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Scientific Explanation and the Philosophy of Persuasion: Understanding Rhetoric through Scientific Principles and Mechanisms

Catalin Constantin Mitelut

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Scientific Explanation and the Philosophy of
Persuasion: Understanding Rhetoric through
Scientific Principles and Mechanisms

by

Catalin Constantin Mitelut

A Thesis
Submitted to the Faculty of Graduate Studies
through Philosophy
in Partial Fulfillment of the Requirements for
the Degree of Master of Arts at the
University of Windsor

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2012

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ABSTRACT

This thesis explores the issue of whether Aristotle's *Rhetoric* is consistent with the principles and tools of contemporary science. The approach is to review Aristotle's *Rhetoric* (along with several modernizing ideas) in light of explanatory mechanisms from psychology, biology, cognitive science and neuroscience. The thesis begins by reviewing Aristotle's *Rhetoric* and modern rhetorical contributions from Chaim Perelman and Christopher Tindale. A discussion of several psychological principles of reasoning and their relevance to philosophical rhetoric follows. Next, a computational cognitive science framework on emotions and cognition and its applicability to rhetoric is provided, followed by a discussion from principles of evolutionary biology on language evolution and morality and their relevance to rhetoric. The thesis concludes with a brief discussion of rhetorical ideas relative to the neuroanatomy of deductive and inductive reasoning and relative to a view of morality founded on brain neurochemistry.

DEDICATION

This work is dedicated to my wife, Rebecca Shaw for the help and support provided through the years including many sleepless nights endured staring at the light of my computer and lamp where I sat working to meet self-imposed deadlines. Thank you for coming on this journey; I hope you will let me do it again... but, hopefully, not too soon.

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CHAPTER I

INTRODUCTION

It is extremely limiting to consider thought to reside purely inside the head. You have become smart by literally extending your thoughts out into the world. (Quartz and Sejnowski 2010, 235)

The study of how human beings make decisions, reason, persuade one another and decide moral questions is as old as western philosophy itself. In western philosophy, Plato framed many of these issues as clashes between desire and reason and argued they corresponded to separate elements of the mind. Two thousand years later, Rene Descartes defended the primacy of reason, the irreducibility of the mind and the independence of true knowledge from the empirical world. Even David Hume's empiricism was consistent with mind-body duality and his idea that we cannot infer moral "oughts" from empirical facts remains a guiding principle for modern theories on morality.

Since the early 20th century, however, scientific research into the nature of reasoning, social interactions and the human brain has challenged many of the ancient and even some modern philosophical doctrines on the mind, reasoning and morality. Plato's notion that emotion and reason are separate is challenged by many cognitive science experiments which establish emotions as necessary for human reasoning; that the mind is irreducible to the body is challenged as more and more cognition is explained in terms of controlled, automatic and unconscious brain processes; and the Humean idea that moral rules cannot be inferred from descriptions of facts is in doubt as some scientists view moral

behaviours as adaptations of social behaviour rather than inborn guiding principles or absolute social rules.

Not all scientific findings challenge ancient or modern philosophical doctrines, however. Among philosophers, some of Aristotle's works – which are over 2300 years old – have received significant attention from the scientific community of the 20th century. Aristotle was not only a great systematizer of the scientific and philosophical thought of his time, writing extensively on many topics, but he employed a systematic approach that largely maintained a consistent infrastructure across topics. In particular, Aristotle's writings on morality maintain a consistency with other writings linking the former to his biological ideas on parent-child relationships and to his political writings on the relationship between the society and the individual. Some contemporary writers, such as political scientist Larry Arnhart, view Aristotle's works on morality as consistent with biology which was important "for all of his philosophic writing. ... for Aristotle, as Stephen Salkever has said, 'ethics and politics are in a way biological sciences.'" (Arnhart 2007, 1). Other contemporary scientists including pioneer neuroscientists Patricia Churchland, Steven R. Quartz and Terrence J. Sejnowski, have gone even further and stated that Aristotle's works on morality are compatible with contemporary scientific understandings of human and societal evolution which place ecology and culture at the centre of moral behaviour.

Thesis Statement

The idea explored in this thesis is centred on the notion of cross-disciplinary consistency between Aristotle's writings and modern science. In particular, this thesis explores the issue of whether one aspect of Aristotle's philosophy, i.e. his *Rhetoric*, which provides a practical methodology for Aristotle's morality, is consistent with – and can be understood in – the language of the contemporary sciences. It is an attempt to determine the validity, meaning and future of Aristotle's practical methodology for morality – rhetoric – in light of contemporary psychological and biological frameworks.

Aristotle presented the *Rhetoric* as practical knowledge (as opposed to theoretical, e.g. mathematical, knowledge) for uncovering non-deductive “means of persuasion” (Aristotle 1984, 1355b27) in legal, political and ceremonial practices and activities. Rhetoric was about discovering the moral. It allowed us “...to say which is the greater or lesser good, the greater or lesser act of justice or injustice; and so on.” (Aristotle 1984, 1355a24-26)¹ and Aristotle described the methods for uncovering morality as dependent on the arguers (and their abilities), audiences, emotions, trust and (social) character, and other elements.

The aim of this work is to take the elements and methods of *Rhetoric* (along with a few updates from modern rhetoricians) and attempt to validate and explain them in the language of modern science. The thesis of this work is that modern biological disciplines do validate many principles of Aristotelian rhetoric.

¹ Aristotle also sees the good as achievable through rational and wise action, not via random luck or lack of choice. “Now we call ‘good’... that at which all things aim; what they would choose if they could acquire understanding and practical wisdom;” See Aristotle 1984, 1363a.15.

provide explanatory mechanisms for elements of rhetoric and can guide future philosophical and scientific inquiry into rhetorical theory.² The thesis proceeds by identifying explanatory mechanisms from modern sciences (e.g. *how* emotion works biologically) and applying them to rhetorical principles (e.g. appeals to emotion) seeking validity, explanation and a direction for future inquiries.

The Chapter Layout

The methodology of this work is to first review Aristotle's theory of rhetoric (along with modern updates), to present ideas and theories from the disciplines of psychology, cognitive science, biology and neuroscience and to discuss rhetorical theory in light of such disciplines. The thesis is divided into seven chapters (including this introductory chapter) as outlined below with each of the Chapters III to VI containing descriptive and analytical sections.

Chapter II reviews Aristotle's theory of rhetorical argumentation. The first section discusses Aristotle's *Rhetoric* and some of his writings on morality. The second section summarizes Chaim Perelman and Olbrechts-Tyteca's legal-based model of rhetorical argumentation with a focus on novel concepts such as audience, regression and inertia. The third section reviews Christopher Tindale's contemporary theory of rhetoric and his focus on cooperation and invitationism.

² An in-depth analysis of the meaning of "mechanistic explanations" presented in this thesis is beyond the scope of this thesis. For an in depth discussion about the meaning of mechanistic explanation in science, see Machamer, P., Darden, L., & Craver, C. F. (2000), "Thinking about mechanisms", *Philosophy of Science*, Vol 67, pp 1-25. And for an updated discussion of "mechanism" considering dynamical, non-linear neural processes see Bechtel, W. "Understanding Endogenously Active Mechanisms: A Scientific and Philosophical Challenge", *European Journal for Philosophy of Science*, May 2012, Volume 2, Issue 2, pp 233-248.

Chapter III is a selective discussion of several psychological theories dealing with the topics of persuasion, reasoning and emotions among others. The first section discusses Persuasion Theory – an experimental and theoretical field of psychology which in many ways directly tested ideas from philosophical rhetoric. The second section introduces dual process theories of reasoning and discusses their application to rhetoric through the Argumentation Theory of Reasoning of Hugo Mercier and Dan Sperber as well as Paul Thagard's work on inferences. The last section discusses some of Jonathan Haidt's work on emotions, groupishness and supersociality.

Chapter IV is an introduction to the computational cognitive science framework as presented by Paul Thagard. Thagard's argument for the need to engage the cognitive science framework in inquiries about argumentation is reviewed along with his "reconceptualization" of cognition and emotional mental processes as maximal coherence processes. The chapter concludes with a discussion of how Thagard's work may validate rhetorical ideas.

Chapter V is a selective discussion of ideas from evolutionary biology and theories on language and brain evolution and development. The first section briefly reviews the arguments of evolutionary anthropologist Mark Pagel on the evolution of language acquisition, development and propagation in human societies. The second section discusses the evolutionary biology of the brain through Steven R. Quartz and Terrence J. Sejnowski's "cultural biology" theory. Their "externalization" hypothesis is discussed along with a short summary of their evolutionist arguments for the development of the self, society and social

behaviour. Chapter four ends with a discussion of how evolutionary biology can validate aspects of rhetoric.

Chapter VI is a discussion of the work of two neuroscience researchers. In the first section, Vinod Goel's research on the neuroanatomy of deductive and inductive reasoning is discussed. Goel's findings and his theoretical framework are presented in a final section discussing validation as well as implications for philosophical rhetoric. Next, Patricia Churchland's attachment theory of morality is discussed with a focus on the extension of self-care and caring for kin to others. The section ends with a discussion of how Churchland's theories on social behaviour could validate normative aspects of rhetoric.

The final chapter provides a summary of chapters two through six. The chapter concludes with a discussion on future directions for inquiry.

CHAPTER II

RHETORIC AS A PHILOSOPHY OF PERSUASION

Rhetoric may be defined as the faculty of observing in any given case the available means of persuasion. (Aristotle 1984, 1355b27)

The aim of this chapter is to review Aristotle's theory of rhetoric and modern updates to the theory from Chaim Perelman and Christopher Tindale. The focus is on presenting rhetoric as a descriptive and normative theory of persuasion which manifests through individual characteristics and abilities (e.g. emotions) and social structures (e.g. the good, happiness as socially defined). The chapter contains five sections. The first section will provide a very brief overview of Aristotle's philosophy. Next, Books I, II and III of Aristotle's *Rhetoric* are summarized by outlining the key elements and methods of rhetorical theory. The third section reviews Perelman's ideas on rhetoric including his ideas of "audience", rhetoric as "regression" and "inertia". The fourth section reviews Tindale's work which defends rhetoric as the most comprehensive theory of argumentation, incorporates scientific notions of emotion, and defends the partial transformation of rhetoric into a cooperative and communicative endeavour. A section summarizing the discussion concludes the chapter.

Aristotle's Philosophy

Aristotle's philosophy can be difficult to present comprehensively and fairly in any work on the subject, let alone in this narrowly focused inquiry. Aristotle's

works encompass metaphysics, scientific disciplines such as biology and physics, logic, and ethical, political and aesthetic theories. Yet, Aristotle employed a systematic approach which aimed at maintaining a consistent infrastructure across topics and understanding individual topics – such as *Rhetoric*, for example – requires comprehensive, rather than topical, knowledge of Aristotle’s works. Simply put, seeking to summarize the *Rhetoric* without a general understanding of Aristotle’s philosophy is difficult and can be misleading.

Aristotle’s philosophy is generally divided into works on theoretical (*sophia*) and practical (*phronesis*) knowledge with rhetoric being a type of practical knowledge. Aristotle’s theory of rhetoric is mostly found in his *Rhetoric* which contains three books. There he presents rhetoric as a method for observing and understanding “human persuasion” in political, legal and ceremonial discourse. Rhetoric is a method for achieving persuasion in situations of uncertainty, where opinion is central and where we cannot solely rely on logical relationships (a point discussed in Aristotle’s *Posterior Analytics*) or on stringent procedures and complex knowledge or premises (e.g. arguments between biologists, discussed in Aristotle’s *Topics*).

Because of the context of rhetoric, normative concepts such as “happiness”, “virtue” and the “good” – primarily discussed by Aristotle in other works – inevitably arise within Aristotle’s *Rhetoric*. *Eudaimonia* – human flourishing or happiness – is defined as the highest good requiring a balanced approach to wealth and pleasure, among others, while not being reducible to either. Reason is at the root of happiness as human life is best lived “in

accordance with reason” (Aristotle 1984, 1094a22–27) and happiness is rational activity executed excellently. Excellence is a state that draws praise for one’s actions (Aristotle 1984, 1105b20–1106a13), rather than praise for inherited faculties (such as health) or states (such as wealth). Lastly, Aristotle viewed the social organization of the city (*polis*) – with its developed institutions – as central to human happiness and fulfillment and for the promotion and protection of the good: the city originates “in the bare needs of life, and continuing in existence for the sake of a good life” (Aristotle 1984, 1098a16–17); and the city guards against the savagery of human nature while allowing us to flourish and not be “separated from law and justice” (Aristotle 1984, 1253a31).

Aristotle’s Rhetoric

Aristotle’s method for expounding the elements and principles of rhetoric was to present *phainomena* (experiences) and enumerate commonly held *endoxa* (reputable or credible opinions or entrenched or common beliefs about the experiences) and then engage in a rigorous analysis of both; he thus turned Platonic skepticism on its head: as there is no evidence that our senses systematically mislead us, we can assume most sense experience is a true representation of the world and a good starting point for inquiries into practical knowledge. Knowledge of rhetoric is thus gained by studying and codifying the best rhetorical practices in the contexts of legal, political and ceremonial persuasion activities.

In the following three subsections, Books I, II and III of the *Rhetoric* are summarized. From Book I various definitions of rhetoric are provided along with a discussion of the context of rhetoric, the role of the audience and the speaker, and a brief review of how the “good” and cultural and societal norms are involved in good rhetoric. From Book II a taxonomy of emotions (*pathé*), types of character (*ethos*) and methods of presentation (*logics*) for persuasion is provided. And from Book III Aristotle’s discussion of arrangements of speech, tone, order of arguments, use of metaphors and rhythm and style are reviewed.

Rhetoric: Book I

Aristotle begins Book I of the *Rhetoric* by describing the context of rhetoric: “all men make use” of rhetoric as a method of persuasion in non-specialized fields such as politics, judicial proceedings and ceremonies (Aristotle 1984, 1354a3). The audience of rhetorical argumentation is ordinary people “who cannot take in at a glance a complicated argument, or follow a long chain of reasoning” while the subjects are “question[s] of right conduct, natural science, politics, and many other things that have nothing to do with one another.”

(Aristotle 1984, 1357a4-7)

Although unlimited in scope of context, the normative aim of rhetorical practice is “not simply to succeed in persuading, but rather to discover the means of coming as near such success” (Aristotle 1984, 1355b8-9) as possible. But the principles of rhetoric are morally neutral and do not favour any particular premises or doctrines. Rhetorical persuasion simply aims at “demonstration”

which is usually achieved by relying on the “enthymeme, [which is] a sort of deduction” (Aristotle 1984, 1355a6), but even appeals to logic (i.e. deduction) and examples (similar to induction) are common. Just as important, in the practice of demonstration, the rhetorician can also appeal to the character of a person in question (*ethos*) and the emotions of the audience (*pathos*).

Rhetoric has normative goals such as identifying moral behaviour within the realms of law, politics and ceremony: it allows us “...to say which is the greater or lesser good, the greater or lesser act of justice or injustice; and so on.” (Aristotle 1984, 1355a24-26)³ This is important as for Aristotle, unlike for Plato and some other philosophers, we are not born knowing the good – or moral virtues; rather, the good is learned through practice and practical knowledge.

“Happiness” appears in the early chapters of the *Rhetoric* “...every individual man and all men in common aim at a certain end which ... is happiness and its constituents.” (Aristotle 1984, 1360b4-5) Aristotle imports this definition to indicate that good arguers must know the “ends” that different audiences may seek: “...prosperity combined with virtue; or as independence of life; or as the secure enjoyment of the maximum of pleasure; or as a good condition of property and body, together with the power of guarding one’s property and body and making use of them.” (Aristotle 1984, 1360b14-17) And “...lovers of victory make for victory, lovers of honour for honour, money-loving men for money, and so with the rest. These then are the sources from which we

³ Aristotle also sees the good as achievable through practical wisdom, not random luck or choice. “Now we call ‘good’... that at which all things aim; what they would choose if they could acquire understanding and practical wisdom;”. See Aristotle (1984), 1363a.15.

must derive our means of persuasion about Good and Utility” (Aristotle, 1984, 1363b1-3).

The *good*, in many – but not all – instances, is discussed normatively as a social activity, for example: “it is really the activity – that is, the use – of property that constitutes wealth” (Aristotle 1984, 1361a24-15). And individual good requires a rational act – a reasoned choice – by the individual: “[e]xercise is a greater good than physical well-being”, while social goods are greater than material ones; “[l]ove of friends is more honourable than love of money” (Aristotle 1984, 1364b.1).

