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Two Contrasting Cultures

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ABSTRACT: I have argued that argumentation theorists should concern themselves with scientific argument as a source for images of epistemic virtue in argument. In this paper I will contrast the lessons learned from this endeavour with their counterpart in the evaluation of political arguments. Despite obvious differences, fundamental symmetries between the two argumentation cultures point to the need for a more serious engagement with rigorous disciplinary arguments in argument theory.

KEYWORDS: argument, culture, epistemology, evaluation, metamathematics, politics, science, truth, Toulmin.

1. INTRODUCTION

At first sight there are no two cultures of argumentation more different than that of mature physical science and politics. Mature physical science is structured by over arching theories that set constraints on permissible moves, is limited to experts in the field and is governed by professional journals that determine which arguments are to be taken seriously. Political debates, on the other hand, or open to any interested party are unstructured except by loose precedent and vague rules of decency and public acceptability and occur in venues that, given the power of the internet, are completely open to divergent ideas and styles of persuasion.

More important, mature physical science is deeply committed to methodological norms that are traditionally grounded in an epistemology of objective truth and, although fallibilist, tend towards the construction of knowledge structures of the highest possible coherence. Political argument, although open to counter examples, is characterized by persuasive techniques that include simplification, hyperbole and one-sided arguments. Scientific arguments rely heavily on increasing coherence with available reliable information; political argument relies heavily on counter-arguments and alternative perspectives. Since I believe that the basic structure found to underlie scientific argument affords insights relevant to the logic of argument evaluation in general, political argument becomes an interesting test case.

My recent efforts, attempting to give an account to emerging truth as the basis for understanding argument in scientific inquiry, result in a construct that identifies and explicitly defines three salient dimensions against which an explanation is to be assessed, depth, breadth and concilience (increasing goodness of fit with primary evidence)

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(Weinstein 2007). The virtue of the sort of account I provide is that it precludes these dimensions being seen as empty metaphors, for the heart of the account is a precise metamathematical characterization of the dimensions, at least for physical science where it is plausible to assume definable models and relations among them. Clearly no such mathematical precision is possible in the amorphous context of political argument. But the dimensions may be seen to have clear salience to argument in general as well as within political argument. The general power of the view is that in identifying the crucial dimensions, it advances beyond seeing premises as true (or acceptable) tout court. Rather different sorts of premises afford different sorts of epistemic grounding. This has a clear affinity with the work of Stephen Toulmin (Weinstein 2006).

2. SCIENTIFIC ARGUMENT

Toulmin's views on warrant and backing are too well known in general to require much more than mention. In what follows I will be extending these notions in ways that, given his antipathy to mathematics, Toulmin would be unlikely to welcome as his own. Therefore, I won't try to justify the constructions in relation to any of his specifics, rather, I work with the ideas in a general sense that I take to be consistent with the basic understanding of his work.

Backing is the framework within which warrants are to be seen. It constitutes the justificatory ground for the warrants in use and shows them to respect relevant methodological demands, frequently differing in different domains of inquiry. In physical science such methodological items include such diverse things as the use of experimental apparatus, broadly construed, typical use of language with special vocabularies, and clearly formulated procedures for using concepts in the widest variety of ways, from identifying instances to deep theoretic explanations. Warrants are the generalizations that support inference, and as such, form the substance of theoretic explanations.

My work was an attempt to develop an emerging theory of truth through inquiry grounded in ontology. The guiding intuition was that the principled reinterpretation of a concept in a theory as an instance of a concept from a higher-order reducing theory determines what the theories may be seen as *really* about. The most obvious case would be the reduction of the enormous variety of chemical reactions known empirically to the molecular descriptions of the underlying process that explains the reaction—the stuff of Chemistry 101. The commitment to the ontology of molecules and atoms is, in my view, a consequence of the power of the reductions available as the theory exhibited in the Periodic Table of Elements became better understood, coupled with the veritable explosion of chemical knowledge that followed in its wake. My model was an attempt to capture the logic of the phenomenon.

