker's theory rests on the original thesis by J. Tooby and I. DeVore, "The reconstruction of hominid evolution through strategic modeling" in *The Evolution of Human Behavior: Primate Models*, ed. W. Kinzey (SUNY Press: Albany, 1987).

[182] Pinker notes that language also became a necessary adaptation. In fact, the debate between language and the explanatory scope of natural selection is wide and diverse. Linguistic EDAs closely resemble Noam Chomsky's resistance to a Darwinian explanation of the design and incorporation of a linguistic automaton. Chomsky argues: "In studying the evolution of mind, we cannot guess to what extent there are physically possible alternatives to, say, transformational generative grammar, for an organism meeting certain other physical conditions characteristic of humans. Conceivably, there are none – or very few – in which case talk about evolution of the language capacity is beside the point. Noam Chomsky, *Language and Mind* (New York: Harcourt Brace, 1972), 98. The late Stephen Jay Gould agrees with Chomsky, insisting that the evolution of some language faculty is a by-product of evolution; he states: …The universals of language are so different from anything else in nature, and so quirky in their structure, that origin as a side consequence of the brain's enhanced capacity, rather than a simple advance in continuity from ancestral grunts and gestures, seems indicated. Stephen Jay Gould, "Tires to Spandrels." *Natural History*, 8-15. Naturally, others reject Chomsky and Gould's objections. Steven Pinker and Paul Bloom argue that "Many people have argued that the evolution of the human language faculty cannot be explained by Darwinian natural selection. Chomsky and Gould have suggested that language may have evolved as the by-product of selection for other abilities or as a consequence of as-yet unknown laws of growth and form…We conclude that there is every reason to believe that specialization for grammar evolved by a conventional neo-Darwinian process." Steven Pinker and Paul Bloom, "Natural Language and Natural Selection." *Behavioural and Brain Sciences*, vol. 13 (1990): 707. See also John Searle, *The Rediscovery of the Mind* (Cambridge: MIT Press, 1992), 88, 244-5.

cognitive evolution included the freedom to practice theoretical reflection and apply external media. Presumably, organisms that applied practiced naturalness would only pass down their genes to future generations provided it was not adverse to selection.[183]

The second arm of Pinker's thesis includes the ability to perform "metaphorical abstraction." Cognitive faculties necessary for projecting concrete beliefs also have the capacity to form metaphorical abstractions. In support of this claim, Pinker considers psycholinguistic scenarios. The sentences "Rose forced the door open" and "Rose forced Sadie to go" differ in their usage of the verb "force." The first sentence reflects a concrete idea, while the second illustrates a metaphorical abstraction. Pinker suggests that grammatical faculties utilize concrete descriptions of "force" to then postulate metaphorical abstractions of the same concept. As such, faculties typically reserved for adaptive purpose – that is, faculties necessary for concrete descriptions – may create abstract concepts analogous to non-adaptive beliefs. If this is right, and given the right cognitive niche, then evolution may have supplied faculties with the capacity in forming non-adaptive beliefs.

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[183] A relevant digression from Pinker's niche construction thesis includes assessing more specifically the environment in which Homo sapient brains evolved. Sterelny's recent work, *The Evolved Apprentice*, details the immense social life of early Hominins, and the fast progression from the great ape lineage. Sterelny analyzes the "Social Intelligence Hypothesis", by which he argues that human, cognitive evolution depends largely on internal psychological features relevant for social cohesion; see Sterelny, *The Evolved*, 6-9. A great deal more could (and should) be said about Sterelny's thesis, especially the focus of "positive feedback loops" that provide a bedrock for cognitive plasticity and learning. It is because Hominins developed adaptive learning skills with each other, as well as passing down these skills to the next generation, that gave way for Homo sapient adaptability within various environments.

