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Andrew Aberdein
Florida Institute of Technology

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ANDREW ABERDEIN

Humanities and Communication
Florida Institute of Technology
150 West University Blvd, Melbourne
Florida 32901-6975
USA
aberdein@fit.edu

ABSTRACT: Is it possible to distinguish communities of arguers by tracking the argumentation schemes they employ? There are many ways of relating schemes to communities, but not all are productive. Attention must be paid not only to the admissibility of schemes within a community of argumentational practice, but also to their comparative frequency. Two examples are discussed: informal mathematics, a convenient source of well-documented argumentational practice, and anthropological evidence of non-standard reasoning.

KEYWORDS: argumentation scheme, community of practice

1. WHAT IS A COMMUNITY OF ARGUMENTATIONAL PRACTICE?

My use of the phrase "community of argumentational practice" consciously echoes the discussion of communities of practice initiated by Jean Lave and Etienne Wenger (1991), which has become influential in the theory of knowledge management. While I shall not attempt to follow their methodology in any detail, their characterization of a community of practice provides a convenient starting point. Such communities are defined by three components: domain, community, and practice. The domain comprises the subject matter of interest to the community, the community is the people employing the practice, and the practice represents a shared body of relevant techniques:

> The term *practice* […] denotes a set of socially defined ways of doing things in a specific domain: a set of common approaches and shared standards that create a basis for action, communication, problem solving, performance and accountability. These communal resources include a variety of knowledge types: cases and stories, theories, rules, frameworks, models, principles, tools, experts, articles, lessons learned, best practices, and heuristics. They include both the tacit and the explicit aspects of the community's knowledge. […] It also embodies a certain way of behaving, a perspective on problems and ideas, a thinking style, and even in many cases an ethical stance. In this sense, a practice is a sort of mini-culture that binds the community together. (Wenger et al. 2002, pp. 38 f.)

Of course, the practice may be concerned with just about anything: the examples discussed by Wenger et al. (2002) range from oil prospecting to flute making. However, we may observe that several of the general features identified above have an inferential or argumentational flavour: for example, problem solving, rules, models, heuristics, and thinking style. Thus, communities of practice, as envisaged by Lave and Wenger, have an argumentational dimension. Nonetheless, this does not suffice to identify them as communities of argumentational practice, since they are unlikely to be individuated by their argumentational practice alone: perhaps the flute makers and oil prospectors reason in homologous ways. Conversely, members of a single community of practice may be divided by their conflicting argumentational norms: indeed, Wenger et al. (2002, p. 123) address this as a (superable) obstacle to globally distributed communities of practice.

The tripartite structure of domain, community and practice may be adapted to characterize communities of argumentational practice. Logic is often said to be domain independent, and some communities of argumentational practice may be defined without regard to domain: their members could use their distinctive argumentational strategies to discuss anything and everything. However, as Stephen Toulmin observed long ago (1958), informal reasoning is tied to its field much more closely than formal reasoning. There are fields that invite specific argumentational approaches, such as legal reasoning, or mathematical reasoning. But Toulmin has been criticized for the sketchiness of his field concept:

> Toulmin never says precisely what counts as a *field*. He gives examples like law, medicine, science, and engineering. He uses cognate terms like *forum of argumentation*, *rational enterprise*, and *context*. But so far as I can tell, he never gives a precise definition of any of these terms. Since so much of Toulmin's approach depends upon the concept of a field, the failure to define it carefully seems to me a serious *lacuna*. (Johnson 1996, p. 139, emphases in original)

This lacuna has been filled in a variety of ways. Whereas some theorists have effectively identified field with domain, others have stressed sociological features, such as community and practice (Bermejo-Luque 2006, p. 73, canvasses the alternatives). This gives rise to further problems:

> Toulmin's notion of field raised the specter of relativism, with field-dependent standards of evaluation. The problem becomes more acute if fields are understood as the discourse of a particular community, whose members would be free to set standards. (Freeman 2006, p. 98)

Communities of argumentational practice have much in common with this richer version of Toulmin's field concept, since they too may contain a standard-setting community. However, the relativistic spectre should be exorcised by the following considerations. Firstly, membership in communities of practice is not exclusive: many individuals operate successfully in multiple, overlapping communities simultaneously. "Code switching" between different communities is commonplace and seemingly unproblematic. This suggests the possibility of intersubjective comparison. Secondly, standards of evaluation are not exclusively field-dependent: there is no requirement that only the standards developed within a community should be applied to the products of that community. Thirdly, as I shall argue below, the practices of different communities may be articulated using a common apparatus: that of argumentation schemes.

