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**Title:** Speech Act Theory and the Multiple Aims of Science

**Abstract:** I draw upon speech act theory to understand the speech acts appropriate to the multiple aims of scientific practice and the role of nonepistemic values in evaluating speech acts made relative to those aims. First, I look at work that distinguishes explaining from describing within scientific practices. I then argue speech act theory provides a framework to make sense of how explaining, describing, and other acts have different felicity conditions. Finally, I argue that if explaining aims to convey understanding to particular audiences rather than describe literally across all contexts, then evaluating explanatory acts directed to the public or policymakers involves asking nonepistemic questions.

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## **I. Introduction**

Hasok Chang “[complains] about...our [i.e., philosophers of science] habit of focusing on descriptive statements that are either products or presuppositions of scientific work, and our commitment to solving problems by investigating the logical relationships between these statements” (2014, 67–8). He argues philosophers of science should adopt “a change of focus from propositions to actions” (67). Chang suggests, “When we do pay attention to words, it would be better to remember to think of ‘how to do things with words’, to recall J. L. Austin’s (1962) famous phrase” (68).

In this paper, I take Chang’s suggestion and argue that attending to Austin’s account of the things we do with words can help us understand the multiple goals of scientific practices, the speech acts appropriate to those goals, and the roles of nonepistemic values in evaluating speech acts made relative to those aims. In §2, I give an overview of a few philosophers of science working on explanation who have shifted focus from propositions to explaining.<sup>1</sup> I also briefly relate this work to a few themes in speech act theory. In §3, I give more details of Austin’s framework to highlight ways of evaluating speech acts beyond truth and falsity. In §4, I explore the multiple goals of scientific practice, especially goals related to conveying understanding to the general public and policymakers, and the speech acts appropriate to those goals.

## **2. The things scientists do with words**

### **2.1 Explaining**

Consider some recent and not-so-recent work on scientific explanation. Andrea Woody’s defense of a functional perspective on explanation aims to motivate “a shift in focus away from explanations, as achievements, toward explaining, as a coordinated activity of communities” (2015, 80). In a similar spirit, Angela Potochnik argues that when looking at explanation, “sidelining the communicative purposes to which explanations are put is a mistake” (2016, 724). She emphasizes that explaining is a communicative act involving a speaker and audience made against a background that shapes the explanations offered. In so

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<sup>1</sup> I make no claims Chang influenced the work I canvas.

arguing, Potochnik deliberately recalls Peter Achinstein's claim, "Explaining is an illocutionary act," i.e., a speech act uttered by a speaker with a certain force and for a certain point (1977, 1).

These accounts share in common an emphasis on the importance of the aims of the speaker and audience, and thus the context of utterance in evaluating, to borrow terminology from Austin, the felicity conditions of explanatory speech acts. In particular, we might focus on the aims of the speaker and their audience in requesting and giving explanations, the time and location of an explaining speech act, and, following Woody, "what role(s) [explanations] might play in practice" (2015, 81). In focusing on the explaining act rather than the supposedly stable propositional content of an act of explanation, our attention is drawn to dimensions of evaluation beyond truth and falsity.

On this last point, Nancy Cartwright argues that the functions of a scientific theory to "tell us...what is true in nature, and how we are to explain it...are entirely different functions" (1980, 159). *Ceteris paribus* laws used in scientific theories are literally false, but still do explanatory work. One way to understand Cartwright's claim is that the speech act of describing the world truly and the speech act of explaining come apart from one another. In coming apart from one another and fulfilling different aims within scientific practice, descriptive and explanatory speech acts have different felicity conditions. For example, Potochnik (2016) examines the ways in which explaining increases understanding. But, Potochnik argues, what gets explained depends on a speaker's and audience's interests, and an explaining act's success in generating understanding depends on the cognitive resources of the audience. As such, to evaluate any given communicative act of explaining requires attending to the epistemic and nonepistemic interests of speakers and audiences that form the background against which explanations are offered. This means evaluating explanatory speech acts solely in terms of truth or falsity is inapt.

## 2.2 Multiple aims and the true/false fetish

I do not think this focus on acts and away from the truth or falsity of descriptive statements is unique to philosophers of science interested in explanation. We see a similar shift in work on the so-called aims approach to values in science (e.g., Elliott and McKaughan 2014;

Intemann 2015). The aims approach shares in common with work on explaining a recognition that scientific practice aims at more than describing the world truly or falsely. Further, if some of those aims include things like making timely policy recommendations for decision makers or increasing public understanding of science, there is a role for nonepistemic values in parts of scientific practice. As Kevin Elliott and Daniel McKaughan put this point, “representations can be evaluated not only on the basis of the relations that they bear to the world but also in connection with the various uses to which they are put” (2014, 3).

