

7. Pragmatics

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Abstract

This chapter reviews core empirical phenomena and technical concepts from linguistic pragmatics, including context dependence, common ground, indexicality, conversational implicature, presupposition, and speech acts. I seek to identify unifying themes among these concepts, provide a high-level guide to the primary literature, and relate the phenomena to issues in computational linguistics.

Keywords context dependence, common ground, indexicality, conversational implicature, presupposition, speech acts

7.1 Introduction

The linguistic objects that speakers use in their utterances vastly underdetermine the contributions that those utterances make to discourse. To borrow an analogy from Levinson (2000: 4), “an utterance is not [...] a veridical model or ‘snapshot’ of the scene it describes”. Rather, the encoded content merely sketches what speakers intend and hearers perceive. The fundamental questions of pragmatics concern how semantic content, contextual information, and general communicative pressures interact to guide discourse participants in filling in these sketches:

- (i) How do language users represent the context of utterance, and which aspects of the context are central to communication?
- (ii) We often “mean more than we say”. What principles guide this pragmatic enrichment, and how do semantic values (conventional aspects of meaning) enable and constrain such enrichment?

The present chapter pursues each of these questions, starting with question (i): section 7.2 outlines techniques for modelling contexts, and section 7.3 reviews a wide

range of context-dependent phenomena. I then turn to question (ii): section 7.4 describes Grice's (1975) framework for pragmatics, with emphasis on conversational implicatures as a prominent kind of pragmatic enrichment, section 7.5 discusses the semantic and pragmatic interactions that deliver multifaceted meanings in context, and section 7.6 addresses the particularly challenging task of assigning speech-act force. I close (section 7.7) by summarising some overarching challenges and our prospects for meeting those challenges.

My overview of the field is necessarily selective. Every aspect of linguistic performance, including intonation (Büring 2007), physical gesture (Goldin-Meadow and Wagner Alibali 2012), and social identity (Eckert 2008), can convey meaning, and many fields can lay claim to aspects of the above foundational questions, including philosophy, sociolinguistics, discourse analysis, cognitive psychology, artificial intelligence, dialogue management (Chapter 8, 'Dialogue'; Chapter 41, 'Spoken language dialogue'), and information extraction (Chapter 35, 'Information extraction'). My goal is to chart a short path through this large, diverse empirical terrain that conveys a sense for what the problems are like, how linguists seek to solve them, and why these results are important for computational research (Bunt and Black 2000).

7.2 Modelling contexts

Robert Stalnaker pioneered work on modelling context with a notion of **common ground** (context set, conversational record), as in definition 7.1. His foundational papers on this topic are Stalnaker 1970, 1974, 1998, which are collected in Stalnaker 1999, and Stalnaker 1973, 2002.

Definition 7.1 (Common ground). The **common ground** for a context C is the set of all propositions that the discourse participants of C mutually and publicly agree to treat as true for the purposes of the talk exchange.

The notion of proposition in this definition encompasses all information. Realistic common grounds will include world knowledge, more immediate information characterising where we are and what goals we have, our beliefs about each other, our beliefs about those beliefs, and so forth. It will also include information about the nature of our language (its semantics, its conventions of use), which utterances have been made, which objects are salient, and so forth (Stalnaker 1998: §IV). This expansive view highlights the fact that propositions are not linguistic objects. Natural language sentences can encode propositions (among other kinds of information); this encoding is a focus for semantic theory (Chapter 5, 'Semantics'). Sentences can in turn

be used, in utterances, to convey content; pragmatics is essentially the study of such language-centered communicative acts.

The common ground is a shared, public data structure. Thomason (1990: 339) encourages us to think of it in terms of people collaborating on a shared task:

What I have in mind is like a group of people working on a common project that is in plain view. For instance, the group might be together in a kitchen, making a salad. From time to time, members of the group add something to the salad. But it is assumed at all times that everyone is aware of the current state of the salad, simply because it's there for everyone to see.

Of course, the shared-database metaphor is an idealisation; there typically isn't a shared record, but rather a set of individual conceptions of that record. However, discourse participants will ("Unless danger signals are perceived"; Thomason 1990: 338) behave as if their own representation of the common ground were the only one, and they will adjust their understandings of it in response to apparent discrepancies with others.

We expect our utterances to be interpreted relative to the common ground, and the norm is to reason in terms of it. The common ground also responds to new events that take place, including linguistic events. Thus, the common ground shapes, and is shaped by, our language; "it is both the object on which speech acts act and the source of information relative to which speech acts are interpreted" (Stalnaker 1998: 98). In keeping with the public nature of the common ground, the task of updating it can be thought of as a coordination problem in which the speaker and the audience collaborate on the nature of the update (Clark 1996; Stone et al. 2007).