Sterelny's account also motivates other similar theses. As Hominins evolved into larger groups, selection included social pressure within kin. Humans must regularly detect cheaters, free loaders, friends, and enemies, as well as comprehend group politics, etiquette, and cultural queues in order to flourish. In other words, following Popper's thesis, within a social environment human survival required a keen sense of intuition, postulating choices, and tentatively simulating hypothetical scenarios; See Karl Popper, "Natural," 62. See also R.I.M Dunbar, "The Social Brain Hypothesis and Its Implications for Social Evolution," *Annals of Human Biology* 36 (2009): 562-72; and Dunbar, "Brain and Behaviour in Primate Evolution," in *Mind the Gap. Tracing the Origins of Human Universals*, eds. P.M Kappeler and J.B. Silk (Berlin: Springer, 2010), 315-30; Todd Tremlin, *Minds and Gods*, 33-4.

We possess a wide range of theses for defending my second contention. Although controversial, theories of cognitive evolution provide some support for understanding the evolution of the faculties responsible for the rise of science. In other words, we possess accounts depicting the evolution of theoretical and outsourcing faculties and, thus, the evolution of practiced naturalness.

Now suppose these accounts amount to "Just so" stories, as Lewontin argues. Even if we reject these hypotheses as scientifically untenable, it is not logically impossible for evolutionary processes to have generated faculties operating in non-adaptive domains. Not only does the evolution of practiced naturalness seem logically coherent, but, unless we have some undercutting defeater, we should accept its plausibility. I want to conclude this section by considering Elliot Sober's evolution of rationality thesis and then bring the Scope Objection into focus.

iv. Sober's Evolution of Rationality Thesis

Sober argues that natural selection is sufficient for supporting the non-adaptive belief responsible for the scientific method.[184] Sober defends this claim by responding to the charge that "an evolutionary account of the origins of rationality is impossible because natural selection is too coarse-grained a process to single out the scientific method from innumerable other, less rational, procedures for constructing beliefs out of other beliefs."[185] This view requires two assumptions: (i) the rationality responsible for the scientific method does not incur reproductive benefit to its practitioners; and (ii) even if (i) is false, the rationality responsible for the scientific method holds equal value with

[184] Elliot Sober, "The Evolution of Rationality," *Synthese* 46: 95-120.

[185] Sober, "The Evolution," 98.

irrational faculties, such that either faculty would have been selected. Thus, according to the truth of (i) and (ii), it is unlikely that evolution forged cognition responsible for non-adaptive belief including the scientific method.

Sober thinks that (i) requires two distinct types of cognition: practical cognition responsible for survival and non-adaptive cognition responsible for the scientific method.[186] If this assumption is right, then evolution did not select the rationality responsible for the scientific method. Sober rejects the assumption, and argues that even if (i) is true, it doesn't follow that cognition responsible for science does not emerge over evolutionary history.

In response to assumption (ii), Sober considers different inductive scenarios where each scenario holds equal potential for being selected. Consider the predicates "is green' and "is grue," where "grue" refers to "all emeralds are green before a time t and blue after t…" famously described by Nelson Goodman.[187] Goodman supports the truth of both predicates given our observation. But according to Sober, the former satisfies the principle of parsimony, and, thus, cognition yielding to simplicity would have been selected for.[188] Commenting on Sober's estimation of Goodman, Ruse states:

> The Proto-human who sat around worrying about grue may have been the better philosopher but it is doubtful that he or she was fitter in the Darwinian sense than the simple minded proto who was satisfied with thinking green.[189]

Cognition that delivers basic induction would be selected for depending on both its success and its simplicity. And because of this basic process, it would not be unusual for

[186] Sober, "The Evolution," 99.

[187] Nelson Goodman, *Fact, Fiction, and Forecast* (Cambridge, Mass: Harvard University Press, 1955).

[188] Sober, "The Evolution," 109.