Good rhetoricians understand the cultural norms of the hearers and appeal to those norms:

The most important and effective qualification for success in persuading audiences ...is to understand all the forms of government and to discriminate their respective customs, institutions, and interests. For all men are persuaded by considerations of their interests, and their interest lies in the maintenance of the established order. (Aristotle 1984, 1365b22-24)

Social norms are thus fundamental to Aristotle’s conception of good rhetoric, and they should be understood within his theory of the “good” – or moral behaviour.

Rhetoric: Book II

In Book I, Aristotle argued that appropriate appeals to character and goodwill are helpful in persuading. In Book II, he provides a comprehensive taxonomy of character types, emotions and the types of logics encountered in good rhetoric.

Good rhetoricians appeal to emotion to put “hearers ... in the right frame of mind” (Aristotle 1984, 1377b25). They know that “... emotions are all those feelings that so change men as to affect their judgments, and that are also attended by pain or pleasure. Such are anger, pity, fear and the like, with their opposites” (Aristotle, 1984, 1378a.20)⁴ Thus both “[g]oodwill and friendliness of disposition must form part of our discussion of the emotions” (Aristotle 1984, 1378a.19-20). Aristotle offers many examples of circumstances where emotions such as anger, calmness, friendship and enmity, fear, shame, kindness, pity, indignation, envy and emulation are significant factors leading to persuasion.

On the topic of character, Aristotle points out that a good speaker adapts both the speech and the speaker’s character to characteristics that the audience likes. “... [I]t adds much to an orator’s influence that his own character should look right and that he should be thought to entertain the right feelings towards his hearers” (Aristotle 1984, 1377b.26-29). However, it is important to recognize that different audiences are receptive to different character type appeals. Thus, young audiences are passionate and have “yet witnessed many instances of wickedness”; elderly audiences are more cynical, e.g. “life on the whole is a bad business” (Aristotle 1984, 1389b.15), and are guided by reasoning more often than passions; audiences of noble birth are ambitious, though some well-born are “poor creatures”; politically powerful audiences are ambitious, tough,

⁴ See also 1377b.31 “When people are feeling friendly and placable, they think one sort of thing; when they are feeling angry or hostile, they think either something totally different or the same thing with a different intensity: when they feel friendly to the man who comes before them for judgment, they regard him as having done little wrong, in any; when they feel hostile, they take the opposite view. ...”

responsible and more dignified; they are also pious and understand that “they live because of events which are really the result of chance” (Aristotle 1984, 1391a.1).

Aristotle presented two main logics – or forms – of rhetorical argument: “example and enthymeme” (Aristotle 1984, 1393a.23-25). The “argument by example, ... has the nature of induction, which is the foundation of reasoning.” (Aristotle 1984, 1393a.25) It is a reference to past facts, invention of ideas (perhaps argument by analogy), and appeals to fables which are suitable for addressing popular assemblies. Maxims, or proverbs, are short statements of a general kind about practical conduct and work better (more appropriately) on elder men and to deal with subjects in which the speaker is experienced.

The enthymeme on the other hand, is a deduction “in some sense” and is used by appealing to well understood facts and aims at proof or demonstration of a proposition. Among many examples of good enthymemes, Aristotle refers to understanding differences between causality and correlation, proof by contradiction, probability arguments, induction and knowing how to rely on the precedent of the wise. Other enthymemic principles described are: avoiding fallacious arguments, i.e. those that appear valid but are not, confusing the meaning of words with the same spelling but different meaning, i.e. homonyms, and learning how indignant language describing a wrongful act can lead the audience to associate the language with the act. Aristotle concludes that because enthymemes are based on probabilities, examples, evidence and signs,

their refutation requires proof of unlikeliness or establishing negative instances, not establishing logical invalidity (Aristotle 1984, 1402b.15).

Rhetoric: Book III

Still, the whole business of rhetoric being concerned with appearances, we must pay attention to the subject of delivery, unworthy though it is, because we cannot do without it. (Aristotle 1984, 1404a)

Book III of the *Rhetoric* discusses the method of delivery – how to “say” the argument: tone of voice, type of language used and rhythm, as well as arrangement of speech: style, visualization and use of metaphors.

Delivery is important for rhetoric and Aristotle refers to the prose of good poets. Good rhetoricians recognize “the defects of [the] hearers” and use common language as “[p]eople do not feel towards strangers as they do towards their own countrymen, and the same thing is true of their feeling for language” (Aristotle 1984, 1404b.10). It is also important to disguise the art of rhetoric because “[n]aturalness is persuasive” and to make appropriate use of metaphor and simile (visualization strategies). Using audience specific language is important as “[e]ach class of men, each type of disposition, will have its own appropriate way of letting the truth appear...” (Aristotle 1984, 1408a.30).

Speaking at (political) public assemblies is similar to painting a scene and is different from speaking to juries in legal proceedings which is more formal, and different from speaking at ceremonies which is meant to be well composed (written). Aristotle points out that the only necessary parts of rhetorical

arguments are the statement of the case and the argument; everything else is up to the arguer who must make judicious use of introductions and epilogues and must keep a happy balance between rapidity of delivery and conciseness.

Conclusion

Aristotle's *Rhetoric* is a tool - a productive science, i.e. one which creates useful objects, namely arguments – to be employed in practical situations by ordinary arguers. As a tool, rhetoric is crucially important in deciding questions of morality, justice and resolving many other non-deductive inquiries. Rhetoric is an inherently social practice: its goal is not to uncover *a priori* truths about the world, but world-grounded guides for actions in situations of uncertainty through an appropriate exchange of opinion between the arguer and the audience.

Aristotle's rhetoric was considered a principal theory of non-deductive argumentation for over 2,000 years. Chaim Perelman, a 20th century philosopher, wrote what is considered the modern update to Aristotle's rhetoric. His works are discussed next with a focus on his novel and modernizing ideas.

Perelman and Olbrechts-Tyteca's *New Rhetoric*

In the same way, the theory of argumentation cannot be developed if every proof is conceived of as a reduction to the self-evident. ... It is good practice not to confuse, at the beginning, those aspects of reasoning relative to truth and those relative to adherence, but to study them separately, even though we might have to examine later their possible interference or correspondence. Only on this condition is it possible to develop a theory of argumentation with any philosophical scope. (Perelman 1969, 4)

In the current chapter, Chaim Perelman's philosophy is reviewed with a focus on his notion of rhetoric as regressive philosophy, universal and particular audiences and inertia. Perelman's 1958/1969 *New Rhetoric: A Treatise on Rhetorical Argumentation*, co-written with Lucie Olbrechts-Tyteca, is a modern version of Aristotle's *Rhetoric* and reflects Perelman's larger philosophical project of founding a philosophy of value judgments to be applied in philosophy, law, politics and ethics. Perelman sought to describe a metaphysics-free philosophy of rhetoric which "opposes progressive knowledge to perfect knowledge, it opposes dialectical knowledge to dogmatic knowledge" (Gross and Dearin 2003, 203); the goal is to define the *reasonable* which results from the "web formed from all the arguments and all the reasons that combine to achieve the desired result" (Gross & Dearin 2003, 45).

One of Perelman's contributions to rhetoric was to describe it as a type of "regressive" philosophy which "considers its axioms, its criteria, and its rules as resulting from a factual situation, and it gives them a validity measured by verifiable facts" (Gross & Dearin 2010, 191). Thus, both the axioms and rules of a rhetorical practice are defensible via rhetoric and the goal of rhetorical interactions is agreement – or adherence – by the audience with "the status of knowledge [is ascribed] to a tested opinion, an opinion, that is, which has survived all objections and criticisms and with regard to which we have a certain confidence, though no certainty, that it will resist all such future attacks" (Perelman 1963, 117).

Another one of Perelman's contributions to rhetoric was the recentering of rhetorical theory around the audience; rhetoric was about "securing the adherence of those to whom it is addressed, it is, in its entirety, relative to the audience to be influenced" (Perelman 1969, 19). Perelman viewed the audience as having particular and universal characteristics, and the rhetorician had to know how to appeal to both. The universal audience was better at considering facts, truths and presumptions such as in scientific or philosophical arguments, although "[e]ach individual, each culture, has thus its own conception of the universal audience" (Perelman 1969, 33); and the particular audience embodied values appealed to in areas of public or political speech where a transformation or reinforcement of values was sought.

In Chapter 27 of the *New Rhetoric*, which considers the acceptability of premises in arguments, Perelman introduces the concept of "inertia". The concept is similar to that of inertia in physics – resistance to change in motion – but is described as: (i) psychological resistance to change within the audience's mind; and (ii) as cultural resistance to change within society:

In most cases, however, a speaker has no firmer support for his presumptions than psychological and social "inertia" which are the equivalents in consciousness and society of the inertia of physics. It can be presumed, failing proof to the contrary, that the attitude previously adopted - the opinion expressed, the behavior preferred - will continue in the future, either from a desire for coherency or from force of habit. (Perelman 1969, 105-106)

Perelman's inertia is a mechanism⁵ that conceptually explains why some premises (beliefs) can have more individual and social value given Perelman's philosophy that no axiom (of philosophy or otherwise) is sufficiently self-evident to not require reasoning to justify its truth or acceptability. Inertia gives certain premises in law and science precedent and privilege: "[t]he technique of the closed case aims at stabilizing certain judgments, at preventing certain decisions from being discussed anew. In science certain propositions are set apart and qualified as axioms and are thus explicitly granted a privileged position within the system: an axiom cannot then be revised except by an equally explicit repudiation;" (Perelman 1969, 105). Inertia is "the basis of the stability of our spiritual and social life" (Perelman 1979, 131) and inertia provides a basis for the initial engagement in rational argumentation. Inertia is even present in indoctrination: "[a]s a rule, the formality surrounding the promulgation of certain texts and the pronouncement of certain words aims at making it more difficult to repudiate them and at increasing social confidence" (Perelman 1969, 105). Perelman argues that "inertia" functions via a socio-cultural mechanism giving "tradition" significant psychological and social 'weight' in rhetorical practices:

The fact is, the rule of justice results from a tendency, natural to the human mind to regard as normal and rational, and so requiring no supplementary justification, a course of behaviour in conformity with precedent. In any social order, then, everything that is traditional will appear to be a matter of course. Per contra every deviation, every change, will have to be justified. This situation, which results from the application of the principle of inertia in the life of the mind, explains the role played by tradition. It is tradition that is taken as a starting-point, it is tradition that is

⁵ Chapter VI contains a suggestion by P. Churchland on how inertia may work neurologically.

criticised and it is tradition that is maintained in so far as no reason is seen for departing from it. And this holds good in the most diverse fields – ethics or law, science or philosophy. (Perelman 1969, 86)

In sum, for Perelman rhetoric seeks the agreement of an audience with particular and universal characteristics (rather than seeking absolute truths); is, in many fields, *the* mode of seeking truth (as a regressive philosophy); and explains how social traditions and psychical phenomena (i.e. inertia) have preferential value but can be overcome. Christopher Tindale, whose works are discussed next, argues that rhetoric should be the primary theory of argumentation, subsuming logic and dialectic, and that rhetoric should be viewed – in part – as a mode of communication and cooperation.

Tindale's Contemporary Theory of Rhetoric

A theory of argumentation and its associated notion of reasonableness should contribute to the development of the idea of the human, facilitate an environment in which it can flourish, and promote ends that connect the threads of that project. (Tindale 1999, 202).

Christopher Tindale, a contemporary argumentation theorist, follows in the line of Aristotle and Perelman. Tindale's project is to make rhetoric *the* central philosophy of argumentation containing the most comprehensive ideas informed by all aspects of persuasion and which is directed by larger humanist goals. In the current section Tindale's work on rhetoric as outlined in *Acts of Arguing* (1999) and several other articles is discussed. The focus is on Tindale's notion of rhetoric as a comprehensive theory of argumentation, as a mode of communication and cooperation and as a way to improve one's mind.

Part of Tindale's project is to develop rhetoric into *the* most comprehensive and sound theory of argumentation: "[a] rhetorical model of argumentation offers the most complete and satisfying account of what argument is, of what it is like to be engaged in argumentation, to be argued to, and to evaluate arguments." (Tindale 1999, 7) Tindale adds many nuances to Aristotle and Perelman's theories of rhetoric. Tindale argues for a pluralistic form of "rationality": where the "rhetorical mode of argumentation ... endorses ... a universal human rationality that takes different forms depending on circumstances; according to culture, religion, race class, education and sex/gender" (Tindale 1999, 207). And he argues for a coherence theory of truth where what matters to truth – what has the value of truth – is the coherence of beliefs rather than their correspondence with an *objective* reality.

Tindale further expands rhetoric to include aspects of interpretation: considering the context – time, culture, etc. – of an argument is necessary in understanding its potential persuasiveness on an intended audience. And he even suggests that in some instances arguers are primarily communicators and that communication can take place in many forms: body language, facial cues, etc. He references postmodernist and feminist rejections of the notion of successful argumentation as the achievement of adherence "at any cost" and argues that argumentation should be a mode of cooperation. Communication practices, such as argumentation, should thus aim at creating atmospheres where an audience that is ready to be persuaded can be so persuaded.

Invitational rhetoric is suggested as an alternative mode of persuasion: as a cooperative venture where position determination and advancement are sought.

Tindale elucidates the potential of rhetoric as a theory which expands the notion of “reason” to include emotions, to stress circumstances and justify appeals to character, to endorse a wider model of relevance and of acceptability, and to avoid defining “argumentation” in exclusionary ways. Tindale’s position is that in some circumstances empathy, listening and understanding may even supersede adherence as the primary goals of the rhetorical activity.

Tindale’s conception of rhetoric is ultimately much broader and more inclusive than both Aristotle and Perelman’s while still being an extension of both. Tindale defines argumentation as “the site of an activity, where reasons are given and appraised, where beliefs are recognized and justified, and where personal development is encouraged” (Tindale 1999, 1). For Tindale the creation and strengthening of the adherence of the audience remains the primary goal of rhetorical argumentation. But he suggests that because argumentation has additional functions which affect the social world, cooperation, communication and the improvement of minds are (at least) a collateral goal. Thus, non-deductive argumentation can be thought of as “a cooperative venture, intended to involve both arguer and audience in its development and outcome” (Tindale 1999, 69) with the audience actively involved in promoting its own thesis. In fact, Tindale goes further to suggest that in argumentation practices the “audience is given the opportunity to complete the argumentation and to evaluate arguments in terms of the reasoning involved” (Tindale 1999, 17).

Perelman saw rhetoric as the theory that could establish the logical foundations of value judgments as well as the foundations of a theory of justice and a theory of knowledge. In several respects, Tindale goes further and suggests that argumentation could be a humanistic practice in which the desire to achieve audience adherence is constantly balanced with empathy, effective communication and position determination, inclusiveness and growth.

Conclusion

Aristotle's theory of rhetoric aimed at uncovering the means of persuasion of an audience who could not "at a glance [follow] a complicated argument, or follow a long chain of reasoning". Evaluating historical arguments in which such audiences were persuaded led Aristotle to uncover many common features: how to appeal to emotions and character, how to use semi-logical structures such as enthymemes, and how to use styles for delivery of rhetorical speech. Arguing that justice and "the greater good" were discoverable through rhetoric, Aristotle presented a theory of non-deductive argumentation.

Perelman pushed rhetoric further and argued that, as a regressive social practice, rhetoric was the only legitimate method for uncovering non-demonstrative truths. Achieving adherence of the audience required appeals to universalizable and particular contextual elements as well as knowing how to motivate the audience away from existing beliefs and tradition. And Tindale's work pushes rhetoric even deeper into the realm of the social. His ideas of

refocusing rhetoric around cooperation and communication challenge adherence at any cost and further blur the individual-society divide.

The rhetorical theories presented here describe *what works* (e.g. appeals to emotions, the enthymeme, etc) and *what should work* (e.g. that *it is* the role of rhetoric to uncover what justice, good etc. are, and that appeals to emotions are appropriate to such inquiries). The question explored by this thesis is of another type, namely, given the descriptive and normative principles of philosophical rhetoric, can science provide explanatory mechanisms for *why* rhetorical methods work and why they should define the normative?