Strictly speaking, Stalnaker's model of contexts should suffice by definition: it encodes *all* information (though see Heim 1982: 21 and Kamp 1988 for arguments that discourse information is importantly different, and Stalnaker 1998: §IV for a rebuttal). Stalnaker in fact *identifies* context with common ground. However, whether or not this is right, it is often useful to break the context down into component parts. This might help us to identify kinds of information that are of special relevance to language, and it might be essential for building tractable computational models. Montague (1970), and Kaplan (1978, 1989) model part of the context in terms of tuples containing a speaker, an addressee, a time, and a location, largely for the purposes of interpreting indexicals (see section 7.3). Karttunen (1976) stimulated a number of theoretical developments and empirical findings about how to model discourse anaphora using structures that track which entities have been introduced and what properties they have (Heim 1982; Kamp 1981; Groenendijk and Stokhof 1991; Bittner 2001; Asher and Lascarides 2003; see Chierchia 1995 for an overview and partial synthesis of these approaches). Related

approaches seek to predict the discourse status of information, using oppositions like old vs. new and topic vs. focus (Prince 1992; Ward and Birner 2004; Büring 2007). Roberts (1996) and Ginzburg (1996) propose that information exchange is driven by abstract questions under discussion, which define lines of inquiry and help to determine what is relevant (see also Groenendijk and Stokhof 1984; Lewis 1988; Roberts 2004). There is also an extensive literature about how to characterise and model the plans, preferences, commitments, and intentions of discourse participants (Cohen et al. 1990).

7.3 Context dependence

Natural language meanings are highly context-dependent: a single syntactic unit (morpheme, word, phrase, sentence) will often take on different values depending on the context in which it is used. It has long been widely recognised that this variability is pervasive (Katz and Fodor 1963; Bar-Hillel 1971b; Stalnaker 1970: 178). Partee (1989a: 276) conjectures that “the general case of lexical meaning is a combination of inherent meaning and dependence on context”. The primary goal of this section is to provide a sense for the range of ways in which expressions can be context dependent. I close with a brief overview of some theoretical approaches to addressing these phenomena.

The purest examples of context dependence are **indexicals**. An indexical is an expression that gets its value directly from the utterance situation. Typical English examples include first- and second-person pronouns, *here*, *now*, *today*, *two days ago*, and *actually*. To know what proposition is expressed by “I am typing here now”, one needs to know the time, place, and agent of the utterance. Kaplan (1989) is a seminal treatment of such expressions as directly referential (see also Montague 1970). For Kaplan, the recursive interpretation process is relative to both a model M , which provides fixed conventional meanings, and a context C , which provides a range of information about the utterance situation. When an indexical is encountered, its meaning is taken directly from C . (Haas 1994 addresses the challenges this poses for representation-based theories of knowledge.) Any syntactic unit that denotes a non-constant function from contexts into denotations (Kaplan called these functions **characters**) is said to be context-dependent.

One of the defining features of Kaplan’s system is that, outside of direct quotation, morphosyntactic operators cannot shift the meanings of indexicals. This seems broadly correct for English. For example, *I* refers to the speaker even when it is embedded inside a sentential complement whose content is attributed to someone else, as in “Sam says that I am happy”, which is not equivalent to “Sam says that Sam is happy”. Kaplan took this to be a correct prediction. However, linguists have since argued that

indexicals can shift under certain circumstances, mostly in other languages (Speas 1999; Schlenker 2003; Anand and Nevins 2004), but in certain non-quotational English settings as well (Banfield 1982; Schlenker 2004; Sharvit 2008; Harris 2012).

Indexical interpretation is often fraught with uncertainty. For first-person singular features, the referent is typically non-vague and easy to determine. Such crisp, certain resolution is the exception, though. English first-person plural features constrain their referents to include the speaker, but the rest of the membership is often unclear. Indexicals like *here* and *now* are more underspecified. They can be very general (planet Earth, this epoch) or very specific (this room, this millisecond), and they have extended senses (*here* as in ‘on the phone’, *here* as in ‘conscious’). The semantic values of all these features constrain the possibilities, but determining their referents is generally a full-fledged pragmatic task.

Many expressions have both indexical and non-indexical uses. Third-person pronouns clearly display the range of possibilities. **Deictic uses** (Chapter 27, ‘Anaphora resolution’) are those that vary by context and thus involve indexicality. For example, if I say, *She is famous*, referring to a woman standing across the room, I might gesture toward her, or I might instead just rely on her salience as a referent in this particular utterance. These uses parallel those for pure indexicals, though pure indexicals generally have enough lexical content to make pointing unnecessary. However, third-person pronouns can pick up a wider array of referents than indexicals can. They can be **discourse anaphoric**, as in *A woman entered. She looked tired* (Chapter 6, ‘Discourse’; Chapter 27, ‘Anaphora resolution’), and they can be bound by quantificational elements, as in *No actress admitted that she was tired* (Chapter 5, ‘Semantics’). Neither of these is possible for indexicals (though see Partee 1989a: fn. 3, Rullmann 2004, Heim 2008, and Kratzer 2009 for apparently bound indexicals).