[189] Ruse, *The Philosophy*, 142.

an enhanced faculty of induction responsible for science to emerge over the course of evolutionary history.[190]

The same argument for the evolution of induction applies to non-adaptive beliefs.[191] Non-adaptive beliefs are the product of cognitive capacities selected because of their success and their simplicity well before those non-adaptive beliefs are realized. According to Sober, then, practical cognition operating over time generates the non-adaptive rationality responsible for the scientific method.[192] If Sober is right, then the evolution of practiced naturalness is not logically impossible. Moreover, unless we possess some defeater for thinking otherwise, we should accept its plausibility. Therefore, we can support the second contention by appealing to both recent scientific

[190] See also Hilary Kornblith, *Inductive Inference and Its Natural Ground: An Essay in Naturalistic Epistemology* (Cambridge, MA: MIT Press, 1993), 91.This isn't describing an evolutionary argument for induction, but rather and evolutionary explanation for the origin of induction. W.V.O Quine already explains the problem with evolutionary arguments for induction, he says: "One part of the problem of induction, that part that asks why there should be regularities in nature at all, can, I think, be dismissed. That there are or have been regularities, for whatever reason, is an established fact of science; and we cannot ask better than that. Why there have been regularities is an obscure question, for it is hard to see what would count as an answer. What does make clear sense is this other part of the problem of induction: why does our innate subjective spacing of qualities accord so well with the functionally relevant groupings in nature as to make our inductions come out right? Why should our subjective spacing of qualities have a special purchase on nature and a lien on the future? There is some encouragement in Darwin. If people's innate spacing of qualities is a gene-linked trait, then the spacing that has made for the most successful inductions will have tended to predominate through natural selection. Creatures inveterately wrong in their inductions have a pathetic but praiseworthy tendency to die out before reproducing more of their kind." W.V.O Quine, *Ontological Relativity and Other Essays* (New York: Columbia University Press, 1969), 126-7. But Quine doesn't think this is an evolutionary argument to justify induction. In a later piece Quine clarifies his view: "I am not appealing to Darwinian biology to justify induction. This would be circular, since biological knowledge depends on induction. Rather, I am granting the efficacy of induction, and then observing that Darwinian biology, if true, helps explain why induction is as efficacious as it is." W.V.O. Quine, "The nature of natural knowledge," in *Mind and Language: Wolfson College Lectures* (Clarendon Press: Oxford, 1975),70.

[191] For the same application for abduction, see P. Carruthers, *Human Knowledge and Human Nature: A New Introduction to an Ancient Debate* (Oxford: Oxford University Press, 1992).

[192] Daniel Dennett makes a similar point, see *Darwin's Dangerous Idea: Evolution and the Meanings of Life* (New York: Simon and Schuster, 1995), 491. See also Steven Pinker's point, and one closely resembling this thesis, that overcoming our biological constraints in mathematics simply requires "hard work." Steven Pinker, "How the Mind Works," in *Philosophy after Darwin: Classic and Contemporary Readings*, ed. Michael Ruse (New Jersey: Princeton, 2009), 281.

theorizing as well as affirming its logical consistency in conjunction with a no-defeater clause.

C. The Scope Objection Revisited

With these details in place, consider again the Scope Objection to DE.

1. DE is plausible only if evolution supplied us with the natural cognitive capacities for achieving non-adaptive true beliefs.
2. Evolution did not supply us with the natural cognitive capacities for achieving non-adaptive true beliefs.
3. So, DE is implausible.

Why should we think that premise two is true? We possess a number of evolutionary explanations necessary for supplying the natural cognition for achieving non-adaptive true beliefs. In the very least premise true remains controversial. Indeed, suppose we grant Lewontin's skepticism that theories of cognitive evolution are beyond the scope of science, there are still viable philosophical reasons for rejecting premise two. It is not logically impossible and we possess no immediate defeater undermining the evolution of practiced naturalness. Thus, we have good reasons for rejecting the Scope Objection to DE.

Summary:

The evolution of practiced naturalness is not scientifically inexplicable and not logically impossible. Moreover, at present we possess no defeater for thinking otherwise. Conversely, all things considered, such an evolutionary story seems perfectly suitable for scientific conjecture and falsification. If this is right, then evolution may have provided the cognitive capacities for actualizing Aristotle's claim, since human cognition is the

product of a flexible and open behaviour program. Furthermore, the cognitive niche with which primates have evolved and the human dependency on advanced tools and technology provides a foundation for outsourcing theoretical beliefs. Our hominid ancestors were not bound by maturational limitations and perhaps overtime this provided the cognitive bedrock for overcoming common-sense biases and outsources non-adaptive beliefs.

