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The handicap principle and the argument of subversion from within

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ABSTRACT

This paper examines the very disparate positions that various actors have taken towards the *argument of subversion from within* (a classical argument against the evolution of altruism by group selection) in a set of related debates on group selection, altruism and the handicap principle. Using this set of debates as a case study, this paper argues that different applications of epistemic values were one of the factors behind the disagreements between John Maynard Smith and Amotz Zahavi over a number of important evolutionary issues. The paper also argues that these different applications were connected to important epistemological differences related in part (but not solely) to their disciplinary background. Apart from conflicting evolutionary views concerning the theoretical feasibility of the handicap effect, these antagonists both differed in the confidence they ascribed to mathematical modeling and over the hereditary basis for altruistic behavior.

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1. Introduction

How are epistemic values applied in scientific discussions? The role of epistemic values has been a focal point for the analysis of scientific practice for more than sixty years. Epistemic values are criteria for "good" scientific conduct, i.e. the criteria by which they distinguish good science from bad science, or "pseudo-science", and by which they evaluate the scientific quality of specific explanations, investigations or factual claims. As such, they purportedly serve an important function in the thinking and decision-making of scientists and permeate every aspect of the scientific process.

Most attempts to capture the role of epistemic values in science have taken the scientific *collective* as its focal point of analysis. From this perspective, philosophers, historians and sociologists of science have constructed a diversity of theoretical entities all designed in order to capture the normative properties of scientific communities. The theoretical entities designed with this purpose includes as diverse constructs as Merton's (1942) *CUDOS* norms; Kuhn's (1969) *disciplinary matrix*; Daston's (1995) *moral economies*, the *styles of reasoning* of Hacking (2002), or even Ziman's (2000) descriptions of the *PLACE norms* for post-academic science.

As to the role of individual choice in the establishment and application of preferred epistemic values within a scientific community, this tradition has in general been silent, although this does not mean that there has been no recognition of a level of individual idiosyncrasy in the application of epistemic values. Perhaps the most important of these recognitions came from Kuhn (1969), who warned against believing that the application of epistemic values was a trivial affair. Although certain kinds of scientific judgments concerning, for instance accuracy might be relatively (though not entirely) stable over time and among members of a scientific community, Kuhn noted that

> "...judgments of simplicity, consistency, plausibility, and so on often vary greatly from individual to individual. What was for Einstein an insupportable inconsistency, one that rendered the pursuit of normal science impossible, was for Bohr and others a difficulty that could be expected to work itself out by normal means." (Kuhn, 1969, p. 184)

Although recognizing that collectivist approaches have delivered important contributions to our understanding of the dynamics of epistemic values in scientific practice, this paper's main analytical perspective is the relation between a collective's shared epistemic

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values and the idiosyncrasies of the individuals who apply them as means to various ends. The focal points of analysis are on two problems of behavioral ecology: the topic of altruism and the debate on the handicap principle. Taking its departure in the analyses of styles of theorizing given by Winther (2005, 2006), as well as the *argument of subversion from within* (a classical argument against the evolution of altruism by group selection), it examines the interplay between epistemic values and other contextual factors such as scientific prestige, disciplinary background, factual beliefs and ontological commitments in a situation where a discipline is under the hegemony of a formal style of theorizing.

2. Two styles of biological theorizing: compositional and formal biology

The concept of style has been employed in a variety of ways in the literature of science studies having caught the attention of scholars with somewhat disparate theoretical approaches. A classical work in this tradition was Fleck's *The Genesis of a Scientific Fact* (1935/1979). Here Fleck defined a thought style (German: *Denkstil*) as the "directed perception, with corresponding mental and objective assimilation of what has been so perceived" (Fleck, 1935/1979, p. 99), noting that a thought style was characterized by common features in the problems of interest to the thought collective, by the judgment which the thought collectives considers evident, and by the methods which it applies its means of cognition. (Fleck, 1935/1979, p. 99). Other uses of the style concept include Harwood's (1987) *national styles* in science or Maienschein's (1991) *epistemic styles*.[1]

In recent years the style concept has been employed by scholars pursuing the idea that it is possible to identify a finite plurality of general methodologies in science that pervades across the boundaries of scientific communities. In a pioneering work, historian of science A. C. Crombie, undertook the daunting task of delivering a complete account of the western history of science since the early Greeks, and identified six general "styles of thinking"—each of which he believed had played a central role in the development of certain scientific areas: (1) a style based on axiomatic postulation and mathematical proof; (2) a experimental style based on designed observation and measurement; (3) a style based on hypothetical modeling as a method of exploring the unknown properties of natural phenomena; (4) a taxonomic style using comparative methods to order the variety in any subject-matter; (5) a probalistic style based on the application statistical analysis; and finally (6) a style of historical derivation seeking to explore the origin and diversification of any subject-matter, whether language or organisms from the common source, and to explain the cause for that diversification (Crombie, 1994, p. xi).

