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The Handbook of Rationality

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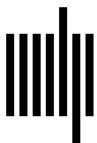
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5.5 Argumentation Theory

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Summary

Unlike persuasion, the study of “rational argument” asks what convinces and what *should* convince (see, e.g., Hahn & Oaksford, 2012). It combines normative and descriptive concerns, both within theory development and the study of behavior. In this chapter, we show the centrality of norms, discuss how norms have shaped empirical research, and highlight how descriptive work has informed normative developments, showing the tight coupling between argumentation, reasoning, and rationality. Finally, we identify future directions for research.

1. What Are Arguments; Why Study Them?

We distinguish two relevant senses of “argument”: arguments as objects and arguments as a kind of social process. Arguments-as-objects are sets of statements: claims or conclusions supported by premises.¹ The strength of support varies. Arguments can be deductive: the conclusion follows necessarily; if one believes the premises, one denies the conclusion on pain of inconsistency. Arguments can also be inductive or abductive: in either case, the inference is ampliative in the sense that the conclusion may be false even if the premises are true. Often such inference is cast as defeasible (presumptive): an argument that “may be strong enough to provide evidence to warrant rational acceptance of its conclusion, given that its premises are acceptable” (Walton, Reed, & Macagno, 2008, p. 1). But acceptance of the conclusion is tentative: it may be overturned by further information (Walton et al., 2008). It is subject to debate to what extent these different types require different normative frameworks. In the remainder, we use the term “inductive” broadly to refer to ampliative arguments, setting aside (unless otherwise indicated) differences between statistical generalizations (“inductive” in a narrower sense), arguments from evidence to causes (e.g., “abduction”), and defeasible arguments.

Arguments-as-processes are dialogues in a social context: dialectical exchanges, with discussants proposing and opposing claims, say, to convince someone of the truth of some claim or persuade someone to perform some action (for a typology, see Walton, 2008). In recent decades, much argumentation research has centered, explicitly or implicitly, on the extent to which arguments-as-objects can be understood without the wider vantage point of arguments-as-processes.

Psychology has tended to focus on arguments-as-objects. In particular, the psychology of reasoning has investigated how people derive, or endorse, conclusions, typically of deductive and inductive arguments (for a survey, see Manktelow, 2012). In mainstream psychology of reasoning, studies have given relatively little attention to social and conversational contexts (although see Evans, Neilens, Handley, & Over, 2008; Girotto, Kimmelman, Sperber, & van der Henst, 2001; Mercier & Sperber, 2011, 2017; Sperber, Cara, & Girotto, 1995; Stevenson & Over, 2001). Yet, if one closely considers how people change their beliefs upon hearing certain premises, one must eventually consider the contexts in which such premises might be uttered. For example, if one tries to understand why participants deviate from the logical prescriptions of modus tollens, one soon sees the need to consider why a particular premise might be uttered in real life (see, e.g., Hahn & Oaksford, 2012).

An undue focus on arguments-as-processes suffers complementary difficulties. Historically, it was argued that so-called fallacies of argumentation—such as “circular arguments” or “question-begging”—could only be adequately understood as fallacious by considering them as argumentative “moves” in a dialectical context (see, e.g., Hahn, 2011, and references therein). Hence, a circular argument such as “God exists, because God exists” is viewed as fallacious because it violates a procedural commitment such as a requirement to meet one’s “burden of proof.” This renders the argument weak even though it is actually deductively valid and, in that sense, strong. However, such explanation by procedural appeal to the

burden of proof is, arguably, itself question-begging, because the argument can only fail to meet that burden of proof *because* it is weak. This, however, means that some independent measure of the strength of the argument's content is required. In other words, the procedural failure presupposes the weakness it is trying to explain (Hahn, 2011; Hahn & Oaksford, 2007).

Any satisfactory account of argument thus ultimately requires consideration of the properties of both arguments-as-objects and arguments-as-processes. In other words, to understand when an argument should convince, we need two distinct, but interconnected, sets of norms.