III. Conclusion

In this chapter I examined two types of natural cognition, whereby one type is capable of overcoming the common-sense limitations of the other. I argued that we possess a wide range of scientific hypotheses supporting the evolution of practiced naturalness that may account for the rise of science and that such accounts are not logically incoherent. Moreover, it is difficult to find any substantial defeater claim undermining such evolutionary supporting strategies. Thus, the second premise of the Scope Objection is false and DE remains plausible.

Chapter 4

Objections, Responses and Conclusions

In this chapter I evaluate two objections to my solution to the Scope Objection. First, I revisit Plantinga's EAAN, focusing on the distinction between cognitive indicators and true belief. If Plantinga is right, then some theories of cognitive evolution amount to cognitive indication but not true belief. Second, I consider Lewontin's skepticism towards the theories of cognitive evolution. I argue that even if Lewontin is right, this does not undermine DE in the restricted sense. That is to say, if DE only seeks to substantiate cognitive reliability for producing truth, then Lewontin's skepticism is irrelevant to its plausibility.

I. Evolution, Cognitive Indication, and True Belief

I have been arguing that evolutionary processes would have been sufficient for explaining the reliability of human cognitive faculties. The most popular objection to this view is Plantinga's recent version of EAAN.[193] On the assumption that naturalism is true, Plantinga argues that evolutionary processes cannot account for the production of true belief. This is because the adaptability of human cognitive faculties is not contingent on forming true belief.

Critics undermine Plantinga's argument by describing cases where organisms display belief formation incurring adaptive behaviour. But Plantinga rejects this move because such accounts do not reflect propositional belief but cognitive indication; Plantinga states:

[193] This isn't quite right and has been stated a number of times already, but deserves a reminder. Plantinga's EAAN is not focused on the descriptive story of evolution and cognitive reliability, but rather on the implications for metaphysical naturalism. According to Plantinga, if one is a theist, then the descriptive story being told throughout this project is perfectly consistent with theism.

> Objection: consider a frog on a lily pad. A fly buzzes by; the frog's tongue flicks out and captures the fly. If this frog is to behave successfully, adaptively, there must be mechanisms in it that register the distance to the fly at each moment, its size, speed, direction, and so on. Aren't these mechanisms part of the frog's cognitive faculties? And don't they have to be accurate in order for the frog to behave adaptively? And isn't it therefore the case that the frog's cognitive mechanisms must be accurate, reliable, if the frog is to survive and reproduce?...Reply: that frog clearly does have "indicators", neural structures that receive input from the frog's sense organs, are correlated with the path of the insect as it flies past, and are connected with the frog's muscles in such a way that flicks out its tongue and captures that unfortunate fly…Now if we like, we can include these indicators under the rubric "cognitive faculties." The important point to see here, however, is that indication of this sort does not require belief. In particular, it does not require belief having to do with the state of affairs indicated; indeed it is entirely compatible with belief inconsistent with that state of affairs.[194]

Plantinga understands cognitive indicators to include processes allowing organisms to flee from predators, locate food, and find mates for reproduction. Indicators must function properly in mapping the environment for producing adaptive behaviour.

Theories of cognitive evolution depict organisms that respond to their environment in a similar way to Plantinga's frog and then relate this belief-forming process with the evolution of Homo sapiens. But if Plantinga is right, then this approach remains unsupported because it confuses two types of cognitive outputs: indication and belief content. In the least, proponents of DE must demonstrate a link between those processes responsible for cognitive indication with the formation of true beliefs.

Consider Griffiths' and Wilkins' argument in light of Plantinga's objection. GW argue that evolution would have selected cognitive faculties responsible for common-sense beliefs that track true states of affairs:

> Any plausible account of the evolution of these sorts of [common-sense] beliefs in humans and other animals will be of the kind described in this section. At the heart of that explanation will be the fact that animals can increase their fitness by

[194] Plantinga, *Where the Conflict*, 328.