Building on the work of Crombie, philosopher of science Ian Hacking has attempted to explicate the content and meaning of the style concept and its bearing on our understanding of science. Preferring the term "styles of reasoning" to "styles of thinking" Hacking has argued that styles are constitutive of scientific work and embedded in contingent systems of thought that, within a given domain, sets the standard both for what is good scientific practice and how to evaluate the truth or falsehood of knowledge claims. According to Hacking the styles of reasoning that we employ determine what counts as objectivity, in the sense that they provide the frame and criteria that determine which kinds of questions and problems that are scientific legitimate, procedures for how to decide and distinguish between different possible approaches to solving these questions, as well as for deciding which kinds of solutions are scientific acceptable.

There is thus a strong normative component to every style of reasoning. But apart from adhering to a specific set of epistemic values or ideals, every style also contain a range of other component including specific possibilities for investigation, types of objects; new evidence; a vocabulary; laws or modalities; and, on occasion, new types of classification and new types of explanations (Hacking, 2002, p. 189). There is a 'holistic' nature to styles of reasoning in the sense that as a concept it attempts to encompass all relevant components that are part of distinct ways of reasoning, hypothezising, evaluating, investigating, organizing, unifying, understanding, modeling and so on.

With this encompassing account of what a style is, it might be prudent to recount what a style is *not*. It is not a "theory of the world" that can be verified or falsified, at least not in any trivial sense. It might be that a style can be shown to be unfruitful, although the complete extinction of a style seems to be a rare incident.[2] Although the oldest of the six styles originally described by Crombie originated in Ancient Greece, Hacking notes that they are all still going strong.

Building heavily on Hackings styles of reasoning, Winther (2005, 2006) has identified two scientific styles within biology, alternately denoting them *styles of scientific investigation* (2005) or *styles of theorizing* (2006).[3] This identification is based on a conceptual distinction between *parts* and *laws*—a distinction that Winther believes is pivotal for understanding biological theorizing. Hence, much biology follows a style of theorizing Winther denotes "compositional biology". Compositional biology is based on the notion of organic world as organized in parts and wholes, and focus on revealing their respective functions and capacities. This style tend to be employed in a disparate set of biological disciplines, including comparative morphology, functional morphology, developmental biology, cellular biology and molecular biology (Winther, 2006, p. 471).

Although this style of theorizing is prevalent in many biological disciplines, Winther notes that most philosophers of biology have had their eyes focused on another style of theorizing, a style Winther denotes "formal biology". This style of theorizing focuses on mathematical laws and models that represent quantitative relations among parameters and variables. Winther regards this style to be dominant in disciplines like theoretical ecology and theoretical population genetics.

Although certain natural domains tend to lend themselves to one style than the other, Winther also notes that most if not all natural domains can be explored using either styles.[4] The important differences between different styles are neither the scientific disciplines, nor the natural domains to which they tend to be applied. Rather, it lies in their respective *methodologies* of theorizing. This also means that the prevalence of a specific style of theorizing within a given domain may be the result of historical accident rather than logical necessity. There may be instances where styles may hybridize and intertwine, or even coexist (Hacking, 2002, p. 183; Winther, 2005, p. 46). But the all-encompassing ambitions of each style ensures, along with their normative character, that conflict

[1] For a comparison of different approaches to scientific styles, see Vicedo (1995).

[2] Hacking gives two examples of possible "dead styles": Renaissance medicine and witchcraft (Hacking, 2002, pp. 194–195.)

[3] In the following I will use the latter term.

[4] Cellular and developmental phenomena are mentioned as examples of natural domains that tend to lend themselves to one style (in this case compositional biology). However it is important to note that this should not be understood in an imperative fashion. Thus, important contribution to the understanding developmental processes has also been given by scientist employing a formal style analysis. Prominent examples of this can for instance be found in the writings of Stuart Kauffman (Winther, 2006, p. 472; Kauffman, 1993).