The core of the construction is a theory, T, seen within a scientific structure, TT. T is defined by syntax and procedures for model choice. And so for my purposes TT and its history support the warrants of T through the various sets of reduction functions, R, and functions F defined on predicates in T and including unions of such sets, RR and FF. (See Appendix for some of the crucial details). Constraints on the functions indicate the backing. The relevant history is that of the changing and evolving array of functions mapping sentences onto models under a member of F in FF, intuitively, the interpretations of the sentences, and their incorporation under reduction functions R in

RR that offer a new set of interpretations along the chain that reflects reinterpretations of the theoretic connections with T.

If we take the intuition behind metamathematics seriously, whatever can be described can be described in some syntax. And given a syntax, we can define functions from that syntax onto models. Models are guaranteed by the deepest, yet most optimistic result in modern logic, every consistent set of sentences has a model. Further, every consistent set has a countable model, the notorious Lowenheim-Skolem Theorem (Kleene 1950). The paradoxical consequences of Lowenheim-Skolem are well known; a denumerable model of the real numbers is available, but this model cannot possibly be the intended model of the real numbers, which are provably non-denumerable (Putnam 1983). Given our aims this is a welcome consequence, for following Putnam, the paradox implies that models are not inherent but rather selected (Weinstein 2002).

Despite the formalism, my work is an extension of Toulmin rather than of Tarski. This results from a 'pragmatic turn.' The various functions are all *a posteriori*. The set of models under the various functions in F are to be of actual empirical and explanatory models that constitute the substance of the field of inquiry represented by the scientific structure (claims and warrants respectively). The constraints on goodness of fit for the functions in F reflect the specifics of experimental rigor and measurement (the backing). Explanation is no longer all or nothing as in the D-N model. We can be satisfied with near isomorphs to the intended model leaving open how closely experimental outcomes and other observations need to conform to the intended model to serve the purposes of inquiry at a time. And similarly for the scope of the representing functions in R. Representing functions may represent only a selected subset of the reduced theory. That is, a reducing theory may fail to accommodate all aspects of the reduced theory based on disciplinary standards of principled rather than ad hoc limitations. Both sets of functions can be broadened or restricted as more models become available whether through new experiments, new applications, and especially through newly available reductions. What counts as near enough or broad enough is for the members of the field to determine and constitute an essential aspect of the backing over a period of time. Similarly for the pace of advance, that is, how much stasis or even backward movement is tolerable as inquiry proceeds is determined by the informed judgment of the field as a whole as a function of ongoing debate. Such modifications capture at least some part of Toulmin's notion of rebuttal for they require that claims based on scientific structures be hedged with caveats that reflect an informed sense of issues such as goodness of fit, range of application and estimations of the potential for progress. What is a priori normative is the requirement that isomorphisms are getting tighter over time. And that the reductions are progressive and the chains in which they sit are progressively deeper and broader as inquiry advances. Scientific structures are assessed in terms of general a priori standards such as increase in descriptive and explanatory power, but are given substance by being grounded in the working standards of the field of inquiry. Thus, both the methodology and the underling epistemology are naturalistic as in Toulmin's vision in *Human Understanding*, but normativity is noetically transparent, precisely presented and open to philosophical challenge.

An immediate yield is in the theory of warrants. What I see as the key insight that drives Toulmin from mathematical logic is the idea that our warrants are limited and presented as limited when used, and so deductive connections are just too strong to make

sense of argumentation. And, of course, in conjunction with the rejection of a probabilistic interpretation of the weakening of deductive entailments. The key that enables a general theory of warrant to be constructed on the model of entailment is the insight of David Hitchcock (1998) that warrants are substantive generalizations, that is, constructed by generalizing over content expressions of whatever logical type. In my earlier work. I saw this by analogy to Carnap's L-true in Beta, that is, true by virtue of meaning postulates (Weinstein 1991). But this proved intractable since meaning postulates are just too strong to capture the variety of warrants in use, ranging from logically true to mere rules of thumb (see Pinto 2001 for a discussion of the variety of doxastic attitudes that supports such a view). Thus, what we want from a theory of entailment is a principled account of the strength of the relationship between premises and conclusion in accord with the underlying inference structure. A first approximation to strength can be read directly from my account.