> detecting states of affairs in the world and matching their actions to those states of affairs.[195]

If GW's argument assumes a type of cognitive indication, then their account fails to incorporate belief content. And by extension, their attempt to link common sense with non-adaptive belief becomes problematic. The implication is that the evolutionary process described by GW is not one illustrating a belief-forming mechanism but mere cognitive indication.[196]

Although GW's argument may succumb to Plantinga's objection, the theories of cognitive evolution outlined in chapter 3 avoid this conundrum. That is because they do not rely on a general conception of cognitive indication but rather postulate the evolution of reflective mechanisms with the potential for realizing non-adaptive beliefs. For example, Pinker's thesis includes the concept of cognitive indication, but also establishes a distinct thesis for analyzing non-adaptive belief: niche construction and metaphorical abstraction. Similarly, Sterelny's grades of "belief" include cognitive indication at the rudimentary level, but it is precisely the nature of decoupled representation that reveals something beyond mere indication. Finally, Popper's emergence of mind provides a complete break from cognitive indication. If Popper is right, then evolution may have supplied the emergence of a distinct set of faculties responsible for more reflective practice. Indeed, says Popper, these distinct faculties generate reflective awareness of counter-factual intuition. This account remains distinct from Plantinga's conception of cognitive indication.

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[195] Griffiths and Wilkins, "When do Evolutionary."

[196] Myron A. Penner raises an important distinction here between reflective and non-reflective outputs. Perhaps the necessary link situates within a type of dual process theory, whereby "cognitive indicators" are analogous to our non-reflective mechanisms. These mechanisms function as the bedrock for our non-reflective beliefs and their propositional content. If Penner is right, then this would salvage Griffiths' and Wilkins' argument from Plantinga's objection.

Although Plantinga's distinction between cognitive indication and belief content affects many types of supporting strategies – especially those theses focusing on common sense – the theories outlined in the previous chapter seem immune to this charge.

II. Lewontin's Skepticism

Lewontin has long been skeptical about the theories of cognitive evolution and considers the project untenable. If Lewontin is right, then we must remain agnostic about whether evolution supplied the cognitive capacities for achieving non-adaptive belief.

A. The Problem with Evolutionary Theories of Cognition

Lewontin's skepticism situates within a larger debate between evolutionary psychology and the non-adaptationist views of the late S.J Gould. Lewontin and Gould's article "The Spandrels of San Marco and the Panglossian Paradigm" rejects a strict adaptationist paradigm concerning evolutionary theory.[197] They argue that many evolved traits are spandrels (by-products) existing as necessities of other adaptive features. It is in this context that Lewontin takes aim at evolutionary psychology and theories of cognitive evolution, suggesting that such accounts fail to satisfy the demands of "real" science.[198]

Lewontin claims that we are missing essential clues within the fossil record for hypothesizing about cognitive evolution. Furthermore, even if scientists possessed the

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[197] Also see the sociobiology of E.O Wilson. For a response to Gould and Lewontin, see Steven Pinker and P. Bloom, "Natural Language and Natural Selection," 707-784; Pinker, *How the mind*, chapter 3; Steven Pinker, "Evolutionary Psychology: An Exchange," *The New York Review*, October 9, (1997): 55-6. See also Richard Dawkins, *The Blind Watchmaker* (Norton: 1986); and D. Queller, "The Spandrels of St. Marx and the Panglossian Paradox: A Critique of a Rhetorical Programme," *Quarterly Review of Biology*, Vol. 70 (1995): 485-48. See Gould's response to Pinker's criticisms, S.J Gould, "Evolutionary Psychology: An Exchange," *The New York Review*, October 9, (1997).

[198] See also Williams, G. C., 1966, *Adaptation and Natural Selection* (Princeton: Princeton University Press); Michael Balter, "How Human Intelligence Evolved – Is it Science or 'Paleofantasy'?" *Science* 319 [5866]: 1028, accessed October 27 2013, http://www.sciencemag.org/cgi/content/full/319/5866/1028a.; see also James Randerson's review of Lewontin's speech, "We Know Nothing About Brain Evolution," *Guardian, a*ccessed October 27, 2013, http://www.theguardian.com/science/blog/2008/feb/19/thedistinguishedbiologistpr.

necessary fossils for reconstructing the relevant traits for inferring about the evolution of human faculties, the fossils remain difficult (perhaps impossible) to interpret in the right way. Thus, Lewontin considers the task of reconstructing cognitive evolution near impossible, and avoids "hypothesizing" in this way since these claims are beyond verification.[199] Even if these theories reflect reality, Lewontin argues that at best they remain "Just so" stories beyond evidential support.