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2. ARGUMENTATION SCHEMES

Argumentation schemes are stereotypical patterns of reasoning. Their use has recently become influential in the analysis and evaluation of argument. While deductive inference schemata may be thought of as special cases of argumentation schemes, most attention has been paid to defeasible schemes typical of informal reasoning. A recent survey identifies ninety-six different schemes, most of which may ultimately be understood as more or less specialized instances of the very general scheme of *Defeasible Modus Ponens*:

> As a rule, if *P*, then *Q*.
> *P*.
> It is not the case that there is an exception to the rule that if *P*, then *Q*.
> Therefore, *Q*. (Walton et al. 2008, p. 366)

For practical purposes, schemes are presented with much greater specificity. Moreover, the defeasible nature of the reasoning is not made explicit amongst the premises, but captured by an additional device, *critical questions*, which point to possible exceptions. For example, this is a scheme for Argument from Analogy:

> Similarity Premise: Generally, case C_1 is similar to case C_2.
>
> Base Premise: *A* is true (false) in case C_1.
>
> Conclusion: *A* is true (false) in case C_2.
>
> Critical Questions:
> 1. Are there differences between C_1 and C_2 that would tend to undermine the force of the similarity cited?
> 2. Is *A* true (false) in C_1?
> 3. Is there some other case C_3 that is also similar to C_1, but in which *A* is false (true)? (Walton et al. 2008, p. 315)

In the remainder of this paper I shall explore how argumentation schemes may be related to communities of argumentational practice.

3. EXAMPLES

Further progress on a positive definition of communities of argumentational practice requires careful study of a diverse range of examples. Within the scope of a single paper this range must be substantially abbreviated. The examples below are drawn from two areas. Firstly, mathematicians have a long history of carefully documenting their own argumentational practices. Moreover, comparatively little of that practice is conducted in exclusively formal terms: truly formalized mathematics only became viable in the nineteenth century and remains a minority activity. Hence informal mathematics provides a convenient source of well-documented communities of argumentational practice.

Secondly, some communities have attracted attention for their ostensibly heterodox argumentational behaviour. In particular, the reasoning practices that some anthropologists have reported from certain "tribal" communities have been explained as demonstrating endorsement of a nonclassical logic. More recently, the argumentational activities of some internet-based communities have attracted similar scrutiny.

3.1 Consequentia Mirabilis

Gerolamo Saccheri, the inadvertent anticipator of non-Euclidean geometry, provides a first illustration of the significance of communities of practice in mathematical reasoning. In both his logic textbook of 1697 and his more famous attempt to derive Euclid's parallel postulate in 1735, Saccheri makes conspicuous use of the following deductive argumentation scheme:

> If P is false, then P is true.
> Therefore, P is true.

As William and Martha Kneale observe, this enthusiasm reflected a wider practice:

> Almost certainly the source of [Saccheri's] inspiration was [an annotation in] the widely read edition of Euclid published in 1574 by Clavius […] And his attention may have been directed to the relevant scholium by his Jesuit teachers. For Clavius himself had belonged to the Society of Jesus, and it seems that the argument on which he wrote his comment had a vogue among the members in the seventeenth century as the *consequentia mirabilis*[1]. (Kneale and Kneale 1962, p. 347)

Reflection on this example should eliminate the naïve thought that the practice of different communities might be individuated by listing either the schemes which they use or the schemes with which their systems are consistent. Neither approach would capture what was distinctive about the inferential practice of seventeenth century Jesuit logicians. For *consequentia mirabilis* is admissible in any system that admits *modus ponens* and *reductio*, and actually used in many such systems, including that of Euclid (in the proof of proposition IX.12), as Clavius's annotation indicates. But those systems are not distinguished by partiality towards this scheme. What is distinctive is the disproportionate use of the scheme, and such references as Saccheri's description of it as "a very beautiful way of proving these same truths without any assumption" or Girolamo Cardano's as "the most wonderful thing that has been discovered since the beginning of the world" (Kneale and Kneale 1962, pp. 346 f.). Accounts of the relation of schemes to communities of practice must document not just the schemes used, but also their frequency of use and any overt commentary on their use.

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[1]The Kneales cite research by Jan Łukasiewicz into seventeenth century Polish Jesuit logicians in support of this point.

