

The Structure of Communicative Acts

Sarah E. Murray · William B. Starr

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Abstract This paper examines views of communication and linguistic meaning from a cross-linguistic perspective on sentential mood and evidentiality. The dominant view of mood assumes that sentences have two fundamentally different *kinds* of meaning: force and content. On this view, mood contributes to the force of the sentence, which is not part of its compositional semantics. A similar view has been defended for evidentials. Against these accounts, we argue that force and content are not different *kinds* of meaning, but different aspects of a sentence's dynamic meaning. On our analysis, mood semantically constrains, but does not determine, the force of an utterance, and evidentials can modify these constraints. What does ultimately determine utterance force is pragmatic, drawing on both the semantic and social structure of communicative acts.

Keywords Speech Acts · Mood · Evidentials · Force · Content · Dynamic Semantics · Communication · Cross-Linguistic Semantics · Pragmatics · Social Norms

1 Introduction

In both linguistics and philosophy, the meaning of a sentence is usually analyzed in terms of its truth-conditions: the conditions in which it would say something true about the world. The influence of foundational work on the semantics of formal logics by Frege, Carnap, Tarski and Montague looms large here. As Frege (1918, 1923) already acknowledged, and as Austin (1962) and Wittgenstein (1953) later urged, natural language is used to do much more than state truths about the world. The truth-conditional model seems suited to capture the meaning of declarative sentences, but what about other sentential **moods**?

- (1) a. Cooper ate a donut. (*Declarative*)
- b. Did Cooper eat a donut? (*Interrogative*)

Sarah E. Murray
Department of Linguistics, Cornell University, Ithaca, NY 14850 USA
E-mail: sarah.murray@cornell.edu

William B. Starr
Sage School of Philosophy, Cornell University, Ithaca, NY 14850 USA
E-mail: will.starr@cornell.edu

c. Cooper, eat a donut! (*Imperative*)

Can the identification of meaning with truth-conditions sustain this observation? Much contemporary work maintains that it can by following Frege's call to distinguish between two fundamentally different kinds of meaning: **force** and **content**. Content can be thought of as a picture presenting a way some world could be, and force can be thought of as specifying whether that picture is intended to represent our world, inquire what our world is like, or direct the addressee to make our world that way. Frege (1923) is quite clear that the basis for this distinction is that force is not involved in the processes central to the study of semantics: compositionality and logical consequence. Speech act theory (Austin 1962; Searle 1969; Searle & Vanderveken 1985) prominently challenged this view of logic and compositionality. But work on mood in linguistics has not embraced speech act theory, opting instead for a Dynamic Pragmatic theory. On this view, force is a distinct, non-compositional kind of meaning pertaining to the dynamics of discourse (Stalnaker 1978; Lewis 1979b; Roberts 1996; Portner 2004). To date, there has been little discussion of the relative merits of speech-act theoretic and Dynamic Pragmatic approaches.¹ As we will explain, the analysis of force in speech act theory does not predict the force of an utterance on the basis of the sentence's linguistic meaning and pragmatic factors. It instead treats utterance force as the basic level of explanation: "the speech act is the basic unit of communication" (Searle 1969, 21). As a result, speech act theory does not make the kinds of predictions that are the bread and butter of contemporary semantics and pragmatics: explaining the details of linguistic communication in terms of linguistic conventions and more general features of social interaction.

Our main critical point in this paper is that a view which combines elements of both accounts is needed. Dynamic Pragmatic views are correct that mood should be understood in terms of discourse dynamics, and that an utterance's force must be factored into linguistic and pragmatic contributions. But its attempt to locate discourse dynamics outside compositional semantics leads to a host of problems. This suggests that speech act theory was correct to reject the Fregean distinction between force and content as two fundamentally different *kinds* of meaning. This tension plays out in §2, where the difficulties for the Speech Act Theory and Dynamic Pragmatic accounts are detailed. Our positive contribution is to show how dynamic semantics (Kamp 1981; Heim 1982; Groenendijk *et al.* 1996; Veltman 1996) can be used to formulate a theory with this combination of virtues that articulates a more plausible version of the force/content distinction. Our compositional semantics for sentence mood and evidentials in §3 will associate it with certain dynamic effects on the discourse, following Murray (2010, 2014) and Starr (2010, 2013). Here, and throughout, we will distinguish between the constant contribution of mood to utterance interpretation **sentential force** and the variable pragmatic property of utterances **utterance (illocutionary) force** (Chierchia & McConnell-Ginet 2000, §4.3). §4 investigates the pragmatic processes that bridge utterance force and sentential force. We outline some of the existing choices here and point to further work where we develop an alternative approach. But on any of these accounts, we contend that a fully semantic account of sentential force is compatible with a pragmatic account of utterance force. By having a pragmatic account of utterance force, but a semantic account of sentential force, we are able to address the limitations of Dynamic Pragmatics and Speech Act Theory.

¹ Accounts like Bach & Harnish (1979) and Wilson & Sperber (1995) are naturally allied with discourse dynamic approaches in their broadly Gricean commitments. This Gricean commitment is that force is understood in terms of the speaker intending and producing certain effects in the hearer. While Bach & Harnish (1979) attempt to recast speech act theory in purely Gricean terms, Wilson & Sperber (1995) reject the project of constructing a taxonomy of speech acts.

2 Communication, Meaning and Force: the standard views

We will begin in §2.1 by summarizing the predominant view of communication in linguistics and philosophy, and then transition to discussing Dynamic Pragmatic and speech-act theoretic analyses of force from this perspective. §2.2 presents and critiques speech act theory from this perspective, and §2.3 does the same for Dynamic Pragmatic theories. We argue that Dynamic Pragmatic theories cannot explain how mood compositionally constrains the force of complex sentences and the more general fact that the communication of content is derivable from force, but not vice versa — following Lewis (1969, 1975) and Millikan (2005) among others. In this argument, we consider Cheyenne (Algonquian), a language in which verbs bear explicit **mood** morphology (e.g. declarative, interrogative, imperative). This language provides a far more transparent testing ground for theories of mood and force than a language like English. Data from Cheyenne make clear what can only be discerned indirectly in English: mood constrains force in a way that can compositionally interact with connectives. We will eventually conclude that a more general conception of meaning, one which encompasses both force and content, is needed for an empirically adequate treatment of mood in natural language.

Our investigation is supplemented by considering a related paradigm of **evidentials** in Cheyenne. As in many other languages, every grammatical Cheyenne sentence contains evidential morphology which classifies the source (e.g. a report, or a direct experience) of the main content presented by the rest of the sentence. Cheyenne sentences simultaneously present this main content and the evidential content (e.g. that the speaker's source for the main content is a report). But these two contents have a very different status in the discourse, as reflected by a number of diagnostics. The particulars of this difference tempt treating the evidential contribution as an illocutionary modifier which cannot compositionally interact with connectives, much like the Dynamic Pragmatic treatment of mood. We argue in §2.3 that this view also faces serious empirical problems. As with mood, we will propose not to think of evidential meaning as a different kind of meaning, but rather to embrace a broader conception of meaning that can simultaneously capture the main and evidential contributions of Cheyenne sentences while respecting their differences.

Our discussion throughout will follow typological work (Sadock & Zwicky 1985; König & Siemund 2007) that posits a universal three-way distinction between **sentence types**: declarative, interrogative and imperative (and 'others' like exclamatives). König & Siemund (2007, 278) identify these types on functional and morphosyntactic (including intonational) grounds by examining over 50 carefully selected languages, and the extensive literature on several of these languages. As König & Siemund (2007, 282) stress, many languages morphosyntactically mark further subdivisions within a sentence type. While English morphosyntax does not sharply distinguish any of the different kinds of directives in (2)-(5), many languages, like Cheyenne, do distinguish at least some subset of them.²

- (2) May he sing! (Optative)
- (3) Sing! (Pure Imperative)
- (4) Let's sing! (Hortative)
- (5) Don't sing! (Prohibitive)

We will call **sentence mood** the morphosyntactic paradigms used to divide and subdivide sentence types. For English, this distinction means little since there are three sentence types

² See also van der Auwera *et al.* (2008a); Dobrushina *et al.* (2008); van der Auwera *et al.* (2008b), Aikhenvald (2010) and Pak *et al.* (2004, 2008).

and three sentence moods.³ But for languages like Cheyenne (Murray to appear), Kalaallisut (Bittner 2011) or Korean (Pak *et al.* 2004, 2008), which feature explicit verbal morphology that subdivide imperatives, etc. this distinction will matter. While this general account of sentence type and mood will be assumed below, we will consider in §2.3 an alternative approach to sentence-typing developed by Zanuttini & Portner (2003), Portner (2004), Pak *et al.* (2004), Pak *et al.* (2008). This account is based solely on *semantic type* — in the sense familiar from Montagovian semantics — and is central to some Dynamic Pragmatic accounts. A noteworthy feature of this view is that there could be no morphosyntactic indicator of sentence type or mood at all. While we will not directly discuss this debate over sentence types, §2.3 does argue against the more general Dynamic Pragmatic account it assumes.

2.1 Communication and Intention

Most research on human communication begins with Grice's (1957) view that producing a meaningful signal involves the sender (speaker) having a particular kind of audience-directed intention:

Communicative Intention Using a signal σ , X intends to bring about some particular effect in Y 's state of mind by means of Y recognizing X 's intention to do so.

It is rather intuitive that producing a meaningful signal involves intending to influence another's state of mind. To distinguish this from other forms of intentional influence, Grice highlights that meaning something requires that influence to be secured by the audience recognizing your intention to bring it about. For example, Grice (1957, 382) contends that A placing B 's handkerchief near a crime scene with the intention of making the police believe that B is the murderer does not count as A meaning something by this action. Though Grice did not explicitly define *communication*, many subsequent researchers saw communicative intentions as an essential component of such a definition (Strawson 1964; Searle 1969; Bach & Harnish 1979; Recanati 1988; Wilson & Sperber 1995). Though these researchers disagree about what more is required for communication, a shared commitment is that the receiver must at least recognize the sender's communicative intention.⁴

Intentional Communication For X to communicate with Y using σ requires, at least, that X have a communicative intention in producing σ and Y recognizes that intention.

However, Wilson & Sperber (1995) and Clark (1996, Ch.4-5) propose adding an element absent from the simple intentional view. They contend that communication involves affecting what is *mutually manifest*, or *common ground* between the agents. This is combined with the intentional approach by specifying the intentional effect and the recognition of the communicative intention in terms of common ground.

Mutual Intentional Communication

For X to communicate with Y using σ requires, at least, (a) and (b):

- (a) X has a communicative intention to affect X and Y 's common ground with σ
- (b) It is common ground between X and Y that Y recognizes that intention.