The discussion that follows in Chapters III to VI reviews scientific ideas, theories and experiments regarding mental processes (e.g. emotion and cognition), language and communication, and moral behaviour with a goal of showing how biology and science generally provide validation of philosophical ideas and explanatory mechanisms of *how* or *why* rhetorical practices and prescriptions work the way rhetoricians have described. To this end the chapters contain descriptive sections – which briefly outline a particular scientific discipline, and critical sections – which attempt to apply the knowledge of a particular discipline to the elements and methods of philosophical rhetoric. The goal is to provide an adequate description of scientific ideas while fairly applying them to the elements and methods of philosophical rhetoric.

CHAPTER III

PSYCHOLOGY AND RHETORIC

The point of this article is to defend an alternative view [of critical thinking] based on evidence that proceeds in ways that are much more informed by psychological research than by informal logic. In place of fallacies, many of which are arcane and rarely committed by people in real situations, the study of critical thinking can consider error tendencies to which people are actually prone, as shown by empirical investigation. (Thagard 2011, 3)

In this chapter several theories from the field of psychology involving reasoning, cognition and emotions are considered. The first section briefly defines the disciplines of cognitive and evolutionary psychology. The following section reviews persuasion theory as a field of study based on philosophical rhetoric. Next, dual process models of cognition are discussed along with Mercier and Sperber's argumentation theory of reasoning and Paul Thagard's suggestion for psychological research into theories of argumentation. Lastly, we discuss Jonathan Haidt's arguments from cognitive psychology and evolutionary biology that our moral minds are evolutionary adaptations that make us groupish. Each of the above sections is followed by an analytical and semi-critical discussion.

The Principles and Methodology of Psychology

Psychology is the study of mind for the purpose of understanding mental processes and their relation to individual and social behaviours. Psychology

considers human capacities for perception and cognition (including emotion) among many topics in the context of conscious and unconscious processes.

Cognitive psychology, which forms a majority of the subject of this chapter, focuses on cognition – i.e. mental processes such as reasoning, problem solving, memory, language and thinking generally. It is related to the broader discipline of cognitive science (which is briefly discussed in the next chapter). Lastly, evolutionary psychology, also discussed in this chapter, examines memory, language and perception as evolved adaptations, i.e. as products of natural selection that solved problems in human environments.

The goal of presenting psychological ideas in this chapter is not to provide a comprehensive or representative picture of the discipline of psychology. Rather, the goal is to identify principles from the field of psychology that are relevant to persuasion by having the potential to validating, explaining and directing future inquiries into persuasion.

Experimental Psychology and Persuasion Theories

Aristotle's *Rhetoric* was followed by many centuries of theoretical writings. However, it was not until the first half of the 20th century that rhetorical ideas were considered in an empirical discipline. Persuasion and Social Influence Theory was arguably the first discipline to systematically explore persuasion as the subject of another discipline, i.e. experimental psychology. Persuasion was defined as the “activity of creating, reinforcing, or modifying beliefs, attitudes, or

behaviors” (Seiter 2009) and Carl Hovland’s program at Yale after WWII studied persuasion via social sciences based on tracking statistical changes in attitudes.

In the late 1940s pioneer communication theorist Harold D. Lasswell generalized the principles and factors of persuasion theories into what is now known as Lasswell’s maxim: “Who (says) What (to) Whom (in) What Channel (with) What Effect”⁶. These factors echoed Aristotelian rhetorical elements and fell into four general classes: (i) source or communicator variables (i.e. credibility, e.g. knowledge, social class, attractiveness, and likeability), (ii) message variables (i.e. effects, e.g. message style, order of arguments, speed of delivery, and repetition), (iii) channel variables (i.e. medium, e.g. video, written or audio), and (iv) receiver variables (i.e. personality characteristics, e.g. self-esteem, mood, authoritarian or dogmatic tendencies, gender). Experimental results on each of these factors gave rise to several theoretical frameworks.

Reinforcement (reward/punishment) and conditioning (e.g. Pavlovian association) theories argued that persuasion occurs incrementally through a series of steps: the message must gain attention, be comprehended, be accepted, be retained, and be acted upon. Consistency theories argued that: “people prefer harmony, or consistency, in their thoughts. ... [and] that when we

⁶ Lasswell, H.D. (1948), “The structure and function of communication in society”, *The Communication of Ideas*, Bryson, I. ed., pp 117–130, p. 117, Univ. of Illinois Press, Urbana, IL.

have inconsistent thoughts, this inconsistency (also called imbalance or incongruity) motivates us to change our thoughts to restore consistency.”⁷ Information integration theories argued that the value and weight of persuasive information and how we integrate it into our existing information plays a role in whether and how much we are persuaded. And the cognitive response model stated that audiences can be active participants in the persuasion process with persuasion occurring only if audience’s beliefs are similar to the message.

The most mechanically descriptive persuasion theories are dual-process theories such as Richard E. Petty and John T. Cacioppo’s Elaboration Likelihood Model (“ELM”)⁸. ELM states that there are two “routes” to persuasion: a central route which consists of thoughtful consideration of the arguments (ideas, content) of the message where the audience is essentially an active participant in the process of persuasion; and a peripheral route where persuasion occurs based on other cues besides the strength of the arguments such as character of speaker or emotion of the audience. Different dual process theories generally agree on one point: “[a]ttitude changes that result mostly from processing issue-relevant arguments (central route) will show greater temporal persistence, greater prediction of behavior, and greater resistance to counter persuasion than attitude changes that result mostly from peripheral cues” (Petty & Cacioppo, 1986, 21).

⁷ See the Communication Institute for Online Scholarship, entry on Congruity Theory, online at http://www.cios.org/encyclopedia/persuasion/Ccongruity_theory_1congruity.htm, last accessed August 6, 2012.

⁸ Another similar model is Alice Eagly and Shelly Chaiken’s heuristic-systematic model (HSM).

Conclusion: Do Persuasion Theories Validate Rhetoric?

The thesis of this work is that scientific theories can validate and explain rhetorical principles. Persuasion theories seem to lie at a transition point between philosophical theory and psychology: they take their cues from rhetoric and engage the theoretical framework and experimental methods of psychology. For example, Lasswell's maxim is a good example of how elements of rhetoric (e.g. character, emotions, style, etc.) were reconceptualized in the language of communication (e.g. communicator variables, message variables, etc.); and ELM expands Aristotle's ideas on persuasion and adds the notions of partial and fleeting persuasion. But do persuasion theories provide explanatory mechanisms for *how* persuasion works beyond the conceptual level?

While persuasion theories expand the meaning and usefulness of rhetorical elements (e.g. identifying new mental phenomena such as conditioning and harmony of beliefs which play roles in attitude change) they provide limited lower level (i.e. beyond the psychological conceptual level) explanatory mechanisms for *how* rhetorical elements and methods work. It is true that ELM offers useful models of persuasion which confirm that rhetorical methods and elements are successful; however, even ELM provides almost no explanations for *why* the methods are successful or discusses a more coherent structure to consider.⁹ To find *how* rhetorical methods function, explanations must be sought in established psychological theories of cognition.

⁹ In fact, several of the persuasion theories are inconsistent with each other as they place weight and emphasis on different mental processes. Because of this, experimentalists have had limited

Cognitive Psychology, Reasoning and Argumentation

Ours is a contribution to the growing body of research showing how, and how much, the human mind is a social mind. (Mercier & Sperber 2011, 101)

Hugo Mercier and Daniel Sperber, two philosophers and psychologists, proposed in 2011 “that the primary function for which [reasoning] evolved is the production and evaluation of arguments in communication.” (Mercier & Sperber 2011, 58) Reasoning, they argued, is not a process of critically assessing propositions in a search for truth, but one primarily aimed at enabling “communicators to produce arguments to convince addressees who would not accept what they say on trust; it enables addressees to evaluate the soundness of these arguments and to accept valuable information that they would be suspicious of otherwise. Thus, thanks to reasoning, human communication is made more reliable and more potent.” (Mercier & Sperber 2011, 71) Mercier and Sperber’s theory is grounded in cognitive psychology and evolutionary biology and describes not only *how* argumentation may function, but also *why* it may have co-evolved with reasoning.

To support their argument, Mercier and Sperber state that since the 1960s “the most important development [in cognitive psychology] has been the emergence of dual process models that distinguish between intuitions and reasoning (or system 1 and system 2 reasoning)” (Mercier and Sperber 2011, 58). System 1 (“S1”) is an intuitive, unconscious, parallel system; and System 2

success in integrating multiple persuasion theories to predict outcomes. Some theories are also not experimentally verifiable.

("S2") is a controlled, sequential and conscious system.¹⁰ Both systems appear to function in conceptual thinking, perception and motor control, but reasoning is specifically an S2 system "where not only is a new mental representation (or conclusion) consciously produced, but the previously held representations (or premises) that warrant it are also consciously entertained. The premises are seen as providing reasons to accept the conclusion" (Mercier & Sperber 2011, 57). Arguments, therefore, are not the product of a conscious process, but the "output of one mechanism of intuitive inference among many that delivers intuitions about premise-conclusion relationships" (Mercier & Sperber 2011, 59). Essentially, an S1 process that is unconscious and subpersonal¹¹ delivers arguments which appear consciously as "representations of relationships between premises and conclusions" (Mercier & Sperber 2011, 58). An S2 process – i.e. reasoning – is then engaged to defend "arriving at a belief through reflection on our reasons to accept it" (Mercier & Sperber 2011, 58). Hence, we do not have reasons for developing an elementary argument – an intuitive S1 process – but only for defending it – a conscious S2 process: "we accept a conclusion because of an argument in its favour that is intuitively strong enough, this acceptance is an epistemic decision that we take at a personal level" (Mercier & Sperber 2011, 59).

¹⁰ ELM (discussed in the previous section) is a model of persuasion which relies on the dual process models to argue for central and peripheral modes of persuasion.

¹¹ Daniel C. Dennett's 1969 *Content and Consciousness*, introduces the notion of subpersonal as a level that engages non-personal mechanisms rather than conscious, personal mental states.

In a 2011 article “Critical Thinking and Informal Logic: Neuropsychological Perspectives” (Thagard 2011) Paul Thagard suggested that approaches to argumentation, rather than reasoning, should focus on inferential (S1) mechanisms rather than reasoning type (S2) mechanisms. In the language of argumentation, rationality "should be understood as a matter of making effective inferences, not just good arguments. ... irrationality involves making erroneous inferences for reasons that go well beyond the employment of fallacious arguments... mistakes arise from a host of psychological error tendencies (biases)" (Thagard 2011, 153). According to Thagard, traditional deductive – or conscious rules based – approaches to reasoning (e.g. Frege, Russell) do not adequately explain "the kinds of multimodal, parallel, coherence-based considerations that produce inferences... [and that] human inference ...is as much emotional as cognitive" (Thagard 2011, 154).

Thagard pointed out that psychological research has already established that we acquire factually incorrect beliefs more often due to inference-type errors rather than argumentation-type errors. *Motivated inference*, as a common inference process error, occurs when people distort their judgment and reasoning process because of underlying personal goals.¹² For example, despite evidence that their child initially dislikes school, some parents still believe that their child will settle down eventually without external help; here, the conclusion seems

¹² Thagard has also written on abductive inference – i.e. the inferential process of generating and evaluating explanatory hypotheses (Thagard 2007). Abduction has a long history of philosophical-logical study as an induction-type process aimed at achieving a satisfactory explanatory hypothesis for an interesting phenomenon.

more "plausible to people ... [because it] fits well with their goals," (Thagard 2011, 157) namely, that their children will do well in school. Psychological research – not argumentation theory – explains *how* the flawed (*motivated*) inference involves "selective recruitment and assessment of evidence based on unconscious processes that are driven by emotional considerations of goals rather than purely cognitive reasoning" (Thagard 2011, 156). And neuropsychology further shows that "in the human brain, the processes for assessing beliefs and values overlap substantially" (Thagard 2011, 157) thus "valuing a situation as extremely desirable or undesirable may produce a high degree of attention that is easily confused with a high degree of credibility" (Thagard 2011, 160). Accordingly, the mechanism – the *how* – of arriving at a poor conclusion has specific psychological and neurological explanations.

Mercier and Sperber presented their argumentation theory of reasoning as being able to solve psychological paradoxes on reasoning. For example, the confirmation bias, i.e. seeking or interpreting "evidence in ways that are partial to existing beliefs, expectations, or a hypothesis in hand", is explained because within the theory, the confirmation bias is not a flaw but a "feature of argument production": it helps reasoners locate reasons supporting their own intuitions – rather than locating objective truth. The theory also explains results from the Wason selection task¹³ where subjects engage in reasoning *after* making a

¹³ The Wason Selection Task is a psychology experiment where subjects are tested on their ability to apply *modus ponens* and *modus tollens* to a set of practical facts. "The Wason selection task is the most widely used task in reasoning, and the performance of participants is generally very poor, hovering around 10% of correct answers (Evans 1989; Evans et al. 1993; Johnson-

choice: reasons are provided “not to evaluate and correct their initial intuition but to find justifications for it” (Mercier & Sperber 2011, 64). Mercier and Sperber further argue their theory explains psychological research which shows “there is an asymmetry between the production of arguments, which involves an intrinsic bias in favor of the opinions or decision of the arguer ... and the evaluation of arguments, which aims at distinguishing good arguments from bad ones ...” (Mercier & Sperber 2011, 72). The theory even supports the experimental results that in some cases, in seeking a particular outcome, there is little difference between relying on intuition or reasons.¹⁴

Mercier and Sperber suggest that evolutionary biology supports their theory: “the emergence of reasoning is best understood within the framework of the evolution of human communication” (Mercier & Sperber, 2011, 60). They state that “[r]easoning has evolved and persisted mainly because it makes human communication more effective and advantageous” (Mercier & Sperber 2011, 60). In earlier work¹⁵, Sperber argued that the nature of human communication makes it innately vulnerable to manipulation and deceit and in order to survive and evolve given these risks, the mind evolved epistemic vigilance: the ability to constantly filter communications by calibrating trust,

Laird & Wason 1970). However, when participants had to solve the task in groups, they reached the level of 80% of correct answers.”, Page 62 – 63.

¹⁴ Experimental findings already support this implication. “It has been consistently observed that attitudes based on reasons were much less predictive of future behaviors (and often not predictive at all) than were attitudes stated without recourse to reasons. This lack of correlation between attitude and behaviour resulting from too much reasoning can even lead participants to form intransitive preferences (Lee et al. 2008).” Mercier & Sperber 2011, page 69.

¹⁵ Sperber, D., Clement, F., Heintz, C., Mascaro, O., Mercier, H., Origgi, G. and Wilson, D., (2001), “Epistemic Vigilance”, *Mind and Language*, Vol 25, Is. 4, pp 359-393.

evaluating arguments and gauging the plausibility of claims (among other abilities). Thus, while some adaptations, such as trust calibration¹⁶ and coherence checking¹⁷, evolved to safeguard human communication from the problems of miscommunication and misinformation, reasoning evolved because it “contributes to the effectiveness and reliability of communication by allowing communicators to argue for their claim and by allowing addressees to assess these arguments. It thus increases both in quantity and in epistemic quality the information humans are able to share”. (Mercier & Sperber 2011, 60)¹⁸

Sperber and Mercier’s theory has some critics who point out that there are competing theories describing the evolution of reasoning¹⁹, that the competencies described by the authors as entailed in S1 and S2 mechanisms are inadequate and that our psychological and neuroscientific understandings of reasoning are too immature for such a broad theory. Despite the criticisms, the

¹⁶ Trust calibration refers to the ability to give different weight to different arguers’ statements on the basis of their “competence and benevolence”.

¹⁷ Coherence checking is part of the comprehension process and is tasked with resolving determinations of inconsistency between new information and existing beliefs.

¹⁸ Sperber has written previously on the evolution of cognitive systems and along with Mercier defends the soundness of such an – albeit biased – system of communication: “What makes communication advantageous to receivers is that it provides them with rich information that they could not, or not easily, have obtained on their own... What makes communication advantageous to communicators is that it allows them to achieve some desirable effect in the receivers ...” (Mercier & Sperber 2011, 96). And: “[c]ognitive systems found in individual organisms are biological adaptations. Adaptations are traits that have evolved and stabilized because, by producing some characteristic effect, they have contributed to the fitness of the organisms endowed with them.” See Sperber, D. (2001), *An Evolutionary perspective on testimony and argumentation*, Philosophical Topics, (2001), Vol. 29. 401-413, page 402.

