

# Implicit speech acts are ubiquitous. Why? They join the dots.

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ABSTRACT: Implicit speech acts perform a vital function in argument dialogue, where a key challenge is to account for the 'glue' between utterances. The ways such speech acts are licensed and governed arise from the dialogical context, which in turn defines the argumentative glue which underpins them. Thus, the same explicit speech acts uttered in different dialogical contexts can have different implicit speech acts connecting them, and, thereby, can be used to make different arguments.

KEYWORDS: dialogue, illocution, implicit speech acts, speech acts,

## 1. INTRODUCTION

The goal of this paper is to explore a part of the foundation of a new theory explicating the relationship between the processes of argumentative dialogue (what O'Keefe (1977) might, roughly, call  $argument_2$ ) and the argumentative structures that those processes create, manipulate, update, and navigate (what O'Keefe might call  $argument_1$ ). Reed and Budzynska (2010) have started to lay out the groundwork, arguing that, by and large, although the distinction between  $argument_1$  and  $argument_2$  is rather well researched and rather well understood, the connection between them is not. And yet at the same time, is it intuitive – to the point of being self-evident – to think of several intimate relationships between the two. First,  $arguments_2$  can create  $arguments_1$ . Take, for example, a trivial dialogue such as (Ex1):

(Ex1)

(1.1) *Bob says, The government will inevitably lower the tax rate*

(1.2) *Wilma says, Why?*

(1.3) *Bob says, Because lower taxes stimulate the economy*

This constitutes a reasonable, if artificial,  $argument_2$ , comprising at least three explicit parts: Bob's first locution that the government will inevitably lower the tax rate ( $q$ ), Wilma's locution expressing a question or challenge, and Bob's second locution that lower taxes stimulate the economy ( $p$ ). The style of analysis is, for reasons discussed

elsewhere (Budzynska & Reed, 2011), based upon propositional reports of locution events (very briefly, this allows us to treat locution reports as just a special case of propositions, and in turn such locution reports can then themselves be the subject of locutions – this nesting allows a proper treatment of arguments involving direct and indirect reported speech such as arguments based on testimony, expert opinion, position to know, and so on). It is strikingly clear however, that somehow in the background of (Ex1) there is an argument<sub>1</sub> that, roughly,  $q$  is the case because  $p$  is the case. We might want to look at the example from an epistemic perspective and treat this argument  $p$  so  $q$  as something that is more or less spelled out in Bob's belief state. This sort of approach is quite common in distributed artificial intelligence where logics of mental states and beliefs are very popular. Alternatively, we may want to view the argument  $p$  so  $q$  from a more externally verifiable point of view, and talk instead about Bob's (and, incidentally Wilma's) commitments. Again, these commitments may be more or less explicit (to Bob) at the outset – Walton, for example, has talked about the maieutic function of dialogue that allows Bob's 'dark-side' commitments to be drawn out and become clear to all parties during a dialogue. Alternatively, and perhaps most commonly, we may try to extract the argument  $p$  so  $q$  from the dialogue – this is what students of critical thinking are often asked to do, to dispose of the dialogical cut and thrust and cut to the quick of the embedded argument<sub>1</sub>.

But there is yet a fourth perspective. If we imagine ourselves as a diligent, impartial audience to this dialogue, but an audience that has no prior understanding or belief of anything in the domain at all, then we could treat (Ex1) as generating an argument for us – specifically, an argument<sub>1</sub> that  $p$  so  $q$ . We might make a record and take it down in a big notebook of arguments. The next time we encounter an argument<sub>2</sub> – whether involving Bob or Wilma or neither – we would take it down too. Sooner or later, if we encountered enough argument dialogues, we might see someone else arguing that  $q$  – but possibly upon different grounds – Mary, say, claiming  $q$  because *Lower taxes would be a vote-winner*, proposition  $r$ . We might then want to cross reference, and keep a track of all the premises for particular conclusions – recording that both  $r$  and  $p$  provide grounds for  $q$  (even though no one arguer may ever have connected them together). By a similar token, we would also – pretty rapidly – start to encounter disagreement. Occasionally it might be explicit and a simple negation (say, someone else arguing that *The government will inevitably not lower the tax rate*), other times a little less obvious (say, *The government will never change the tax rate*). But we could record these various types of disagreement too. As our notebook grows in size we will also have to handle all the usual problems of deixis and reference in order to ensure we recognise identity between propositions. Gradually, though, we will start to build a complex web of arguments interconnected through a cacophony of points of view and conceptions. From this perspective, arguments<sub>2</sub> can be seen to create the structures of argument<sub>1</sub> captured in our web. They can also, of course, extend them – Mary's argument  $r$  so  $q$ , for example, adds in  $r$  to our web, connecting it to  $q$  which is already there.