³ Setting aside the controversial case of exclamatives, cf. Michaelis (2001) vs. Zanuttini & Portner (2003) vs. Rett (2012).

⁴ For example, Searle (1969, 49-50) proposes a stronger view that the communicative intention actually be satisfied and thus that σ actually does affect the receiver in the way intended. He proposes that the intended effect is the speaker merely understanding that a speech act with a given force and content has been performed.

The idea here is that X intends to make some *wholly overt* change to what's being taken for granted and it is wholly overt that the receiver has recognized this intention. The point of requiring overtness in a theory of communication is to rule out various forms of deception and manipulation, maintaining the idea that communication essentially involves coordination (Strawson 1964; Schiffer 1972; Clark & Marshall 1981). This requirement has surfaced in numerous works on meaning and communication (Strawson 1964; Lewis 1969; Schiffer 1972; Stalnaker 1975, 48) and has been defined in equally numerous ways.⁵ All such definitions grant that having an infinitely nested set of attitudes, as in (a) below, *would* make something common ground.⁶

Common Ground

For any proposition p , if (a) holds, then p is common ground between X and Y .

- (a) Both X and Y are assuming that p , both X and Y are assuming that both X and Y are assuming that p , both X and Y are assuming that both X and Y are assuming that both X and Y are assuming that p , and so on.

However, all acknowledge that, at least on a simple representational reading, these infinitely nested assumptions could not be made by finite minds. They therefore propose analyses that generate, or approximate, this infinite hierarchy with finite means, e.g. recursive dispositions (Stalnaker 2002). The details on which these analyses differ will not be essential here.

A glaring feature of the discussion above is that common ground seems to be limited to propositional, or informational, content. But not all communication serves to say how things are. How is non-declarative communication captured within this approach to communication? Most attempts to address this issue begin with Frege's view that a sentence conveys not just a propositional content, but also the force that content has.

The influence of one person on another is brought about for the most part by [content]. One communicates [propositional content]. How does this happen? One brings about changes in the common outside world which, perceived by another person, are supposed to induce him to apprehend [a propositional content] **and** take it to be true." (Frege 1918, 310; our emphasis)

So assertively using a sentence manifests a content and a judgment of that content (force):

[T]wo things must be distinguished in a [declarative] sentence: the content, which it has in common with the corresponding sentence-question, and the assertion... So it is possible to express the [content] without laying it down as true. Both are so closely joined in [a declarative] sentence that it is easy to overlook their separability.

Consequently we may distinguish:

- (1) the apprehension of a [content] – thinking,
- (2) the recognition of the truth of a [content] – judgment,
- (3) the manifestation of this judgment – assertion.

(Frege 1918, 293-4)

Frege also maintained that logical connectives serve to combine contents, and took care to note that his view about the communication of force implies that forces cannot be combined by logical connectives (Frege 1923, 2-5).

The Fregean view about force and content is not an immediate fit with the intentional approaches to communication. Extant views in the literature can be seen as alternative ways

⁵ See Wilson & Sperber (1995, §1.8), Fagin *et al.* (1995), Clark (1996, Ch.4) and Stalnaker (2002).

⁶ More precisely, let $A_G(p)$ mean each agent in group G assumes that p , and let A_G^k abbreviate k iterations of A_G . Then $CG_G(p)$ holds if and only if for all positive integers k , $A_G^k(p)$ (Fagin *et al.* 1995, 23).

of responding to this conflict. On the mutual intentional approach, communication results in the mutual assumption of a new proposition. This would replace step (2) of Frege's picture: the mutual assumption of a proposition is a kind of judging. But, Frege assumes that communicating a content with a difference force, say that of a command, involves a difference precisely at that step. It then follows that the mutual intentional approach to communication must be expanded with a suite of mutual attitudes, each appropriate to the different forces associated with the various sentence-types. We will consider accounts of this variety, like Portner (2004), in §2.3. However, a less thoroughly Fregean alternative is developed by Searle (1965, 1969), who reduces all communication to the communication of information. On Searle's account, force and propositional content are both forms of content (surprisingly!). Force is thought of as a kind of 'meta-content' that *represents* how the propositional content is to be taken, i.e. that it is taken as the speaker's representation of the world. While Searle takes different parts of the sentence to encode these different kinds of content, it is all content ('conditions of satisfaction'). It is precisely for this reason that Searle is able to maintain that both force and content are combinable by traditional logical connectives (Searle 1969, 32).⁷ In this paper we argue that Searle's account is correct in linking utterance force with social practices and its embrace of connectives compositionally interacting with sentence mood. However, we also argue that there are problems for Searle's view which a Neo-Fregean account is better-positioned to solve. Since this leaves us with problems for both approaches, our positive account is to reconcile these challenges.

2.2 Communicating Force in Speech Act Theory

Austin (1962) upheld Frege's understanding of the force/content distinction when he proposed that what one can do with words is importantly dependent on the social rules underlying practices like marriage and promises. However, Searle (1968) argued that this distinction had to be rejected, and this rejection was a keystone in Searle's (1965; 1969) synthesis of Grice's, Austin's and Frege's ideas. As highlighted above, this synthesis made it possible to integrate the account with an intentional approach to communication. On Searle's account, a meaningful natural language utterance achieves an effect on the hearer which is associated with that sentence by constitutive conventional rules – much like the rules of chess govern the effect of moving some piece in a particular direction. These rules are held to associate each sentence with a unique force and a unique content. The **content** is some state (or states) of affairs, and the **force** specifies a content which represents what kind of act involving that state of affairs has been performed by uttering the sentence. The intended effect on the hearer, which Searle calls the *illocutionary effect*, is that they are aware an utterance with the specified force and content has been made. For example, uttering *Annie sang* presents a content, the states of affairs where Annie sang, and specifies that this utterance has the force of representing the actual world as being among those states of affairs. The intended effect on the hearer is that they are aware that the speaker has represented the actual world to be this way. Uttering *Sing Annie!* presents (roughly) the same states of affairs, but has the force of commanding that the hearer make the actual world be one of those states of affairs. The intended effect on the hearer is that they are aware the speaker has made such a command.

⁷ Thus Searle (1969) belongs to the tradition of those who attempt to reduce non-declarative meaning to declarative (representational) meaning (Ross 1970; Lewis 1970; Cresswell 1973; Davidson 1979), though Searle attempts the reduction at the level of content communicated rather than at the level of logical form.

Searle (1969, 1979) and Searle & Vanderveken (1985) present analyses of what having a particular force consists in.⁸ These analyses, however, face some serious empirical limitations.⁹ Searle's theory of force is a theory of *utterance force*: it pertains to the force of a speech act, not the conventional function of the linguistic form involved. Yet to explain how force is conveyed, Searle's theory must assume that each *sentence* contains a 'force indicator' which specifies the force of the utterance (Searle 1969, 30). This assumption is problematic in three ways. First, the mapping between sentence types and utterance forces is indirect. For example, an interrogative like *what does that customer over there need?* can have the force of a command when uttered by a supervisor to their employee. So one cannot rely on sentences to directly encode utterance force. This point has been widely discussed in the literature as a serious problem for the Literal Force Hypothesis assumed by speech act theory: sentences somehow encode utterance force Levinson (1983, §5).¹⁰ Second, Searle proposes a five-way distinction between types of utterance forces, and an indefinite number of distinct particular forces (Searle 1979; Searle & Vanderveken 1985, Ch.3). This classification between types radically cross-cuts the major indicator of force, or force potential, acknowledged by linguists: the distinction between declarative, imperative and interrogative sentence types (Sadock 1994; König & Siemund 2007).¹¹ This means that, on Searle's account of force, sentences cannot even encode utterance force *type*, let alone the indefinitely many particular utterance forces.

One might hold out hope that it is possible to adapt Searle's analysis of utterance force to a setting where utterance force and sentential force are distinguished, and only the latter is linguistically encoded. But the third problem for Searle's analysis calls into question the prospects of such an adaptation. To illustrate this, consider Searle's proposal that interrogative mood produces a directive utterance force, which has the effect of making three propositions mutually assumed: (i) the utterance of the interrogative counts as an attempt to get the hearer to provide some information to the speaker, (ii) the speaker does not know that information and (iii) the speaker wants to know that information (Searle 1969, 66). There are literal, direct uses of interrogatives which fail to make any of these three conditions mutually assumed.

- (6) a. *On an exam*: What is the capital of Latvia?
 b. *Supervisor to inattentive employee*: What does that customer over there need?

But if none of the effects are constant consequences of uttering interrogatives, it is hard to see how any of Searle's three conditions can be attributed to the sentence's conventional meaning. A detailed examination of Searle's analyses reveals parallel exceptions.¹² This compels us to search for a theory of sentential force which isolates a more constant contribution to utterance force. Of course, a major open question will be what pragmatic processes

⁸ See also Stenius (1967) for a related account of force.

⁹ We suspect these limitations are behind linguists' neglect of speech act theory, but they have not been explicitly discussed in the literature.

¹⁰ E.g. Davidson (1979), Levinson (1983, §5.5) and Wilson & Sperber (1988), and is not limited to indirect forms like *Can you pass the salt?* For objections to this tradition see Levinson (1983, §5) and Starr (2014b).

¹¹ Here we are assuming that first-person present-tense 'illocutionary verbs' like *I promise that* are not conventional indicators of force in the same way as sentence mood is. Searle's assumption that these verbs are leads to a non-compositional treatment of them: in first-person present they are force-modifiers, but in other person/tense combinations they have simple representational content (Cohen 1964). We agree with Bach & Harnish (1979) that these verbs do not directly constrain force in virtue of their conventional meaning, but rather as a result of their content, declarative (sentential) force and other pragmatic processes.

¹² Starr (2014b, 171-3) presents something like this objection to Searle's analysis of force.

are layered on top of that contribution to generate utterance force. Such a theory of sentential force seems to be offered in work on discourse dynamics, to which we now turn.

2.3 Discourse Dynamics and Dynamic Pragmatics

Much recent work on the semantics and pragmatics of non-declaratives draws from classic work on the semantics of interrogatives that are embedded in the complement of verbs like *wonder* (Hamblin 1958, 1973; Karttunen 1977; Groenendijk & Stokhof 1982) and conversational dynamics (Hamblin 1971; Stalnaker 1978; Lewis 1979b). This work on embedded interrogatives convinced many that interrogatives are not just different in force from declaratives, but also in content. In particular, the content of an interrogative is the set of propositions that would count as answers to it. Similarly, others advanced the view that imperatives have a distinctive kind of content, namely a property of the addressee that they are directed to instantiate (Hausser 1980; Portner 2004). Thus, a kind of ‘content pluralism’ emerged with respect to sentence types: propositions for declaratives, sets of propositions for interrogatives and properties for imperatives. This, however, says little about the *force* an utterance of a sentence can have. When identified with an abstract object like a set of possible worlds, a proposition in no way intrinsically represents the world. That set of worlds could be understood as representing the world, directing an agent to make the world one of those ways, or asking whether or not the world is one of those ways.¹³ The same is true of the abstract objects assigned to interrogatives and imperatives. **Dynamic Pragmatic** approaches attempt to analyze the force of a content by looking to how that content is involved in the dynamic process of language use.