If Lewontin is right, then knowledge about whether evolution supplied the cognitive capacities for achieving non-adaptive beliefs remains inscrutable. That is, we can neither affirm nor deny the second premise of the Scope Objection. What follows from this skepticism, if anything? Provided that we have overcome Plantinga's objection, DE remains immune to this charge. As Lewontin admits, it is trivial that evolution had some bearing on human cognition, only that we lack knowledge about the process.[200] But if we have good reasons for thinking that humans evolved by evolutionary processes, then presumably human faculties were included in the process. Indeed, perhaps non-adaptive beliefs are epistemic flukes, piggybacking off some other adaptive faculties. A non-adaptive process of this sort would still generate reliable faculties. Exactly what type of argument – save Plantinga's – supports the second premise or even undermines objections to it? Nagel just concedes the possibility of evolved practiced naturalness and then proceeds to consider another objection. In other words, it seems prima facie that we

[199] Lewontin, "The Evolution," 129; Michael Bradie raises a similar concern, see his introduction to evolutionary epistemology and the EEM program; see Michael Bradie and William Harms, "Evolutionary Epistemology," in *The Stanford Encyclopedia of Philosophy*, accessed December 12, 2013. http://plato.stanford.edu/archives/win2012/entries/epistemology-evolutionary/.

[200] Lewontin, "The Evolution."

should reject premise two until some undercutting defeater presents itself. Skepticism towards premise two does not imply that the premise is true.

Summary:

Plantinga distinguishes between cognitive indication and belief content. Assuming that Plantinga is right about this distinction, proponents of DE must postulate the evolution of cognitive devices responsible for belief-formation in a more reflective sense and not indicator outputs akin to common sense.

Lewontin remains skeptical about theories of cognitive evolution, considering these hypotheses to be "Just so" stories beyond evidential scope. Thus, if Lewontin is right, knowledge of premise two of the Scope Objection remains inscrutable. This problem can be resolved provided we restrict DE to include only cognitive reliability for producing true belief and not justification.

III. Conclusions and Problems for Further Thought

DE is controversial, creating divergence between proponents of ESAs and EDAs. Some biologists and philosophers argue that evolutionary processes would have included the formation of reliable faculties, while others contend that evolution precludes reliability. Moreover, it is unclear how DE and epistemic justification coincide. For the present purpose, the only priority has been to focus on the implications of evolution for cognitive reliability and not justification. By restricting DE as such, I'm confident that it overcomes the Scope Objection.

Overcoming the Scope Objection first requires nuancing the term "natural" to distinguish between two types of natural cognition. Humans possess maturational natural capacities responsible for common-sense beliefs. These capacities operate well within

their respective domain, but generate false beliefs beyond the scope of their design. We also possess practiced natural capacities. These capacities enable us to generate non-adaptive beliefs, provided we apply the right tools and training.

The second requirement for overcoming the Scope Objection must ground practiced naturalness within evolutionary theory. One must demonstrate how evolutionary processes supplied practiced natural cognition and skills. Here we possess a wide range of scientific and philosophical theses that demonstrate the evolution of practiced naturalness responsible for the rise of science. From this premise it seems plausible that evolution supplied cognitive capacities for non-adaptive beliefs more generally, including systematic theories of epistemology.

The obvious problem with the current project is that a restriction on DE such that one precludes justification undermines the main focus of epistemology. The history of inquiring into knowledge and rational belief centers on epistemic justification. If DE includes the concept of justification, then overcoming the Scope Objection may be more difficult. In any event, proponents of DE must begin postulating ways to overcome Scope Objections pertaining to evolutionary justification and not just speculating into evolutionary accounts supporting cognitive reliability.

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