¹⁹ See Evans, J., in Mercier & Sperber 2011, pp. 77-78: “...the new mind (distinctively human) can conduct mental simulations and reason consequentially, anticipating the future” and thus it is “... more plausible to argue that the new mind was a voluntary accident, in which case an expanded ability for reasoning derived from argumentation may well be part of that story.”

theory has significant explanatory power and cannot be overlooked in considering theories of reasoning.

Reasoning, Evolution and Rhetoric

Do the psychological and evolutionist theories discussed by Mercier, Sperber and Thagard validate or explain *why* rhetorical methods work? The answer is a qualified “yes”. While we must note that neither Mercier and Sperber nor Thagard identified rhetoric as the topic of their research, all were concerned with argumentation: Sperber and Mercier stated that argumentation was the *raison d’être* of reasoning; and Thagard argued that critical thinking and informal logic researchers should consider unconscious processes as responsible for belief formation.

Mercier and Sperber’s theory *does* validate rhetorical principles on several levels. First, rhetorical elements can consistently be reconceptualised in the S1-S2 paradigm with some qualifying as central processing (e.g. considerations of enthymemic structure) and some as peripheral processing (e.g. automatic emotional responses). Such a reconceptualization imports an entire field of research with well developed theories into questions of rhetorical methodology²⁰. Just as interesting is that Mercier and Sperber view reasoning as (primarily) a social tool for seeking adherence and consensus (a social goal), rather than proof or truth (an asocial goal): “the function of reasoning is primarily social: In particular, it allows people to anticipate the need to justify their decisions to

²⁰ Further lower level analysis is beyond the scope of this thesis.

others.” (Mercier & Sperber 2011, 71) This could be viewed not only as an evolutionist validation of the biological plausibility of rhetoric but also the completeness of rhetoric relative to argumentation theories grounded in logic which consider only non-social reasoning. That “the human mind is a social mind” (Mercier & Sperber 2011, 101) further suggests that rhetorical methods could have evolutionary psychology explanations where the arguer and the audience are two sides of an interacting – biologically and psychologically describable - system; it also indirectly supports normative claims of rhetoric as *the* method for determining questions about human social and moral behaviour (as Aristotle and Perelman suggested), that *should* be applied in moral ways to preserve a human-society equilibrium (e.g. not seek adherence at any cost; as Aristotle and Tindale suggested), and as being a communicative, cooperative endeavour consistent with individual-society co-evolution (as Tindale suggested). A (scientific) paradigm where the human mind is a social entity and where determining ‘objective’ truth is secondary to social coherence and general sociality is consistent with – and validates – the normative function of rhetoric of determining morality via social activity – e.g. reasoning and persuasion.²¹

One particular rhetorical idea, that of rhetoric as a type of cooperation, is consistent with Mercier and Sperber’s idea that “the confirmation bias contributes to an efficient form of division of cognitive labor” (Mercier & Sperber 2011, 65) where “rather than looking for flaws in our own arguments, it is easier to let the

²¹ For a more in-depth discussion on the compatibility of the epistemic value of social cooperation with objective theories of truth see the discussion in Chapter 2 of Goldman, A., *Knowledge in a Social World* (1999), Oxford University Press Inc., New York.

other person find them” (Mercier & Sperber 2011, 73). The consistency arises from the apparently inherent benefit of “cooperation” in achieving better outcomes and removing some biases from human reasoning. Keith Frankish explains this point in evolutionary biology terms “[r]easoning may thus have evolved primarily for collective cognition, if not for the individual variety” (Mercier & Sperber 2011, 79).

Sperber’s work on trust calibration also provides a framework for expanding the notions of – and explaining the mechanisms of – *ethos* (character). Sperber’s argument is that research shows that people constantly calibrate trust based on competence and benevolence²² with even 3-year-old children showing signs of calibration. And David Pietraszewski’s corollary to Sperber and Mercier’s theory has the potential to provide an evolutionary anthropology explanation of *ethos*. He argues that in argumentation “the exposition of claims – and the signal of agreement or disagreement with them – can be used as a social instrument to mark affiliation. Agreement and disagreement therefore become commodities themselves as a way of signaling the coordination strength and challenging others. ... who is arguing should be just as important as what they are saying when considering the “goodness” of an argument. Additionally, the motivation to argue, and the choice of argument content itself, should be at least in part the result of strategic non-conscious assessments of the local social world” (Mercier & Sperber 2011, 87).

²² See Petty, R. E., & Wegener, D. T. (1998). *Attitude change: Multiple roles for persuasion variables*, In Handbook of social psychology (4th ed.), Eds. Gilbert, D. T., Fiske, S. T., & Lindzey, G., Vol. 1, pp. 323–390, Boston, MA: McGraw-Hill.

Pietraszewski's statement that "negotiating conflicts of interest and isolating social coordination" (Mercier & Sperber 2011, 87) is a part of communicative and persuasive practices entrenches the need for - and appropriateness of - appeals to character in human persuasion activities.

Finally, psychological research on reasoning already describes cognitive processes involving S1 inferential mechanisms – e.g. intuitions about the structure of the argument, emotions, intuitions about the character of the subject, of the speech and of the speaker, plus an entire host of argument delivery methods which involve non-verbal communication. Studying these mechanisms in the context of persuasion will likely reveal further explanations of rhetorical methods. There are studies which already show that in some contexts there is little difference between relying on intuition and reasoning to predict one's future behaviours.²³

Haidt and Group Evolution

If I could nominate one candidate for "biggest obstacle to world peace and social harmony," it would be naïve realism because it is so easily ratcheted up from the individual to the group level: My group is right because we see things as they are. Those who disagree are obviously biased by their religion, their ideology, or their self-interest. Naïve realism gives us a world full of good and evil, and this brings us to the most disturbing implication of the sages' advice about hypocrisy: Good and evil do not exist outside of our beliefs about them. (Haidt 2006, 71)

²³ "It has been consistently observed that attitudes based on reasons were much less predictive of future behaviors (and often not predictive at all) than were attitudes stated without recourse to reasons. This lack of correlation between attitude and behaviour resulting from too much reasoning can even lead participants to form intransitive preferences (Lee et al. 2008)." Mercier & Sperber 2011, page 69.

Jonathan Haidt, an evolutionary psychologist, has been working for several years conducting research on the cultural aspects of morality and emotions. He views morality as a group level evolutionary adaptation which forced humans into teams – not to seek truths – but to gain group benefits while enabling better competition against other groups. He views humans as born to be cultural “hypocrites” because group allegiances provide significant advantages – even over truth – in navigating the social world.

Haidt argues that his research into multi-level selection was based on Charles Darwin’s own puzzlement over how certain social behaviors (e.g. altruism, reputation, etc.) evolved despite seeming to benefit neither individuals nor their offspring.²⁴ Initial (20th century) group-level selection explanations for such behaviours were abandoned as the explanations were uncovered to be either reducible to individual-level mechanisms or not able to overcome the “free rider problem”: that altruists are always doomed to extinction because of the selfish behaviour of others.²⁵ ²⁶ Haidt (along with others) argues for a revival of multi-level selection by pointing out that human societies, at least, created

²⁴ See Darwin, C., *Descent of Man*, Vol. 1, London, UK: John Murray, at page 203: “When two tribes of primeval man, living in the same country, came into competition, if... the one tribe included a great number of courageous, sympathetic and faithful members, who were always ready to warn each other of danger, to aid and defended each other, this tribe would succeed better and conquer the other...”; and p. 204: “Selfish and contentious people will not cohere, and without coherence nothing can be effected. A tribe rich in the above qualities would spread and be victorious over other tribes.”

²⁵ Some of the criticisms were based on the premise that the anthropological record established that, until recently, human wars were relatively rare occurrences. Thus, it was thought that the ultimate group altruistic sacrifice – dying in a war – could not have acted as an evolutionary pressure for a significant period of time. This premise has been now challenged.

²⁶ The principle that “man is selfish” spawned many theories: Selfish Gene Theory in evolutionary biology, Rational Choice Theory in economics, and Equity Theory in social psychology.

solutions to free rider problems – called “major evolutionary transitions” – with relative frequency in the form of human religion, shaming, gossip and other low-cost control techniques.²⁷ Such solutions were group level adaptations that provided more advantages than selfish behaviour; and they occurred in human societies due to our extremely unique capabilities of: cooperation, cognition and culture which gave rise to “ultrasocial behaviour”^{28 29}. Haidt’s two points are: (i) the vast majority of human biology *is* explained by genetic evolution but without multi-level selection, it is difficult to understand human societies, let alone morality³⁰; and (ii) while selfishness overcomes altruism in groups, altruistic

²⁷ Mechanisms for overcoming selfish behaviour are present in other species. In bees, for example, the mechanism is the limitation that only the queen can breed.

²⁸ The original theory on ultrasociality is by Tomasello et al.: *Understanding and sharing intentions: The origins of cultural cognition*, Behavioural and Brain Sciences (2005) 28, 675–735, Page 675. Haidt writes about Tomasello’s theory at length and states: “Tomasello believes that human ultrasociality arose in two steps. The first was the ability to share intentions in groups of two or three people who were actively hunting or foraging together. (That was the Rubicon.) Then, after several hundred thousand years of evolution for better sharing and collaboration as nomadic hunter-gatherers, more collaborative groups began to get larger, perhaps in response to the threat of other groups. Victory went to the most cohesive groups—the ones that could scale up their ability to share intentions from three people to three hundred or three thousand people. This was the second step: natural selection favored increasing levels of what Tomasello calls “group-mindedness”—the ability to learn and conform to social norms, feel and share group-related emotions, and ultimately, to create and obey social institutions, including religion. A new set of selection pressures operated within groups (e.g., nonconformists were punished, or at very least were less likely to be chosen as partners for joint ventures) as well as between groups (cohesive groups took territory and other resources from less cohesive groups)”.

²⁹ The further hypothesis is that human sociality arose due to close environments such as the cave. Richerson & Boyd (2005) *Not By Genes Alone: How Culture Transformed Human Evolution*, Chicago : University of Chicago Press, 2005, offer a tribal instincts hypothesis: “such environments favored the evolution of a suite of new social instincts suited to life in such groups, including a psychology which ‘expects’ life to be structured by moral norms and is designed to learn and internalize such norms; new emotions such as shame and guilt, which increase the chance that the norms are followed, and a psychology which “expects” social worlds to be divided into symbolically marked groups.” See Page 214.

³⁰ His “hive psychology hypothesis” is that human nature is 90% chimp and 10% bee.

groups defeat selfish groups and thus altruism played a significant role in human evolution.³¹

Haidt's work also encompasses ideas on emotional cognition and inferential mechanisms. He argues that in the framework of automatic (S1) and controlled (S2) processes, "most mental processes happen automatically, without the need for conscious attention or control" (Haidt 2006, 15). The evolutionary point is that controlled mental processes, such as reasoning, are significantly newer than the automatic processes which regulate bodily functions and elementary emotions (which are shared with many other animals, have been around for hundreds of millions of years and are nearly perfected). The frontal cortex (part of neo-cortex – the newer part of the brain involved in higher cognitive functions) did not separate us from emotions (the older brain systems). Rather, the frontal cortex allowed emotions to expand, as for example, without the help of the orbitofrontal cortex people become paralyzed with choice; thus, human "rationality depends critically on sophisticated emotionality. And it is only because our emotional brain works so well that our reasoning can work at all" (Haidt 2006, 13). Even more striking: "although the controlled system does not conform to behaviorist principles, it also has relatively little power to cause behaviour. ... The controlled system ... is better seen as an advisor"³² (Haidt

³¹ See Wilson, D.S. & Wilson, E.O. (2008), "Evolution 'for the Good of the Group' ", *American Scientist*, Sep/Oct 2008, Volume 96, Pages 378 – 389. The implications of the group-level selection theory is that "When between-group selection dominates within-group selection, the group becomes so cooperative that it becomes a higher-level organism. Another major pathway of evolution, in addition to mutational change."

³² Haidt's book *Happiness Hypothesis* relies heavily on the elephant and elephant rider analogy (depicted on the cover of the hardcover book) in which the rider represents controlled processes

2006, 17). In other words, conscious thought has limited direct causal effect on behaviour.³³

Continuing on the topic of controlled mental processes, Haidt argues that studies carried out in the 1960s on brain injured and split brain patients showed an unhesitating tendency for such patients to confabulate: “people will readily fabricate reasons to explain their own behaviour” (Haidt 2006, 8) even when they clearly could not have known the truth. Even after a lesion, controlled processes in left brain - the *interpreter module* – continue a “running commentary on whatever the self is doing, even though the interpreter module has no access to the real causes or motives of the self’s behaviour” (Haidt 2006, 8). And Haidt argues that the confirmation bias and other reasoning oddities stem from such controlled mental processes whose main function is the defense of intuitive beliefs; as such, *moral judgment* and *aesthetic judgment* are confabulations: “[y]ou don’t really know why you think something is beautiful, but your interpreter module (the rider) is skilled at making up reasons... You search for a plausible reason for liking the painting, and you latch on to the first reason that makes sense... Moral arguments are much the same: Two people feel strongly about an issue, their feelings come first, and their reasons are invited on the fly, to throw at each other” (Haidt 2006, 21). During moral reasoning, for example, “it is really

and the elephant stands for automatic brain processes. The rider is viewed as an advisor or a servant to a more powerful elephant who is everything else: feelings, reactions and intuitions.

³³ For a recent review of consciousness and causality see *Do Conscious Thoughts Cause Behavior?*, Baumister et. Al., *Annu. Rev. Psychol.* 2011.62:331-361. Their conclusion is that “Consciousness seems especially useful for enabling behavior to be shaped by nonpresent factors and by social and cultural information, as well as for dealing with multiple competing options or impulses. And that it is plausible that almost every human behavior comes from a mixture of conscious and unconscious processing.”

the elephant [the intuitive, automatic processes] holding the reins, guiding the rider [the conscious, controlled processes]... but only the rider can string sentences together and create arguments to give to other people” (Haidt 2006, 22). Thus, “[i]n moral arguments, the rider goes beyond being just an advisor to the elephant; he becomes a lawyer, fighting in the court of public opinion to persuade others of the elephant’s point of view” (Haidt 2006, 22). Haidt notes that even in non-moral domains we frequently lie, cheat and steal and our reasoning modules work overtime to justify our actions. In non-adversarial groups our reasoning biases are even more ramped up and we sometimes engage in a “consensual hallucination” (Haidt 2006, 76).

Much like Sperber and Mercier, Haidt notes that we are fairly accurate in our perceptions of others but it is our self-perceptions that are distorted as we inflate our social-worth and our roles in past events to serve our goals. Success in society means achieving reputation and there are advantages to being able to manipulate the world of appearances and having our individual reasoning mechanisms constantly spin the facts in our favour – deluding ourselves and others. Thus, conscious verbal reasoning is great at confirming intuitions, not at seeking truth, and the main cure for the confirmation bias is engaging other people in communication activities.

Groupishness, Confabulation and Rhetoric

Arguably, Haidt’s arguments are an extension of Mercier and Sperber’s ideas into the language of evolutionary psychology. Essentially, Haidt argues

that our reasoning abilities are not only biased towards selfishness and groupishness, but may not be truly in charge – their main purpose being defending the intuitions of a more primary cognitive system. And like Mercier and Sperber, Haidt’s ideas are consistent with the principles and methods of rhetorical theory and as suggesting directions for research on persuasion.

First, Haidt’s argument that people are, in a small but significant part, “hive creatures like bees” (Haidt et al. 2008, S134) and that being bound to a community which shares norms and values is necessary in order to flourish and be happy provides an explanatory mechanism for the Perelmanian idea of particular and universal audiences. More precisely, achieving adherence requires appeals to group loyalties (i.e. particular audiences) because of the innate traits of audiences³⁴ as well as appeals to more generalizable audience traits. Aristotle himself had identified the need to appeal to audience types (e.g. good arguers know the “ends” that different audiences may seek: “...prosperity combined with virtue; or as independence of life; or as the secure enjoyment of the maximum of pleasure;” etc.). And Haidt’s ideas explain why such appeals are important: because our group is not only important to happiness it is part of what we are, our “hive” nature.