When our web becomes sufficiently complex, we could finally also see arguments<sub>2</sub> as simply navigating extant argument<sub>1</sub> structures. If for example, we changed our own role from that of passive observer to active participant, we would have a formidable library of argument structures to bring to bear. If for example we found

ourselves in a debate with someone arguing that *The government will never change the tax rate*, we would be able, given our experience with Bob and Mary, to formulate two different reasons ( $p$  and  $r$ ) for the contrary position. We would not need to be inventive or creative. Just so long as we could recognise propositions offered by speakers in the debate we could look them up in our notebook and identify potential ways of responding. Of course actually deciding which way (of the potentially very many ways) to respond would require some sort of strategic reasoning and some sort of representation of what it is we want to achieve – but at least in principle we could see our debate, our argument<sub>2</sub>, as navigating an existing structure of arguments<sub>1</sub>.

Arguments<sub>2</sub> can in these ways be seen to create, extend and navigate structures of argument<sub>1</sub>, or conversely, arguments<sub>1</sub> can be seen to license, govern or constrain processes of argument<sub>2</sub>. The obvious question is: how?

## 2. EXPLICIT SPEECH ACTS

If someone utters the locution  $p$ , there is no way in general to know what speech act is being performed. In some cases, we might be reasonably confident, based on a rather complex and heuristic assessment of the verb phrase in  $p$ . Most obviously, assertions can sometimes be clear in this way: *it is sunny* would naturally be taken to be an assertive, for example. Clearly, almost any locution could fulfil the requirements of any speech act – this is the challenge tackled in trying to understand indirect speech acts – but even without going so far as to consider indirect speech acts, very simple locutions can simply be ambiguous when taken out of context. *I will come*, for example, could reasonably be taken to be either commissive or assertive without needing to develop an indirect interpretation. In order to assess, or analyse, or make a judgement of felicitousness of a speech act in general, we have to know more about its context.

With arguments, the situation is exacerbated, because the speech act of arguing is in some way epiphenomenal on the brute speech acts which are assertive and directive. To make this additional challenge clear, consider a naive attempt at making speech acts explicit. It would be possible to take Austin's 'hereby' test for speech-act-hood and to deploy it explicitly. If speakers said things like, *I hereby assert that  $p$*  for example, then we no longer need context and complex processing to figure out what is going on. Or at least, we don't need them for determining the simple speech acts referred to by the *hereby*. For during a discussion, it is perfectly possible for us to hear a speaker uttering *I hereby assert that  $p$*  (and to hear them doing so felicitously and appropriately), but for us still to be unsure whether an argument is being put forward or not. We would still need context in order to be able to analyse the speech act of argumentation. This follows directly from pragma-dialectical analysis which views the speech act of assertion (in this case) as occurring at the 'sentence' level, and the speech act of argument occurring at a 'higher textual level' (Houtlosser, 1994).

From pragma-dialectics, then, we have that the speech act *argue*( $p$ ) is performed in virtue of the performance of the speech act *assert*( $p$ ). The challenge that we have in the current work is that if we are to connect each record of a locution with one or more elements of the argument web in our notebook, then we can only record intrinsic features