2. Norms

"Good argumentation" is widely recognized as a desirable goal, for instance, by education systems (Crowell & Kuhn, 2014; Kuhn & Crowell, 2011). In defining "goodness," one can usefully distinguish two types of norm (Hahn & Oaksford, 2012): first, procedural norms, aimed at regulating discussants' behavior to achieve consensus and, second, epistemic norms, aimed at regulating structure and content to achieve truth or justified belief.

Procedural accounts have drawn inspiration from natural-language pragmatics (Walton, 2008). Understood abstractly, arguments comprise the following procedures: proponents secure commitments from their opponents to advance their own case and exploit weaknesses in their opponents' argument to undermine their opponents' case (Walton, 1989). An influential example is pragma-dialectics, which posits different stages of argumentative dialogues and a set of rules to regulate behavior at each stage (van Eemeren & Grootendorst, 1984, 1992, 1995, 2004). An intuitive rule is the "burden of proof" rule, according to which proponents are expected to offer evidence to support their standpoints.

Argument content plays a deeper role in epistemic norms. Some epistemic norms are familiar from the psychology of reasoning. A central normative system is classical logic, which enforces consistency through its definition of logical validity: that the truth of the premises guarantees the truth of the conclusion. A "good argument," from the perspective of classical logic, is a valid argument. This does not, however, suffice for ampliative argument, leaving the majority of everyday informal argument unaccounted for.

Probability theory generalizes classical logic and adds to logical consistency the notion of probabilistic coherence. This has been exploited in the body of work known as "Bayesian Argumentation" (Hahn & Oaksford, 2007;

Zenker, 2012). A good argument, from this perspective, is one in which the premises mandate an increase in the probability (degree of belief) we assign to the conclusion. This framework formally explains so-called fallacies of argumentation (such as circular arguments, mentioned above; see Hahn & Oaksford, 2006, 2007; on the catalogue of fallacies, see, e.g., Woods, Irvine, & Walton, 2004), thus filling a long-standing theoretical "gap" (Hamblin, 1970). A probabilistic approach can be extended to include utilities, invoking decision theory to capture considerations of argument strength (see, e.g., Corner, Hahn, & Oaksford, 2011; Evans et al., 2008).

In the literature, there have been tensions between procedural and epistemic approaches, illustrated by Walton et al.'s (2008) critical discussion of probabilities as a model for argumentation and by Bhatia and Oaksford's (2015) test of competing procedural and probabilistic predictions for ad hominem arguments. Nevertheless, argumentation is a complex phenomenon, and different normative systems might be valuable for different facets of argumentation. Uniquely, procedural rules, for instance, advise participants how to behave to secure consensus and can be understood as ethical prescriptions (Christmann, Mischo, & Flender, 2000; Schreier, Groeben, & Christmann, 1995). Ultimately, the two systems are complementary, not least because procedural rules will likely have to appeal to epistemic norms for their foundation (Corner & Hahn, 2013).

Presently, it is not clear that procedural rules have deep normative force (Corner & Hahn, 2011; Collins & Hahn, 2016; Walton et al., 2008). There are, however, deep justifications for the probabilistic approach to argumentation: mathematical arguments for the optimality of Bayesian inference (Leitgeb & Pettigrew, 2010a, 2010b; Pettigrew, 2016; Rosenkrantz, 1992) and its relationship with belief accuracy or truth. Ultimately, at least one factor in an appropriate foundation for procedural rules is likely to be that they *maximize opportunities for truth to emerge* (although it is not necessarily the only factor; see recent considerations of virtue epistemology in argument, which blur lines between content and process when it comes to quality; Aberdein, 2010; Paglieri, 2015). Normative systems may help to resolve disputes (van Eemeren, Garssen, & Meuffels, 2009) and resolve them in accuracy-maximizing ways. Detailed elaborations of such foundations have yet to be provided.

3. Empirical Evidence

Similarly intertwined when it comes to argumentation are normative and empirical considerations: the

conceptual justification of norms for argumentation means that data on argumentation can speak to human rationality, about which there is considerable debate in cognitive science. At the same time, probing people's adherence to putative normative systems governing argumentation means probing the conventional validity of these systems, that is, examining how far they underpin the argumentative behavior of typical discussants, untrained in analysis or evaluation of argumentation (Schellens, Šorm, Timmers, & Hoeken, 2017; van Eemeren et al., 2009). We next sketch current evidence on how people assess arguments and how those data bear on the validity of normative systems.