Partee (1973) shows that tense elements pattern with pronouns. For example, in basic sentences, the simple past is generally defined relative to the utterance time; if A says, “I didn’t turn off the stove”, he likely doesn’t mean that there is no past time at which he turned off the stove, but rather that there is a particular, salient time span before the utterance time during which he did not turn off the stove. This is a kind of indexical or deictic reading. Discourse binding is possible as well, as in *Mary woke up sometime in the night. She turned on the light*, where the prior time span against which we evaluate the second sentence is determined by the indefinite phrase *sometime in the night* in the first. Finally, quantificational binding of tense is common: *Whenever Mary awoke from a nightmare as a child, she turned on the light*. Partee (1989a) is a general discussion of expressions displaying this range of possibilities, including *local* (as in a *local bar*), null complement anaphora (*The baby started crying. Everyone noticed.*), and a wide range of perspectival elements (*two feet away*, *near*).

Not all context dependence involves entity-level expressions. For example, the domains for quantificational phrases are highly variable and context dependent. If I say to my class, “Every student did the homework”, I almost certainly speak falsely if I intend *every student* to range over all students in the world. It is more likely that I intend the quantifier to range only over students in my class, or in the study group I am addressing. Implicit domain restrictions are the norm for quantificational terms in natural language, not just for nominals but quite generally — for adverbial quantifiers (e.g., *usually*, *necessarily*), modal auxiliaries (e.g., *may* and *should*; Kratzer 1981, 1991; Portner 2009; Hacquard 2012, topic–focus structures (Hajičová and Partee 1998; Büring 2007), and a great many others.

Recovering implicit domains from context is also important for interpreting gradable adjectives like *tall*, *expensive*, and *soft* when they are used in simple predications like *That computer is expensive* or *Gregory is tall*. These predications are made relative to a contextually-supplied set of entities called a **comparison class**, a scale, and a contextual standard on that scale (see von Stechow 1984, Klein 1991, and Kennedy 1999 for details on these ideas and alternatives to them). For example, *The watch is expensive* and *The watch is affordable* might be interpreted relative to the same comparison class (the set of all watches, the set of all objects in the store) and the same scale (prices), but they require different standards. The comparison class is often recoverable from the immediate linguistic context (say, *large mouse* has the set of mice as its context-set), and it can be spelled out explicitly with phrases like *large for a mouse*. However, even these cases are not always free of context dependence when it comes to this argument. For example, Kennedy (2007: 11) observes that *Bill has an expensive BMW* might be true even if he has the least expensive BMW — for example, if the comparison class is the set of all cars. Similar standard-fixing is required for interpreting certain quantificational elements. To evaluate a politician’s claim that “Many people support my proposal”, we need to know both whether there are additional domain restrictions (people in the city, people who own cats), and we need to have a sense for the current numerical standards for *many* (perhaps along with sense disambiguation for *many*; Partee 1989b).

Within theoretical linguistics, work on context dependence is predominantly about characterising and cataloguing the types of context dependence that are attested in natural language, which extends far beyond the above small sample. Thus, the literature is rich in generalisations about what is linguistically possible and theoretical characterisations of it. This is only one part of the story, though. We also want to know what actually happens — for example, what the preferences are for resolving discourse anaphora, setting contextual standards, and controlling vagueness. The computational literature has made a more concerted effort to provide theories of such

usage preferences and expectations. Of particular relevance to the facts reviewed above are theories of abductive inference (Hobbs 1979; for a review, see Hobbs 2004), centering (Grosz et al. 1995; Walker et al. 1997), and intention recognition (Cohen et al. 1990). There is also a rich body of psycholinguistic findings about context-dependence resolution (for overviews, see Gernsbacher 1994; Clark 2004; Gaskell 2009).

7.4 Gricean pragmatics

Broadly speaking, resolving context dependence, as described above, is a signalling game in the sense of Lewis (1969, 1975): the communicative goal of the discourse participants is to find a common understanding of the context-dependent elements in the overt signal (the language used). This is just one small aspect of the overall signalling problem, though, because, as foundational question (ii) suggests, the speaker's intended message can be considerably richer than what one would obtain from simply resolving this context dependence.

The philosopher H.P. Grice was the first to describe, in his 1967 William James Lectures (reprinted as part I of Grice 1989), a general theoretical framework for collaborative, purposive interactions of this kind. Grice was driven by a desire to reconcile mathematical logic with the insights of ordinary language philosophy, and he drew inspiration from the then-novel premise of Chomskyan generative grammar that the seemingly unruly syntax of natural language could be given concise formal characterisation (Bach 1994; Chapman 2005: 86).

The heart of Gricean pragmatics, as described in Grice 1975, is the **Cooperative Principle**, which is analysed into four **conversational maxims**:

Definition 7.2 (Gricean pragmatics).

The Cooperative Principle: Make your contribution as is required, when it is required, by the conversation in which you are engaged.

