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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 consider work that distinguishes explanatory speech acts from descriptive speech acts within scientific practice. I then show how speech act theory provides a framework to make sense of explaining’s and describing’s distinct felicity conditions. Finally, I argue that if explaining aims to convey understanding to particular audiences rather than describe literally across contexts, then evaluating explanatory speech acts directed to nonscientists involves nonepistemic criteria.

**Acknowledgments:** Thanks to the students in my science and values class in Fall 2017, especially Abbey Willman for writing a term paper that touched on the topic here; the Philosophy of Science Reading Group at the University of Washington; the audience at PSA 2018; Kevin Elliott; and Erin Kendig for helpful discussion and/or suggestions that improved the paper.

## 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 up Chang’s suggestion and argue that attending to Austin’s account of the things we do with words can help us understand the multiple aims of scientific practices, the speech acts appropriate to those aims, and the roles of nonepistemic values in evaluating speech acts made relative to those aims. To do this, I first show how Austin’s speech act theory provides a framework for making sense of the ways scientific representations can be used for different speech acts depending on one’s aims. Second, I show that evaluating the success of these different speech acts involves looking to felicity conditions other than truth and falsity, the securing of uptake in one’s audience, and, sometimes, nonepistemic values.

In §2, I consider philosophers of science working on explanation who have shifted focus from propositions to the act of explaining and relate this work to speech act theory.<sup>1</sup> In §3, I provide details of Austin’s framework to highlight the felicity conditions of speech acts beyond truth and falsity. In §4, I consider work on the multiple aims of scientific practice, especially aims related to conveying understanding to nonscientists, and argue that evaluating speech acts appropriate to those aims involves nonepistemic values.

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

## 2. Things scientists do with words

### 2.1 Explaining

Consider some recent and not-so-recent work on scientific explanation. Andrea Woody's functional perspective motivates "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 "sidelining the communicative purposes to which explanations are put is a mistake" (2016, 724). For Potochnik, explaining is a communicative act involving a speaker and audience made against a background that shapes the explanations offered. In so arguing, Potochnik deliberately recalls Peter Achinstein's claim, "Explaining is an illocutionary act," i.e., a speech act uttered by a speaker to an audience with a certain force and for a certain point (1977, 1).

These accounts share in common an emphasis on the importance of context, especially the aims of the speaker and interests of the audience in evaluating, to use Austin's terminology, the felicity conditions of explanatory speech acts. In particular, we might focus on the aims of the speaker and their audience in giving and requesting explanations, and the time and location of an explanatory speech act in deciding if the act is successful or felicitous. In focusing on the explaining act rather than the supposedly stable propositional content of an explanation, our attention is drawn to ways of evaluating that act beyond truth and falsity.

Related to this last point, Nancy Cartwright argues 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 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 and fulfill distinct aims within scientific practice. It follows that descriptive and explanatory speech acts have different felicity conditions. If this is

right, evaluating explanatory speech acts solely in terms of truth or falsity can be inapt. For example, suppose explaining aims to increase understanding in one's audience. As Potochnik (2016) argues, what gets explained depends on a speaker's and audience's interests, and the success of an explaining act in generating understanding depends, in part, on the cognitive resources of the audience. As such, to evaluate any given act of explaining requires attending to the interests and cognitive resources of speakers and audiences and the context in which explanations are offered. This moves beyond merely focusing on the descriptive content of explanatory speech acts.

## 2.2 Multiple aims

A focus on acts and away from the truth or falsity of descriptive content is not unique to recent work on explanation. We see a similar shift in the aims approach to values in science, e.g., Kevin Elliott and Daniel McKaughan (2014), and Kristen Intemann (2015). The aims approach, like the mentioned work on explaining, recognizes scientific practice aims at more than describing the world and so the results of scientific practice can be evaluated from a number of perspectives related to those aims. As Elliott and 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). Further, if some of those uses include things like providing timely input for policymakers or increasing public understanding of science for ethical and political reasons, there is a role for nonepistemic values in evaluating the success of those uses.

I think the general framework of Austin's speech act theory helps flesh out this picture about the multiple aims of scientific practice and their relationship to nonepistemic values in at least two ways. First, speech act theory makes sense of how one and the same sentence can be used

to perform different speech acts depending on the aims of the speaker and the context of utterance. Second, it shows that evaluating different speech acts requires more than looking at “the basis of the relations that they bear to the world” (3). Instead, to properly evaluate speech acts we have to look to the aims of the speaker and the interests of their audience, including whatever nonepistemic values are relevant to those aims and interests.

Take Austin’s claim that evaluating apparently descriptive speech acts like “‘France is hexagonal,’” involves 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 estimating. In determining the use the sentence is put to—by consulting context and inquiring after the aims of the speaker and the interests of 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 require a descriptively literal account of France’s shape. As such, evaluating the speech act solely in terms of truth or falsity misses something important since the speaker might not be aiming to describe literally, but at something else entirely. Further, if the aims of the general are nonepistemic in character, we can evaluate the felicity of the speech act relative to how well it meets those aims.