Stalnaker (1978, 1984, 1999, 2014) contains the most complete philosophical analysis of force in terms of discourse dynamics. For declaratives, the idea is this. A set of worlds inherits its representational force from the fact that it is expressed by a declarative sentence and the assumption that declarative sentences have the function of updating representational mental states. One can then appeal to a theory of mental representation (e.g. Stalnaker 1984, Ch.1) to say exactly what that amounts to.¹⁴ The approach can be extended to the other sentence types and their contents by assuming that those sentence types serve to update different kinds of attitudes, ones which are not representational. This suggested to some a fully general account where sets of propositions and properties can also be ‘mutually assumed’ in some sense, and (successful) utterances of interrogatives and imperatives change these assumptions (Gazdar 1981; Levinson 1983; Belnap 1990). This suggestion became an actual theory in the hands of linguists. Roberts (1996) proposed that interrogatives update the Questions under Discussion — those questions we mutually assume we are wondering about — and Portner (2004) proposed that imperatives update the addressee’s To-Do List — those properties we mutually assume the addressee is to make true.

Stalnaker (1978, 1984, 1999, 2014) does not say whether he is attempting to understand sentential force, or utterance force. But Portner (2004, 236) is quite explicit that his model

¹³ An influential contingent of philosophers working on propositions contend that propositions have their truth-conditions essentially and use this point to argue against the identification of propositions with sets of worlds; see the essays in King *et al.* (2014). Indeed, they contend that identifying propositions with *any* set-theoretic entity has this problem. Though pursuing different routes, each seeks to answer the question by looking to relations agents impose on sentences via cognitive or linguistic acts. This strikes me as surprisingly similar to the received view in linguistics sketched below, even if the entities identified as propositions differ.

¹⁴ Of course, there are serious and deep philosophical questions about the details of this approach to force, and further ones about the nature of mental representation. We are setting those aside here in favor of getting the complete picture on the table and exploring its empirical predictions.

concerns sentential force only. Accordingly, it is important to keep in mind that an additional theory of utterance force is still needed — a gap we will return to in §4. It is also worth noting that this theory has departed from the letter of the Mutual Intentional approach to communication (§2.1): communication does not always involve an intention to affect the common ground, because the common ground contains only propositions. Nevertheless, it follows the spirit of that approach: communication always involves an intention to affect the common ground, questions under discussion or to-do list.

To evaluate the Dynamic Pragmatic approach to sentential force, it is helpful to have a more rigorous formulation to examine. Simplifying to the setting of a formal logic, the semantic component of this account can be modeled using the tools of intensional semantics. Atomic expressions A, B, C, \dots are used to model simple forms like *Maya sang*, but should be understood as moodless. Sentences are formed by adding a mood operator (declarative \triangleright , interrogative $?$, imperative $!(x)$) to an atomic expression, or Boolean combinations thereof, e.g. $\triangleright A$ or $\triangleright (\neg A \vee B)$. The imperative operator contains a variable x which is used to pick out the addressee of the discourse context. The semantics begins by assigning atomic expressions to the set of worlds where they are true, and then specifying the meanings of Booleans by the standard set theoretic operations. Incorporating the ‘content pluralist’ approaches above: declarative mood returns the very same proposition denoted by its scope, interrogative mood creates a set of propositions and imperative mood creates a property.

Atomic and Connective Semantics Given a space of possible worlds W , agents $x \in D$

1. **Atomics** $\llbracket A \rrbracket = \{w \mid A \text{ is true in } w\}$
2. **Negation** $\llbracket \neg \phi \rrbracket = W - \llbracket \phi \rrbracket$
3. **Conjunction** $\llbracket \phi \wedge \psi \rrbracket = \llbracket \phi \rrbracket \cap \llbracket \psi \rrbracket$
4. **Disjunction** $\llbracket \phi \vee \psi \rrbracket = \llbracket \phi \rrbracket \cup \llbracket \psi \rrbracket$

Sentential Mood Semantics

1. **Declarative** $\llbracket \triangleright \phi \rrbracket = \llbracket \phi \rrbracket$
2. **Interrogative** $\llbracket ?\phi \rrbracket = \{\llbracket \phi \rrbracket, W - \llbracket \phi \rrbracket\}$
3. **Imperative** $\llbracket !\phi(x) \rrbracket_{s,c} = \{ \langle y, w \rangle \mid y = \text{add}_c \ \& \ w \in \llbracket \phi(x) \rrbracket_{s[x/\text{add}_c],c} \}$
 - For a variable assignment s , context c , where add_c is addressee of c , and $s[x/\text{add}_c]$ is the assignment which differs at most from s in that it assigns x to add_c

Imperatives denote the property the addressee must instantiate to satisfy the imperative.¹⁵ It does this by pairing y and w just in case y is the addressee of c and $\phi(x)$ is true in w when x is interpreted as referring to the addressee of c . This basic compositional semantics already raises one question: should Boolean connectives be allowed to combine mood-marked sentences? Should they be allowed to mix sentences of different moods? This technical question inspires an empirical one: do natural languages allow mood to scope under connectives? We shall return to this question shortly. At present, we turn to the next component of the account: the discourse updates associated with each clause type.

There are two different ways of spelling out the Dynamic Pragmatic approach from here. But, each of them model discourse context with three sets of contents that are mutually supposed $\langle CG, QS, TDL \rangle$:

1. **Common Ground (CG)** The mutually conversationally adopted propositions: set of propositions.
2. **Question Set (QS)** The mutually conversationally adopted questions: set of sets of propositions.

¹⁵ *Property* here is being used in a sense standard in formal semantics: a predicate intension, which is a function from individuals to a function from worlds to truth-values. To be precise, we use here the equivalent sense of property: that set of pairs of entities and worlds mapped to True.

3. **To-Do List (TDL)** For each agent x , the properties it has been mutually conversationally adopted x is to make true: function from individuals to sets of properties.

The two forms of Dynamic Pragmatics are not usually carefully distinguished, but the details will be important in what follows. The first version of the Dynamic Pragmatic theory is formulated by Portner (2012, 2007, 357), and is consonant with the general approach to representation, propositions and force developed by Stalnaker (1984): each of the three clause types has the compositional semantics above, but they each have an additional, non-compositional, kind of meaning that specifies how they function in a discourse. In this version, each sentence type or mood has an associated discourse rule. The second version (Portner to appear, 2004, 240) is far more radical, assuming that the discourse rules appeal only to the type of content denoted by a clause. This version makes no direct appeal to sentential mood operators in the discourse rules, and could just as well operate on a language where there is no distinct morphosyntax by which to identify sentence types. We will consider each of these views in turn.

The first version of Dynamic Pragmatics gives a discourse rule for each sentence type:

Dynamic Pragmatics v1

1. *Declarative Effect*: The utterance of a declarative clause counts as an attempt to add its content to CG, $CG \cup \llbracket \triangleright \phi \rrbracket$
2. *Interrogative Effect*: The utterance of an interrogative clause counts as an attempt to add its content QS, $QS \cup \llbracket ?\phi \rrbracket$
3. *Imperative Effect*: The utterance of an imperative clause counts as an attempt to add its content to the addressee's TDL, $TDL(add_c) \cup \llbracket !\phi(x) \rrbracket_{s,c}$

This version of Dynamic Pragmatics is consonant with Stalnaker's (1984) approach to representation: sets of worlds have a representational force because they are expressed by declarative sentences and by the first rule above, declarative sentences have the function of updating representational attitudes: those that define the CG. Importantly, this account also explains why only the contents of matrix sentence-types can have sentential force. Merely uttering a clause with the right content, e.g. *that Bob danced*, will not thereby trigger the declarative update rule or its associated effect on CG. On this approach, the kind of meaning that relates to force cannot be further combined: connectives operate on contents, not updates. This is a reincarnation of Frege's (1923, 2-5) view that force and content are entirely distinct kinds of meanings. Such a view makes a clear and interesting prediction: *sentences of different types cannot be combined with connectives*. If they did, the rules above would not apply, because the resulting sentence would not be of a single mood. On the semantics for connectives given above, the hybrid contents that would result from these combinations, say the union of a proposition and a property, would not be of the right sort to be added to *any* component of the discourse context. The only option for this version of Dynamic Pragmatics is to adopt a non-standard semantics for the connectives, and offer discourse rules for each type of clause formed with a connective. For example, one might treat conjunctions as denoting an ordered pair of contents and analyze $\triangleright A \wedge !B$ by supplementing the above rules with this one: the utterance of a conjoined declarative and imperative counts as an utterance of $\triangleright A$ and $!B$. By rules 1 and 2 above, this will result in an attempt to add $\llbracket \triangleright A \rrbracket$ to CG and $\llbracket !B \rrbracket$ to TDL. But such a supplement is not ultimately possible because infinitely many rules would be needed to cover the full range of sentences. To see this, consider that $(\triangleright A \wedge !C) \wedge !B$ will require a yet another rule of a fundamentally different kind. Taking a step back, it is not surprising to find this expressive limitation for a Dynamic Pragmatic account since it delib-

erately excluded sentential force from being modeled with the tools appropriate to a truly compositional semantics.

The second version of Dynamic Pragmatics is interesting to consider here, in part because it does not appeal to discourse rules that refer to the sentence's type or mood. Instead, the rules appeal only to the type of content denoted by the sentence. This approach is best articulated by Portner (2004, 236):

...[A]toms of morphosyntax contribute to meaning in a compositional way, but force is not one of the aspects of meaning they contribute. Rather, the result of compositional interpretation is always a traditional semantic object like a proposition or property (along with associated presuppositions and so forth, of course). According to our hypothesis, force is determined only indirectly, on the basis of these meanings.