- **Quality:** Contribute only what you know to be true. Do not say false things. Do not say things for which you lack evidence.
- **Quantity:** Make your contribution as informative as is required. Do not say more than is required.
- **Relation (Relevance):** Make your contribution relevant.
- **Manner:** (i) Avoid obscurity; (ii) avoid ambiguity; (iii) be brief; (iv) be orderly.

The Cooperative Principle governs information exchange. The only presumption is that the discourse participants wish to accurately recognise one another's intended messages. This can be true even if their real-world objectives are in opposition, as long as each side still has incentives to accurately recognise the other's intentions. (Asher and Lascarides (2013) study communication in contexts with varying levels of cooperativity.)

The maxims of Quality, Quantity, and Relation govern the flow of information and thus are not inherently tied to linguistic forms. Grice (1975: 47) writes, "As one of my avowed aims is to see talking as a special case or variety of purposive, indeed rational, behaviour, it may be worth noting that the specific expectations of presumptions connected with at least some of the foregoing maxims have their analogues in the sphere of transactions that are not talk exchanges", and he proceeds to give examples of these maxims at work in language-free collaborative tasks. It follows from this that two linguistic forms with the same information content will interact with these maxims in exactly the same ways (Levinson 1983: §3). Manner is the exception. It governs specific forms, rather than the meanings of those forms, and is most influential where there are two forms that are (near-)synonyms relative to the context of utterance.

One of the defining characteristics of the maxims is that discourse participants are rarely, if ever, in a position to satisfy all of them at once. For example, there are inherent tensions internal to Manner: brief utterances are likely to be ambiguous, and technical terms are generally less ambiguous, but more obscure, than non-technical ones. Similarly, Quantity and Manner can play off each other: one wishes to provide a full explanation, but it will take a long time to provide one. Which maxim dominates in these situations is typically highly variable, with the exception of interactions that pit Quality against a subset of the other maxims. In those cases, Quality typically wins decisively; the pressure for truth is arguably more fundamental than the others (Grice 1975: 27). For example, suppose one wants to provide relevant information towards resolving a question under discussion but lacks sufficient evidence to do so. In such cases, the cooperative speaker opts for a partial resolution of the issue (Quality trumps Relevance).

These tensions between the maxims lead to the main source of pragmatic enrichment that Grice articulated, the **conversational implicature**:

Definition 7.3 (Conversational implicature; Grice 1975: 49–50). Proposition q is a **conversational implicature** of utterance U by agent A in context C just in case: (i) it is mutual, public knowledge of all the discourse participants in C that A is obeying the Cooperative Principle; (ii) in order to maintain (i), it must be assumed that A believes q ; and (iii) A believes that it is mutual, public knowledge of all the discourse participants that (ii) holds.

To see how this definition works, consider the simple exchange in (7.1).

(7.1) A: “Which city does Barbara live in?”

B: “She lives in Russia.”

Assume that *B* is cooperative at least insofar as he is known to be forthcoming about the relevant set of issues. In this context, the discourse participants will likely infer $q = B$ does not know which city Barbara lives in. We can show that q is a conversational implicature of *B*'s utterance, as follows: (i) holds by assumption. To show that (ii) holds, assume that *B* does not believe q . Then *B* does know which city Barbara lives in. By (i) (in particular, by Relevance), *B* is therefore uncooperative for not providing this more relevant answer. This contradicts (i), so we conclude that (ii) does hold. Condition (iii) requires that the discourse participants be sufficiently knowledgeable about the domain and about the underlying notions of cooperativity to reason this way about (i) and (ii). Assuming it holds, we can conclude that q is an implicature.

Conversational implicatures are extremely sensitive to the context of utterance. It is often striking how a conversational implicature that is prominent in context *C* can disappear in even slight variations on *C*. For example, if the cooperativity premise (i) is false (say, *A* is a spy who is reluctant to inform on Barbara), then q is not inferred as a conversational implicature. Changing what is relevant can also dramatically impact conversational implicatures. In (7.2), *B* uses the same sentence as in (7.1), but here the conversational implicature is absent, because we can consistently assume both that *A* is cooperative and that he knows which city Barbara lives in. Relevance demands only the name of a country; naming the city might even provide too much information, or be too indirect.

(7.2) A: “Which country does Barbara live in?”

B: “She lives in Russia.”

Conversational implicatures can also generally be cancelled directly: the speaker can explicitly deny them without thereby speaking inconsistently (but see [Eckardt 2007](#); [Lauer 2013](#): §9). For example, in scenario (7.1), *B* could say, “She lives in Russia — in fact, in Petersburg”. In some cases, cancellations will incur penalties from Manner, for being less concise than they could have been, but they can also serve important communicative functions, by manipulating which information is salient, revealing a chain of reasoning, or confronting expectations.