As a basis, a generalization, w, is a *putative warrant* if there is a theory, T, such that T appropriately explains w (T||-e w), in that w is a explanatory consequence of T. A putative warrant is a an explanatory consequence of some accepted body of codified knowledge constructed so as to include near models and with controls on irrelevance (see the Appendix for the construction). We then develop strength as a measure of the theory T as seen within a larger structure of related theories, TT. There are three levels of strength, although each can be internally complex as in the Richter scale. These permit of transparent definitions of epistemic adequacy over time, that is, being 'progressive.' For example, the levels of warrant in what follow are internally structured through a metric on the history of progressive model chains over time and similarly for reductions.

At the first level, a putative warrant, w*, is available as a *warrant*, if m*||-w* and m* sits within a progressive model chain (Appendix, 1.1). The intuition is clear. A warrant must rest within a body of knowledge that is either adequate to the intended model or moving progressively towards it. Intuitively, a generalization serves as a warrant where there is reason to expect that generalization to be adequate to the phenomena it purports to describe or increasingly so.

We then add strength in two significant ways, first in terms of models derived from functions in F and then in terms of models donated from functions in R. A warrant, w*, is *strong* if it is model chain progressive (1.2) It is *stronger* if the model chain, C*, within which it sits is model chain progressive (1.3). The intuition is that strong warrants are adequate to an increasing range of similar phenomena and stronger if they are increasingly so. The next level of strength reflects deep theoretic connections, so a warrant, w*, is *super strong* if m* sits in a progressive model chain C* and where C* is supported by underlying theories, that are reduction progressive (2). Grades of super strength indicate the power of increasingly broad (2.1) and deep (2.3) reduction chains. Super strong warrants are indicators of possible ontology. That is, when the progressive reduction chains branch. This is clear in mature physical science. Ontology, and the connection with truth in some sense approaching correspondence, in conjunction with internal realism (and to the exclusion of instrumentalism), requires the grand unifications, the major reductions: electricity and magnetism, chemistry and physics, physical chemistry and biology and possibly psychology and biochemistry. That is, they are branching reducers (2.3) and ultimately, progressively branching reducers (2.4) as

theories ramify under the impact of the new conceptions (models) available from the reducing theories and deep connections are perceived.

The notion of warrant strength has immediate consequences for the core of argumentation, that is, refutation. A simple model is available looking at A/O opposition as on the Square of Opposition. This requires a preliminary word about generalizations.

3. THE LOGIC OF A/O OPPOSITION

It seems to me that there is an oddness that only familiarity can disguise, about the Square of Opposition as normally expressed in English. The word ‘all’ having a number of clear uses in both mathematics and daily life seems misplaced in all but the clichéd examples having to do with mythology (mortal and immortals) or a primitive taxonomy based on the meanings of common terms. The use in mathematics is quite respectable, the application to ordinary concerns quite odd. ‘All dogs are mammals’ without something like Aristotle optimism about natural kinds misses a crucial logical component for a well-mannered universal quantifier. That is, no domain is specified. To say that the domain is mammals, or even animals is mere hand waving, since whatever the utility of such ordinary classifications their boundary in space, time and even scientific theory is unspecified. And without such constraints, neither necessary nor sufficient conditions are forthcoming. In desperation we might make the ‘linguistic turn’ and refer to the universe of utterances, but even there concerns with underlying propositions and the identification of boundaries of time and space and interlocutors, make this piece of linguistic legislation a poor substitute for the robustness of ‘all’ in mathematics and other logically proper languages. That is, languages where necessary and sufficient conditions are clearly stateable and extensionally anchored in definable models.