On this approach, sentential force is determined by the type of content denoted:

Dynamic Pragmatics v2

1. *Declarative Effect*: The utterance of a clause denoting a proposition (set of worlds) counts as an attempt to add that content to CG, $CG \cup \llbracket \triangleright \phi \rrbracket$
2. *Interrogative Effect*: The utterance of a clause denoting a set of propositions counts as an attempt to add that content to QS, $QS \cup \llbracket ?\phi \rrbracket$
3. *Imperative Effect*: The utterance of a clause denoting a property counts as an attempt to add that content to the addressee's TDL, $TDL(addy) \cup \llbracket !\phi(x) \rrbracket_{s,c}$

While this approach has slightly more resources for handling sentences like $\triangleright A \wedge !B$, it is worth being clear at the outset that it faces very serious conceptual problems — problems which most philosophers of language regard as conclusive shortcomings of the view (e.g. King *et al.* 2014). Recall the seemingly innocuous point discussed above: a set of worlds is not itself intrinsically representational, as it could just as well model an instruction to make the world some way or a question of whether the world is one of these ways. Indeed, this fact is implicit in the practice of formal semantics where sets of worlds have been used to model directive contents (Huntley 1980; Russell 2007), properties to model representational contents (Lewis 1979a; Egan 2007) and sets of propositions to model representational content (Simons 2005, 286). Stalnaker (1984) addresses this issue by grounding the representational function of sets of worlds in the fact that declarative sentences have the function of updating representational mental states. But it is precisely this latter resource that has been given up by the second version of Dynamic Pragmatics. Matters are even worse on approaches other than Stalnaker's. Lewis (1969, 1975, 172) and Millikan (2005, iv) explicitly derive content from (sentential) force — i.e. the exact opposite of Dynamic Pragmatics v2. This issue is nicely illustrated by considering why proposition denoting *that*-clauses or determiner-phrases cannot be used to make assertions.¹⁶ This fact is not immediately predicted by the rules above. One could replace 'clause' with 'matrix clause' in the rules, but this only sharpens what is left unexplained: why is it only the utterance of matrix clauses that count as making a move in the language game? It is tempting to say it is because of matrix clauses' morphosyntax and semantics. But that is precisely what an advocate of Dynamic Pragmatics cannot say, and what the kind of theory we offer later will be able to say.

It is still worthwhile considering whether this second version of Dynamic Pragmatics would be better-positioned to explain complex sentences of differing types. Since this version of the approach appeals only to content, it will need to modify the semantics of conjunc-

¹⁶ See Stainton (1999) for related observations. It is also worth noting that this issue has also played out in the animal communication literature, where it is now widely assumed that content is derived from its dynamic effects rather than vice versa (Scott-Phillips 2008; Scott-Phillips & Kirby 2013).

tion to handle a sentence like $\triangleright A \wedge !B$. One possibility is to treat conjunction as forming an ordered pair consisting of each conjunct's contents: $\llbracket \triangleright A \wedge !B \rrbracket = \langle \llbracket \triangleright A \rrbracket, \llbracket !B \rrbracket \rangle$. One could then try adding a rule for pair-denoting clauses: the utterance of a clause denoting a pair counts as an attempt to add the left element to CG if it's a proposition, to QS if it's a set of propositions and to the addressee's TDL if it's a property; similarly for the right element. Once again, this rule is not general enough to handle even one further embedding. $(\triangleright A \wedge !C) \wedge !B$ would need to denote an ordered pair consisting of an ordered pair and a property. At this point it is clear what will be needed: a way of recursively pulling apart arbitrarily complex contents and adding them to the appropriate component of the discourse context. Further, one is going to have to do this in a plausible way for many connectives.¹⁷ But this is a self-defeating strategy for Dynamic Pragmatics: their reason for positing semantic rules for a given phenomenon are recursive compositional effects on interpretation. Denying that sentence force is one of these effects becomes unprincipled, and unmotivated.

The limitations of Dynamic Pragmatics so far have been conceptual since we have not yet argued that hybrid conjunctions exist. We will argue that in §3, but we want to first extend the empirical scope of the discussion. This broader view makes the limitations of Dynamic Pragmatics all the more pressing. While we will focus in this paper on *and* and conjunctions of imperatives and declaratives, the phenomenon is far more general:

- (7) Donate donuts because cops need to eat too! Donate lots of donuts unless you are unable to afford it. Do it regardless of whether you fear the police. Offer kindness to all fellow humans but you should be careful not to be taken advantage of. That drifter may be handsome but is he really only taking your car for a short drive? Do something kind today or I'll do something kind today, I don't care which. But someone should do something kind every day.

Some may suspect that these examples show merely that sentence connectives can also serve as 'discourse connectives', where they don't have their standard compositional meaning. To be plausible, this view must say how one gets from a traditional static meaning for the connectives to their discourse use. But the recent literature of discourse connectives largely assume exactly the kind of dynamic approach to connectives we will embrace in §3 (Weber *et al.* 2003; Asher & Lascarides 2003). The reason is simple: only the dynamic approach naturally extends the meaning of a connective when it operates within a sentence to its use to connect segments of a discourse. Further, it is not just further connectives that deserve consideration. Phenomena other than sentence mood have received Speech Act¹⁸ and Dynamic Pragmatic analyses. Evidentiality, appositives and hedges ('slifting') are among them. While the framework we propose in §3 can be extended to all of these phenomena (Murray 2014), we will focus here on evidentials.

Many of the world's languages have explicit morphology, evidentials, which encode an agent's source of evidence. Sentences in these languages convey two pieces of information, the **scope proposition** p and the **evidential proposition** q . For example p might be the proposition that it is raining, while q might be the proposition that the speaker's evidence for

¹⁷ Starr (2013) argues that the matter is even worse: there is no static non-propositional semantics for imperatives, conjunction and disjunction such that declaratives, imperatives, conjunctions and disjunctions update the context differently. This surprising result supplements the argument here, as it is also a serious obstacle for Dynamic Pragmatics v2. It is, however, a less general problem than that raised here.

¹⁸ It's also worth noting that speech act theory's predictions about mood scoping under connectives are problematic. For example, it predicts that *Take out the trash or wash the dishes* is either a command to take out the trash or a command to wash the dishes, and it predicts that *Are Bill and Ted coming?* and *Is Bill coming, and is Ted coming?* are equivalent, despite their answers being different. This is another reason why reducing force to meta-content is implausible.

p is a report. What is interesting from the present perspective is that these two contents have a very different status in the communicative exchange and in the compositional semantics of the sentence (Faller 2002; Matthewson *et al.* 2007; Murray 2010). Evidentials, like mood, always scope over negation and the evidential content has a backgrounded status: it cannot be directly challenged. Further, the evidential contribution can sometimes modify the status of the scope proposition. For example, in the Cheyenne data discussed below, using the reportative evidential frees the speaker from commitment to the scope proposition. Indeed, one can even follow up a reportative claim that p with a denial of p . Some have attempted to analyze this data by treating evidentials as force indicators in Searle's framework (Faller 2002). For reasons articulated above, that framework comes with significant drawbacks.¹⁹ A different analysis suggested by the account of mood above is to assign evidentials only a 'discourse meaning', which specifies how an utterance of the sentence is supposed to update the discourse context. This might proceed by postulating an additional set of propositions that are merely reported rather than being common ground. Just as in the case of mood, such an analysis predicts that different evidential sentences cannot be combined with conjunction or disjunction. As we will show in the next section, this prediction is incorrect. As in the case of mood, we will capture this phenomenon by identifying the compositional meaning of evidentials with their dynamic effects, following Murray (2014).

One final phenomenon to discuss is the embedding of sentence mood in non-matrix clauses. For example, it is well known that interrogatives occur under certain attitude and speech verbs, and many authors have argued that imperative mood embeds in speech reports, e.g. in Korean Pak *et al.* (2008), English Crnić & Trinh (2009) and German (Kaufmann & Poschmann 2013). In all of these cases, the important observation is that the embedded mood does not result in the affiliated update to the context. We will focus in §3 on Cheyenne here, where matrix moods are not syntactically allowed in subordinate clauses — there is a separate system of dependent moods for those environments. However, one might wonder how these embeddings in other languages can be squared with our assumption that sentence mood encodes sentence force. One option is to effectively assume that deep down all languages are like Cheyenne: morphosyntactically, and hence semantically, these embedded occurrences have a related but distinct semantics. The other option is to draw inspiration from Stalnaker (1987) and Heim (1992), who model verbs like this as creating 'subordinate contexts' where the embedded sentences do have their standard update effect. On this account, X said that ϕ would generate a subordinate context appropriate to X 's utterance, and then update the discourse context with information about what happens when the subordinate context is updated with ϕ . For a detailed version of such an account, see Bittner (2012, 2011). Note, that this is not to say that there are 'embedded speech acts' as Krifka (2014) does.²⁰ As we will detail in §4, sentential force is only one aspect of utterance (illocutionary) force. So the mere embedding of sentential force does not count as the embedding of a speech act, whatever that would mean.

¹⁹ It also incorrectly predicts that negation should be able to scope over evidentials, and that a single matrix clause could not feature both an evidential and interrogative mood.

²⁰ While our account draws inspiration from Krifka (2014), we aim to show that many of the complexities of that analysis are not necessary. The basic tools of dynamic semantics, added to an account of sentence mood and evidentiality are enough. Many of those complexities are motivated by Krifka's (2014) idea that there are embedded speech acts, and that speech acts are index-shifters. We show that context-shifters are enough, and contend in §4 that the idea of embedded speech acts is not coherent.

3 Dynamic Semantics for Mood and Evidentiality

This section begins with a negative argument which is then used to motivate a positive proposal. The negative argument concerns the theoretical limitations of Dynamic Pragmatic approaches discussed in §2.3. We will present data from Cheyenne which are uncontroversial instances of conjoined imperatives and declaratives where the imperative and declarative have their standard effect on the discourse context (§3.1). Parallel data for evidentials is then used to illustrate yet another case where this limitation is problematic. Sections 3.2 and 3.3 develop our positive, dynamic account of sentence mood and evidentiality. It is worth clarifying that this semantics is only an account of sentential force, not utterance (illocutionary) force. Even Dynamic Pragmatic accounts grant that a wide number of additional pragmatic processes supplement the . This point, and the general issue of how to pragmatically bridge sentence and utterance force, will be the topic of §4.

3.1 Composing Moods and Composing Evidentials

English is a difficult testing ground for a semantics of mood, particularly when questions of scope are central (as it is with the Discourse Rule analysis). Because English lacks explicit mood morphology, potentially controversial assumptions are needed to support claims that mood scopes under connectives. Fortunately, English has no special place in the study of meaning and many languages, including Cheyenne²¹, explicitly mark mood on every verb. Matrix verbs are marked for declarative, interrogative, or imperative mood. An excerpt of the Cheyenne matrix mood paradigm is given below in (8); there are also other evidentials, an immediate imperative mood, a hortative mood, which is similar to imperative mood, and moods for dependent (embedded) clauses (see Murray 2010, to appear).