The above examples centrally involve Relevance. The general principle seems to be that an utterance *U* construed as a response to question *Q* will generate implicatures concerning all alternative utterances *U'* that more fully resolve *Q* than *U*

does (Hirschberg 1985; Groenendijk and Stokhof 1984; van Rooy 2003). Another well-studied class of conversational implicatures are the **scalar implicatures**. These involve sets of lexical items that can be ordered along some dimension of strength. For example, $\langle all, most, some \rangle$ is a standard pragmatic scale ordered by entailment (or something very close to it, if $all(X, Y)$ can be true where X is empty). Thus, if I am asked how well my students did on their exam and I reply, “Some did well”, a fast lexical calculation will lead my addressee to conclude that it would have been infelicitous to say “Most/All did well”, which will lead to conversational implicatures concerning the meanings those utterances would have had (e.g., that I don’t know whether all of them did well, that I know not all of them did well, that I regard whether all of them did well as irrelevant or inappropriate to discuss, etc.). Lexical scales of this sort abound — for example, $\langle must, should, might \rangle$, $\langle and, or \rangle$, $\langle adequate, good, excellent \rangle$. Such scales can also have highly context-specific orderings (Horn 1972; Hirschberg 1985).

Horn (1984) identifies and explores the principle that marked expressions tend to be used to report unusual events, and unmarked expressions tend to be used to report normal events (see also Levinson 2000). For example, when it comes to driving a car, *stop the car* is less marked than *cause the car to stop*. Thus, speakers will assume that “Ali stopped the car” describes a normal situation involving her placing her foot on the brake, whereas “Ali caused the car to stop” involves something more unusual: a special device, a well-placed tree, etc. (McCawley 1978; Blutner 1998). The notion of markedness is extremely broad but certainly plays off of the sub-maxims of Manner, which will generally favour lexicalised forms over phrasal ones (unless the lexical form is rare or obscure).

Not all pragmatic enrichments can be classified as conversational implicatures (though see Hirschberg 1985: §2 on the challenge of actually ensuring this definitionally). For example, as a semantic fact, statements of the form X said that S convey nothing about the truth of S , simply because it is possible to say both true and false things. However, such statements commonly interact with information in the common ground so as to lead speakers to conclude from such statements that S is in fact true. For instance, if a respected newspaper prints the sentence *United Widget said that its chairman resigned*, then, absent additional information, readers will infer that United Widget’s chairman resigned. This proposition, call it q , is inferred because the context contains the premise that companies generally report only true things about their personnel changes. However, there is no guarantee that q is a conversational implicature, because we can consistently maintain both that the author was cooperative and that he does not endorse q . (This might in fact be the pretense of the journalist, who wishes to be committed only to United Widget having made the report.)

It's an open question whether conversational implicature is behind the inferences associated with discourse coherence (Hobbs 1985; Kehler 2002, 2004; Chapter 6, 'Discourse'). A two-sentence sequence like *Kim took the medication. She got better* will typically license the inference that Kim got better *because* she took the medication. This inference presumably has its source in the pressures of cooperativity: given normal background information and the premise that the speaker will be relevant, this causal interpretation will be salient for the listener. This is a defeasible inference; the sentences uttered are consistent with a merely temporal relationship between the two events, for example, and so a speaker can easily continue with a denial that a causal link was intended. These are hallmarks of implicature. However, it seems clear that definition 7.3 is at best a partial explanation for coherence-related inferences, which seem to be defined and constrained by numerous lexical and constructional facts (Prasad et al. 2008).

The Gricean definition 7.3 is cognitively demanding: clause (i) presupposes independent criteria for whether an agent is cooperative, and clauses (ii)–(iii) assess whether complex pieces of information have the status of mutual knowledge. This might lead one to expect implicatures to be both infrequent and effortful. There is presently little consensus on whether these expectations are born out empirically. For instance, Paris (1973) reports relatively low rates of conversational implicature based on logical connectives (see also Geurts 2009), whereas Hendriks et al. (2009) report high rates for similar items, and van Tiel et al. (2013) find considerable lexical variation in implicature inferences. The picture is similarly mixed on the question of cognitive demands. For example, Huang and Snedeker (2009) find that implicature inferences are slow relative to truth-conditional ones, whereas Grodner et al. (2010) argue that the differences, where observed, can be attributed to other factors. Despite these conflicting viewpoints, I believe there is currently broad consensus around the idea that inferences consistent with definition 7.3 are widely attested, in children and adults, at least where contextual factors favor them and performance limitations do not interfere (Grodner and Sedivy 2008; Sedivy 2007; Stiller et al. 2011).

The utility of the maxims extends far beyond the calculation of conversational implicatures. For example, I noted in section 7.3 that the lexical content of indexicals typically underspecifies their referents, even when they are situated in context: *here* could refer to my precise global coordinates, but it could also mean that I am in my office, in the department, in California, on planet Earth. In context, though, some of these resolutions are likely to be uninformative and others are likely to be clearly false. Thus, Quantity and Quality will help delimit the possibilities, and information in the common ground (section 7.2) might further cut down on the possibilities, thereby getting us closer to an acceptable level of indeterminacy.