In making these points, I think Austin is right that we can “play Old Harry with two fetishes...(1) the true/false fetish, (2) the value/fact fetish” (150). In combating these fetishes, Austin sought to free philosophers from the view “that the sole business, the sole interesting business, of any utterance...is to be true or at least false” (1970, 233). In doing so, speech act theory motivates a constructive shift from the truth or falsity of descriptive statements to

considering the multiple aims we have in performing different speech acts and the role of nonepistemic criteria in evaluating how well those speech acts meet aims not purely epistemic in character.

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

### **3. Speech act theory**

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

Austin first drew our attention to things we do with words by discussing performative utterances. Of these, Austin says, "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 promising, Austin claims the speaker does not describe an internal act she has concurrent to her utterance. Instead, in making that utterance, the speaker performs the act of promising thereby committing herself to actions related to the timely review of papers.

While promising has no special connection to truth, it still must meet certain felicity conditions to be happy. In order to successfully promise to return their referee report in two weeks, the speaker must meet the sincerity condition of forming an intention to do so and must also be able to realize their intention. There is unhappiness in, or an abuse of the speech act if the speaker promises knowing 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 promises in this context. Such conventions might allow the speaker to promise without uttering, 'I promise,' e.g.,

by accepting a request that reads, ‘In agreeing to review you commit to returning your report within such-and-such a time.’

Austin first contrasts performatives with constatives, e.g., descriptive statements or assertions that aim to state something true about the world, but which do not seem to be actions. However, Austin claims describing and asserting are as much actions as promising, even if their felicity conditions are closely connected to truth and falsity. Consider an editor saying of a reviewer, ‘They review quickly, and I expect 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 says, “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 prompted. Other felicity conditions of assertions include a sincerity condition; generally, people should believe what they say. Finally, the context of an assertion shapes its felicity conditions: an editor should utter the sentence in appropriate circumstances, e.g., as a response to concerns about the speed of the reviewer. 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 a single representation can be put to different uses depending on our aims, and how different uses have different felicity conditions despite sharing locutionary content.<sup>2</sup> Consider the sentence, ‘This product contains chemicals known to cause cancer.’ The locutionary content consists in the proposition expressed by the sentence as determined by the conventional sense and reference of the words and can be common to different illocutionary acts. Someone uttering the sentence could be describing a product, issuing a warning, or explaining why they use a particular product but not another. Uttering the sentence with the force of a description, the force of a warning, or the force of an explanation will share some felicity conditions related to truth. Namely, the locutionary content should be true or approximately true 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 when a 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. In these last two

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<sup>2</sup> The inductive risk argument in science and values focuses on perlocutionary effects. See Heather Douglas (2009) and Franco (2017).



cases, nonepistemic criteria related to risk, cost-effectiveness, and so on can be used to evaluate the happiness of warnings or explanations.

Austin thinks attending to these points combats a form of abstraction that distorts our thinking about the felicity conditions of speech acts. When examining descriptive statements, Austin thinks “we abstract from the illocutionary...aspects of the speech act, and we concentrate on the locutionary” (1962, 144–5). 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 in doing so, “we use an over-simplified notion of correspondence with the facts—over-simplified because essentially it brings in the illocutionary aspect” (145). Questions concerning correspondence with the facts brings in 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 words. Descriptions might be true or false, but, strictly speaking, not warnings or explanations. In order to know, then, if evaluating a speech act along the true-false dimension is apt, we need to know its illocutionary force. But to know the illocutionary force 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 argues context and aims are central to determining the illocutionary force of a speech act, and hence to evaluating its felicity.

#### **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 speech act theory’s relevance to philosophy of science. Maybe scientific

practice just is a case in which abstracting away from illocutionary force to focus on locutionary content is appropriate. For example, Austin says “perhaps with mathematical formulas in physics books...we approximate in real life to finding” speech acts where focusing solely on the locutionary content is not pernicious (1962, 145). If scientific practice aims at timeless, true descriptions holding across all contexts independent of the aims and interests of speakers and audiences necessary to evaluating the felicity of speech acts, then perhaps 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 accords with conventions governing estimations for the particular purpose it is put to and if this particular estimation serves the purposes and interests of the speaker and their audience. ‘France is hexagonal’ can count as felicitous even if rough and not literally true because it might aim at something other than truth.

McKaughan makes a related point about scientific speech acts. He argues 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). For example, following Woody, when examining particular acts or patterns of explaining used in scientific practice we might focus not on the locutionary content,

but on the ways “explanatory discourse...functions to sculpt and subsequently perpetuate communal norms of intelligibility” (2015, 81). In focusing on this aspect of explanatory speech acts, 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). On Woody’s view, the ideal gas law, in practice, does not have the force of a descriptive speech act, but lays down a rule guiding the investigation of gases.<sup>3</sup> The success of explanatory speech acts from this perspective has less to do with describing actual gases, and more to do with 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). Depending on one’s aims, an explanatory act that fails to increase understanding of related phenomena might be infelicitous even if the locutionary content confronts the facts in approximately true ways.