Perelman’s conception of rhetoric as the social activity by which (non-demonstrative) knowledge construction can occur is also explained by Haidt’s arguments that controlled mental processes (e.g. reasoning) have as their main function the defense of intuitive beliefs. Essentially, because individual

³⁴ There is no ideal group and individual audience members belong to many different groups.

reasoning is biased, the social arena of rhetoric provides the only means of verification of opinion and reasoning.³⁵ Given the vast – and somewhat unsettling – psychological research which shows significant biases in reasoning, perhaps the goal of argumentation should be to increase openness and consideration of others’ positions, rather than primarily seeking attitude change. This is essentially the Tindalean idea that rhetoric may sometimes function primarily as a mode of cooperation, communication or empathy rather than as a mode of achieving adherence.

On the rhetorical notion of *pathos*, Haidt’s arguments that human “rationality depends critically on sophisticated emotionality” further validates and justifies the rhetorical principle that appeals to emotion *do* form – and *should* form – part of persuasion practices. Simply put: psychological theories of rationality view “emotions” as another type of rational behaviour and – to further reduce the role of controlled reasoning – it is such automatic processes that are in charge of almost all mental processing. Such ideas further entrench the validity of rhetoric, with its broad considerations of persuasive methods and approaches, as the most appropriately broad theoretical approach to attitude change.

Lastly, because Haidt’s arguments support a psychology of mental processes centred on social interaction, rather than truth seeking, persuasion activities may be biased towards conforming to one’s group’s beliefs rather than seeking inter-group norms (Haidt himself confesses to becoming more politically

³⁵ See footnote 20 for a reference to a discussion of social cooperation vs. objective truth.

centred after completing his research). Future research into persuasion may need to address the topic of group-biased reasoning and identify mechanisms by which biases form and function during persuasion activities.

Conclusion

The discipline of psychology provides a broad and tested framework for understanding mental processes involved in cognition (e.g. reasoning and emotions). As argued above, the framework provides: (i) significant validation to philosophical rhetoric, for example by confirming the central role of emotions in cognition and the social nature of the brain; (ii) lower level explanations of persuasion mechanisms, for example explaining why appealing to an audience's type (its group characteristics) has a persuasive function; and (iii) suggests directions for further research into rhetorical elements, for example exploring the social nature of the brain and whether rhetorical activities may be more cooperative than adversarial.

In the remaining chapters a review of computational, biological and neuroscience ideas on cognition and the social nature of the brain are provided. The goal is to uncover other levels of scientific explanation for *how* and *why* rhetorical principles and methods do the work rhetoricians tell us they do.

CHAPTER IV

COMPUTATIONAL COGNITIVE SCIENCE AND PERSUASION

Many philosophers, such as Frege, have thought that the sort of naturalistic, psychologistic account of reasoning that cognitive science offers is incompatible with rationality and objectivity. On the contrary, an approach to the theory of knowledge based on cognitive science can avoid the sheer irrelevance that models based on formal logic and probability theory have to actual scientific practice. (Thagard 2008, 540)

In the current chapter the work of philosopher and cognitive scientist Paul Thagard is discussed with a focus on how it could contribute to understanding rhetorical theories of persuasion. Thagard himself suggested in a 2011 paper that the inquiry into critical thinking – and argumentation – should be more informed by existing cognitive science and psychology research on inferences and inferential mechanisms. And his 2000 and 2006 books centre on computational models of cognition and emotion. The current chapter provides a brief introduction to cognitive science and explains how Thagard's computational framework tackles cognition, inference and emotions.

Cognitive Science and Computational Representation

Here is the central hypothesis of cognitive science: thinking can best be understood in terms of representational structures in the mind and computational procedures that operate on those structures. (Thagard 2005, 10)

Cognitive science is defined as the “interdisciplinary study of mind and intelligence, embracing philosophy, psychology, artificial intelligence,

neuroscience, linguistics, and anthropology” (Thagard 2005, ix). The main aim of cognitive science is to explain how people accomplish mental tasks and according to Thagard, in achieving this aim the most “fertile approach has been to understand the mind in terms of representation and computation” (Thagard 2005, 10). Further, “according to the computational hypothesis of cognitive science, the mind is a mechanism whose parts are mental representations of various sorts that are organized such that there are computational procedures that operate on them to produce new representations.” (Thagard 2009, 533)³⁶ Thus, cognitive science theories of mental phenomena are “sets of hypotheses about the constituents of the explanatory mechanisms” which show how mental representations operate on (transform) representations. And because the goal of cognitive science is to show how mental mechanisms produce psychological phenomena (e.g. sense of smell) by coalescing philosophical, psychological, neurocognitive and other types of knowledge into more complete theories of the human mind, philosophy and cognitive science are tightly intertwined.

Thagard has applied the cognitive science framework to cognitive processes, such as judgment or reasoning, as well as emotions to show how they can be modeled computationally as constraint satisfaction processes. In particular, in his book *Coherence in Thought and Action* (Thagard 2000) Thagard combined philosophical ideas and cognitive science – into a cognitive naturalism

³⁶ Some philosophers continue to hold dualist theories of mind and matter, e.g. that consciousness is not explicable in terms of physical mechanisms. These positions are criticized by many neuroscientists and cognitive scientists; see for example, Churchland, P. 2002, *Brain-Wise: Studies in Neurophilosophy*.

– to develop a Theory of Explanatory Coherence (“TEC”)³⁷ which states that cognition (hypothesis evaluation, decision making etc.) is a process of maximizing the inter-coherence of mental representations (propositions, planned actions etc.). His general point is that a lot of decision making is intuitive: “[f]or most people, decisions are not the result of a cognitive calculation of the sort described in normative models such as multi-attribute utility theory, but rather the result of arriving at emotional reactions to different situations.” (Thagard 2000, 66) The basic idea is that mental representations are inter-related via coherence (or incoherence) and that in this framework cognition can be thought of as the constraint satisfaction process of partitioning the inter-relations of mental representation into quantitatively coherent and incoherent groups to achieve maximum overall coherence.³⁸ And such coherence mechanisms, according to Thagard, are both computationally feasible and psychologically plausible.

In chapter 6 of his 2000 book, Thagard presents a model for understanding emotions – hot coherence (“HOTCO”) – in which the elements of cognitive coherence systems are adapted with an additional component – “emotional *valence*” (Thagard 2000, 170) – to indicate desirability or lack thereof, for example, of an action or belief. Valence, Thagard suggests, is a function of other types of coherence (explanatory, analogical, etc.) and he argues that HOTCO already provides a relatively successful computational model for trust, empathy, nationalism and general coherence.

³⁷ There are 7 principles of TEC: symmetry, explanation, analogy, data priority, contradiction, competition and acceptance. See Thagard 2000, page 43.

³⁸ See Thagard 2000, Page 18 for a formal definition.

Thagard's more recent *Hot Thought: Mechanisms and Applications of Emotional Cognition* (Thagard 2006) defends the similar thesis that human actions are rarely the result of reasoning, but the result of maximization of different types of coherence³⁹. Thagard argues that our beliefs and the available sensory evidence are constantly competing with emotional associations for control (e.g. of the motor cortex) and that a connectionist model of emotional coherence adequately encapsulates the interactive mechanisms. Thus, the psychological "gut feeling" which motivates us to action is the end result of an interactive process of cognitive and emotional constraint satisfaction processes which is almost always intuitive and rarely the result of a reasoned or argumentation process (Thagard 2006, 18-19)⁴⁰. Thagard states that the dynamic systems of emotion arousal and change are already well simulated by computational models that perform parallel constraint satisfaction and he proposes HOTCO and ITERA as two such programs for modeling emotional cognition.

In chapter 5 of his 2006 book entitled "Emotional Consensus in Group Decision Making" Thagard considers how group decision making "[m]echanisms such as emotional contagion, altruism, means-ends argument, analogy and empathy can transfer emotional attitudes across individuals and lead to the

³⁹ "Coherence can be understood in terms of maximal satisfaction of multiple constraints...", Thagard 2006, Page 16.

⁴⁰ Thagard argues that decisions are reached intuitively: "People are rarely convinced by an argument directly... Making reasoning explicit in decisions helps to communicate to all the people involved what the relevant goals, actions, and facilitation relations might be. If communication is effective, then the desired result will be that each decision maker will make a better informed intuitive decision about what to do." Thagard 2006, page 24.

resolution of conflicts” (Thagard 2006, 84). That discussion hints at how persuasion activities can be modeled in Thagard’s framework as multi-agent coherence systems seeking consensus (or other goals).⁴¹

Lastly, Thagard argues that in the search for computationally feasible models of cognition, neurological realism should be maintained. Neuroscience research on emotions has already identified the ventromedial prefrontal cortex (“VMPFC”), for example, as involved in producing somatic markers which are “the feelings, or emotional reactions, that have become associated through experience with the predicted long-term outcomes of certain responses to a given situation” (Thagard 2006, 90). The nucleus accumbens (“NAcc”), another important region involved in emotions, acts to narrow choices by combining VMPFC, hippocampus, the ventral tegmental area (“VTA”) and other regions’ input to “access higher-level cognitive processes and/or the motor effector sites responsible for action” (Thagard 2006, 92)⁴². To this end, Thagard developed GAGE which is a program that “organizes neurons into anatomically recognized groups corresponding to crucial brain areas, including the ... (VMPFC), the hippocampus, and the amygdala” (Thagard 2006, 87). Thagard suggests that

⁴¹ Thagard’s computational models show unexpected, but interesting results, such as the dependency of consensus on the order of interaction between agents and clustering effects – in which a subgroup coalesces around a position – with the effect of blocking consensus building.

⁴² Thagard argues that the neuroscience is sufficiently ready advanced to describe how the nucleus accumbens mediates emotion. The nucleus accumbens is in a mostly hyper-polarized state as a result of the “massive inhibitory dopamine input form the ventral tegmental area” and thus can resist the constant VMPFC and amygdale potentials. It seems only when the nucleus accumbens receives hippocampal potentials – long-duration, large amplitude and depolarizing in nature – that a window for VMPFC and amygdale activity opens for passage through the gateway. (See Thagard 2006, 93). Also, “[t]he NAcc forms a gateway for somatic markers, and the hippocampus determines what passes through this gateway by limiting throughput to those responses that are consistent with the current environment.” (Thagard 2006, 95).

even neurochemical effects in the brain are relevant to computational models as “the variety of neuromodulators used by the brain expands its computational abilities in ways that help to explain aspects of human thinking” (Thagard 2006, 123). Hormonal effects – in addition to synaptic inputs - can determine whether a neuron fires and a computation “system that involves neuromodulators can be expected to have different temporal behaviours” (Thagard 2006, 125) than one without such modulators.

Thagard’s research centres on the idea that the psychological and biological mechanisms behind many mental processes are well known and can be simulated by computational models. He argues that it is automatic processes that are the dominant factors in most cognition and that successful computational models of cognitive and emotional processes can be established to identify mechanisms – such as coherence – to explain such processes.

The Computational Framework, Emotion and Rhetoric

It should be noted from the outset that Thagard has been an advocate of approaches to argumentation which focus on S1 processes such as intuitive inferential processes (see Chapter III). The arguments presented here are essentially that both reasoning (S2) and emotional cognition (S1) processes can be computationally modeled as maximal coherence processes. Do either the computational framework of cognitive science or Thagard’s application of the framework validate, explain or suggest a direction of research into rhetoric?

Generally, the computational hypothesis of cognitive science, that cognitive functions – such as reasoning, judgment, emotion etc. – can be modeled computationally based on scientifically plausible (and tested) mechanisms, can serve a significant explanatory and research function for philosophical rhetoric. Thus, if we are seeking explanations for *how* rhetorical elements function, the computational framework – albeit not a biological one – provides an apparently useful and potentially realistic system for understanding *how* such elements function via cognition and emotional processes. We can thus explain how appeals to emotions and character conceptually work, why giving examples *can* be persuasive, and how style of speech or arrangement *can* be persuasive by engaging co-evolved cognitive-emotional systems – all of which we can model and test. While HOTCO and the ITERA models are elementary, Thagard argues that later models such as GAGE are neurologically realistic. Computational cognitive science will grow to provide computational models that develop with our neurological understanding of the brain.

Can the computational framework be expanded to consider multiple agents seeking to persuade one another? Thagard's HOTCO 2 and 3 models already simulate "group decision making understood as emotional consensus." (Thagard 2006, 66). It can be argued that these elementary models of emotional consensus can be expanded to include not only emotional, but other rhetorical elements so that persuasion activities are modeled as maximum coherence processes across multiple agents. It is thus theoretically possible to use the computational framework to model: *ethos*, *pathos*, the enthymeme, style and

rhythm of speech delivery, and other Aristotelian rhetorical elements and incorporate them into a multi-agent model. Perelmanian ideas of inertia and the peculiarities of particular and general audiences could also be modeled computationally based on models of emotional and cognitive coherence. In fact, Perelman's notion of inertia as "the basis of the stability of our spiritual and social life" (Perelman 1979, 131) could be explained via the constraint relationships and valence weights (strengths) within Thagard's models.

Does Thagard's significant work on computational models of *emotions* modernize Aristotle's treatment of *pathos* (and *ethos*)? At least one rhetorician, i.e. Tindale, seems to think so. In fact, Tindale even suggests Thagard's (and others') arguments that all judgments – all cognitive processes – involve emotional and value considerations leads to the position that "persuasion alters judgments of value. This may be its most significant power" (Tindale 'unpublished manuscript', 27). Tindale's suggestion is that rhetorical elements do their work not by convincing us of the logical value of the argument but by improving our emotional attitude towards the desired conclusion.

Conclusion

The work of cognitive scientists such as Thagard allows us to reconceive philosophical concepts, such as "reasoning" and "emotions", in the language of computational representations. While cognitive science models of cognition seem to have explanatory power, the models do not directly explain the evolution and *prima facie* existence of biological phenomena; rather, the models must rely

for inspiration on psychologically, biologically and neurologically established scientific theories and principles.

In the next chapter a brief review of evolutionary biology is provided with the aim of uncovering ever more biological explanations for *how* the elements and principles of rhetoric evolved in biological and socially defined cognitive systems and *why* they are able to do their work.

CHAPTER V

BIOLOGY, ANTHROPOLOGY AND RHETORIC

The last decade of brain research has converged on the realization that worldly information and the brain are two sides of a very complex interacting system. ... experiences with the world alter .. brain's structure, chemistry, and genetic expression, often profoundly, throughout ... life. (Quartz & Sejnowski 2002, 41)

While Aristotle wrote that the human moral sense is imbedded in human nature and arrived at this finding through observations, Charles Darwin (and contemporary biologists) arrived at similar conclusions regarding morality via the mechanisms and principles of modern evolutionary biology. In the current chapter we review three evolutionary biologists' theories on the evolution of humans and brains. We start with a brief review of Mark Pagel's work in evolutionary biology and draw from some of his insights on language-culture co-evolution. Next, the work of two pioneering evolutionary biologists and neuroscientists – Steven Quartz and Terrence Sejnowski – is reviewed along with their cultural biology theory that evolution externalized (extended) brains into the social world and that morality has biological foundations.

Pagel and the Anthropology of Language

Evolutionary biology is the branch of biology that studies evolutionary change in gene pools via mechanisms such as genetic variation and natural

selection. At the core of natural selection is the idea of fitness, i.e. an organism's ability to survive and reproduce. It is via fitness that explanations of the evolution of human behaviour, such as social behaviour, and human traits, such as emotions, are understood.

Mark Pagel's work primarily involves the evolution of human languages across the globe. His research on language development relies on the evolutionary relatedness among linguistic groups (phylogenetics) to determine the development and evolution of languages around the world. He essentially views language as a culturally transmitted replicator with similar biological properties as genes. Pagel explains that the mechanisms of language are similar to a remote control: language allows a speaker to "implant a thought into someone else's mind, they can attempt to do the same"⁴³. And genetically speaking, language is genes talking to get what they want.

According to Pagel, the story of how language evolved started about 2 million years ago with Homo Erectus' repetitive tool making and use, well before social learning was present.⁴⁴ It wasn't until about 200,000 years ago that social learning arose along with the dilemma of learning as visual theft: "If I can learn by watching you, I can steal your best ideas; I can learn without risk and without

⁴³ Quote from TED Presentation given by Mark Pagel on July 2011, online: http://www.ted.com/talks/mark_pagel_how_language_transformed_humanity.html, last accessed July 29, 2012. Pagel's book *Wired for Culture: the Origins of the Human Social Mind* (2012) is centred around the idea of visual theft.