Grice offered the maxims only tentatively, as an example of how one might formulate a theory in the terms he envisioned (Chapman 2005: §5). There have since been a number of reformulations that maintain, to a greater or lesser degree, the broad outlines of definition 7.2 while nonetheless displaying different behaviour. Lakoff (1973) and Brown and Levinson (1987) add maxims for politeness (see also Grice 1975: 47) and show that such pressures are diverse and powerful. Horn (1984) is a more dramatic overhaul. Horn sees in the Gricean maxims the hallmarks of Zipf's (1949) balance between the speaker's desire to minimise effort and the hearer's desire to acquire relevant information reliably. Levinson (2000) builds on Horn's (1984) formulation, but with an explicit counterpart to Manner. Relevance Theory (Sperber and Wilson 1995, 2004) denies many of the tenets of Gricean pragmatics, including the centrality of the Cooperative Principle, in favor of a complex, over-arching principle of relevance. More recent efforts using decision-theoretic tools seek to derive the effects of the maxims from more basic principles of cooperation and goal orientation (Franke 2009; Jäger 2012; Frank and Goodman 2012; Vogel et al. 2013), which is arguably a desirable approach given the extreme difficulty inherent in trying to formalise the maxims themselves.

7.5 Dimensions of meaning

Conversational implicatures are not the only additional meanings that utterances convey. Natural language meanings are multifaceted; a single utterance can make multiple distinct (but perhaps interrelated) contributions to a discourse. With “Sam passed the damn test”, I convey p = Sam passed the test, but I also convey that I am in a heightened emotional state. (Presumably this has something to do with Sam's passing.) *Sam managed to pass the test* also conveys p , but now with an additional meaning that (roughly) we expected him not to (Karttunen 1971; Karttunen and Peters 1979; Nairn et al. 2006; MacCartney 2009). *Even Sam passed the test* again conveys p , but with an additional scalar meaning that Sam was among the least likely to pass (see Beaver and Clark 2008: §3 for discussion and references).

For each of the above cases, we can fairly reliably identify p as the primary contribution and others as secondary comments on p serving to contextualise it (Potts 2012: §3). Among the most extensively investigated questions in semantics and pragmatics are, (i) what is the nature of these secondary contributions, (ii) what is their source, and (iii) how do they relate to the primary contribution? Questions (i) and (ii) must be addressed largely on a case-by-case basis, since they involve the idiosyncrasies of particular lexical items and constructions. I largely set them aside here in favour of question (iii), which is the **presupposition projection problem** (Morgan 1969; Keenan 1971;

Karttunen 1973; Heim 1983, 1992; Beaver 1997), though I am here generalising it to all kinds of secondary semantic content, in the spirit of Thomason (1990), Roberts et al. (2009), and Tonhauser et al. (2013).

To begin, I pursue a line of investigation pioneered by Karttunen (1973), who identifies a range of semantic operators that allow us to distinguish primary contributions from secondary ones. Consider sentence (7.3) and the variants of it in (7.3a–d).

- (7.3) Sam broke his skateboard.
- a. Sam didn't break his skateboard.
 - b. Did Sam break his skateboard?
 - c. If Sam broke his skateboard, then he will be unhappy.
 - d. Sam must have broken his skateboard (or else he would be out cruising around).

The primary meaning of (7.3) is that, at some time prior to the time of utterance, Sam broke his skateboard. Call this proposition p . The secondary meaning of interest is the proposition q that Sam owns a skateboard. In some sense, (7.3) conveys $(p \wedge q)$, the conjunction of p and q . However, it is a mistake to treat the two meanings in this symmetric fashion. The asymmetries reveal themselves when we consider the variants (7.3a–d). The negation (7.3a) conveys $(\neg p \wedge q)$, with the negation \neg scoping only over the primary content. The secondary content is untouched by negation. This observation generalises to a wide range of semantic operators that weaken or reverse commitment. The interrogative (7.3b) queries only p , with q an unmodified commitment (cf. *Does Sam own a skateboard that broke?*). The conditional (7.3c) conditionalises only p ; the commitment to q remains. And, with the epistemic modal statement (7.3d), the speaker commits to q directly, with the modal qualifying only p .

One might worry at this point that we are looking, not at secondary dimensions of meaning, but rather at entailments of the primary dimension. Any given contentful claim will have numerous entailments. For example, (7.3) entails that Sam broke something. However, this meaning shows completely different behaviour with regard to the holes. For example, none of the examples in (7.3a–d) entail that Sam broke something.

The primary dimension of meaning is primary in the discourse sense as well. As a result, explicit challenges to an utterance are likely to be interpreted as challenging the main content only. If I utter (7.3) and you reply with, “Not true!” or a similar kind of denial, then you will likely be interpreted as denying that Sam broke his skateboard, but probably also agreeing with the claim that he has one. For more personal and participant-relativised content like that of *damn*, both affirmations and denials will

factor out this content; if I say, “Sam passed the damn test” and you accept or reject my claim, you are likely to be perceived as remaining silent about what my using *damn* did.