This is not a problem of English, or a call for a replacement by elementary set theory. Rather it points to a needed flexibility if ‘all’ is to function in the range of activities for which the word is needed, and given my interests, as it functions in inquiry. ‘All’ in ordinary discourse frequently refers to specific collections, and in such contexts it is clear as to its logical force. It is the extension to unbounded contexts that prompts the oddness of ‘all’ in ordinary contexts, since the very notion of boundaries to our ordinary concepts is not at all clear. Science, on the other hand, when sufficiently mature and theoretical, as in physical chemistry, requires clear and often mathematical theories. In such formal theoretic contexts, as in mature scientific theories, predicate often refer to an unbounded, yet definable domain as specified by the theory. That is to say that within a theory predicates are given clear and explicit definitions in respect of an equally explicit domain of theoretic entities, and so ‘all’ makes clear sense as applying to the entire unbounded range of possible instances. That is, science, like mathematics, takes ‘all’ seriously. But when the theory reaches out to reality, to the models of data, which stand as its confirmatory basis such clarity, is often obscured by the empirical facts. For although experimental data is interpretable in terms of the theory and its predicates, the world has something to say about the specifics. This is required for the theory to be empirical, that is, falsifiable.

The history of theoretic generalizations in relation to their empirical database, however, is not the simple one of refutation by experimental counter-example as in the classic view of Popper. Theories often resist anomalous data in light of the robustness of

the theoretic contexts within which the interpretation of empirical data occurs. Theories are subject to modification or even disconfirmation in light of recalcitrant facts, interpreted within the domain and predicates of the theory, that fail to support its theoretic generalizations. But empirical data may also be resisted in the name of the power of the theory, measured by its over-all empirical basis, and as important, its place in a network of other theories, each of which is supported by its own empirical basis and its place in the network of related theories. It is this give and take between theoretic embeddedness on the one hand, and risk of modification or falsification in light of recalcitrant empirical data that the discussion that follows attempts to illuminate. Such an account should explain how counter examples are to be considered on their merit, rather than serving as automatic refutations as in the traditional square or the philosophy of Karl Popper.

What is both relevant and clear is that generalizations, as in the nomic generalizations or other universal tending operations are, contrary to the traditional square, reasonably insensitive to refutation by a particular counter examples. And so my goal is to articulate what it is about the structure that underlies such generalizations that accounts for their resistance to counter example in perfectly appropriate ways. That is, to devise a logical structure that weights the embeddedness of a generalization as against the force of the counter example. I focus on the connection between universal affirmative and particular negative, A/O opposition, since that is the most essential relationship in inquiry. The paradigmatic case for our purposes is where a theory T is confronted with a counterexample, a specific model of a data set inconsistent with T. The interesting case is where T has prima facie credibility, that is.where T is at least model progressive, that is, is increasingly confirmed over time.

A. The basic notion is that a model, cm, is a *confirming model* of theory T in TT, a model of data, of some experimental set-up or a set of systematic observations interpreted in light of the prevailing theory that warrants the data being used. And where

1) cm. is either a model of T or
2) cm is an approximation to a model of T and is the nth member of a sequence of models ordered in time and T is model progressive (1.2).

B. A model interpretable in T, but not a confirming model of T is an *anomalous model.*

The definitions of warrant strength from the previous section reflect a natural hierarchy of theoretic embeddedness: model progressive, (1.2), model chain progressive (1.3) reduction progressive (2), reduction chain progressive (2.2), branching reducers (2.3) and progressively branching reducers (2.4). A/O opposition varies with the strength of the theory. So, if T is merely model progressive, an anomalous model is type-1 anomalous, if in addition, model chain progressive, type-2 anomalous etc. up to type-6 anomalous for theories that are progressively branching reducers.