⁴⁴ Chimpanzees lack social learning as they do the same thing over and over due to a very limited ability to copy or imitate from just watching (taking several years to learn to crack nuts with stones). Homo Erectus made the same basic hand axes over and over for one million years - about 40,000 generations. Neanderthals changed very little of the technology during the 300,000 years they lived in Eurasia.

doing”.⁴⁵ Thus, language likely arose initially as a social technology for managing cooperation as well as reputation. However, Pagel believes that language also evolved as a way to exclude those not belonging to one’s culture⁴⁶. After the rise of language, groupishness and tribalism increased significantly as they reduced conflicts of interest by aligning people’s behaviour and values. Culture thus allowed for better predictions of behaviour and easier assessments of trust. And language, as a technology, was used to protect knowledge by creating barriers to the transfer of knowledge and goods and limiting cooperation only to those who could communicate – i.e., those belonging to the same culture.

Pagel argues that social learning (as visual theft) plays the same role in our society as natural selection plays in biological (genetic) systems. The unfortunate result, however, is that being selected for social learning makes us less innovative – and perhaps even less intelligent – because the ability to copy has higher fitness than the ability to innovate. As our societies become larger, there is even less pressure on individuals to innovate, with an even greater advantage – and pressure – to be better copiers because available technologies increase in number proportional with the size of society.

⁴⁵ This quote is from the TED talk reference above. Pagel’s book *Wired for Culture: the Origins of the Human Social Mind* (2012) is centred on the idea of visual theft. As Pagel explains, copying became the main component of human intelligence – albeit a “shrewd” form of intelligence – and human natural selection became about the best copiers, not best innovators.

⁴⁶ Pagel argues that stricter cultures lead to more predictability and trust of members – and suspicion, i.e. exclusion, of non-members. His research also shows that language diversity is most dense in smaller communities. Papua New Guinea, for example, has 800 to 1000 languages of the 7000 languages world wide although it is only the size of California. This supports the theory that language evolved to promote tribalism and protect ideas.

Pagel even hypothesizes that because of the nature of language, the generative mechanism for idea evolution may simply be a random process – akin to the mechanisms of random mutation in genes. Randomness of idea generation – and problem solving – might simply be the best strategy that biological systems can provide; genes cannot possibly “know” how to mutate as they cannot anticipate the direction and reaction of our world. Creative and innovative solutions may simply spawn from chance.

Evolutionary Anthropology and Rhetoric

Pagel’s arguments based on evolutionary anthropology are that language was a communication adaptation that evolved to support groupish behavior to the exclusion of others. Pagel’s ideas linking communication to groupishness are relevant to rhetoric because in the field of communication theory, persuasion (e.g. creating or modifying beliefs and attitudes) is accepted as a major motivation for human communication. So do Pagel’s ideas, which provide a picture of language as a technology for predictions, groupishness and exclusion of the other, validate, explain or suggest directions of research into rhetoric?

If Pagel is correct and language evolved to manage and exploit reputation and cooperation by trying to alter “settings” in another’s brain, this is a strong piece of evidence that communication may have evolved primarily – or at least significantly – to enable persuasion. Such a persuasion based theory of communication (PBTC) is similar to foundational ideas of existing communication theories. PBTC is also consistent with the argumentation theory of reasoning

presented by Mercier and Sperber who suggested that the emergence of reasoning – primarily serving an argumentation function – was “best understood within the framework of the evolution of human communication” (Mercier and Sperber 2011, 60). PBTC is biologically sound as it is consistent with the broad evolutionary principle of natural selection: genes of those able to communicate for persuasion purposes are more likely to survive than those of individuals who altruistically communicate information with others. In other words, despite the resource intensive nature of language acquisition (requiring years of brain-environment interactions, not to mention millions of years of evolution) communication for self-beneficial or group-beneficial purposes may have provided the sufficient benefit to overcome such resource needs as it could result in: (i) a direct increase in the fitness of the arguer; and (ii) facilitate cooperation which was increasingly valuable as human environments became increasingly social and would thus result in an indirect increase in the fitness of the arguer.

PBTC (or the general idea of persuasion as a principal motivation for the evolution of communication and language) brings persuasion front and center in the evolution of humans and human societies. With respect to rhetoric, PBTC and Pagel’s ideas are generally consistent with Tindale’s work on rhetoric which suggests a blurring of the line between communication and persuasion. Tindale (and others like Sally Gearhart) have already pointed out that cooperation and inclusiveness should be partial goals of argumentation activities. Given Pagel’s ideas, we can draw an even more specific conclusion: that rhetoric and persuasion are generally about the protection of culture rather than its challenge.

In fact, Perelman's notion of rhetoric as a mode of truth (at least in the sciences and philosophy) when combined with his audience centred philosophy is consistent with such an extension of Pagel's ideas. But Perelman's notion would be more appropriately stated as rhetoric is a mode of culturally consistent truth where "culture" means any number of ways in which groupishness can manifest.

Pagel's notion of language as a technology used to promote culture (groupishness at some level) is also consistent with the signification roles of *ethos* and *pathos* in persuasion practices suggested by rhetoric. Both *ethos* (e.g. social trust) and *pathos* (e.g. expected emotional reaction) require in-depth knowledge of culture and community. Thus, shared practices and beliefs as well as shared or similar emotional attitudes may have simply directed the evolution of persuasion methods towards considerations of character and emotion. Pagel's ideas also suggest a potential barrier to persuasion, namely, that in the context of cross-cultural persuasion biological barriers may arise because of the exclusionary nature of language; to put it roughly, my brain will not allow me to be persuaded in an environment with significant cultural differences. And Perelman's conception of "inertia" (e.g. as tradition) is a great conceptual starting point for understanding why cross-cultural stalemates in persuasion activities occur. The next step would be to study cross-cultural resistance to persuasion, not as a general psychological phenomenon (which likely has already been done), but as a biological phenomenon where the neuroanatomy of audience members is observed and hypotheses for such biological barriers are presented.

An interesting corollary from Pagel's work is to consider how chance – which plays the role of supplying variation for natural selection in evolutionary biology – may be involved in persuasion activities.⁴⁷ Given that natural selection acts on chance mutation (i.e. by selecting environment-favourable genes for propagation) and given the complexity of the brain, perhaps attitude change – being persuaded – involves chance at some level. We can make this point indirectly, by suggesting that given biological theories for the co-evolution of culture and brains, developing (and valuing) rhetorical theory based on its value in explaining historically successful argumentation may not be satisfactory. For example, it may turn out that mechanisms such as chance played significant roles in historically successful argumentation. And there are other, interesting phenomena in which persuasion is achieved due to repetitive exposure; perhaps Abraham Lincoln's - albeit sound - rhetorical arguments (often quoted by Perelman in the *New Rhetoric* as great examples of dissociative techniques) were persuasive not due to a rhetorically definable soundness, but due to repetitive exposure of the audience to them which fostered familiarity and other types of emotional responses.⁴⁸ And perhaps Aristotle (and Perelman's) rhetorical methods drawn from historically successful argumentation may have evolutionary biology explanations: commonly used argumentative methods, e.g. rhythm, style, ordering, dissociation of concepts, are successful not *solely* due to

⁴⁷ "If evolutionists have learned anything from a detailed analysis of evolution, it is the lesson that the origin of new taxa [species] is largely a chance event." Mayr, E. (1985) "The Probability of Extraterrestrial Intelligent Life", *Philosophy of Biology*, M. Ruse ed., Macmillan Publishing Co., New York, pp. 279-285.

⁴⁸ See for example, Zajonc, R. B. "Attitudinal effects of mere exposure", *Journal of Personality and Social Psychology Monographs*, 9 (Part 2) pp. 1–27 (1968).

a rhetorical logic, but because they engage biological mechanisms of familiarity and leverage cultural and biological idiosyncrasies (i.e. social behaviours or biological traits that are peculiar rather than necessary). The point here is that it would be interesting to study historically successful persuasion in the context of evolutionary biology where chance and complex biological systems play a more significant role.

Quartz and Sejnowski's Cultural Biology

Steven R. Quartz and Terrence J. Sejnowski's 2002 book *Liars, Lovers and Heroes* (LLH) is a comprehensive, multi-disciplinary theory about the biology and sociality of the human brain. The human brain is presented as the product of clashing ancient survival mechanisms – such as guidance systems which evolved to navigate the physical world – with modern brain systems which evolved to navigate a social world. In this section we summarize Quartz and Sejnowski's argument for the externalization of brain functions, the evolution of personality and their biologically sound conceptions of morality, intelligence and happiness.

The Externalization of the Human Brain

It is extremely limiting to consider thought to reside purely inside the head. You have become smart by literally extending your thoughts out into the world. (Quartz & Sejnowski 2002, 235)

In LLH one of Quartz and Sejnowski's main goals is to disprove the idea that human brain complexity evolved via the periodic addition of genetic

blueprints for modules responsible for more and more complex behaviour. They point out that human genetic material cannot be solely responsible for brain complexity because we share much of our genetic material with mice and there are some plants with a larger genome than humans.

Instead, the LLH argument is that our complex behaviour is shaped after we are born as our brains are actually developing into the world – socially and culturally. This is possible because natural selection favoured “a process of progressive externalization [during which] hominid brains exposed more of their developmental program to the world, letting the interaction between developmental mechanisms and a structured world shape the brain” (Quartz & Sejnowski 2002, 195). The environment has thus become part of our biology and carries a significant part of the burden of our development and even a significant part of daily mental processing. Rather than developing a multitude of behaviour modules designed to deal with all eventualities, the brain evolved hyper-flexibility to our environment so that we: (i) acquire abilities reflective of the environment we inhabit; and (ii) we delegate some of the mental processing to the environment. A simplified example of externalization from biology is that humans stopped producing enzymes to make vitamin C because of abundance in nature; it was simply easier to rely on our environment for vitamin C than our genes.

Quartz and Sejnowski point out that while the main function of brain systems is prediction (brains are obsessed with finding patterns and making sense of environment) most prediction systems are *automatic* and we share

them with other species; it is cognition and reasoning systems that evolved more recently as *controlled* prediction systems. And Quartz and Sejnowski argue that *emotional* systems, in particular, evolved to provide bridges between automated and controlled systems and that emotion now plays numerous functions including in how animals learn and in prediction/decision making reward systems; emotions are “built-in reward systems [that] engage you with your world and enable you to learn from it, including building symbolic worlds inside your cerebral cortex” (Quartz & Sejnowski 2002, 113). Emotions are thus functionally important to higher cognition; for example, having no ‘gut feeling’ can lead to thinking paralysis and altering one’s mood can influence performance even in the most logical tasks of syllogistic deduction.⁴⁹

Quartz and Sejnowski also argue that human culture contains part of the developmental program that works with genes to build the brain that underlies *personality* and other individual characteristics.⁵⁰ Human personality thus manifests as prefrontal brain structures – more responsible for controlled processes – crystallize and take priority in governing behaviour in life: “[p]ersonality is the repertoire of strategies that each individual develops in an

⁴⁹ Quartz & Sejnowski refer to Woodworth and Sells’ 1935 research which shows that the mood of the syllogism affected their decisions. If at least one premise was negative, subjects most frequently accepted a conclusion that was also negative. If at least one premise was particular, subjects most frequently accepted a conclusion that was also particular.

⁵⁰ The negative implications of this theory are well established in developmental psychology: children who miss their developmental “windows of opportunity” for acquiring sociality (language and even emotional expression) are not only unable to acquire them later in life, but physically “wilt” from a failure to develop. Essentially, without timely cultural interactions the brain cannot fulfill its developmental mandate.

effort to survive childhood". (Quartz & Sejnowski 2002, 135)⁵¹ The self arises from a combination of conflicts which force the brain to organize experiences around an enduring subject which allows it to make long-term plans and see others as persons. The self is thus made of many identities which require a "long interaction with a social environment, during which flexible self-representations are constructed" (Quartz & Sejnowski 2002, 135).

From Self to Society: Morality, Intelligence and Happiness

The organization of the hormonal and neural systems underlying human social bonds vindicates Aristotle's conjecture that human sociability flows out of the bonds of child rearing. (Quartz & Sejnowski 2002, 176)

While cultural biology provides a comprehensive explanation of human brain development, including the evolution of cognition and personality, Quartz and Sejnowski argue it also explains social behaviours, such as morality, and other complex concepts such as happiness and intelligence. On the issue of morality, cultural biology validates Aristotle's suggestion that humans "may have inherited an extraordinary capacity for trust and civic life from the heavy demands of child rearing" (Quartz & Sejnowski 2002, 161). Quartz and Sejnowski argue that neurochemicals, such as Oxytocin and Arginine Vasopressin, engage powerful brain systems which have "the necessary properties to underlie human

⁵¹ Sigmund Freud emphasized child-parent conflict; Judith Harris argues that peer groups have the most effect on personality, intelligence and mental health; and Frank Sulloway concludes that personality is a survival strategy that unfolds to navigate the world of family with sibling interactions.

sociability, and perhaps even the affiliative impulse that can build the trust needed for a civil society” (Quartz & Sejnowski 2002, 170). Accordingly, their hypothesis is that human morality may be grounded in “[b]iological attachment systems, a theory of mind, a rich repertoire of selves. These are the components that underlie your capacity to live in a moral order and to build moral codes” (Quartz & Sejnowski 2002, 183; more on this in Chapter VI).

Within cultural biology, intelligence can be understood as “a complex strand of social, emotional, intellectual, and motivational brain systems” (Quartz & Sejnowski 2002, 233), and is not merely a modular capacity “inside the head”. The simplest physical artifacts, like pen and paper, can overcome limitations of internal memory; more complex – social – systems not only enable intelligence, but they *are* locums of intelligence. Intelligence is thus a continuum of systems: on one hand individual localized brain systems *are* intelligence because they oversee individual-immediate environment interactions with a goal of increasing physical fitness; other non-localized systems, such as culture, oversee interactions between individual and society with the goal of social fitness.⁵²

Vindicating Aristotle further, Quartz and Sejnowski argue that Aristotle’s *eudaimonia* – the concept of happiness as human flourishing within society – is compatible with cultural biology. They point out that civic engagement triggers and fosters uniquely human capacities; i.e. without social engagement some capacities do not manifest. And psychological studies on human happiness

⁵² According to LLH, neuroscience research supports this theory as environmental alternations have been shown to change the structure of the nervous system to improve mental performance.

consistently identify the quality of social bonds as the most powerful predictor of life satisfaction – another remarkable validation of Aristotelian philosophy.

In sum, Quartz and Sejnowski's cultural biology underpins a psychology of mental processes centred on social interaction, rather than localization, and support the idea of human sociability flowing out of the bonds of child rearing.⁵³

Rhetoric and the Biology of Brains, Emotions and Morality

In LLH Quartz and Sejnowski argued that evolutionary biology supports the conception of brains as externalized, emotions as bridging controlled and automated brain systems, of culture as a type of intelligence, and morality as founded on neurochemistry. Do such notions validate or explain how and why rhetorical elements and methods are successful?

First, Quartz and Sejnowski are among several modern biologists who explicitly state that their research validates Aristotle's argument that morality rises out of the child-parent bond: the "organization of the hormonal and neural systems underlying human social bonds vindicates Aristotle's conjecture that human sociability flows out of the bonds of child rearing" (Quartz & Sejnowski 2002, 176). If this is correct, then rhetorical persuasion should be understood and studied as a type of social behaviour that is inescapably tied to the founding biological principle of the child-parent bond. Furthermore, biological findings that:

(i) the human brain will not fully evolve without adequate social interaction, and

⁵³ See Quartz & Sejnowski 2002, 160: "This sociability, Aristotle believed, grows out of the child-parent bond, which is essential to an animal requiring intensive and prolonged child care, and spreads from there to create the bonds that underlie all your social life."

(ii) that some mental capacities will not develop without social engagement, both support the Aristotelian idea that happiness means being engaged in rewarding human relationships. Even Tindale's more contemporary notion of cooperative rhetoric may find support within cultural biology as the former aims at diluting adversarial and conquest principles of persuasion while the latter suggests the innate need for social engagement.