of those locutions. But the performance of argument is not an intrinsic feature of the assertion of  $p$ , but rather an extrinsic feature, dependent upon the relationship that the utterance of  $p$  has to other utterances (and specifically, in our example, the uttering of *Why  $q$ ?*). An argument for  $q$  cannot be an intrinsic feature of the locution,  $p$ , or even the locution *I hereby assert that  $p$* . It would be an intrinsic feature of the locution *I hereby assert that  $p$  so  $q$* , but here our sloppiness in characterisation hides a hopelessly redundant analysis: we would have to maintain that the speaker's utterance of  $p$  is actually best analysed as the compound locutions of *I hereby assert that  $p$ , and that  $p$  so  $q$ , and that  $q$ , as a result* (i.e. four separate assertions). It does not seem reasonable to pack all of this into the hearer's utterance  $p$ , not least because we would undoubtedly want to analyse the speaker's utterance of  $p$  differently on a different occasion (that is, we are shifting the intrinsic/extrinsic problem from the illocution-argument<sub>1</sub> relation to the utterance-locution relation). Our goal, then is to develop an account of the speech action which reflects, on the one hand, the fact that the speech act of arguing, as Houtlosser (1994) et al. have argued, is being performed in some way implicitly, but which also captures the essential relational character of that speech act. In order to understand the structure of relations between the dialogical parts of arguments, we next introduce the idea of dialogue glue.

### 3. DIALOGUE GLUE

Philosophers of language Asher and Lascarides (2003) have described the logical connection between dialogical moves as 'dialogue glue,' and they provide a logical characterisation in an attempt to study implicature in dialogical settings (amongst other things). Here, we take the spirit of their idea that there must be connective material lying between utterances in dialogue (and that that material plays an important role in the meaning of discourse), but we develop a rather different characterisation which focuses specifically on those facets of dialogue that are particularly important in argumentative settings.

Let us revise our earlier example in (Ex2) in order to briefly explore the nature of this dialogue glue.

(Ex2)

(2.1) *Bob says, The government will inevitably lower the tax rate.*

(2.2) *Bob says, After all, lower taxes stimulate the economy*

(2.3) *Bob says, because they ease cash flow for small business.*

(2.4) *Bob says, And any way, lower taxes are a sure-fire vote winner*

For real glue to connect two items, it is necessary and sufficient that the two items are touching. (Ex2) shows why this is not the case for dialogue glue. We would certainly want our glue to adhere between (2.1) and (2.2) – the latter is acting as a premise for the former. Similarly for (2.2) and (2.3). Perhaps we might assume therefore that temporal

sequence is the major component of dialogue glue. The relationship between (2.3) and (2.4) demonstrates why this is not so: despite being consecutive, there is little or no connection between them. Temporal sequence is thus not sufficient as the sort of relationship that we want our glue to capture. Equally, the relationship between (2.1) and (2.4) is very much the sort of relationship we do want to capture, despite the fact that it is not only non-consecutive, but given that the intervening subargument could be arbitrarily large, the distance between (2.1) and (2.4) could be arbitrarily great. Thus temporal sequence is not even necessary. Instead, what we are interested in are the functional relationships between components in dialogue. There are three functional relationships between the utterances in (Ex2): between (2.2) and (2.1); between (2.3) and (2.2); and between (2.4) and (2.1). In each case, the relationship is the same: *supporting*. As one might expect, there are more relationships, however. In (Ex1), for example, the relationship between (1.2) and (1.3) is not one of support, but one of response, or, perhaps more perspicuously, *substantiating*<sup>1</sup>. Between (1.1) and (1.2) it is one of *challenging*. Once we see that there are a number of such relationships, we must ask where they come from, how many they are, and how they are specified, lest they multiply out of control with ever more ad hoc unprincipled additions to our bag of relationships.