At the one extreme, type-1 anomalies approach classical A/O opposition, the anomalous model falsifies the theory or must itself be rejected At the other extreme type-6 anomalies promote scientific revolutions, that is require a thoroughgoing replacement of an entire scientific structure otherwise the anomalous model is rejected. The replacement of Aristotelian by Newtonian physics is a classic example of a response to

type-6 anomalies. Type-2 anomalies require that there be a modification of the theory that preserves most model chains and the sequence of type-2 anomalies over time is model progressive within the modified theory, otherwise the anomalous model is rejected. The discovery of isotopes is based on type-2 anomalies. Type-3 anomalies require that there be an alternative reducing theory or the anomaly is rejected. That is the anomalous model can be seen within a reinterpretation of the theory without substantial modifications of the theory itself. The kinetic theory of heat is an example of a reinterpretation based on type-3 anomalies. Type-4 anomalies require the reorganization of interconnected theories or they are rejected. The development of the Periodic Table of Elements can be seen as a response to type-4 anomalies. Type-5 anomalies require major theoretic advances that reorganize and modify existing theories deeper reduction chains (2.1) and potentially branching reducers. Black box radiation is an example of a type-5 anomaly that if not rejected prompts theoretic advances of deep ontological significance, in this case, quantum mechanics.

The ordering of anomalies is essential for evaluating dialectical resistance to the force of the anomaly. This yields the first of two dialectical principles.

> P1. The strength of the anomaly is inversely proportional to dialectical resistance, that is, counter-evidence afforded by an anomaly will be considered as a refutation of T as a function of the strength of T in relation to TT. In terms of dialectical obligation, a claimant is dialectically responsible to account for type 1 anomalies or reject T and less so as the type of the anomalies increases.

The second principle is based on the epistemic force of the anomalous model itself. If the model is a purely empirical model, that is a set of data that is free of theoretic support, we call it a model of type zero. We then apply our hierarchy, to yield models of increasing epistemic power due to increasing theoretic warrant, for models type 1 through type 6. This yields our second principle.

> P2: The strength of an anomaly is directly proportional to dialectical advantage, that is, the anomalous evidence will be considered as refuting as a function of the power of the explanatory structure within which it sits.

This yields the core intuition

> P*: The dialectical use of refutation is rational to the extent that it is an additive function of P1 and P2

Clearly the task is now to begin the study of how P* is accommodated in cases, a task far beyond my capabilities. One that requires a community to perform. This can be seen as the deep agenda behind Toulmin's work. Still, and perhaps surprisingly, the perspective affords insight into political argument.

3. POLITICAL ARGUMENT

The relation of the apparatus to political discourse is far from obvious, yet a reasonably persuasive case can be made if we permit the Toulmin discussion to be construed in terms of two basic levels of commitment, commitment via warrants and commitment via backing. Each of these subdivides into its component parts in relation the nature of backing and warrant and the degree of embeddedness of elements in the complex of political commitments. The complexity of the resulting model not withstanding, it is my claim that once described the image of discourse permits deeper and more epistemically relevant analysis to be made of argumentation then alternatives such as fallacy based approaches or structural approaches that do not distinguish between the weight and function of premise kinds.

The deepest level of support in current political argument can be seen in terms of two sorts of commitment, broad political perspectives such as liberal or conservative and backing that supports the evaluation of political proposals and empirical claims. Commitments of the first sort are both broad in their reach and specific in their function. They afford a normative and interpretation function, classifying claims and other proposals in terms of their coherence with such fundamental vectors in political commitment. Obvious examples include a commitment to free market principles for conservatives as contrasted with the support of government intervention by liberals.

Commitments of the second sort are more standard and rely on the sorts of warrants put forward. They range from the evaluation of statistical procedures in polling to standards of evidence, by analogy to those used in courts of law, to establish veracity, based on competing evidence, to standard logical concerns such as fallacies of bias, or more general fallacies such as insufficient evidence and the presentation of empirical counter-examples to empirical claims. A crucial aspect of backing, although one that is amorphous and frequently implicit are standards for adequacy found in the various social sciences, indicated the reliability and reach of social science generalizations.

Distinguishing between the first and second sorts of support is essential, both in identifying sources of deep disconnect in political argument as deep interpretative claims clash and in looking for areas of normative overlap where a shared commitment to backing permits reasonable disputation to take place.