(8) Some Cheyenne Matrix Moods (Leman 2011)

- | | |
|--|---|
| <p>a. <u>Declarative + Direct evidential</u>
 <i>É-néméne-Ø.</i>
 3-sing-DIR
 ‘He sang (I witnessed).’</p> | <p>c. <u>Interrogative</u>
 <i>Né-némene-he?</i>
 2-sing-INT
 ‘Did you (sg.) sing?’</p> |
| <p>b. <u>Declarative + Reportative evidential</u>
 <i>É-némene-séstse.</i>
 3-sing-RPT.3SG
 ‘He sang, I hear.’</p> | <p>d. <u>(Delayed) imperative</u>
 <i>Némene-o'ol!</i>
 sing-DEL.IMP.2SG
 ‘(You (sg.)) sing (later)!’</p> |

Since mood markers and evidentials occur in the same verbal slot in Cheyenne, and all dependent clauses are marked with mood, evidentials do not occur in embedded clauses (Murray to appear).

According to Frege (1923), force and content are fundamentally different kinds of meaning. Logical connectives operate on content and must scope under mood. In Cheyenne, because mood is explicitly marked on every verb, we can examine the interpretation of

²¹ Cheyenne is an Algonquian language spoken in Montana and Oklahoma. The data discussed in this paper are from Author 1’s fieldwork in summers since 2006, supplemented with a Cheyenne Grammar (Leman 2011), collections of texts (Leman 1980, 1987), and a dictionary (Fisher *et al.* 2006). Morphological analysis, glossing, and translation for all included data is Author 1’s.

- (14) *É-sáa-ho'sóe-he-séstse* Annie.
 3-not-dance-NEG-RPT.3SG Annie
 ‘Annie didn’t dance, I hear.’
 ✕ ‘I didn’t hear that Annie danced.’ / ✕ ‘Annie danced, they didn’t say.’

This behavior is similar to presuppositions, but the evidential content is discourse-new information. Based on these data and other semantic diagnostics (see, e.g., Potts 2005; Simons *et al.* 2011; Tonhauser 2012), several researchers have concluded that the evidential proposition is typically not-at-issue while the scope proposition is typically at-issue (e.g., Murray 2010, 2014).²³ One way of thinking of the at-issue/not-at-issue distinction is as a distinction in attention: we attend to the at-issue propositions in a way that we do not for the not-at-issue propositions (see Section 3.3 and Bittner (2011) for attention in other domains). Parallel to the argument above for mood, we need a theory that distinguishes the functions these two types of contents play and how these functions are communicated.

Because of this difference in function, one might pursue the kind of Neo-Fregean analysis of evidentials discussed at the end of §2.3. However, like mood, evidentials can scope under connectives. Consider the Cheyenne example (15), which is a conjunction of declarative sentences, the first with a reportative evidential, the second with a direct evidential. The scope proposition in (15ii) is the negation of the scope proposition in (15i).

- (15) (i) *É-némene-séstse* Annie *naa oha* (ii) *é-sáa-némene-he-Ø*.
 3-sing-RPT.3SG Annie but 3-not-sing-NEG-DIR
 ‘Annie sang, they say, but (I witnessed that) she didn’t.’

Example (15) shows that sentences with the reportative evidential make no commitment to the truth of the scope proposition: in (15), the speaker has direct evidence to the contrary of what was reported (see also Faller 2002; Murray 2014). Crucially, the two scope propositions in (15) are contradictory. But this sentence is not a contradiction. Intuitively, the truth conditions are that the speaker has reportative evidence that Annie sang, direct evidence that she didn’t, and that Annie did not sing. We do not want an analysis of (15) that predicts it is one declarative sentence that represents both reportative and direct evidence for a contradiction. So, like mood, evidentials also cannot be analyzed as a Fregean tag.

3.2 Dynamic Semantics for Mood

This section develops a semantics for declarative, interrogative and imperative moods. We adopt one general feature of the approach to sentential mood from §2.3: we assume the different sentential forces are grounded in different kinds of attitudes or mental states. We also follow the general approach of capturing the three-way distinction between sentential forces by having the three different sentence types update different kinds of mutual commitments: a common ground (Stalnaker 1978), questions under discussion (Roberts 1996) and a to-do list (Portner 2004). However, we propose a modified characterization of these three different kinds of mutual commitments. In particular, we appeal to a set of contextual possibilities, the context set c , a set of alternative propositions C covering those possibilities and a preference relation R over those alternative propositions. Formally, there is only one object, R , and the context set c and the alternatives C can be constructed from R . This different model will allow us to more smoothly combine updates which interact across multiple

²³ On this view, evidentials are similar to appositives in that they contribute not-at-issue content (Potts 2005), but they can also affect the level of commitment to the scope proposition, illustrated in (15); see §3.3.

kinds of mutual commitments, including combinations of sentences in different moods. The formal differences between this model, and the models developed in (Roberts 1996) and (Portner 2004), are not going to be discussed in detail here. Our focus here is developing the leanest formal system that captures the basic data, while being close enough to the more general approaches developed and defended in Murray (2014) and Starr (2013). These more complex systems generalize data involving slifting, appositives, quantification, disjunction and conditionals. For further data, we are open to positing a more complex and separate QUD structure (Roberts 1996) rather than C , and we are also open to taking the relata of preferences to be properties rather than propositions. However, we are firmly committed to the primary effect of imperatives being the modification of a preference relation, rather than a TDL. As discussed in Charlow (2010, 2014) and Starr (2010, 2013), preference-based analyses overcome serious limitations of TDL approaches when it comes to imperative disjunctions and conditionals.²⁴ With this general orientation in place, we turn to presenting our model in more detail.

Rational agents acquire information. Collectively, the informational content they acquire can be usefully modeled as a set of possible worlds. This set distinguishes ways the world might be (worlds in the set) from ways it isn't (worlds excluded from the set). One set of worlds (informational content) is particularly useful for understanding how linguistic interactions unfold – the context set.

Context Set (c) As communication and inquiry unfold, a body of information accumulates.

Think of it as what the agents are mutually taking for granted for the purpose of the interaction. The set of worlds embodying this information is the *context set*, c . (Lewis 1979b, Stalnaker 1978)

On this model, inquiry progresses by gaining information, which amounts to the elimination of worlds. Consider two sentences A: *Annie sang*, and B: *Bob sang*, just four worlds will do; one for each Boolean combination. Figure 1 depicts the process of gaining the information carried by A. Worlds where a proposition is true are indicated with a capital letter, A; worlds where that proposition is false with a lowercase letter, a. We begin in a state with no

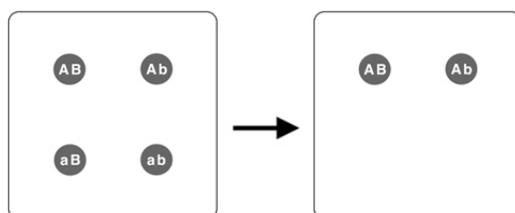


Fig. 1 Gaining the information that A

information about A or B: $\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}$. When we gain the information that A, all worlds where A is false are eliminated, bringing us to $\{w_{AB}, w_{Ab}\}$.

Of course, it is not just information that accumulates in communication and inquiry. A science or conversation is partly defined by the questions it aims to settle (Bromberger 1966;

²⁴ The idea that imperatives dynamically extend partial preference relations originates with van Benthem & Liu (2007) and Yamada (2008). Recently Condoravdi & Lauer (2012) have developed a somewhat different approach based on preferences that has more in common with modal analyses (Kaufmann 2012) where imperatives communicate information about preferences, rather than communicating them directly.

Roberts 2004). Recent work in epistemology, semantics and pragmatics has illustrated the importance of this fact.²⁵ In our model, we capture this by tracking how the worlds in c are divided into *alternatives*.

Alternatives (C) Alternatives represent open, competing propositions the agents are concerned with deciding between; their **issues**.²⁶ Formally, this grouping of c may be identified with a set of sets of worlds; call it C . There is no need to also keep track of c : it is just the union of all the alternatives in C .

For example, suppose again that there are just four worlds ($w_{AB}, w_{Ab}, w_{aB}, w_{ab}$) and the agents have ruled out no worlds so $c = \{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}$. This does not fully specify their progress, if, for example the aim of their inquiry is to know whether Annie sang, in which case the set of alternatives would be $\{\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\}$. Figure 2 depicts recognizing the issue of whether A in the case where there are no previous issues.

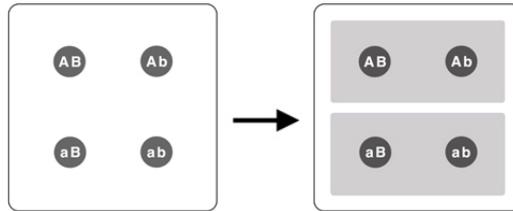


Fig. 2 Recognizing the issue whether A

Figure 2 represents using sets of propositions as the context. We begin in a state with no information about A or B and no issues: $C = \{\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}\}$. When we recognize the issue that A, worlds where A is true are grouped together and worlds where A is false are grouped together, bringing us to $C' = \{\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\}$. In this case the alternatives are exclusive and exhaustive, but that needn't be the case. While new issues modify the groupings in C , new information will eliminate worlds from the members of C . Some technicalities aside, this is Groenendijk & Roelofsen's 2009 model of context.²⁷ In Figure 2, no information has been added, so no worlds have been eliminated – the context set remains the same, $c = \{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\} = \cup C = \cup C'$.

Following Starr (2013), we adopt one more extension. Agents not only gather information and identify competing alternatives, they form **preferences** regarding those alternatives (Hansson & Grüne-Yanoff 2011). This has been one of the driving ideas in thinking about rational decision and choice since perhaps Ramsey (1931) and is central to **decision theory**, as it is applied in philosophy, artificial intelligence (Newell 1992) and economics (Savage 1954).²⁸ While identifying an issue introduces the goal of finding *any* of the alternatives, forming a preference introduces the goal of finding a particular alternative. Sometimes, this goal is a reflection of something epistemic, like a hunch or higher credence. Sometimes, this goal reflects a desire for one of the answers to be true. Often, both factors are interwoven

²⁵ E.g. Jeffrey (1990), Rooth (1992), Schaffer (2004), Groenendijk (1999) and Roberts (2004).

²⁶ *Open* since they are composed from worlds in c . *Competing* because they are distinct. *Objects of concern* since they are the alternatives in C .

²⁷ Groenendijk & Roelofsen (2009) builds substantially on Groenendijk (1999) and Hulstijn (1997).