Why look to speech act theory to flesh out this picture about the multiple aims of scientific practice and their relationship to nonepistemic values? In part because speech act theory makes sense of the different uses to which one and the same sentence might be put depending on the aims of the speaker and audience and the context of utterance. In doing so, I think Austin is right that we can “play Old Harry with two fetishes...(1) the true/false fetish, (2) the value/fact fetish” (1962, 150). Austin was mainly content to play Old Harry with these fetishes to free philosophers from the grip of the so-called descriptive fallacy: the view “that the sole business, the sole interesting business, of any utterance...is to be true or at least false” (1970, 233). But I also think that in combating the descriptive fallacy and the true/false and fact/value fetishes, speech act theory motivates a constructive shift from the truth or falsity of descriptive statements to the things we do with words.

Take Austin’s claim that evaluating apparently descriptive speech acts like “‘France is hexagonal,’” involves nonepistemic questions about who is uttering the statement, in what context, and with what “intents and purposes” (1962, 142). Rather than concluding the sentence is false and leaving it at that, Austin points out the different speech acts one can use such a sentence to perform, e.g., stating or interpreting or estimating. In determining the use the sentence is put to—with the help of context and by inquiring after the interests of the speaker and their audience—we might realize, irrespective of the sentence’s literal truth or falsity, “It is good enough for a top-ranking general, perhaps, but not for a geographer” (142). In other words, it serves the aims of the general, which, unlike the aims of the geographer, do not necessarily require a descriptively literal account of France’s shape. The statement might not aim to assert or describe literally, but do something else entirely. As such,

evaluating it along the lines of truth or falsity will miss something important about the aims of a speaker in uttering it.

To expand on this picture, I turn to explicating Austin's speech act theory.

### **3. Austin's speech act theory**

#### **3.1 Performatives and constatives**

Austin first drew our attention to the things we do with words by discussing performative utterances. Austin says of these, "if a person makes an utterance of this sort we should say that he is *doing* something rather than merely *saying* something" (1970, 235). Imagine a speaker utters 'I promise to return my referee report in two weeks' during the peer review process. In making this speech act, Austin claims the speaker does not describe an internal act she has concurrent to her utterance. Instead, in making that utterance, the speaker just is performing the act of promising thereby committing herself to actions related to the timely review of papers.

While promising has no special connection to truth and falsity, it still must meet what Austin calls felicity conditions to be happy or unhappy. In order to promise to return their referee report in two weeks successfully, the speaker must meet the sincerity condition of forming an intention to do so, even if they are not describing "some inward spiritual act of promising" (236). The speaker must also be in a position to follow through on their intention. Thus, there is unhappiness in the speech act if the speaker promises knowing full well other commitments will prevent her from returning the report in two weeks. The speaker must also have the authority to make a promise; unless authorized, an editor cannot promise on behalf of a reviewer. There should also exist a convention for making a promise in peer review contexts. Such conventions might allow the speaker to promise without uttering, 'I promise,' e.g., by accepting a request that reads, 'In accepting this review assignment you commit to returning the referee report within such-and-such a time.'

Austin first contrasts performatives with constatives, e.g., descriptive statements or assertions that aim to state something truly or falsely about the world, but which do not seem to perform an action. However, Austin claims describing or asserting is as much an action as promising, even if the felicity conditions for asserting are more closely connected to truth

or falsity. Consider an editor saying of a reviewer, ‘They review quickly, and I expect that they will return their review within two weeks.’ In saying this, the editor commits herself to providing evidence for her description of the reviewer as quick, and perhaps justifying her expectation that the reviewer’s past behavior provides good evidence for future behavior. As Robert Brandom puts this point, “In asserting a claim one not only authorizes further assertions, but commits oneself to vindicate the original claim, showing that one is entitled to make it” (1983, 641). That is, the utterer must be in a position of authority—here in an epistemic sense—with regards to the claim and be ready to perform further speech acts if so prompted. Other felicity conditions of assertions or descriptions include a sincerity condition: an editor uttering our example sentence should believe what they say. Finally, the context of an assertion also shapes its felicity conditions: an editor should utter the sentence in the appropriate circumstances, e.g., as a response to a worry about the speed of the review process. Should these conditions not be met, the speech act might be unhappy even if true.

### 3.2 Locution and illocution

Austin develops speech act theory to capture the similarities between performatives and constatives. Speech acts like promising and describing have three dimensions: the locutionary content, which is the conventional sense and reference of the uttered sentence; the illocutionary force, which is the use the utterance is put to; and the perlocutionary effects, which are intended and unintended “effects upon the feelings, thoughts, or actions of the audience, or of the speaker, or of other persons” (1962, 101).