While further validation or explanation using the cultural biology framework may be difficult without significant speculation, we can suggest potential avenues for future inquiry. First, Quartz and Sejnowski's biological hypothesis of morality as arising out of extended child-mother attachment mechanisms may explain why the credibility of the arguer and their role in the "community group" is so important in persuasion activities; it would be interesting to study the relationship between successful persuasion and the social class of the arguer. Second, with respect to the LLH ideas on brain externalization, perhaps persuasion can be thought of as externalizing the decision making process; at the very least, such a hypothesis is in line with Keith Frankish' suggestion that "[r]easoning may thus have evolved primarily for collective cognition, if not for the individual variety" (Mercier & Sperber 2011, 79). Thus, persuasion activities could be viewed as collective reasoning or even collective thinking; this may fit well with Tindale's suggestion that persuasion must function to "improve minds". And Tindale's ideas of "invitational rhetoric" and of rhetoric as a "cooperative venture" may receive significant support from a biological paradigm where language is considered as an adaptation aimed at controlling cooperation and resources.

Lastly, it may be fruitful to investigate how the “self” is engaged in persuasion activities. If personality – the self – is a construct of social conflicts and is based on long term planning, then perhaps the self is heavily involved in persuasion activities; in fact, several persuasion theories (see Chapter III) converge on the idea of belief harmony (consistency theory) or the ease of information integration (information integration theory) as involved in attitude change. One hypothesis can be that the self is always at risk (of change or challenge) in persuasion activities. Thus persuasion activities may be viewed as threatening to systems which by all indications appear to prefer the *status quo*.

Conclusion

Pagel’s as well as Quartz and Sejnowski’s ideas on humans and society are largely consistent with established and accepted scientific principles. While it is not straightforward to extend ideas from evolutionary theory to rhetoric, it is clear that some rhetorical ideas are already consistent with evolutionary biology and that many more could be discussed (and perhaps challenged) by evolutionary biology.

The last chapter of this thesis discusses another field of biology: neuroscience and focuses on the neurochemistry of morality (as hinted at in this chapter) and the neuroanatomy of deductive and inductive reasoning. The results are presented as further validating and articulating rhetorical ideas.

CHAPTER VI

NEUROSCIENCE AND RHETORIC

Aristotle observed that we are fundamentally a social species. Social species create emergent structures beyond the individual, ranging from dyads (or pairs) and families to groups, communities, and cultures. What Aristotle did not appreciate is that these emergent structures evolved hand in hand with the neural, neuroendocrine, cellular, and genetic mechanisms that support them. Evolving social behaviors helped these organisms survive, reproduce, and care for dependent offspring for a sufficiently long time that they too reproduced. (Cacioppo & Ortigue 2011, 1)

The last chapter of this work discusses scientific findings on cognition from the discipline of neuroscience and what such findings may mean to the rhetorical approach to persuasion. We start with a review of Vinod Goel's neuroimaging research on deductive and inductive reasoning processes and try to extend his findings to the rhetorical methodology. Next, we review Patricia Churchland's argument that neurochemistry and evolutionary biology can explain human morality as a type of social behavior.

Neuroscience, Goel and the Neuroanatomy of Logical Reasoning

Our lack of success in this regard [i.e. uncovering mechanisms of inductive inference] may result from a misconceptualization of our reasoning abilities. In particular, our belief that we can, in principle, access any piece of knowledge in any given situation, maybe an illusion. We may not be general-purpose reasoning systems after all. (Goel & Waechter 2012, 36)

Neuroscience is defined as the science of the nervous system with cognitive neuroscience focusing on how cognitive psychological functions (e.g.

reasoning) are produced by neural circuitry. Social neuroscience is a newer field of study that evolved to investigate the role of biological mechanisms in social interactions; as Cacioppo and Ortigue point out, “we are unlikely to achieve a complete understanding of social behavior if we limit analyses to any single level of organization. ... Comprehensive behavior theories thus require understanding of biological, social, and other factors.” (Cacioppo & Ortigue 2011, 4).

In this section we review Vinod Goel’s research into the role of the prefrontal cortex in deductive and inductive reasoning. Goel has carried out numerous functional neuroimaging studies of inductive and deductive reasoning with the goal of identifying what neuroanatomy is engaged when we reason. Aristotle himself had acknowledged that induction played a significant role in rhetoric and reasoning: “argument by example [a rhetorical approach], ... has the nature of induction, which is the foundation of reasoning.” (Aristotle 1984, 1393a.25) and Goel’s research seeks answers to basic questions about the neurological nature of inductive and deductive processes.

While Goel’s research is in neuroscience, it is directed by psychological theories and philosophical ideas. Thinking processes, according to Goel, are studied in psychology over three branches: problem solving, reasoning, and judgment and decision making. One of the focuses of psychological studies over the years has been to determine the difference between reliance on beliefs and engagement in logical analysis: “[t]he important point for our purposes is the distinction between using knowledge and beliefs to solve a problem versus using more general or universal, content-free procedures” (Goel 2009, 419).

Goel's neuroimaging research on reasoning has shown "two distinct [brain] systems are involved in reasoning about familiar and unfamiliar material" (Goel 2009, 419). That is, reasoning using examples and reasoning using abstract structures each activate different parts of the brain.⁵⁴ Other studies have extended Goel's findings to decision-making and the best theory put forward thus far is that the prefrontal cortex stores large scale knowledge structures which guide our reasoning in routine situations. Thus, errors in *deductive* reasoning could occur from the premature engagement of such structures; for example, rather than assessing the logical validity of an argument, we engage in a process to determine the truth of the conclusion.⁵⁵ Another similar theory, "structured event complex (SEC) theory proposes that much of our world knowledge is stored in script-like data structures and frontal lobe patients have difficulty in accessing/retrieving these structures" (Goel 2009, 425).

To summarize, current neurological theories of thinking operate at the phenomenological or computational description level and there is limited understanding of mid-level constructs; however, there are good candidate theories: content sensitive pattern matchers, conflict detection systems, uncertain information maintenance systems which all attempt to explain psychological research and philosophical notions of reasoning.

⁵⁴ "More specifically, a left lateralized frontal-temporal conceptual/language system processes familiar, conceptually coherent material, corresponding to the heuristic "term", while a bilateral parietal visuospatial system processes unfamiliar, nonconceptual material, corresponding to the formal/universal system." Goel & Waechter, 2012, page 3.

⁵⁵ The research on deductive reasoning shows that subjects perform better when logical conclusions are consistent with beliefs they hold about the world.

In a recent paper (Goel & Waechter 2012) Goel provides a multidisciplinary, though not exhaustive, framework for understanding the philosophy, psychology and neuroscience of deductive and inductive reasoning. Goel defines reasoning as “reaching conclusions not explicit in argument premises” (Goel & Waechter 2012, 36) and argues that: (i) philosophically, reasoning is studied via epistemic relationships between premises and conclusions; (ii) psychologically reasoning is studied as cognitive processes of drawing inferences; and (iii) neurologically reasoning is studied via neural mechanisms of brain processes engaged while subjects reason.

While philosophers have studied *deduction* and *induction* for many years, Goel argues that a point missed (by philosophers such as Hume who discussed induction at length) is that we are quite selective about when to rely on induction as the mind is only “prepared to generalize or project certain regularities but not others” (Goel & Waechter 2012, 42). With respect to the psychology of *deduction*, Goel states that the literature by and large focuses on reasoning errors: how intelligent subjects make numerous mistakes in deductive reasoning; why subjects reason more accurately when the deducible conclusion is consistent with their beliefs; why subjects misidentify given tasks and show preference towards matching existential or negative qualifiers of premises and conclusions⁵⁶; and why subjects are overall affected in deductive reasoning tasks by atmosphere and mood effects. On the other hand, the psychology of

⁵⁶ *Modus ponens* is accepted at a 97% rate; *modus tollens* 60%; denying the antecedent and affirming the consequent accepted at a 40% rate.

induction research is largely focused on the: (i) similarity between premise and conclusion – also known as relevance or a way of increasing confidence in the conclusion; and (ii) causality generalization which is usually present wherever premises and conclusions have some causal relationship. However, the frame problem – how to decide what is relevant – is a very difficult theoretical problem⁵⁷ and causality studies also suffer from general difficulties. Goel suggests that one theory regarding the psychology of *induction* comes from neurology, namely, that we may need to consider induction as “a tight causal coupling (i.e., no gap) between input-output [premise-conclusion] pairs. If this is correct, then our ability to respond to wide-ranging stimuli, in extremely flexible ways, is simply an illusion” (Goel & Waechter 2012, 22).

The cognitive neuroscience of *deductive* and *inductive* reasoning is much more limited than the philosophical and psychological literature. The neuroscience of such reasoning processes starts with the basic goal of identifying neuronal systems involved and understanding the causal interactions for various inference processes. Goel himself has conducted experiments with subjects given reasoning tasks and has uncovered several results. First, there appears to be no single *deduction* reasoning module: “different brain areas are recruited for logical reasoning depending upon factors such as type of argument (syllogisms, transitive inferences, conditionals, etc.) presence of negation, the presence of unbelievable sentences, form of the argument (valid, inconsistent,

⁵⁷ There are likely strong parallels between the struggles of psychologists and those of argumentation theorists in trying to define relevance.

indeterminate), presence or absence of content, emotional valence of content, etc.” (Goel & Waechter 2012, 23). Furthermore, it appears that there are separate systems for dealing with familiar and unfamiliar material and certain and uncertain information.⁵⁸ The mechanisms which detect conflicts between formal reasoning mechanisms and belief-bias (i.e. the mechanisms which make us aware that logically valid arguments may have false conclusions) were also localized to several areas.⁵⁹ The implications for cognitive neuroscience theories of *deductive* reasoning are “that both [visuospatial systems and language/syntactic systems] can be engaged depending on the nature of the stimuli... data shows the involvement of multiple systems, one which does corresponds to the effortful formal system, but the other is a very sophisticated conceptual, language mediated system that we certainly do not share with rats and pigeons.” (Goel & Waechter 2012, 28).

Lastly, with respect to neuroanatomy of *induction* there are very limited results and Goel states that while it is difficult to theorize from the data, some neuroscientists already hypothesize that *inductive* reasoning appears to rely on working memory and linguistic processing.⁶⁰

⁵⁸ “Left lateralized frontal-temporal conceptual/language system processes familiar, conceptually coherent material while a bilateral parietal visuospatial system, with some dorsal frontal involvement processes unfamiliar, nonconceptual or conceptually incoherent material.” See Goel & Waechter 2012, page 23.

⁵⁹ The engagement of right lateral/dorsal lateral prefrontal cortex (BA 45, 46) is a well documented phenomenon.

⁶⁰ Specifically, activity has been located to Brodmann’s Areas 8, 9 and 10.

Rhetoric and the Neuroanatomy of Deduction and Induction

While Aristotle (and more contemporary rhetoricians) defended a conception of rhetorical persuasion which did not centre on formal deduction or induction, both induction and deduction play a role in rhetoric. Aristotle even stated that “the orator’s demonstration is an enthymeme, [and this is, in general, the most effective of the modes of persuasion];” (Aristotle, 1984, 1355a7; text in brackets excised in some translations). It is thus appropriate to ask what a descriptive science of neurological inductive and deductive processes could tell us about appeals to deductive and inductive notions and what, if anything, that would imply for our understanding of rhetorical persuasion.

To start we should point out that Aristotle’s rhetoric appeals to two types of logical devices (in addition to appeals to emotions and character), namely, the enthymeme and the example: [“The example is an induction, the enthymeme is a deduction, and the apparent enthymeme is an a apparent deduction; for I call a rhetorical deduction an enthymeme, and rhetorical induction an example.”] (Aristotle, 1984, 1356b2-4; excised text in some translations). Aristotle also states that “the true and the approximately true are apprehended by the same faculty.” (Aristotle, 1984, 1355a14).

Goel’s findings on *deduction* were that “different brain areas” were recruited depending on various factors involved in the reasoning task (e.g. conditionals, negation, unbelievable sentences etc.) and that unfamiliarity and uncertainty of information involved multiple brain areas as well. While Goel did not test true vs. apparent deduction, it does appear that when faced with a

formally valid argument, the brain is prepared to – and frequently – contextualizes much of the elements; this contextualization process seems to be in part to blame for some of the errors in logical reasoning discussed in the psychological literature (e.g. misunderstanding the task, performing better when given agreeable conclusions or familiar topics, etc.). This bias towards contextualization may indicate that brain systems are primed to handle uncertainty (i.e. non-deductive reasoning) by having a web of systems which value validity-irrelevant considerations. A speculative explanation may simply be that in its evolutionary experience of processing millions of years worth of information, the evolving brain encountered less formally valid reasoning tasks than other types of tasks (such as those requiring assessments of character and perhaps engagement of emotions) and did not experience a sufficient impetus for acquiring perfectly deductive reasoning systems. Ultimately, as there is no direct neurological research into quasi-deduction (i.e. enthymeme) it is difficult to state the relationship between systems which recognize valid deductions and those that deal with apparent deduction; however, from the type of mechanisms involved in valid deduction, it can be reasonably expected that “apparent” deductions rely on similar (if not identical) machinery as involved in reasoning about valid deductions.

With respect to the *induction* involved in the rhetorical example, maxim or analogy, psychological and neuroscience research are beginning to broadly define the mechanisms behind the process. The psychological research seems to point towards a tendency to reason via induction when there are similarities or

causal relationships between premises and conclusion. And the neuroscience research suggests working memory (as opposed to all memory) and linguistic structures – both of which are more recently evolved systems. Goel speculates that the brain engages induction systems when there is “a tight causal coupling (i.e., no gap) between input-output pairs” (Goel & Waechter 2012, 22); this may suggest that induction systems are triggered by semantic systems which yield and present causal or similarity relationships to other systems.

Does this limited research on induction validate rhetorical methods that appeal to examples, maxims or analogies, or provide any explanatory mechanisms for how and why such devices work? In one way we can certainly see some validation of Aristotle’s emphasis on examples (and other induction based appeals) as good persuasion strategies in the fact that reasoning via induction engages linguistic processing and working memory – both of which are active during persuasion activities. For example, using an analogy is powerful because the audience – during the communication exchange – is engaging similar brain systems to process the communicated information as they would if they were engaged in inductive reasoning. It would be very interesting to have more research to determine how much of a role different brain systems involved in communication have in dictating the modes of persuasion.

Perhaps the most concerning conclusion of Goel’s research is that most of the problems requiring conscious thinking are commonly solved by relying on reasoning scripts which are in turn triggered by cues such as familiarity, trust and other emotions; as Goel puts it, we may not be general purpose reasoning

machines and “our ability to respond to wide-ranging stimuli, in extremely flexible ways, is simply an illusion” (Goel 2012, 22). This is primarily a concern for its direct challenge to the notion that we can easily recognize deductive validity (research shows we frequently don’t) and that we are consciously aware of how we reason, especially when carrying out deductive proofs (the research shows that we do not always engage the appropriate neuroanatomy and that we also automate the deductive proof process, which should be a controlled system). Is there an incompatibility between rhetorical methodologies that suggest specific well-defined strategies for achieving adherence and the real world-heuristics of reasoning minds which appear to rely (at some levels) on automation? Not necessarily; in fact, the conclusion that can be drawn from the research is that we are imperfect logicians and that it is necessary to appeal to multiple modes of persuasion in order to properly address and engage our reasoning systems. While we commonly consider validity-irrelevant factors (e.g. when we err in deductive reasoning), in the context of real world reasoning – and argumentation – it may simply be that syllogisms are uncommon and that we are better off having multi-purpose reasoning mechanisms than validity focused mechanisms. Making errors in logical reasoning may be an acceptable trade-off relative to being able to assess complex reasoning and general persuasion efforts.

Perhaps we have to accept Goel’s hypothesis that we are not general purpose reasoning machines or logicians at face value. And that when faced with real world arguments – i.e. those not taking the form of logical deductions –

the need to consider a wide range of methods to stimulate our (ancient and newer) reasoning systems has significant validation.

Churchland's Neuroscience of Morality

In this last section of the chapter, Patricia Churchland's theory of morality as outlined in her book *Braintrust: What Neuroscience Tells Us about Morality* (Churchland 2011) is discussed. Churchland views morality as rooted in basic human biology (much like Aristotle) and dismisses the idea that morality is genetically inherited – on one extreme – or reducible to socially created rules⁶¹ – on the other. For her, morality is an adaptation where neurochemical systems designed for self-care are extended to care-for-others, such as offspring, kin and groups. Churchland's hypothesis is that social and moral behaviour lies on a continuum of neurochemically modulated behaviour.⁶²

Churchland argues that the story of morality begins with self-preservation brain systems – e.g. the brainstem-limbic circuitry – that evolved based on complex anatomy with specialized components, neurochemicals, pathways and connections which register fear and anxiety and trigger “protect-myself” signals. Churchland argues that once such systems gave rise to a minimal sense of self, self-caring behaviour set a ground-floor for the evolution of the nervous system;

⁶¹ Such as “do unto others, as you would have them do unto you”.