One source of evidence is naturalistic data: the conceptual analysis of real-world arguments. Procedural-rules theorists have analyzed extended arguments (van Eemeren & Houtlosser, 1999). So, too, have Bayesians, a notable example being a Bayesian reconstruction of the entire body of evidence in one of the United States' most famous court cases (Kadane & Schum, 1996). The argumentation-scheme literature has compiled systems of generalized "types" of arguments that form the basic components of much of everyday informal argument. A wide range of different schemes has been proposed (Garsen, 1997; Hastings, 1962; Kienpointner, 1992; Perelman & Olbrechts-Tyteca, 1969; Schellens, 1985; Walton et al., 2008), with over 50 different schemes distinguished by some authors. Some aspects of those typologies may arguably be redundant, but these schemes are not yet exhaustive, for example, in the domain of causal argument (Hahn, Bluhm, & Zenker, 2017). These (generalized) descriptive data have themselves been subjected to normative analysis from various viewpoints (e.g., Walton et al., 2008), including a probabilistic perspective (Hahn & Hornikx, 2016). Such qualitative data suggest the usefulness of procedural and epistemic normative systems.

More controlled data come from cognitive-psychological experiments. These experiments tend to manipulate properties of arguments and have participants assess the reasonableness, persuasiveness, or convincingness of the arguments on Likert-style scales. In the procedural-rules tradition, van Eemeren et al. (2009) have found evidence for the conventional validity of procedural rules. In one study, participants read arguments containing legitimate attacks on a person, disguised fallacious ad hominem attacks, and openly abusive ad hominem attacks. Participants distinguished among these conditions in judging reasonableness (similarly, in the "fairness rules" formulation, see Christmann et al., 2000; Schreier et al., 1995). In the argumentation-schemes tradition, Schellens et al.

(2017) found that participants were sensitive to different argument parameters for a range of schemes, including arguments from authority, analogy, and example. Participants also invoked such parameters in open-ended questioning.

A larger literature has tested whether the Bayesian approach to argumentation has conventional validity, finding considerable support. The approach is to identify probabilistic parameters, manipulate them experimentally, and assess whether participants are sensitive to them. Arguments are typically set in dialogues. Take arguments from ignorance. As Hahn and Oaksford (2007) show, these arguments can be modeled analogously to drug testing. For example:

- (1) Drug A is toxic because a toxic effect has been observed.
- (2) Drug A is not toxic because no toxic effect has been observed.

Argument (2) is an argument from ignorance. Reconstructed probabilistically, the strength of (1) and (2) can be modeled with Bayes' rule. The crucial parameters are sensitivity ($P(\text{Effect} | \text{Toxicity})$) and specificity ($P(\text{NoEffect} | \text{NoToxicity})$). In several tasks, participants were influenced by these parameters.

Participants show the influence of probabilistic parameters in other common arguments. For instance, a Bayesian analysis of slippery-slope arguments—"If you allow gay marriage, people will soon want to marry their pets"—predicts influence of both probabilities and utilities, that is, $P(\text{Outcome} | \text{Action})$ and $U(\text{Outcome})$ (see Hahn & Oaksford, 2007). Experimental evidence suggests such influence and links it to cognitive mechanisms for categorization (Corner et al., 2011). Similarly, Bayesian models have been applied to arguments involving sources. Inspired by models of testimony, these models account well for participants' assessments of ad hominem arguments and arguments from expertise (Harris, Hahn, Madsen, & Hsu, 2016; Harris, Hsu, & Madsen, 2012).

Thus far, there is evidence that participants, at a group level, endorse procedural rules, argumentation schemes, and probabilistic norms. That they endorse probabilistic norms can also be taken as evidence that people approximate behaviors that have deep conceptual justification.

4. Future Directions

The psychology of argumentation has yet to fully capitalize on a wide range of possible cognitive-psychological methods for exploring argumentation. Two promising areas are exploration of individual differences and

intervention studies to improve argumentation. As we will see below, there is already suggestive, but limited, evidence. The limitation arises from the fact that we do not currently have reliable, theory-neutral measures of argumentation skills. Such measures would be challenging to develop but would yield rich rewards.