In order to tackle this challenge, we need a structure which defines the set of ways in which utterances in a dialogue can be related, laying out which types of utterance can follow which others, and how making one sort of utterance can license or demand the making of another. These structures are precisely what are provided by dialogue games, particularly those in the style of Lorenzen (1987); Hamblin (1971); Rescher (1977); Mackenzie (1990) and Walton and Krabbe (1995). Such dialogue games, however, rarely (that is to say, as far as I know, never) specify exhaustively the functional relationships between moves explicitly. Rather, they use a far more compact and efficient representation which describes rules of dialogue (and specifically here we are interested in the structural and locution rules). It is straightforward to compute the set of relationships from those rules however: if a locution rule states that an assertion must be followed by a challenge or a concession, then we have two functional relationships: the assertion-challenge relationship and the assertion-concession relationship<sup>2</sup>. Both the process of computing such relationships, and the set that then results, are well known in computer science, where the ways in which a system (such as that described by a dialogue game) can change can be modelled using a particular class of representation depending on the underlying complexity. The least complex class of representation is suitable for many dialogue games, which is why the technique is frequently adopted in distributed AI systems. This is the class of Finite State Machines, which are comprised of a network of nodes – which represents states the system can be in – and connections between them – which represent transitions between states. A state, for example, is something like, 'everything asserted has been conceded' and a transition, something like, 'the asserted proposition is challenged.' To be consistent with the language of this computational heritage, we refer to the connections between components in a dialogue not as relationships but as *transitions*. The possible transitions in a given dialogue are

<sup>1</sup>It is a common but unfortunate feature that there is not really a good single term in English for 'responding to a challenge with a further support.' Terms such as *defend* or *parry*, are too overloaded (not to mention martial); whilst terms such as *response* and *reply* too general.

<sup>2</sup>For both of which we would need to invent some appropriate name, *vide supra*.

specified by the dialogue game that is being played. Thus we have that our dialogue glue – sets of transitions – is in fact already available to us in the specifications of various different dialogue games. Claiming that transitions specified (usually implicitly) in dialogue games can be used to model the functional relationships between utterances in dialogue is relatively uncontroversial. It is, rather, a slightly different way of construing a familiar idea. Slightly more controversial is the idea that these transitions play a more active role in the communicative process.

#### 4. IMPLICIT SPEECH ACTS

The idea of implicit or missing components in arguments is old and well established. Though something of a misnomer (as Walton and Reed (2005) point out), such enthymemes are ubiquitous. Rarely is an argument presented with its warrant or major premise stated explicitly – to do so is (almost always) unacceptably cumbersome rhetorically. Reconstructing implicit parts of arguments is a common – if challenging – task to be given to students of critical thinking. If one is dealing with argumentation in the wild, in natural settings, then it is an inescapable part of analysis.

How exactly the speaker introduces or sets up such implicit material is still very unclear. Van Eemeren and colleagues have explored how implicit speech acts are connected with argumentation, and with enthymemes in argument (Eemeren & Grootendorst, 1984: Ch.6); (Eemeren & Grootendorst, 1992: p54). Propositions introduced by the means that van Eemeren et al. advocate are not, however, the only components of argument that are left implicit. In most analyses of argument<sub>1</sub> (in particular), what is drawn out is the set of components and the connections between them. In many diagramming methods the connections are drawn as lines or arrows between boxes that encapsulate components (premises and conclusions and so on). This has one major limitation: as Pollock (1995) has argued quite convincingly, there are good reasons to distinguish attacks which *rebut* an argument (directly attacking components of the argument) from those which *undercut* an argument (attacking the application of inference in a given situation). The example he gives is that the inference 'This object looks red therefore it is red' is presumptively strong, but can be undercut by the fact that 'The object is illuminated by a red light'. Crucially, this attack makes no claim pro or contra with respect to the conclusion that the object is, in fact, red – it merely says that this inference is inapplicable. Such undercutters have been linked to the critical questions associated with a variety of presumptive argumentation schemes (Gordon et al., 2007).

In order to be able to clearly identify the target for undercutters, we need some sort of locus to capture the application of inference, or more precisely, to represent the application of a rule of inference. If we admit such rule applications into our analyses then it becomes clear that these too are often left implicit in natural dialogue. We can also adopt the same approach as was advocated by van Eemeren et al. in expecting them to be associated with implicit speech acts. More specifically, we can associate specific parts of the dialogue with those implicit speech acts and thereby the rule applications.

The challenge now is to determine which components of dialogue generate, or give rise to, or are responsible for, rule applications. Before we can do tackle the

challenge, however, a brief summary of the way in which other components of dialogue are connected to argument structures is required.