There are discourse-level methods for challenging secondary aspects of meaning. These are often referred to as *Wait a minute!* tests for presupposition, following [Shanon \(1976\)](#), who studied them in the context of presuppositions. If I assert (7.3), you could go after my secondary meaning by saying, “Wait a minute! I didn’t know Sam had a skateboard!”, or perhaps the stronger “Wait a minute! Sam doesn’t have a skateboard!”. A general characterisation of this discourse move is that it serves to ensure that a piece of de-emphasised secondary content, offered by the speaker as an aside, is moved into the spotlight, where it can be discussed and debated as a primary contribution. For additional discussion of this discourse move in the context of presuppositions and related kinds of meaning, see [von Fintel 2004](#) and [von Fintel and Matthewson 2008](#).

There seems to be a great deal of conventionalisation regarding how words and constructions determine which aspects of a sentence are primary and which are secondary. However, this is also subject to considerable influence from general pragmatic and contextual factors, making it a full-fledged pragmatic problem, rather than one that can be handled entirely in the semantics. For example, the morphosyntax of *We regret that the pool is closed* would lead one to expect that the primary contribution is that the speaker has a certain emotional state (regret). However, if this sign is hanging on the gate leading to the pool area, the primary contribution will certainly be that the pool is closed, even though this is expressed in an embedded clause and is arguably not even invariably an entailment of the sentence in a narrow semantic sense ([Thomason 1990](#): 331). Similarly, if I exclaim to my co-author “We need to finish this damn paper”, the primary content is well-known and thus merely evoked for the purposes of my conveying urgency using *damn*.

Much of the literature on dimensions of meaning in this sense concerns whether they are purely the result of pragmatic reasoning or whether they trace to conventionalised facts about words and constructions. Discussion of this issue often turns on how reliably the secondary dimensions are present. We expect pragmatic meanings to be malleable and cancellable, as discussed in section 7.4, whereas we expect semantic facts to be rigid and non-negotiable (setting aside vagueness). This debate formed part of the earliest discussions of presuppositions and presupposition projection ([Karttunen 1973](#); [Boër and Lycan 1976](#)), and it continues today (see [Simons 2006](#) for an overview).

Another central question of this literature is whether there are distinct subtypes of secondary content. [Potts \(2005\)](#) argues that we can reliably distinguish [Grice’s \(1975\) conventional implicatures](#) (as opposed to conversational) from both presuppositions and regular semantic entailments, but this remains a controversial claim, one that is

deeply entwined with the sense in which presuppositions can be informative for the hearer (von Stechow 2008; Beaver and Zeevat 2007; Gauker 2008) and the ways in which meanings project in a complex array of environments. For discussion, see Karttunen and Peters 1979; Bach 1999a; Potts 2007, 2012.

7.6 Speech acts

One of the most widely studied connections between computational linguistics and pragmatics is speech-act theory (Searle 1969; Searle and Vanderveken 1985), and there are a number of excellent existing resources on this topic (Jurafsky 2004; Leech and Weisser 2003; Jurafsky and Martin 2009: §21, 24). I therefore concentrate on the issue of how **speech act (illocutionary)** force is assigned to utterances, casting this as a problem of context dependence and highlighting the ways in which the context and Gricean reasoning can help.

Speech-acts broadly categorise utterances based on the speaker's intentions for their core semantic content, indicating whether it is meant to be asserted, queried, commanded, exclaimed, and so forth. It is often assumed that there is a deterministic relationship between clause-types and speech-act force: imperative clauses are for commanding, interrogative clauses are for querying, declaratives are for asserting, and so forth, with the deviations from this pattern seen as exceptional (Sadock and Zwicky 1985; Hamblin 1987). However, the factual situation is considerably more complex than this would seem to suggest. I illustrate in (7.4)–(7.10) with imperatives, using data and insights from Lauer and Condoravdi 2010:

(7.4) “Please don’t rain!” (plea)

(7.5) Host to visitor: “Have a seat.” (invitation)

(7.6) Parent to child: “Clean your room!” (order)

(7.7) Navigator to driver: “Take a right here.” (suggestion)

(7.8) To an ailing friend: “Get well soon!” (well-wish)

(7.9) To an enemy: “Drop dead!” (ill-wish)

(7.10) Ticket agent to the crowd: “Have your boarding passes ready” (request)

Example (7.6) involves an imperative with command force. There seems to be little basis for taking this particular example as basic, though. The others are equally familiar and natural in context, and some of them do not meet basic requirements for issuing orders: the addressee does not have sufficient control in (7.8) or (7.9), and it is not even clear that (7.4) has an addressee at all (Schmerling 1982). What's more, it is easy

to find other clause-types issued with the force of commands; the demanding parent from (7.6) could intend to issue a command with either the declarative (7.11) or the interrogative in (7.12).