Austin’s points about the illocutionary dimension of a speech act most clearly capture how one and the same representation might be put to different uses depending on our goals, and how different uses have different felicity conditions despite sharing locutionary content. Consider the sentence, ‘This product contains chemicals known to the state of California to cause cancer.’ The locutionary content would just consist in the proposition expressed by the sentence as determined by the conventional sense and reference of the words. This content can be common to different illocutionary acts. Someone uttering the sentence could be describing a product, issuing a warning, or explaining why they do not use this particular product but another. Uttering the sentence with the force of a description, the force of a

warning, and the force of an explanation will have similar felicity conditions related to truth and falsity. Namely, the locutionary content should be true or approximately true for an utterance to count as a good description, a good warning, or a good explanation.

However, a warning might be infelicitous in ways a description might not. For example, warnings might be issued only in the case in which some pre-determined level of significant risk at a certain level of exposure is met. In cases where such levels are not met, issuing a warning might be infelicitous. Consider also that uttering such a sentence with the force of an explanation might be called for only if, e.g., someone is prompted to justify their choice of a product that does not contain cancer-causing chemicals over a more easily available and cheaper product that does contain those chemicals. In these last two cases, nonepistemic reasons related to risk, cost-effectiveness, and so on can enter into the evaluation of the happiness of a warning or explanation.<sup>2</sup>

Austin thinks attending to these points combats a form of abstraction that distorts our thinking about the felicity conditions of descriptive statements. He thinks that when examining statements, “we abstract from the illocutionary...aspects of the speech act, and we concentrate on the locutionary” (1962, 144–5). In so doing, “we use an over-simplified notion of correspondence with the facts—over-simplified because essentially it brings in the illocutionary aspect” (145). Such an approach focuses on “the ideal of what would be right to say in all circumstances, for any purpose, to any audience, &c.” (145). But, as Austin claims, questions concerning correspondence with the facts brings with it the illocutionary aspect since truth or falsity does not attach to sentences or locutionary content. Instead, truth or falsity is related to particular things speakers do with sentences. Descriptions might be, strictly speaking, true or false, but not recommendations or explanations. In order to know, then, if evaluating a speech act along the true-false dimension is apt, we need to know the illocutionary force of that act. But to know the illocutionary force of the act requires we attend to context, including the aims of both speaker and audience, time and place of utterance, and conventions governing the specific speech situation. In this way, Austin

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<sup>2</sup> Any speech act will also have perlocutionary effects, and we might follow Heather Douglas (2009) and Paul Franco (2017) in focusing on the nonepistemic consequences of making false descriptions, giving bad warnings, or explaining unclearly.

argues context and aims are central to determining the illocutionary force of a speech act, and hence to evaluating its felicity or infelicity.

#### **4. Aims-approaches and speech act theory**

##### **4.1 Explaining and understanding**

Scientific practice might seem to deal in paradigmatically constative speech acts, e.g., descriptions. Such speech acts are, to varying degrees, evaluable along dimensions of truth or falsity in ways we might question the relevance of speech act theory to philosophy of science. That is, we might say that scientific practice just is a case in which abstracting away from the illocutionary force of an utterance to focus on locutionary content is appropriate. For example, Austin says that “perhaps with mathematical formulas in physics books...we approximate in real life to finding” speech acts where focusing on the locutionary content is appropriate (1962, 145). If scientific practice aims at timeless truths holding across all contexts independent of the sorts of aims and interests of speakers and audiences necessary to evaluating the felicity or infelicity of speech acts, then it seems speech act theory is irrelevant to philosophy of science.

Yet, as Austin points out, “When a constative is confronted with facts, we in fact appraise it in ways involving the employment of a vast array of terms which overlap with those that we use in the appraisal of performatives. In real life, as opposed to the simple situations envisaged in logical theory, one cannot always answer in a simple manner whether it is true or false” (141–2). Consider again ‘France is hexagonal.’ Austin asks, “How can one answer...whether it is true or false that France is hexagonal? It is just rough, and that is the right and final answer to the question of the relation of ‘France is hexagonal’ to France. It is a rough description; it is not a true or false one” (142). Though rough, it is still open to evaluation. We can ask if it is in accord with conventions governing estimations and if this estimation serves the purposes and interests of the speaker and their audience at the time of utterance. ‘France is hexagonal’ can count as felicitous even if rough and not literally true because it aims at something other than truth.