In a related vein, Potochnik claims “that what best facilitates understanding is not determined solely by the relationship between a representation and the world” (2015, 74). Suppose a scientist’s aim is to increase understanding of some phenomena rather than to describe it in all its complexity. In this case, a particular explanatory speech act making use of the ideal gas law is not defective because it fails to describe all causal factors at play in the behavior of actual gases. An explanatory speech act making use of an idealization might successfully fulfill the aims of a scientist insofar as it “secure[s] computational tractability” or isolates “all but the most significant causal influences on a phenomenon” (71). In eschewing descriptive complexity in favor of other

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<sup>3</sup> Austin (1962, 143) entertains a similar point about laws.

goals, 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).

Moreover, 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, then, we should look at how the speaker’s aims shape the focus of their explanation and also how the explanation increases an audience’s understanding, where this involves considering their interests in seeking an explanation. An explanation irrelevant to the audience’s interests or that fails to increase their understanding or guide their thinking about related phenomena, but that nonetheless has approximately true locutionary content might count as infelicitous.

#### 4.2 Values

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 role for nonepistemic values in scientific practice emphasizes, explaining and describing to fellow scientists 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 are often nonepistemic in character.

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. Drawing upon the aforementioned work on explaining, I consider how this aim and the values of policymakers and the public shape the nonepistemic felicity conditions of explanatory speech acts directed at them.

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 activities come apart and have different felicity conditions can be made sense of, in part, by focusing on the audience to whom scientists are speaking. For Potochnik (2016), understanding is a cognitive state that depends on the abilities and interests of those explaining and those to whom explanations are directed. In communicating to specific audiences of policymakers and specific audiences composed of members of the general public, scientists should consider the interests of the audience in asking for an explanation as well as their level of knowledge regarding the phenomenon in question, in this case, climate change.<sup>4</sup> In so doing, scientists might find a description that describes climate change in all its complexity might not serve these aims well. Instead, scientists might aim for an explanation that, though omitting

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<sup>4</sup> Assuming a specific audience is identifiable. See Stephen John (2015) on the difficulties of carrying out similar suggestions when no single, specific audience is identifiable.

descriptive complexity, draws upon models that include causal factors related to their audiences' interests in understanding climate change, some of which will be nonepistemic character, e.g., mitigating risks from extreme weather events. Furthermore, a scientist's speech acts should be cognitively accessible for the nonscientists in their audience, perhaps in such a way that it guides their thinking more generally about climate change and its impact on things they value.<sup>5</sup>

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. In developing the aims approach, Intemann emphasizes a similar point. 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 their values. For example, if stakeholders and policymakers communicate worries about extreme weather events and ask about "how to adapt to 'worst case scenarios,' then models able to capture extreme weather events should be preferred" to 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 stakeholders care about. Insofar as the explanations generated do not meet these goals because they are unrelated to stakeholders' interests, the attendant speech acts might be infelicitous even if they describe some related phenomenon more or less accurately.

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<sup>5</sup> This suggestion could be extended to other forms of communication, e.g., visual representations like infographics.

Both points about pitching cognitively accessible explanations and choosing models for representing climate change phenomena in ways sensitive to stakeholders' values and interests illustrate Austin's emphasis on 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 policymakers and the 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 nonscientists, they will not secure uptake in the sense of generating understanding in their audience, even if the locutionary content of their speech act approximates truth.

Of course, a scientist's explaining something to their audience will also be infelicitous if based on inaccurate information or if it extrapolates from what is known to their audience's interests in unjustified ways. However, if scientists aim to increase public understanding, they should not stick solely to descriptively complex claims, but aim at making explanatory speech acts relevant to their audience's interests in cognitively accessible ways. Elliott, for example, emphasizes the importance of securing uptake in discussing how scientists should communicate uncertainty: "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). Thus, if scientists are to meet responsibilities the American Geophysical Union claims they have with regard to conveying understanding about climate change, those scientists should communicate using explanatory speech acts best able to secure uptake in the general public and

policymakers. This involves considering the epistemic and nonepistemic interests and cognitive resources of their audience in ways that shape the felicity conditions of the speech acts beyond truth and falsity.

## 5. Conclusion

Speech act theory can tie together threads in recent work on explaining and the aims approach to values in science that share in common a shift in focus from descriptive propositions to other things scientists do with words. Explaining is at least one of the things scientists do with words that aims at something other than describing the world literally. When we look at, say, the aims of scientists in explaining some phenomena to nonscientists through the lens of speech act theory, our attention is drawn to ways explanatory speech acts can be happy or unhappy beyond describing truly or falsely. For example, successfully securing uptake in the general public or policymakers in ways that increases their understanding of phenomena relevant to their nonepistemic interests requires attention to the cognitive resources and values of audiences, as well as the contexts in which explanations are requested. These all shape the felicity conditions of speech acts directed to the general public or policymakers. Future work within this framework may aim to articulate in greater detail the felicity conditions of speech acts made relative to the multiple aims of scientific practice with an eye towards their connection to the nonepistemic values of speakers and audiences.

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