Warrants in political argument are similarly divided into normative tending, ranging from prudential requirements such as policies on cost value analysis to more deeply intractable commitments as in substantive moral constraints (equal opportunity, specific rights, appeals to the common good) and warrants that reflect social and political facts and theories. A particularly relevant sets of warrants are those grounded in law and other de facto political policies. A much more complex and amorphous set of warrants are those drawn from and by analogy with social science principles, sociological psychological and even anthropological claims that proffer generalizations of various strengths about human behaviour.

What the model drawn from my work permits us to see is to see the hierarchical chains that connect networks of backing and warrant to an indefinite set of claims that may be put forward in light of commitments. In my model, such connections are explicit and permit of a metric. This is due to the definability of mathematical models and various approximation relations that permit the assignment of epistemic value to the model

history over time. Clearly this is not possible in the amorphous domain of political argument, but a useful analogy enables us to make sense of pervasive aspects of political argument.

As an example, take the current debate between conservatives and liberals as to the appropriateness of the stimulus package recommended by President Obama and its rejection by almost all Republican congressmen. Even a cursory look at the Republican rhetoric points to the depth of the disagreement. The argument is increasingly coached in terms of big government (socialism) as against a commitment to the free market. Even if these are mere political hyperbole, their presence in the public debate, the Republican call to return to the basics of their 'philosophy' in the light of the losses in recent elections, exposes a deep a aprioristic core in the positions of at least one of the two parties, even in the face of clear practical contingencies.

A deep principle that serves as a super strong warrant for the political stance, free market, as the preferred mechanism for political economy supports a broad range of generalizations that serve as more specific warrants for arguments, including the undesirability of government interventions that interfere with markets, particularly taxes that limit the amount of available capital for investment, beyond absolute minimums needed for social continuity. And from this, more claims about the appropriateness of specific sorts of taxation. Support flows downward from the principles. Refutation is put on hold.

Much of the recent discussion, especially on TV and talk radio is at this most basic level of commitment and therefore resistant to rational adjudication in light of P1. Such discussions rely on the depth of the principles, principles the permeate points of view and afford significant reinterpretations of events. Such connections tend to be gappy, with many warrants of various kinds consistent within competing perspectives, yet only loosely connected by inferential relationships. This may result in many facts unexplained or with alternative explanations, events weakly explained by both points of view. This yields both the openness of political debate and the resistance to rational adjudication. Broad political perspectives reach across a wide spectrum of theory and fact, and although unifying interpretations within each perspective (as do reduction relations in science) leave little room for rational negotiation, since they result in parallel perspectives, equally persuasive to their adherents, but relatively incapable of creating consensus, since counter-arguments can be dismissed in the name of deeply entrenched principles. In practical politics this often leads to negotiation and inconsistencies are tolerated for the sake of expediency. The result is the persuasive sense of hypocrisy leading to anger among adherents who see deep principles violated in the negotiated settlement.

Better informed discussions ascend from the level of broad political (ideological) commitment to the discussion of the merits of substantive proposals, that is determinations in light of P*. In such more substantive debates reduction to deep principles is eschewed in light of shared backing and available economic models. Surprisingly, the mathematical model yields a metaphor that furnishes illumination to the process when it is functioning well. Any given point put forward in a disputation, has itself, to be certified in terms of its adequacy. My model shows us how. At the basic level of empirical evidence put forward, empirical claims need to sit within a model chain of available corroborative data that demonstrates epistemic adequacy. The empirical claim