Austin claims that many of our apparently constative speech acts are evaluable along similar dimensions given that they also confront facts in similarly rough ways. McKaughan



makes a related point about scientific speech acts. He argues that certain speech acts central to scientific practice like “conjecturing, hypothesizing, guessing and the like often play a role in scientific discourse that serves neither to assert that an hypothesis is true nor to express such a belief” (2012, 89). Moreover, as mentioned in §2, the picture of scientific practice as concerned solely with the truth is challenged, among other places, in work on explanation, and also in values in science. For example, when looking at the role particular acts or patterns of explaining play in scientific discourse we might focus not on the locutionary content of an explanatory speech act, but on the ways “explanatory discourse...functions to sculpt and subsequently perpetuate communal norms of intelligibility” (Woody 2015, 81). In focusing on this aspect of explaining, we might find, for example, that “the ideal gas law’s role in practice is not essentially descriptive, but rather prescriptive; by providing selective attention to, and simplified treatment of, certain gas properties (and their relations) and ignoring other aspects of actual gas phenomena, the ideal gas law effectively instructs chemists in how to think about gases as they are characterized within chemistry” (82). In other words, the ideal gas law, in practice, does not have the force of a descriptive speech act, but lays down a rule of sorts guiding the investigation of gases.<sup>3</sup> The success of acts of explaining from this perspective will have less to do with accurately describing actual gases, but the way they facilitate, say, the education of new scientists or increase understanding of related phenomena, e.g., “by laying foundation for the concept of ‘temperature’” beyond “the subjective, inherently comparative quality of human perception” (82). An act of explaining that fails to achieve pedagogical aims or fails to increase understanding of related phenomena might be infelicitous even if the locutionary content of that act confronts the facts in the right way to count as approximately true.

On this point about the ways explanations might increase understanding without describing, Potochnik claims “that what best facilitates understanding is not determined solely by the relationship between a representation and the world” (2015, 74). An idealized explanation like the ideal gas law is not defective because it fails to fully describe all the

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<sup>3</sup> About universal generalizations Austin writes, “many have claimed, with much justice, that utterances such as those beginning ‘All...’ are prescriptive definitions or advice to adopt a rule” (1962, 143). Austin does not fully endorse this suggestion.

possible causal factors at play in the behavior of actual gases. Though literally false, an idealization might be successful insofar as it “secure[s] computational tractability” or successfully isolates “all but the most significant causal influences on a phenomenon” (71). In so doing, we increase our understanding by facilitating “successful mastery, in some sense, of the target of understanding” or “by revealing patterns and enabling insights that would otherwise be inaccessible” (72). Indeed, pointing out all the ways in which the ideal gas law fails to hold for actual gases or is literally false as a description might hinder the use of explanations in scientific discourse to provide “shared exemplars that function as norms of intelligibility” (Woody 2015, 84).

In a related vein, Potochnik argues, “Because understanding is a cognitive state, its achievement depends in part on the characteristics of those who seek to understand,” including both the speaker and the audience (2015, 74). In evaluating an act of explaining, we should look at how the speaker’s interest has shaped the focus of their explanation and also how the explanation increases an audience’s understanding, where this involves considering the audience’s interests in seeking an explanation. An explanation that fails to be relevant to the audience or fails to increase their understanding or guide their thinking about related phenomena, but that nonetheless has locutionary content that is approximately true, might count as infelicitous.

## 4.2 Values and science

On the views of explaining canvassed, the aims of generating literally true descriptions of the world come apart from, say, explaining and understanding the most important causal factors at play for a given phenomenon. Now, as the aims approach to the proper role for nonepistemic values in scientific practice emphasizes, explaining and describing do not exhaust the goals of scientific practice. The aims approach focuses on the ways “scientific decision-making, including methodological choices, selection of data, and choice of theories or models, are...a function of the aims that constitute the research context” (Intemann 2015, 218). Given that the research context includes social, political, and moral considerations, the aims of science can just as well be understood in nonepistemic ways as it can be understood in epistemic ways.

Consider, for example, the American Geophysical Union's position statement on human-induced climate change. At the end of their statement, they claim, "The community of scientists has responsibilities to improve overall understanding of climate change and its impacts. Improvements will come from pursuing the research needed to understand climate change, working with stakeholders to identify relevant information, and conveying understanding clearly and accurately, both to decision makers and to the general public" (American Geophysical Union 2013). Here, I focus on the claim that scientists have responsibilities to improve the understanding of policymakers and the general public, and drawing upon the aforementioned work on explaining, think about how adopting this aim shapes the felicity conditions of explanatory speech acts directed at the audiences mentioned.