²⁸ The focus on the dynamics of preferences draws on dynamic epistemic logic (van Benthem & Liu 2007).

in preferences.²⁹ A body of preferences is represented as a binary **preference relation** on alternatives, i.e. a set of pairs of propositions. The contextual alternatives C and possibilities c from above can be constructed from this relation, as detailed below.

Preferences (R) A preference state R is a binary relation on a set of alternative propositions.

It represents the preferences that are being taken for granted for the purposes of the interaction. $R(a, a')$ means that a is preferred to a' . C_R (issues at stake in R) is the set of (non-empty) alternatives related by R . c_R (information at stake in R) is the union those non-empty alternatives. It is assumed that the agents always prefer their information to absurdity, so $\forall R : R(c_R, \emptyset)$.

For example, suppose again that there are just four worlds ($w_{AB}, w_{Ab}, w_{aB}, w_{ab}$). The preference for A comes out as $\{\{\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\}\}$: the set containing the pair of A and $\neg A$. These preferences are illustrated with complementary colors, as in Figure 3, reserving the warm color for the favored alternative.

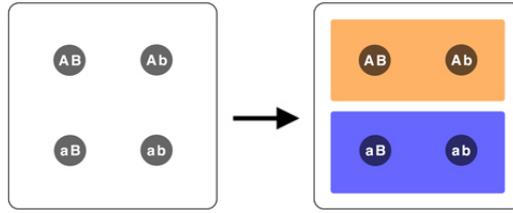


Fig. 3 Coming to prefer A (to $\neg A$)

Figure 3 illustrates how we will represent the context, using sets of pairs of propositions. We begin in a state with no information about A or B, no issues, and no preferences: $R = \{\{\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \emptyset\}\}$. When no issues or preferences are present, all worlds are ranked over the empty set. A proposition ranked over the empty set indicates that that proposition is preferable to the absurd state. When we come to prefer that A, worlds where A is true are grouped together and ranked over worlds where A is false, bringing us to $R' = \{\{\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\}\}$. The contextual alternatives C_R can be constructed from this relation by taking all non-empty sets of worlds related by R : $C_R = (\text{dom}(R) \cup \text{ran}(R)) - \emptyset$. In the example above, $C_R = \{\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}\}$ and $C_{R'} = \{\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\}$.³⁰ The context set c_R can be constructed from the alternatives, as their union: $\bigcup C_R$. In the example above, $c_R = c_{R'} = \{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\} = \bigcup C_R = \bigcup C_{R'}$.

Modeling context this way, as sets of pairs of propositions, encapsulates three kinds of contents: information, issues and preferences. Take for example the initial state over A and B which encodes no information, no issues and no preferences: $\{\{\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \emptyset\}\}$. Gaining the information that A, as in Figure 1 can be represented as the transition from $\{\{\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \emptyset\}\}$ to $\{\{\{w_{AB}, w_{Ab}\}, \emptyset\}\}$. Worlds where A is true are pointwise removed from each set of worlds. Recognizing the issue of whether A can be represented as the transition from $\{\{\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \emptyset\}\}$ to $\{\{\{w_{AB}, w_{Ab}\}, \emptyset\}, \{w_{aB}, w_{ab}\}, \emptyset\}\}$.

²⁹ If preferences have certain properties they can be represented as a combination of degrees of belief (subjective probabilities) and utilities (Ramsey 1931; von Neumann & Morgenstern 1944; Savage 1954).

³⁰ Technically, this definition implies that imperatives raise issues. We can't explore this implication here, but we should note that an alternative definition does not have this implication: C is the set of all a such that both $\langle a, \emptyset \rangle$ and $\langle c_R - a, \emptyset \rangle$ are in R .

Each alternative is preferred over the absurd state. Coming to prefer that A can be represented as the transition from $\{\langle\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \emptyset\rangle\}$ to $\{\langle\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\rangle\}$, where A is preferred to $\neg A$. These effects of gaining information, recognizing issues and imposing preferences are summarized in (16).³¹

(16) Gaining information, recognizing issues and imposing preferences

$\{\langle\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \emptyset\rangle\}$	Gain information that A $\Rightarrow \{\langle\{w_{AB}, w_{Ab}\}, \emptyset\rangle\}$
$\{\langle\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \emptyset\rangle\}$	Recognize issue whether A $\Rightarrow \{\langle\{w_{AB}, w_{Ab}\}, \emptyset\rangle, \langle\{w_{aB}, w_{ab}\}, \emptyset\rangle\}$
$\{\langle\{w_{AB}, w_{Ab}, w_{aB}, w_{ab}\}, \emptyset\rangle\}$	Impose preference for A $\Rightarrow \{\langle\{w_{AB}, w_{Ab}\}, \{w_{aB}, w_{ab}\}\rangle\}$

The linguistic **meaning** of a sentence will specify how a sentence moves the interaction forward from any one state to another. This is a dynamic notion of meaning, the function from one state to another, in contrast to a static notion, where meanings are contents (proposition, question, property, preference, etc.).

The meaning of a sentence ϕ is a function from one state R to another R' : $R[\phi] = R'$. A sentence meaning $[\phi]$ says how R and R' differ. This allows a formalization of the notions of content and the functional role of that content. Content is the information, issues and preferences encoded in R . This semantics is embedded in a pragmatic framework that employs an idealized conception of a rational agent's activities familiar from decision theory (Starr 2013). Agents are assumed to use their preferences to choose an alternative to act on. In particular, they must choose from the alternatives that their preferences identify as good, namely those that they do not disprefer to any other alternative. Even this idealized picture of agents' rational activities endows information and preferences with a functional role. Informational content has the function of representing how the world is, since it is only when the actual world is in c_R that the agent will generally get what they want by acting on their preferences. Preferences have the function of guiding the agents' choices. In an extended pragmatic framework like Roberts (1996) or Groenendijk (1999), one can further specify the functional role of issues and information in terms of a game of relevant information exchange. Thus, the on the above analysis of mood, where it changes the structure of preference states in one of three ways, it changes which contents are playing which roles.

Let's return to examples of English declarative, interrogative and imperative sentences, thinking also of their Cheyenne counterparts. Let's assume they have the same core proposition A, that Annie sang (abstracting from issues like tense). The translation is given below each example.

(17) *Annie sang.*
declarative: $\triangleright A$

(18) *Did Annie sing?*
interrogative: $?A$

(19) *(Annie,) Sing!*
imperative: $!A$

The declarative sentence (17) is analyzed as pointwise eliminating each $\neg A$ -world from each alternative (proposition) in the initial state R . If any pair is left with no preferred A-worlds, then eliminate that pair. Then, distill new information into an alternative by ranking

³¹ For full formal definitions see Starr (2013).

all remaining worlds over \emptyset . The interrogative sentence (18) is analyzed as adding alternatives for A and $\neg A$. All of the issues/preferences in R are preserved. Then, a preference is added for all A -worlds in c_R to \emptyset , and one for $\neg A$ -worlds in c_R to \emptyset . The imperative sentence (19) is analyzed as adding a preference for A . All of the preferences in R are preserved. Then, a preference is added for all A -worlds in c_R over $\neg A$ -worlds. For each existing alternative alt , if there are any A -worlds in alt , introduce a preference for them over the $\neg A$ -worlds in alt . These analyses are summarized in Figure 4 below.

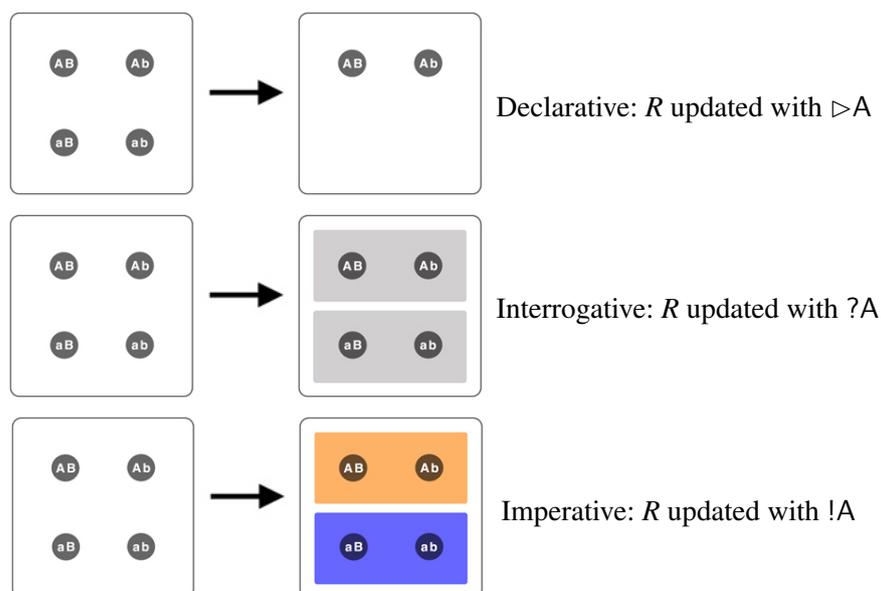


Fig. 4 Analysis of Declarative, Interrogative and Imperative Moods

In dynamic semantics, the conjunction *and* is analyzed as sequential update rather than content intersection. This allows an analysis of conjunctions like English (20) and Cheyenne (9) where mood can scope under the conjunction.

(20) *I am going to sing and (you) dance!*

English (20) can be translated as $R[\triangleright A \wedge !B]$, or, equivalently, $R[\triangleright A][!B]$. The dynamic meanings thereby deliver non-ambiguous analysis of *and* despite the fact that there is not a single operation on *contents* (propositions, issues, preferences) we could associate with it. Similar results hold for *or* and conditional consequents (Starr 2013). This is the resource we needed that Dynamic Pragmatic accounts lacked. The limitations discussed in §2.3 have been lifted by taking sentential mood to be a semantic contribution, and using a dynamic analysis of connectives where they operate on updates rather than contents.

3.3 Dynamic Semantics for Evidentiality

This analysis of mood can be extended to sentences with evidentials by adding a way of representing the distinction between at-issue and not-at-issue content. Evidentials are not mood

markers, and sentences with evidentials are also marked for mood, but often these contributions interact. Recall Cheyenne (12), a declarative sentence with a reportative evidential, repeated below as (21). Two propositions are conveyed by (21): the scope proposition A and an evidential proposition B (see §3.1).