3.2 Euclid

A second example of a mathematical community of argumentational practice is the proof methods employed in Euclid's *Elements*. It may seem odd to identify a single work by a single author, however influential, as a community of practice. But Euclid was not writing an original monograph. Rather his work was expressly designed to document the most fundamental mathematical techniques developed over the preceding two centuries of Greek mathematics. Knowledge management professionals identify building and organizing knowledge repositories as one of the key objectives for communities of practice (Wenger et al. 2002 pp. 102 ff.). Euclid's appointment at Alexandria, coincident with the establishment of its celebrated library, demonstrates the institutional support which Ptolemy I, his employer, was prepared to lend to the construction of a knowledge repository for the practice of geometry. Much of that repository survives in the pages of the *Elements*. This makes it possible for us to extrapolate the practice that gave rise to that work.

One conspicuous aspect is Euclid's avoidance of purely logical inferences. For example, he proves propositions I.6 (If in a triangle two angles be equal to one another, the sides which subtend the equal angles will also be equal to one another) and I.19 (In any triangle the greater angle is subtended by the greater side) geometrically. However, as Augustus De Morgan observes, these propositions may be derived from their converses I.5 (In isosceles triangles the angles at the base are equal to one another, and, if the equal straight lines be produced further, the angles under the base will be equal to one another) and I.18 (In any triangle the greater side subtends the greater angle) as follows:

> Let there be … propositions … *X*, *Y* and *Z*—of which it is the property that one or the other must be true, *and one only*. Let there be three other propositions *P*, *Q* and *R* of which it is also the property that one, and one only, must be true. Let it be a connexion of those assertions that:
> when *X* is true, *P* is true,
> when *Y* is true, *Q* is true,
> when *Z* is true, *R* is true.
> *Consequence*: then it follows that,
> when *P* is true, *X* is true,
> when *Q* is true, *Y* is true,
> when *R* is true, *Z* is true.
> (De Morgan 1847, cited in Heath 2006, p. 132)

The inference which De Morgan sets out here is a deductive argumentation scheme, but one that Euclid declines to employ. It is justified by repeated application of Aristotle's operation of contraposition.[2] Hence, we could reduce this scheme to the rather simpler deductive argumentation scheme for contraposition:

> When *P* is true, *Q* is true.

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[2]Since $Y \Rightarrow Q$ and $Z \Rightarrow R$, then, by contraposition, $\sim Q \Rightarrow \sim Y$ and $\sim R \Rightarrow \sim Z$, and by the constraint on the truth of the two sets of propositions, $P \Leftrightarrow (\sim Q \& \sim R)$ and $X \Leftrightarrow (\sim Y \& \sim Z)$. Therefore, $P \Rightarrow (\sim Q \& \sim R) \Rightarrow (\sim Y \& \sim Z) \Rightarrow X$, and similarly for the other two cases.

Therefore, when *Q* is false, *P* is false.

This scheme, although acknowledged as valid by Aristotle, is not to be found anywhere in Euclid either (De Morgan 1966, p. 174). Although one might complain that Euclid could have spared his readers the bother of proving I.6 and I.19 if he had adopted this scheme, it could just as readily be argued that Euclid followed the more sensible path— this "merely logical deduction" is a fair bit of trouble. Thus Euclid's practice may have been well adapted to his purposes. The moral of this story is that there are deductive argumentation schemes that are consistent with the argumentational practice of the *Elements*, some of which may be found in works of logic presumably available to Euclid, but which have no part in his practice. The avoidance of a scheme may be characteristic of a practice, even if the scheme would be admissible within the logical system central to that practice.

A further illustrative case drawn from Euclid concerns his "Common Notion 4," that "Things which coincide with one another are equal to one another" (Heath 2006, p. 72). (Incidentally, the characterization of this axiom as a "common notion," common that is to mathematics as a whole, not just geometry, is an explicit appeal to a field-invariant standard of evaluation.) Common Notion 4 gives rise to the method of superposition, which might be expressed as the following argumentation scheme:

One figure may be superposed on another so that its vertices and edges perfectly coincide.
Therefore, the two figures are identical.