⁶² Neuroimaging research already indicates that the same parts of the prefrontal cortex are used when engaging in social and moral behaviours. Churchland speculates that being moral may not be uniquely conceptualizable – i.e. “moral” does not have a firm meaning – much like neuroscience shows some social concepts to have unclear – fuzzy – regional boundaries within the brain. (This idea of “fuzzy” boundaries may have similarities with Aristotle's homonymical theory of essences which considered different meanings – or uses – of notions such as “the good” as irreducible to a core concept.)

eventually, “protect-mine” behaviour arose. The next level of circuitry, e.g. “protect-offspring” behaviours were “not the result of a wholly new engineering plan, but rather, an adaptation of existing arrangements and mechanisms that are intimately linked with the self-preserving circuitry for fighting, freezing, and flight, on the one hand, and for rest and digest, on the other” (Churchland 2011, 48).⁶³ From there, Churchland suggests the key to the extension of protective behaviours to non-kin was social trust and is explainable by several factors: “[c]ooperative parenting, in tandem with stable pair-bonding anchored by an oxytocin and vasopressin network, [which] might mean that for hominids... trust was a typical baseline within the family, and could readily be extended to kin and affiliates in a small group, benefits and reputation permitting” (Churchland 2011, 91). Predictability of other individuals’ behaviour within society gave rise to reputation and this allowed social behaviour to go even further and expand “beyond the circle of kin and familiar folks if the institutional arrangements can be counted on to assure a reasonable level of trustworthiness of participants, known and unknown” (Churchland 2011, 65). And lastly, altruistic “resource levelling” (e.g. food sharing) spreading within clans gave some support to altruism genes spreading wherever clan warfare was accompanied by resource levelling.⁶⁴ Churchland suggests there were other factors involved in human cooperation such as the ability to delay gratifications, or suppressing costly impulses, having

⁶³ “Thus the mother rat behaves as though the newborn pups are included in her basic homeostatic ambit”, Churchland 2011, at page 30.

⁶⁴ Churchland provides four hypotheses for the evolution of human cooperation: lose hierarchy and easygoing temperament, cooperative parenting expanding to the group, sexual selection and lethal intergroup competition.

good memory and analogical reasoning abilities – many of which, she points out, were discussed by Aristotle in the *Nicomachean Ethics* in relation to the acquisition of social virtue and wisdom through experience.

Churchland concludes that moral behaviour results from many brain systems interacting together to solve social problems and that moral “dilemmas we encounter in the real world are typically resolved by constraint-satisfaction, [and] case-based analogies, emotions, memory, and imagination are almost always involved” (Churchland 2011, 184). She rejects the view that morality is arbitrary or innate and agrees with Aristotle who saw “morality as not a divine business or a magical business, but as an essentially practical business” (Churchland 2011, 201). While the idea of morality being innate is “irresistible”, it is unlikely that cooperation – and moral behaviour – are associated with large-effect genes. We know, for example, that some traits – such as skin pigmentation⁶⁵ – can be linked to ecological conditions but reverse engineering traits (or behaviour) to brain regions or genes is fraught with potential for errors. Churchland is an ardent critic of Haidt’s innateness approach to morality⁶⁶ and argues that the apparent universality of some moral behaviours is simply due to the particular behaviours being an obvious solution to a common problem.⁶⁷

⁶⁵ Skin pigmentation not only involves over 100 genes, scientists are unsure how the genes interact.

⁶⁶ Haidt’s Moral Foundations Theory supposes that moral virtues have an evolutionary basis. Churchland argues that the science does not support such a view and it is more likely that moral behaviour reflects social practice acquired during childhood and ingrained via the reward system.

⁶⁷ Churchland provides the example that boat making is a common solution to travel over water, but likely not innate, and that truth-telling is reliable and important, but it is a social practice, not a strict rule. Genes for – or the innateness of - truth-telling or boat building are not warranted despite the universality of such behaviours.

Thus, we should not assume that the commonality of some moral behaviours – not killing, for example – makes them genetically inheritable or socially innate or universal.⁶⁸ That certain social practices are common – such as not killing – may simply be an obvious solution to a common social problem, aka “constraint satisfaction problems”. Churchland suggests an analogy to problem solving: the fact that distinct human societies learned to build boats to cross rivers is not due to innateness of such a technology, but due to the obviousness of such solutions to a common practical problem. In genetic terms, there may simply be no gene or group of genes responsible for moral or deceptive behaviour.⁶⁹ Moreover, rules constantly run into conflict with each other⁷⁰ and even the Golden Rule of *do unto others as you would have them do unto you* runs into business and trade exceptions, war exceptions, policing exceptions and priority exceptions when one must give preference to those of closer kin; “[a]s both Aristotle and Confucius realized, context matters a lot, which is why they both considered moral

⁶⁸ The example given by her is that some Inuit cultures value truth more than murder. The anthropologist Resmusen tells a story about the Inuits where the father was away hunting and his child gathered eggs in piles by a rock by the ocean; he then called everyone to say a ship was coming and pelted them with rotten eggs; mother asked the elder man of the group to kill child and the elder of the group took him and threw him in a crevasse; the child fell through and then returned home where, apparently he didn’t hold a grudge.

⁶⁹ See Dierick, H.A. and Greenspan, R.J. (2006) “Molecular analysis of flies selected for aggressive behaviour”, *Nature Genetics* 38: 1023-1031. The researchers wanted to trace aggression genes and they bred aggression in fruit flies over 28 generations with an expectation that in the final generation of hyper-aggressive flies there would be identifiable genetic differences to correlate with aggression. The surprising findings were that only tiny changes occurred across 80 genes – none of which were involved with neurochemicals responsible for aggression. The conclusion drawn was that behaviour was a matter of how a network of brain structures interact rather than a simple one to one mapping of gene to behaviour.

⁷⁰ Churchland gives examples of the conflicts between different parts of the US Constitution.

knowledge to be rooted in skills and dispositions, not a set of rules or, in Hauser's terms, a "moral grammar"⁷¹.

To summarize, Churchland's arguments are that although neuroscience research into morality is still in its infancy, the science already tells us a lot: individual genes, brain-regions or modules cannot be the sole source of moral behaviour and morality appears to be a type of social behaviour. Churchland argues that aside from understanding how mother-child bonding was adapted to other social and moral circumstances, we have no better way to understand moral behaviour; we are essentially left with Aristotle's suggestion: "social wisdom ... depends on the early development of good habits, and the capacity to reason sensibly about specific social issues" (Churchland 2011, 164).

Neurochemistry and Rhetoric

Do Churchland's arguments on the biology of morality yield any explanatory power or implications for rhetoric? If we accept Churchland's statements at face value, neuroscience validates not just the large parts of Aristotle's moral writings which she references, but his rhetorical approach to morality. That is, if morality is a type of (evolved) social behaviour that is not governed by genes or universal axioms, but uncovered through a process where we "reason sensibly about specific social issues", as Churchland states, then

⁷¹ Hauser's approach is modeled on Noam Chomsky's view on the nature of language and language acquisition. "Chomsky believes that the human brain is genetically equipped with a unique "language organ" specifying abstract principles of syntax that become more concrete with exposure to language. From this organ flows our grammatical intuitions, and our ability to learn specific languages. Hauser argues that humans likewise have a "moral organ" that specifies the universal principles of morality...", See Churchland 2011, pages 104-105.

rhetoric is clearly a form of social engagement in reasoning that fits the bill for uncovering what is moral. Aristotle envisioned the practice of rhetoric as allowing us "...to say which is the greater or lesser good, the greater or lesser act of justice or injustice; and so on." (Aristotle 1984, 1355a24-26) and such a role is validated in a world where neither genetic inheritance nor absolute (*a priori*) rules can determine questions of "justice" and the "good". The very nature of rhetoric as a type of social activity which engages the whole person, rather than as an inquiry into logic, brings rhetorical methodology in line with Churchland's ideas that social issues need to be resolved via sensible reasoning.

Another important point that should not be overlooked is that morality, in Churchland's view, is a type of social behaviour evolving out of complex systems of neurochemical interactions; morality is by its very nature emotional and is connected to ancient brain systems that involve protection of self and of kin. Such a conception of morality validates the importance and appropriateness of appeals to emotions and character (e.g. character trust, which is partially an emotional appeal) in rhetorical activities – which are a type of social activity that brains have evolved to take part in and essentially externalize into.

It can also be argued that there is some consistency between Churchland's position that moral behaviour is the outcome of a constraint satisfaction process with no unique solutions and Perelman's conception of rhetoric as solely about the adherence of the audience at hand – rather than the adherence of a general adherence. More precisely, Perelman's notions that rhetoric "...is, in its entirety, relative to the audience to be influenced" (Perelman

1969, 19) and that “[e]ach individual, each culture, has thus its own conception of the universal audience” (Perelman 1969, 33) supports the idea that the outcome of rhetorical practices does not have to be unique. Perelman’s position that particular and universal audiences can be construed differently by an individual’s sense of self and culture is certainly consistent with Churchland’s position.

Not only does Churchland explicitly echo Aristotle’s sentiments on morality but she re-discovers the device of “inertia” that Perelman referred to in his writings and she provides a biological explanation for what “inertia” may mean. Perelman had defined “inertia” as an “...attitude previously adopted - the opinion expressed, the behavior preferred - will continue in the future, either from a desire for coherency or from force of habit.” (Perelman 1969, 105-106); and as tradition: “[i]n any social order, then, everything that is traditional will appear to be a matter of course. Per contra every deviation, every change, will have to be justified. This situation, which results from the application of the principle of inertia in the life of the mind, explains the role played by tradition.” (Perelman 1963, 86).

Churchland conceived of inertia neurologically as an “internalization of social standards via the reward/punishment system” (Churchland 2011, 131) which “means that prevailing practice may have substantial inertia, and can be changed only quite slowly, bit by bit. When the practices embody long-acquired wisdom, this can be beneficial. When conditions require a change, this inertia may be a detriment.” (Churchland 2011, 132) Her conception of this psychological resistance to change – which she incredibly names “inertia” as well

– is very similar, if not identical, to Perelman’s work; and her reconceptualization of “inertia” as a type of internalization of social standards defines the concept with sufficient scientific description that it could be psychologically and neurologically studied.

Lastly, other rhetorical devices, such as the appeal to the trust and character of the speaker (i.e. *ethos*) are consistent with Churchland’s conception on the central role trust played in the evolution of social behaviour. Churchland argued that the ability to trust non-kin was a key stepping stone in the evolution of moral behaviour from care-for-kin to care-for-others.

Overall, Churchland’s framework for understanding morality as biologically evolved social behaviour validates and provides several explanations for rhetorical devices put forward by the rhetoricians. By defending a notion of morality that is dependent on practical wisdom and concern for one’s kin rather than being a type of universally unique principle, Churchland validates the importance of engaging in persuasion practices involving reasoning; there is no better methodology for such practices than rhetoric.

CHAPTER VII

CONCLUSION

The proof that the state is a creation of nature and prior to the individual is that the individual, when isolated, is not self-sufficing; and therefore he is like a part in relation to the whole..., Aristotle, 1984, (*Politics*), 1253a25-32

The goal of this thesis was to link the principles outlined in Aristotle's *Rhetoric* (along with some modern updates) to theories and ideas from modern psychology, biology and neuroscience. The thesis was that the rhetorical approach to non-deductive persuasion – which stated that in persuasion activities the arguer, the audience with its motivations, and emotions and other entities were responsible for attitude change – could be validated and explained within the paradigms of modern biological sciences.

In Chapter II we discussed the principal ideas from Aristotelian *Rhetoric* such as: appealing to quasi-logical structures such as enthymemes and examples, appeals to *ethos* (character of arguer) and *pathé* (emotions of audiences), and the styles and methods of delivery of argumentation. We discussed Chaim Perelman's conception of rhetoric as regressive philosophy in which the adherence of a particular but universalizable audience was the primary goal and where tradition (i.e. "inertia") played a significant stabilizing role. And we reviewed Christopher Tindale's conception of rhetoric as the all-encompassing theory of persuasion where humanist goals, such as inclusion, cooperation and communication, are sought alongside audience adherence.

In Chapter III we presented several ideas on how rhetorical methods are validated and explained by modern psychology. We discussed dual process theories of reasoning which classify and explain rhetorical appeals as involving automated and controlled reasoning systems and which establish automated systems, such as emotions, at least as valuable as controlled systems, such as reasoning proper; we reviewed psycho-social theories of cognition in which rhetorical methods could be viewed as curing reasoning biases via collective argumentation; we suggested that ideas from evolutionary psychology confirm the importance of *ethos* (character) as a valid form of conflict negotiation and coordination of social relationships; and we presented the argument that belonging to a group may explain the importance of both character and appeals to peculiarities (particularity and universality) of audiences.

In Chapter IV, we discussed rhetoric and ideas from the computational framework of cognitive science. We reviewed how rhetorical appeals to character (*ethos*) and emotions (*pathos*) are consistent with a framework where both cognition and emotional processes are reconceptualised as constraint satisfaction processes where decision making is more similar to arriving at an – intuitive – emotional reaction, rather than carrying out a conscious, deliberate calculation; and we pointed to the potential for rhetorical persuasion to be modeled as group decision making understood as cognitive and emotional consensus building.

In Chapter V, we reviewed biological theories of human-culture co-evolution. We discussed the idea of language as a technology that increased

inner-group cooperation while excluding non-group members and how such an idea may explain the importance of character (e.g. appearing to belong to the same group) and emotion (e.g. knowing the emotional spectrum of the audience) in persuasion activities. We also discussed how morality may have evolved out of the child-parent biological bond and suggested that rhetorical persuasion could be understood and studied as a type of social behaviour that arises, perhaps, in larger societies but which is inescapably tied to the evolutionary biology principles of human evolution.

Finally, Chapter VI reviewed ideas from the discipline of neuroscience including: that script-like – i.e. unconscious – processes may be involved not only in emotional cognition but also in deductive and inductive reasoning indicating that brains are primed – and biased – towards evaluation of a world of uncertainty, further validating the importance of the rhetorical approach to persuasion and the need to consider a wide range of methods to stimulate our (ancient and newer) reasoning systems; and that moral behaviour is a type of social behaviour not governed by genes or discoverable axioms which further validates the importance of the social activity of rhetoric and our ability to communally reason about social issues.

What would render Aristotle's philosophical rhetoric inconsistent with modern biology? To undermine the accuracy, usefulness or modern relevance of rhetorical ideas we would need evidence (or arguments) for either a *qualitative* or *quantitative* failure; i.e. we would require strong arguments that either: (i) other non-rhetorical principles are mostly responsible for attitude change in non-

deductive argumentation (e.g. it is not appeal to character traits, but bio-rhythms or other non-conscious processes not affected by rhetorical methods which effect attitude change); or (ii) rhetorical principles play a small role in attitude change (e.g. appeal to character promotes little attitude change compared to the bio-rhythms or other chance effects within the hearer).

Given the scientific ideas presented in this thesis, there is little evidence that rhetoric fails *qualitatively*: traditional (and modern) rhetorical methodology appear to exhaustively describe non-deductive argumentation methods for achieving attitude change; and this should be expected as Aristotle's rhetoric by and large withstood the test of time. *Quantitatively* rhetoric is not challenged by psychological or biological theories; however, because philosophical rhetoric only addresses *what* works, it is possible that future scientific ideas may undermine (or at least challenge) the importance of rhetorical principles by uncovering additional, more important, methods for achieving attitude change.

For now, it appears that appeals to rhetorical elements (e.g. emotions, character, etc.) engage vast neural systems of the human brain via many controlled and automatic cognition systems, and Aristotle's philosophical intuitions about rhetoric (with its modern revisions) are not in danger of being challenged by science. But future scientific inquiries may raise challenges, although Aristotle would likely not mind; he defined rhetoric as "observing" all the means of persuasion and would certainly accept "scientific observation" as just another way to uncover the means of persuasion and our true human nature.

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