must be replicable, or increasingly supported by newly available evidence. The notion of progressive model chain (1.1) points to the fact that empirical evidence must be reliable, that is further investigation corroborates the claim (by duplicating it or by increasingly approximating the specific claim over time). If the claim strikes deeply at a warrant as in anomalies of type 2, the claim loses credence unless it too is warranted, that is, is embedded in some theoretic account. If both views are warranted by competing networks of generalizations (warrants) and supported by shared methodological and other aprioristic constraints (backing), the situation becomes much more complex. So, for example, competing recommendations as to the degree of stimulus needed to correct the current recession need to be supported by networks of economic and other relevant generalizations (increasingly social psychological). Experts argue for their points of view in support of their specific recommendations based on the availability of theoretical justification. It is here that ordinary voters must rely on experts who can describe in popular language the framework they employ in making their judgments. These frameworks have 'track records' in terms of the range of economic situations that render them coherent (breadth) and their consistency with deep framework principles (depth) and reflect acceptable methodological principles (backing).

The simplifications in the formal account do not furnish a descriptively adequate account of cases. Rather, they render the proposal noetically transparent. Actual cases, even in physical science, would be difficult if not impossible to sketch except in broad outline (and there is no need to; the adequacy of the underlying logic is exhibited by the fact that members of fields draw principled inferences). The metamathematics gives a precise metaphor that permits of philosophical scrutiny. In a messy realm like economics the chains would have gaps and the goodness of fit across approximations would be far more lenient than in physical science. But yet since principled inferences are drawn in practice it is plausible to look at these inferences, their warrants, their methodological bonafides and the history of their application over time. This then gives us a sense of the weight of the position and permits P* to engage.

The details are frightfully complex and they engage with another aspect of Toulmin's agenda. It is plausible to conjecture that warrants have different strengths (and function differently, for example supporting modalities of different sorts) across the various sets of concepts that are the basis for aspects of political argument as a function of underlying backing. Certainly, however questionable, the internal theoretic connections within quantitative economics are of a different sort than those within structuralist accounts of political causality. To the contrary, warrants based on legislation are extremely strong and point to well established procedures in courts and with the application of precedent. Sorting this out is to work within Toulmin's view that complexes of warrants and their backing (fields) function differently and most important, for argument theory in general, that the differences are essential to grasping the intricacies of argument in such multilogical arenas as political discourse. .

Again, the point of the metamathematics is not to give some tool for resolving substantive issues, hence the lack of need for the presentation and analysis of detailed examples. All that is needed is sufficient philosophical clarity so that the noetic force of the position is clear. The metamathematics affords an existence proof; it shows that these ideas can have explicit content, as viewed within the foundational logical discourse frame that sees metamathematics as the key to deep concepts, that is, modern logical theory.

This is a lesson that informal logicians and argumentation theorists might heed and a direction for their own endeavours. The basic dimensions in the model point to the possibility of a principled differentiation of premises in terms of sorts of backing and warrant kinds. The earlier discussion shows a first level of nuance, definable in terms of any subject matter that permits of arithmetic models. It is my recommendation that these dimension be looked to by informal logicians and argumentation theorists in all domains. Among the most amorphous of all of these, political argument, are at the other end of spectrum from where arguments in physical science are found. Yet the model offers the possibility of clarification even there.

4. CONCLUSION

If my discussion is at all correct, it raises enormous issues for thinking critically about political arguments and especially for education for democratic citizenship. For if informal logic is the rational core of critical thinking, and if informal logic requires argument analysis, the job of analyzing and evaluating arguments far transcends the capabilities of many of us. Even specialists are limited to which aspect of arguments they are competent to evaluate. Given the centrality of authorities and subject matter, the analysis points to a clear win for John McPeck in the critical thinking debate (Weinstein, 1993). The best we can hope for is a broad liberal education that permits of the evaluation of expert presentations based on a basic familiarity with the field and its arguments along with a spirit of critical inquiry. Much of the apparatus of recent informal logic, particularly critical questions, point to areas in which P* is to be engaged, but the evaluation that is required moves beyond argument diagramming (whether logical or dialogical). For the core determination required for evaluation, determining the force and reach of warrants, requires familiarity, at least, with the substance of the underlying arguments. And hence, despite my penchant for symbols, informal logic as a quasi-formal discipline is impossible.

Link to appendix Link to commentary

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