This scheme may succeed as a practical test, but it would not be accepted as a sound mathematical proof in modern practice (Heath 2006, p. 97). Euclid himself seems to have sensed that the method was suboptimal. As Heath observes,

> it is clear that Euclid disliked the method and avoided it wherever he could, e.g. in I.26, where he proves the equality of two triangles which have two angles respectively equal to two angles and one side of the one equal to the corresponding side of the other. It looks as though he found the method handed down by tradition […] and followed it, in the few cases where he does so, only because he had not been able to see his way to a satisfactory substitute. But seeing how much of the *Elements* depends on I.4 [which Euclid proves by superposition], directly or indirectly, the method can hardly be regarded as being, in Euclid, of only subordinate importance; on the contrary, it is fundamental. (Heath 2006, p. 73)

From this example we can arrive at a second moral: the presence of a scheme within a practice is not sufficient to identify the role that scheme plays. The scheme may only be used reluctantly, when it cannot be avoided. Conversely, the infrequency of a scheme's use need not imply that it is deprecated in the practice. Its use may be limited for other, more benign reasons.

3.3 The Azande

The heterodox behaviour reported by some ethnographers provides a further source of ostensibly well-documented communities of argumentational practice. The most widely discussed example is the subject of Evans-Pritchard's classic 1937 study, *Witchcraft,*

Oracles and Magic among the Azande. For example, Zande reasoners would reject the following argument:

> All and only witches have witchcraft-substance.
> Witchcraft-substance is always inherited by the same-sexed children of a witch.

The Zande clan is a group of persons related biologically to one another through the male line.

> Man *A* of clan *C* is a witch.
> Therefore, every man in clan *C* is a witch. (R. C. Jennings's reconstruction of Evans-Pritchard, in da Costa et al. 1998, p. 42)

Since they would accept the premises of this argument, but deny the conclusion, its apparent validity suggests that they are committed to both the conclusion and its negation, and thereby to a contradiction. Several proposals have been made for the resolution of this paradox. These range from the mundane suggestion that the Azande may not actually accept all the premises, to the more esoteric proposals that they may employ some form of non-classical logic, whether to treat some of the premises as non-truth-valued, or even to tolerate inconsistencies.

However, Zande inferential behaviour might be better explained by a preference for non-deductive argumentation schemes. This does less violence to their reported statements than would be required for them to be represented as employing classical logic consistently, and less violence to our intuitions than endorsement of a non-classical logic. Specifically, several of the inferential steps required for a derivation of the conclusion of this argument, such as that from "Every man in clan *C* has witchcraft-substance" to "Every man in clan *C* is a witch," rely on the deductive scheme of *modus ponens*. If this is understood instead as exhibiting Walton's scheme of defeasible *modus ponens*, then the conclusion would only follow in the absence of exceptions. But at several such junctures Evans-Pritchard records possible exceptions: for example, witchcraft-substance is sometimes "cool," in which case its possession does not make a man a witch (da Costa et al. 1998, p. 51). Thus, on this analysis, the Azande would be right to reject the conclusion, despite accepting (defeasibly) the premises.

Of course, this begs the question of whether the Zande acceptance of the premises should be understood defeasibly. Is this the best interpretation of their argumentational practice, or is it at least as tendentious as the ascription to them of a non-classical logic? One answer to this question may be to observe that the interpretation suggested here is essentially identical to that employed in the analysis of much more familiar communities of argumentational practice. For example, when I observe that "All dogs have four legs," "Lucky is a dog" and "Lucky has three legs," I do not feel motivated to endorse paraconsistent logic. Rather, I would defend my first claim as a defeasible generalization about dogs, which holds so widely as to be practically useful, despite occasional exceptions, such as the misnamed Lucky. Defeasible *modus ponens* would not support the erroneous inference that "Lucky has four legs," and is thereby a better fit for my actual reasoning than *modus ponens*. Despite its more exotic provenance and subject matter, the Zande example may be resolved in exactly the same manner.

One moral of this example is the importance of interpretation of argumentational behaviour in the analysis of communities of argumentational practice. Particularly when dealing with participants from unfamiliar cultures, there can be considerable scope for disagreement over how best to interpret the observed behaviour. Even the strategy pursued here, of stressing continuities with more familiar practices, is not beyond dispute (da Costa et al. 1998, p. 50). I shall not attempt to recapitulate the lengthy debate over the use of such principles of charity as constraints on translation (see Quine 1960; da Costa et al. 1998, pp. 48 ff.; and cf. Walton et al. 2008, p. 193). However, the assumptions I have made here are purposefully modest.