We turn, first, to the study of individual differences. Such studies allow us to probe conventional validity in more detail, asking whether norms are endorsed to the same extent by all participants and what participant characteristics drive differences in endorsement. Perhaps more interestingly, studies could also offer evidence for or against certain norms, when paired with a reliable measure of argumentation skills. In principle, adherence to certain norms, or related cognitive skills, should correlate with higher scores on measures of argument quality.

Existing research offers suggestive evidence. Argumentation skills have largely been assessed using procedural norms: for instance, the number of counterarguments and rebuttals might be counted (Nussbaum & Asterhan, 2016) without deep assessment of the content (although see Kuhn, 1991, for some more epistemic criteria, albeit with unclear validity). Compared with such norms, few people attain proficiency (for discussion, see Asterhan & Schwarz, 2016). Individual characteristics such as level of education (Kuhn, 1991) or epistemological belief (Kuhn, Cheney, & Weinstock, 2000; Kuhn, Wang, & Li, 2010) predict success to some degree. For instance, there are “multiplists,” who view facts as freely chosen opinions and tend not to engage in argumentation at all, but there are also “evaluativists,” who view facts as judgments that can be evaluated against standards of evidence (Kuhn et al., 2000; Kuhn et al., 2010). This literature could be enriched by considering other norms and a theory-neutral definition of skill.

Another potentially rich source of evidence is intervention studies: studies that set out to improve argumentative skills. These studies can offer data on conventional validity through their control groups. As with individual-difference studies, the data are more suggestive than decisive. A growing literature demonstrates that intervention can increase adherence to procedural norms, in particular, increase the frequency of attempts to make claims, justify them, respond to other arguments, and compare competing arguments (Crowell & Kuhn, 2011, 2014). Successful interventions range from an intensive and complex three-year program with children (Crowell & Kuhn, 2014; Kuhn & Crowell, 2011) to an hourlong intervention with undergraduate students (Zavala & Kuhn, 2017). Perhaps the most striking evidence comes from studies that demonstrate transfer

from argumentation tasks to other tasks, such as from training in mathematical argumentation to scores on standardized tests of mathematics and reading (Nussbaum & Asterhan, 2016). Such assessments are theory neutral regarding argumentation. Thus far, there do not seem to be equivalent studies testing interventions based on argumentation schemes or Bayesian norms. But there is no reason to consider such interventions impossible, and they would pave the way for contrastive studies.

Strikingly, the empirical literature does not seem to have asked whether particular norms help resolve disputes. While this question is sometimes considered conceptual (van Eemeren et al., 2009), it seems straightforward to imagine its empirical study. There is already a large literature on group judgment and decision making, exploring both how people interact to reach a single judgment or decision (for a review, see Kerr & Tindale, 2004) and the extent to which argument improves performance (e.g., Mercier, Trouche, Yama, Heintz, & Girotto, 2015). Such methods could be adapted to test whether compliance with sets of norms improves the likelihood or efficiency of arriving at a consensus. The consensus answers could be assessed in the usual way, to test whether these norms increase success in tracking the truth.

5. Conclusions

The psychology of argumentation offers valuable, if limited, data. There is evidence that people implicitly endorse both procedural and epistemic norms for argumentation. Argumentation seems rational in the sense that it is a considered, rule-governed behavior. Moreover, data suggest that (at least some) people approximate probabilistic norms when evaluating arguments—behavior that has deeper conceptual justification and a stronger claim on rationality.

Nevertheless, much remains to be done. Probabilistic norms, in particular, lend themselves to constrained models, which offer substantial advantages over existing approaches, where much is left unspecified, rendering the models hard to falsify (for discussion, see Schellens et al., 2017). Theories and models of argumentation can, likewise, link pragmatic reasoning to specific forms of argument, offering increased specificity to the study of natural-language pragmatics (Macagno & Walton, 2013).

In sum, we have considered the merits of studying the psychology of argumentation, its connections with the psychology of reasoning, and the central feature they both share: the interdependence of descriptive and normative considerations.

Note

1. Sometimes, “arguments-as-objects” may also be used to refer to just the premises or “reasons” themselves. It should be clear from the context which use is intended.

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