- | | |
|--|--|
| (21) <i>É-ho'sóe-sèstse</i> Annie.
3-dance-RPT.3SG Annie
'Annie danced, I hear.' | A: Annie danced
B: The speaker has reportative evidence that Annie danced |
|--|--|

The difference in status between these propositions is analyzed as a difference in at-issuiness: the scope proposition (A) is at-issue while the evidential proposition (B) is not-at-issue (Murray 2014). This parallels the distinction for sentences with appositives, where the appositive contributes not-at-issue content (e.g., Potts 2005). However, unlike appositives or other elements analyzed as contributing a conventional implicature, evidentials can also affect the level of commitment to the scope proposition, discussed above in §3.1 and below.

One way to think about the at-issue/not-at-issue distinction is in terms of attention: at-issue propositions are information we are attending to, information central to the purpose of the conversation, while not-at-issue propositions are backgrounded or peripheral (see also Bittner (2011) for attention in other domains and, e.g., Simons *et al.* (2011) for at-issuiness defined relative to the question under discussion). So far in our analysis, this distinction is lost. Assume A is the at-issue proposition and B is the not-at-issue proposition, as in (21). Once both $\neg A$ and $\neg B$ -worlds are eliminated, we have no way of distinguishing the A-information from the B-information – no way of distinguishing at-issue and not-at-issue content. To capture this, we adopt the proposal from Murray (2014) to represent at-issue information with a propositional discourse referent.³²

In general to communicate, and to analyze language, we need to keep track of the propositions (and other things) that have been introduced in discourse. Following Bittner (2011), we think of updates that introduce discourse referents as updates of attention – they track what is being attended to, and their relative prominence. We extend the preference states introduced in the previous section to **preference states with attention**, which consist of a preference state R , plus a list of propositions being attended to: $S = \langle R, \langle p_0, \dots, p_n \rangle \rangle$. Essentially, this is a list of propositional discourse referents. Each proposition is the set of all worlds where the relevant sentence is true. We represent these separately from the state R because importantly they are not subsets of the current context set.³³ In this extended model, we can analyze the distinction between at-issue and not-at-issue content: both at-issue and not-at-issue assertions eliminate worlds from the context set c_R , but at-issue assertions also add their propositional content to the propositions being attended to.³⁴ Thus, we can separate

³² For us, not-at-issue information will not be represented by a propositional discourse referent, though for other phenomena beyond grammatical evidentials that is too simplistic (see Murray 2014).

³³ It is worth highlighting here that Stalnaker's (2014, 87-8, 172-3) criticisms of dynamic semantics miss the mark. He worries that dynamic accounts do not allow one to distinguish between the context-independent content of propositions asserted, and their influence on the context set. But it is precisely this distinction that our system captures with propositional discourse referents. Further, phenomena involving conditionals actually suggest that dynamic semantics offers a *better* treatment of assessing sentences outside of their contexts of utterance (Starr 2014a, forthcoming).

³⁴ Take an at-issue assertion to be an assertion of an at-issue proposition and a not-at-issue assertion to be an assertion of a not-at-issue proposition. Here, the only difference between them is in attention, whether or not a propositional discourse referent is introduced. Murray (2010, 2014) makes a further distinction: not-at-issue content is directly added to the common ground, while at-issue content is first proposed to be added to the common ground.

what information is entailed (asserted) from what information is being attended to (at-issue); as shown below, this is crucial for the analysis of reportatives.

We can now implement an analysis of sentences with evidentials. Consider Cheyenne (22), a declarative sentence with a direct evidential. Let A be the scope proposition (at-issue) and B be the evidential proposition (not-at-issue).

- | | |
|---|---|
| (22) <i>É-ho'soo'e-Ø Annie.</i>
3-dance-DIR Annie
'Annie danced (I witnessed).' | A: Annie danced
B: The speaker has direct evidence that Annie danced |
|---|---|

Cheyenne (22) will be translated as $\triangleright_{\text{dir}} A$. We analyze the evidential and declarative mood as fused into a single operator ($\triangleright_{\text{ev}}$).³⁵ However, these are still declarative sentences, and still have the same core declarative update (\triangleright) as the English sentences discussed in §3.2. The interpretation of $\triangleright_{\text{dir}} A$ has three parts, illustrated in Figure 5. $\neg B$ -worlds are eliminated from each alternative (committing to the evidential proposition), a discourse referent for all A -worlds is added to the list (attending to the scope proposition), and $\neg A$ -worlds are eliminated from each alternative (committing to the scope proposition). These are illustrated as separate steps in Figure 5, but they are not separate or ordered in any significant way.

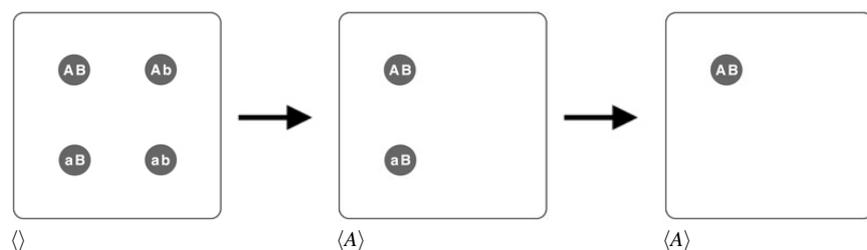


Fig. 5 Analysis of Cheyenne (22): $\triangleright_{\text{dir}} A$

In Figure 5, the initial state S is $\langle R, \langle \rangle \rangle$, where $R = \{ \{ w_{AB}, w_{Ab}, w_{aB}, w_{ab} \}, \emptyset \}$ and the list of propositional discourse referents is empty ($\langle \rangle$). State S updated with $\triangleright_{\text{dir}} A$, $S[\triangleright_{\text{dir}} A]$, is $S' = \langle R', \langle A \rangle \rangle$, where $R' = \{ \{ w_{AB} \}, \emptyset \}$. The truth conditions for (22) are that A is true B is true: that Annie danced and that the speaker has direct evidence that Annie danced. In addition, we predict only A will be easily accessible for propositional anaphora, because there is a propositional discourse referent for A but not for B , accounting for the direct challengeability data, e.g., in (13) for the reportative. In other words, both propositions A and B are added to the common ground, but they differ in status.

A parallel analysis can be given for Cheyenne sentences with reportative evidentials, as in (21), with one important difference: they do not make any commitment to the scope proposition. That is, Cheyenne (21) does not require that Annie danced, or even that Annie having danced is possible. In fact, the scope of a reportative can be explicitly denied (see (15)). Again let A be the scope proposition (at-issue) and B be the evidential proposition (not-at-issue). Cheyenne (21) will be translated as $\triangleright_{\text{rpt}} A$. The interpretation of $\triangleright_{\text{rpt}} A$ has

³⁵ Ideally, both declarative mood and the evidential should compositionally contribute to this meaning, but that takes some extra work (see Murray 2014).

two parts, illustrated in Figure 6. $\neg B$ -worlds are eliminated from each alternative (committing to the evidential proposition) and a discourse referent for all A -worlds is added to the list (attending to the scope proposition). Unlike with the direct evidential, the $\neg A$ -worlds are not eliminated: we keep both A -worlds and $\neg A$ -worlds. Thus, a follow-up like in (15) will be possible.

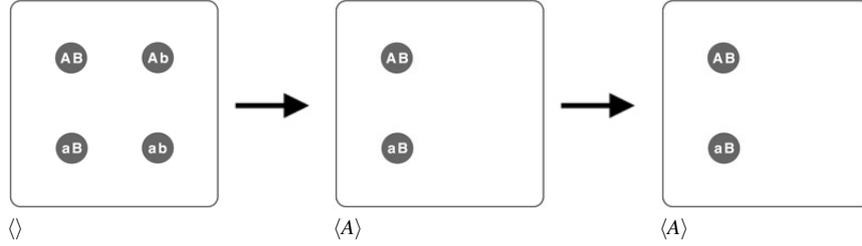


Fig. 6 Analysis of Cheyenne (21): $\triangleright_{\text{rpt}}A$

In Figure 6, as in Figure 5, the initial state S is $\langle R, \langle \rangle \rangle$, where $R = \{ \{ \{ w_{AB}, w_{Ab}, w_{aB}, w_{ab} \}, \emptyset \} \}$ and the list of propositional discourse referents is empty $\langle \rangle$. State S updated with $\triangleright_{\text{rpt}}A$, $S[\triangleright_{\text{rpt}}A]$, is $S' = \langle R', \langle A \rangle \rangle$, where $R' = \{ \{ \{ w_{AB}, w_{aB} \}, \emptyset \} \}$. The truth conditions for (21) are that B is true, that the speaker has reportative evidence that Annie danced. In addition, we again predict only A will be easily accessible for propositional anaphora.

In other words, there is a truth-conditional commitment to B but not A , and there is a discourse referent for A but not B . This captures how reportative evidentials present the at-issue content (A) without committing to it (Faller 2002). On the account proposed here, declarative sentences with evidentials are given a unified analysis – they are all declarative sentences. They all make commitments to propositions, but the evidential can affect what the commitments are. There is no need to analyze sentences with evidentials with fundamentally different types of speech acts. The proposed semantics for mood makes this possible: assigning a meaning to declarative mood that makes explicit the commitment to a proposition allows other elements of a sentence, like evidentials, to affect these commitments compositionally. Evidentials can also occur with other moods, and can have similar, compositional effects (Murray 2014).

This section has illustrated how a dynamic analysis of mood and evidentiality can capture the kind of data that Dynamic Pragmatic approaches cannot. The dynamic approach to meaning was essential for relaxing the Fregean assumption that sentential force and content are fundamentally different kinds of meaning. By stating conventional meanings in terms of update procedures, we were able to have connectives compositionally operate on the update procedures contributed by mood and evidentials. Yet, our formalism did not reject Frege’s distinction between force and content altogether. In our system, there is still a distinction between force and content: force pertains to what component of context a sentence updates while content pertains to the particular change induced in that component of the context. This addresses one major gap in the existing theories of sentential force. But there is another issue looming: how is utterance force related to sentential force?

4 Communicating Utterance Force

As with the Dynamic Pragmatic accounts from §2.3, our analysis in §3 does not explain what utterance force is, let alone what interpretive processes link sentential and utterance force. We will begin by illustrating this with some concrete examples, and then briefly survey the options for understanding this pragmatic process. Our focus here will not be promoting a particular account, but rather showing what is needed and that the alternative accounts available are consistent with the approach to sentential mood offered in §3.