3.4 The Internet

A source of argumentational idiosyncrasies closer to home than the tribes of 1930s central Africa is the internet. Argument in many online communities is noted for rebarbative mutual hostility. However, some internet communities have developed explicit rules designed to exclude less attractive practices. A well-known example is "Godwin's Law of Nazi Analogies: As an online discussion grows longer, the probability of a comparison involving Nazis or Hitler approaches one" (Godwin 1994). Latterly, Godwin's Law is often stated as an explicitly argumentational norm, stipulating that the first person to mention Hitler has lost the argument. As such it may be understood as mandating an answer to the first critical question for the Argumentation Scheme for Argument from Analogy stated above: for most domains, there are *always* differences between C_1 and C_2 that tend to undermine the force of the similarity cited, when C_2 is Hitler.[3] This example demonstrates two features of communities of argumentational practice: that the practice can evolve (or devolve) over time, and that the agency of change may be indirect. Godwin describes how he "seeded Godwin's Law in any newsgroup or topic where I saw a gratuitous Nazi reference," which in time seemed to have reduced the incidence of such references (Godwin 1994). But the Law as originally formulated is (a satiric version of) an observed law of nature, not an explicit norm of argumentation. Had Godwin just asserted such a norm, he may not have had such success.

On the other hand, some off-putting argumentational behaviour may be defensible within an appropriate context. As one recent study observes, structural factors in the design of online environments, such as anonymity, "lack of rules for holding the floor, multiple concurrent discussion threads, and limitations on space […] invite alternative forms of argumentative dialogue" (Weger and Aakhus, 2003, p. 31). The type of dialogue in which an argumentation scheme is deployed can make a big difference to the way it is evaluated, as proponents of the argumentation scheme approach acknowledge: "In addition to the argumentation scheme component, a dialectical component is needed representing other relevant factors of the text and context of dialogue in a given case" (Walton et al. 2008, p. 218). Here, "context of dialogue" refers to the dialogue types discussed by Walton in earlier work, including critical discussion, negotiation, inquiry, deliberation, information seeking, and quarrel (Walton and Krabbe 1995, p. 66). This list

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[3]There are, of course, domains wherein analogies with Hitler are legitimate, such as discussions of genocide or military defeat.

is not exhaustive, hence we may propose addenda, such as the "wit testing" dialogue which has been suggested to be characteristic of some online environments (Weger and Aakhus 2003, p. 35). What might count elsewhere as fallacious *ad hominem* reasoning may be legitimate in wit testing dialogues.

This example suggests that the argumentational practice of a community can be constrained by structural factors, and that an account of the practice will include dialogue types as well as argumentation schemes. Although the practice of some communities may be restricted to a single dialogue type, others will be concerned with arguments in more than one context and perhaps the relationships between the two. For example, Wikipedia editors have rules governing both the argumentational practice to be followed within Wikipedia articles, and that to be employed in discussing those articles (Butler et al. 2008, p. 1103). This example also reinforces an observation made in Section One. Participants in practices that tolerate the more extreme sorts of argumentational behaviour do not always argue in such a manner: they are (mostly) just as capable of participating in more conventional argumentational practices. Switching between communities of argumentational practice restricted to the same dialogue type may be less clear-cut. The spread of Godwin's Law beyond the internet-based communities in which it originated shows how horizontal transfer may occur between communities of argumentational practice.

4. CONCLUSION

In this paper I have sought to explore the usefulness of argumentation schemes in the individuation and classification of communities of argumentational practice. I have argued that it is possible to distinguish communities of arguers by tracking the schemes they employ, subject to several points of clarification that arose from the discussion of examples above. That is, a satisfactory account of a community of argumentational practice should itemize the schemes employed within the practice, but it should also:

1. track frequency of use for the schemes (including those omitted altogether), paying particular attention to schemes whose use is disproportionate to that in comparable practices;
2. record information, explicit or tacit, about preferences amongst the community with regard to specific schemes;
3. relate each scheme to the context(s) of dialogue employed by the community;
4. where possible, observe how the practice changes with time.

These goals raise significant methodological issues. The task will be constrained by the source of data, whether historical or empirical. I have suggested that the ideal source would be a participant in the practice, although that also raises issues of objectivity. Furthermore, there is the question of how schemes are to be extracted from practice. We have seen that mere admissibility, in which the schemes are those consistent with recorded practice, or even those which participants can be persuaded to accept, is insufficient. The schemes must arise in unprompted use. Further progress on these questions will require a more extensive study of a wider range of examples.

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