(7.11) I want you to clean up your room.

(7.12) Why don't you clean your room already?

Indirect speech-acts highlight additional complexities. When the mobster says, “Take care not to let your dog out at night”, he might indeed intend this to be a suggestion, but this is not the only identifiable force. The utterance might primarily be a threat. This kind of indirection is important to issues in language and the law, because many legal disputes turn on whether certain speech acts were performed — with utterance *U*, did the speaker invoke the right to counsel, grant the police permission to enter, issue a threat, assert something untruthful (Solan and Tiersma 2005)?

Thus, while clause-typing is an important factor in inferences about utterance force, it is not the only factor. The problem can fruitfully be thought of as one of resolving context dependence through a combination of linguistic knowledge, contextual reasoning, and general pragmatic pressures. For example, I noted above that it seems beyond the addressee's control to bring about the propositions implicit in (7.8) and (7.9). However, a general precondition for felicitously ordering an agent *A* to bring it about that *p* is that *A* has the power to achieve that goal. Thus, the preconditions are not met in these cases, so the Cooperative Principle will steer discourse participants away from such a construal. Conversely, the discourse conditions for issuing a command are perfectly met in (7.6), so that reading is naturally salient (as in (7.11)–(7.12), for that matter). Examples like (7.7) are even more complicated: depending on the power relationship between speaker and addressee, and their goals, the utterance might manifest itself as a complex blend of request, suggestion, and order. Indeed, such examples highlight the fact that it is not speech-act labelling per se that is important (often it unclear which labels one would choose), but rather identifying and tracking the effects that these utterances have on the context.

7.7 Challenges and prospects

The phrase “the pragmatic wastebasket” evokes a messy, neglected place. It seems to have been coined by Bar-Hillel (1971a: 405), who warns against “forcing bits and pieces you find in the pragmatic wastebasket into your favourite syntactico-semantic theory”. That was an era in which Chomskyan linguists saw syntax wherever they looked. The present-day concern is usually about the reverse direction. As Bach (1999b) writes, “In linguistics the category of pragmatics has served mainly as a bin for disposing of

phenomena that would otherwise be the business of semantics (as part of grammar) to explain.” The winking presumption is that we can have elegant formal theories of semantics as long as we agree that the messiest stuff belongs to another field.

Despite the prominent “waste” metaphor, I think the outlook for the field is bright, for three central reasons. First, we have a clearer empirical picture than ever before, thanks to a number of important corpus resources (Stoia et al. 2008; Thompson et al. 1993; Prasad et al. 2008; Calhoun et al. 2010) and increasing consensus about which psycholinguistic methods are most effective for exploring meanings in context. Second, the field is moving towards collaborative models, in the spirit of pioneers Lewis (1969, 1975) and Clark (1996). Whereas earlier models were overwhelmingly focused on the interpretive (listener) perspective, these new models truly embrace the fact that we are all constantly shifting between these roles as we work collaboratively in discourse (Benz et al. 2005; Stone et al. 2007). Third, pragmaticists are establishing, or re-establishing, connections with cognitive psychology, artificial intelligence, and natural language processing, which is having the effect of adding to their theoretical toolkit, sharpening the empirical picture, and making results more relevant and accessible than ever before.

Further reading and relevant resources

The papers collected in Horn and Ward 2004 provide fuller introductions to all of the topics addressed here, among others, and they also connect with other areas of linguistics, psychology, and computer science. From that collection, Jurafsky 2004 is an apt companion to the present paper; its empirical focus is narrower, but it builds a forceful case that computational and algorithmic perspectives can shed new light on pragmatic phenomena.

The papers in Stalnaker 1999 form a detailed picture of context, common ground, and their role in semantics and pragmatics. Thomason 1990 begins from a similarly general view of context but makes direct connections with computation and artificial intelligence. Thomason also deliberately blurs the distinction between presupposition and implicature within his interactional model.

On the topic of Gricean pragmatics and conversational implicature, Horn (2006) is a lively overview of the phenomena and how they relate to semantics. Hirschberg (1985) focuses on scalar implicatures, broadly construed in terms of context-sensitive partial orders on expressions, but she also offers a general perspective on Gricean pragmatics and the challenges of computational implementation. Jäger (2012) describes the iterated best response model, a decision-theoretic approach that characterises the Gricean definition of conversational implicature in probabilistic terms, using techniques related to those of Lewis 1969; see also the papers collected in Benz et al. 2005.

Recent overviews of multifaceted linguistic meaning, going beyond the short overview of section 7.5, include Potts 2012, Beaver and Geurts 2012, Tonhauser et al. 2013, and the papers in Ramchand and Reiss 2007: §III. Green 2007 is a detailed empirical and historical overview of speech-act theory (section 7.6), and Condoravdi and Lauer (2011) and Lauer (2013) seek to establish direct connections between speech-act inferences and preference-driven interpretation.

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