4.1 Utterance Force for the Neo-Gricean

Stalnaker (1978, 87) is quite careful to say that his essential effect of assertion — reducing the context set — is necessary, but not sufficient for making an assertion. One simple reason is that non-communicative events, like a donkey walking into the room, can also reduce the context set. So what more is required of an assertion? Neo-Gricean approaches like Bach & Harnish (1979, 42) return to the central ideas of the Mutual Intentional approach to communication from §2.1. For them, a speaker *S*'s utterance of *Janis was a singer* to *H* counts as an assertion roughly when:³⁶

- (23) *S* intends *H* to recognize that:
- a. *S* believes that Janis was a singer and
 - b. *S* intends *H* to form this same belief

A *successful* assertion only requires that *H* and *S* mutually recognize (23), not that (23a) or (23b) hold. It is useful to consider how this account can be combined with a Dynamic Pragmatic one like Stalnaker's (1978). The assertion will add the proposition that Janis was a singer to the context set and prompt a pragmatic inference that results in (23) also being added to the context set — an inferential process discussed extensively by Bach & Harnish (1979).³⁷ Different speech acts involving declarative sentences, such as informing and insisting, will still involve Stalnaker's essential effect, but involve slightly different speaker intentions. Bach & Harnish (1979) analyze imperatives in terms of desires, in a way that can be easily merged with our account of imperative mood in terms of preferences. This offers one way to account for diversity of uses imperatives support (Davies 1986), one which has been absent from recent discussions (Portner 2012; Condoravdi & Lauer 2012; Kaufmann 2012). We present this concrete style of analysis to illustrate several points. First, the basic idea of this Neo-Gricean approach is compatible both with Dynamic Pragmatic, and Dynamic Semantic accounts. Whether Stalnaker's essential effect is the compositional contribution of sentence mood, or an inferred pragmatic property, it is still only a necessary feature of assertions. Much more is pragmatically inferred about the utterance when an actual assertion has been made. Further, it is even possible that this necessary effect be attenuated or nullified by this kind of pragmatic inference. Second, the main data explained by existing approaches to utterance force are our intuitive classification of utterances using verbs like 'assert', 'inform', etc. This is to follow the lead of speech act theory. Finally, this

³⁶ Additional qualifications ensure that the utterance is literal, communicative and that the intention in (23) is appropriately transparent and recognized in the right way (Bach & Harnish 1979, §1.6).

³⁷ See also Cohen & Perrault (1979) and Cohen & Levesque (1985, 1990) for a related approach that motivates modeling things in a more nuanced way using default logic. This allows one to capture the idea that (23) only becomes *defeasibly common ground* after a successful assertion.

model assumes that utterance force is communicated in more or less the same way that content is communicated: it amounts to some additional *content* entering the context set. After all, that is the foundation of the Mutual Intentional approach to communication.³⁸

While several authors talk about embedded speech (illocutionary) acts (Searle 1969; Krifka 2014), this turns out to be a category on the analysis above. Only sentences and, by extension, their conventional meanings are linguistically embedded. While conventional meanings encode the sentential force of a sentence, they do not encode the force any particular utterance of that sentence has. Utterance force is an essential component of a speech act, but is not part of the sentence's meaning. Thus, speech acts are never themselves embedded. More concretely, a sentence such as $!A \wedge !B$ does not involve two embedded commands. It involves two embedded imperatives, and performs a speech act whose force is only in part determined by the two sequential updates determined by the conjunction.³⁹ So on our approach, it is simply a category error to apply semantic concepts such as entailment or embedding to speech acts. This seemingly pedantic conceptual point turns out to have important theoretical consequences: Krifka (2014) models speech acts as index (e.g. world) changing actions, which requires a rather complex algebra of branching-worlds. By focusing on the dynamics of context-change alone, we have illustrated how this kind of data can be captured in a far simpler system, one which does not apply linguistic concepts (embedded) to events that are largely individuated in terms of non-linguistic properties (speech acts).

4.2 Utterance Force Socialized

For the purposes of this paper, the preceding discussion does enough to make our main point: embracing a dynamic semantics for sentence mood/force still allows one to offer a pragmatic explanation of utterance force. Furthermore, there is little reason and great cost to adopting the extreme position that any sentence in any context can have any force (Davidson 1979; Levinson 1983). However, there is some reason for pause. Wilson & Sperber (1995) have challenged the assumption that a theory of utterance force is needed at all. Their concern is this: we have no reason to assume that across languages and individuals there is a stable and interesting division of speech acts into distinctive classes. The inventory of speech verbs and social circumstances of a given language may be a stronger influence how individuals classify speech acts than the actual linguistic reality. We are sympathetic to this in part because it is very difficult to collect the relevant data from untrained native-speakers during fieldwork on languages other than English, and extrapolate this into a general account of utterance force. Furthermore, analyses like Bach & Harnish (1979) assume that each sentence has a single mood, and it is not immediately obvious how to relax this assumption. We regard this as good reason to speculate about rather different characterizations of utterance force that would support a rather different methodology and theory. While our thoughts here will be largely speculative, we develop these ideas more substantially in Author 1 & Author 2 (2016).

³⁸ We have not talked here about indirect speech acts like many utterances of *Can you pass the salt?* However we take the position offered by Lepore & Stone (2014, §6) to be rather compelling: there is striking evidence that English interrogatives containing ability modals are ambiguous between two different conventional meanings, the pure question meaning and the request meaning. Among this evidence is the fact that the sentence, in this use, admits of modifiers like *please* which are conventionally incompatible with the pure inquiry interpretation (Lakoff 1973; Sadock 1974; Horn 1984).

³⁹ Contrast this with $!(A \wedge B)$ which involves a single update of the mutual preferences with a conjunctive content.

Consider the following dialogue between two sisters, a veteran teacher Kathy and a new teacher Sharon, excerpted from the Santa Barbara Corpus (Du Bois *et al.* 2000).⁴⁰

- (24) a. *Kathy*: All you have is twelve kids?
 b. *Sharon*: No. Seventeen
 c. *Kathy*: Oh, okay.
 d. *Sharon*: ...and fourth-graders.
 e. *Kathy*: So then, what you do is, you sprinkle the fifth-graders out evenly... And you make the fourth-graders take the responsibility for teaching them.
 f. *Sharon*: Third-graders?
 g. *Kathy*: And you engrain in them, that it's their responsibility to help those little kids. That's what I did.

Kathy's imperative utterance in (24e) is tempting to construe as advice, rather than as a command. But what does this difference come to, empirically? Suppose Sharon subsequently puts into practice Kathy's directives. We may then ask how Sharon's state of mind changed as a result of talking to Kathy and why. On our account of sentential force, Kathy's imperatives influenced the preferences mutually supposed R_M in the conversation. But this leaves open the question of how those mutually supposed preferences influenced Sharon's private preferences R_S which subsequently informed her actions. It is quite natural to appeal here to the social structure of the conversation rather than the speaker's intentions. Sharon does not trust Kathy because she recognizes Kathy's cooperative intentions, she trusts her because of far more pervasive aspects of social psychology. Interactions fall within a certain range of power dynamics (Fiske 1992) and fit within particular schema/activity types (Schank & Abelson 1977; Levinson 1979). Our choice of actions in these social interactions is tightly constrained by social norms that are sensitive to these features, i.e. our self-fulfilling beliefs about what agents like us do in circumstances like these (Bicchieri 2005). In this particular example, Sharon and Kathy were taking part in a communal (altruistic, non-competitive) interaction supported by each others' trust and social reputation, and Kathy is perceived as being more reputable than Sharon. As such, Kathy's contributions are construed as more authoritative, but not absolutely authoritative. After all, it's a communal exchange. This leads Kathy to simply adopt the expressed preferences, and use them to guide her own actions.

Note some telling differences between this way of spelling out what the utterance force of 'advice' comes to. First, it predicts that if the interaction type were different, say an interaction with an authoritarian principle, Kathy would have likely adopted the same preferences, but for different reasons. Similarly, if it had been with an untrusted colleague she might not have adopted the directive at all. This provides an empirical grip to the otherwise nebulous concept of utterance force. It allows one to investigate hypotheses by systematically manipulating certain variables. Of course, it is hard to see how this does not blur the line between pragmatics and social psychology, but that is a line which has already been profitably blurred (Clark 1996). An account of this kind is formally developed in Author 1 & Author 2 (2016), where we propose to model the state of a conversation as not just the mutual preferences, issues and information R , but with each of the participants private states as well, e.g. $\langle R_M, R_K, R_S \rangle$ for (24). One can then formulate social norms as expectations about how R_K and R_S change as a result of a particular change to R_M . While the change to R_M reflects sentential force, the change to R_K and R_S reflects *utterance force*. Social norms which compel us to adopt preferences made mutual under certain social conditions are then the main explanatory tool for capturing the variety of utterance forces exhibited by imperatives.

⁴⁰ From SBC004, 967.87 969.38–983.09 983.67.

Indeed, the norms can be formulated generally enough to apply to any mutual contribution of information, issues or preferences (Author 1 & Author 2 2016).

The style of account just sketched is crucially different from accounts like [Bach & Har-nish \(1979\)](#) or [Portner \(2012\)](#); [Condoravdi & Lauer \(2012\)](#); [Kaufmann \(2012\)](#) in that it is not limited exclusively to changes to *mutual* discourse assumptions: it talks about what the agents are actually privately committed to as a result of their interaction. Mutual assumptions, such as the mutual information encoded in the context set, fall far short of this. They encode only what the agents are provisionally assume for the purposes of the conversation. Further, this account does not assume that utterance force arises as a species of interpretive Gricean reasoning whereby the speaker's communicative intention is made mutual. That is, it is not an inference which results in certain further information being made mutual. Instead, it results in the replication (or not) of certain contents being made mutual. This matters specifically in the case of complex sentence types which introduce, say, information and preferences simultaneously.

5 Conclusion: Communication Redux

We are now in a position to return to the larger context of communication that shaped our discussion. The pressure to distinguish the constant contribution of sentential force from utterance force compelled us to abandon speech act theory (§2.2). Dynamic Pragmatic accounts provided us with a key insight about how to do this: think about sentential force in terms of discourse dynamics. However, we argued that the systematic and compositional way in which sentential mood and evidentials affect sentential force require thinking about these discourse dynamics semantically (§2.3). On our dynamic semantic approach, sentence moods encode different kinds of updates and phenomena like evidentials can modify the particular structure of these updates. Since connectives operate on updates rather than contents, it can solve the limitations revealed for Dynamic Pragmatic analyses (§3). This dynamic approach to sentence mood does not, however, involve denying that utterance force is an essentially pragmatic phenomenon. We have shown how the resulting semantics can be unified with a relatively traditional Gricean approach to utterance force (§4.1). We do have some reservations about this pragmatic approach, and have speculated about an alternative pragmatic account to utterance force (§4.2). This alternative approach seems to suggest a more thoroughly empirical methodology for studying utterance force and did seem to require some departure from the Mutual Intentional approach to communication. But either way, we view the resultant picture of mood, force and meaning as a significant advance on previous ones.

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