Notice that the position statement distinguishes the research necessary to understand climate change from conveying that understanding to policymakers and the general public. The sense in which these different activities come apart from one another and have different success conditions can be made sense of, in part, by focusing on the audience to whom scientists are speaking. We saw that for Potochnik (2016) understanding is a cognitive state that depends on the abilities and interests of those who are explaining and those to whom explanations are directed. In communicating to policymakers and the general public, scientists should consider the interests of the speaker in asking for an explanation as well as their level of knowledge regarding the phenomenon in question, in this case, climate change. In so doing, scientists might find that a description that aims to describe climate change in all its complexity might not serve these aims well. Instead, scientists might aim for an explanation that, though omitting descriptive complexity, draws upon models that represent those causal factors related to the audience's interests in a way that is cognitively accessible and helps guide the public in thinking more generally about climate change.

On this point, the American Geophysical Union's position statement maintains scientists ought to enlist the help of stakeholders in identifying potentially relevant information to their research. This is a point Intemann makes in developing the aims approach. She says of climate science, "[T]he aim is not only to produce accurate beliefs about the atmosphere, but to do so in a way that allows us to generate useful predictions for protecting a variety of social, economic and environmental goods that we care about" (2015,

219). In the view of the American Geophysical Union, in order to do this well, scientists ought to consult with relevant stakeholders and policymakers regarding what they value. Thus, for example, if stakeholders and policymakers communicate worries about extreme weather events and “how to adapt to ‘worst case scenarios,’ then models able to capture extreme weather events should be preferred” to those models that “anticipate slow gradual changes” (Intemann 2015, 220). Notice that in making such a decision, the grounds for choosing models able to represent aspects of climate change relevant to stakeholders’ interests are nonepistemic rather than epistemic, e.g., generating predictions useful for protecting goods the general public cares about. Insofar as the representations or explanations generated do not meet these goals because they are unrelated to stakeholders’ interests, the attendant speech acts might very well be infelicitous even if they describe some related phenomenon more or less accurately.

Both points about pitching explanations at a level that is cognitively accessible and choosing models for representing climate change phenomena in ways sensitive to stakeholders’ interests illustrate a point Austin makes about the importance of uptake to successfully performing a speech act. Austin claims, “Unless a certain effect is achieved, the illocutionary act will not have been happily, successfully performed....I cannot be said to have warned an audience unless it hears what I say and takes what I say in a certain sense....Generally the effect amounts to bringing about the understanding of the meaning and force of the locution” (1962, 116). In aiming to convey understanding through explaining relevant aspects of climate change to decision makers and the general public, a speaker should consider the interests, background knowledge, and cognitive resources of their audience. Insofar as scientists fail to do so in explaining to the general public, even if the locutionary content that comprises their speech act approximates truth, they will not secure uptake in the sense of generating understanding in their audience. As such, their speech act will be infelicitous.

Of course, a scientist’s explaining something to their audience will also be infelicitous if it is based on inaccurate information or extrapolates from what is known to their audience’s interests in unjustified ways. However, this does not mean that if scientists aim to convey understanding to the public they should stick solely to descriptive claims. As

Elliott emphasizes in discussing how scientists should best communicate uncertainty to the public, “It does little good to expect scientists to provide unbiased information to the public if their pronouncements are completely misinterpreted or misused by those who receive them” (2017, 89). Similarly, “members of the public might not be able to ‘connect the dots’” between scientists’ descriptive speech acts and the ways those are relevant to their interests; insofar as scientists do not explain with the aims of conveying understanding—which as Potochnik argues, comes apart from describing the world truly in all its complexity—the public “would be left wondering what [the descriptions] might mean” (88). Thus, if scientists are to meet responsibilities the American Geophysical Union claims they have with regard to conveying understanding to the general public, those scientists should communicate using speech acts best able to secure uptake in the general public. This involves considering the interests and cognitive resources of the general public in ways that shape the felicity conditions of the speech acts beyond truth and falsity.

## **5. Conclusion**

I argued speech act theory can tie together a few threads in recent work on explaining and values in science that share in common a shift in focus from descriptive propositions to things scientists do with words. Some of those things, like explaining, also seem the sorts of speech acts appropriate for fulfilling aims scientists have other than describing the world literally, like conveying understanding to the public and policymakers. Insofar as successfully fulfilling these aims involves explaining, and insofar as acts of explaining that secure uptake require attention to the nonepistemic interests and cognitive resources of speaker and audience, our attention is drawn towards ways explanatory speech acts can be happy or unhappy beyond describing truly or falsely. Future work will aim to delineate these felicity conditions in greater detail with an eye towards revealing further nonepistemic dimensions of evaluation.

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