Connections between an explicit assertion in an argument<sub>2</sub> and the proposition in an argument<sub>1</sub> structure to which it refers are usually very easy to account for. As described in more detail in (Reed and Budzynska, 2010), the basic approach is to use speech act theory to give us the machinery to account for the connection from the propositional report of a dialogue event (such as *Bob says, The government will inevitably lower the tax rate*) and the proposition to which it refers (viz., *The government will inevitably lower the tax rate*). The type of the connection is the type of the speech act, or more specifically, the type of illocutionary force. The various types can be schematised in a way that is very similar to (and uses much of the same theoretical techniques as) argumentation schemes. In place of critical questions, for example, these 'illocutionary schemes' have constitutive conditions. In the same way that there are taxonomies of argumentation schemes from different authors (Perelman & Olbrechts-Tyteca, 1967; Walton, 1997; Walton et al., 2008; etc.) so too are there various taxonomies of illocutionary scheme (such as those proposed by Searle, 1969; Bach and Harnish, 1987; Searle and Vanderveken, 1989; etc.). Thus, (the propositional report of the utterance in) (1.1) is connected to its propositional content by an application of the *asserting* illocutionary scheme, and the (propositional report of the utterance in) (1.2) is connected to the same propositional content by an application of the *challenging* illocutionary scheme<sup>3</sup>.

So if the relationship between argument<sub>1</sub> and argument<sub>2</sub> is captured by the connection between components of dialogue on the one hand, and components of argument structure on the other, mediated by illocutionary schemes, then we can refine our search for the dialogical origins of rule applications: we need to identify both a component of the dialogue and also an appropriate (class of) illocutionary scheme. The intuition is straightforward. In (Ex1), it is precisely in virtue of the fact that (1.3) is substantiating (1.2) (that is, the transition between (1.2) and (1.3) is of type *substantiating*, as described in the previous section) that an argument is being offered. That is, the inferential link between *p* and *q* is generated not by the utterance in (1.3), but by the relationship that holds between the question at (1.2) and its reply at (1.3). Responding with an assertion to this sort of challenge is precisely where the act of arguing (for something) lies. The illocutionary scheme that is employed is, naturally, *arguing*. And the speech act locution that conveys the illocution is, often, implicit.

At first glance, it is perhaps a little surprising that the rule application connecting *p* and *q* might not supervene on a dialogical relation (that is, a transition) between the utterance of *p* and the utterance of *q*<sup>4</sup>. The surprise arises from overlooking that utterance is of course not the same as assertion. The propositional content of the challenge move at (1.2) is, indeed, *p*, so the transition between (1.2) and (1.3) is indeed connecting utterances referring to *p* and to *q*, as we would expect.

<sup>3</sup>The *challenging* illocutionary scheme is a special type of a directive.

<sup>4</sup>It could do in some contexts, but even this trivially simple example demonstrates that it need not.

There is an interesting complication in treating transitions as being associated with implicit speech acts which arises from the fact that transitions are not strictly propositional reports of dialogue steps. Rather, the signature of transitions is one of connecting propositional reports of dialogue locutions. That is, transition applications are relations between (locutional) propositions. This is by direct analogy to rule applications. Here too, rule applications are relations between (general) propositions – they are not propositions in themselves. The relations they capture are, roughly, entailment<sup>5</sup> relations. With both rules and transitions, it is possible to propositionalise – after all, one can say things like, *we infer p from q*. In the same way, one could say, *p substantiates the challenge of q*. But in both cases, these propositions have to be calculated from the basic entailment or transitional structure (for further details of calculated properties, see (Reed, 2010)). The reason that this presents a complication is that if transition applications are treated as corresponding to implicit speech acts, then they are non-propositional (but rather relational) and their contents are non-propositional (but relational).

Finally, it is worth pointing out that not all implicit speech acts associated with transitions are completely mute. In this regard, (1.3) is particularly interesting. From a purist grammatical point of view, *\*Because lower taxes stimulate the economy* is ill formed: the 'because' indicator introduces a relative clause, and does not produce a grammatical sentence. Yet in the context of the dialogue (Ex1) this criticism is rather weak. (1.3) seems perfectly well formed. We might want to consider (1.3) elliptical; an abbreviated form of *The government will inevitably lower the tax rate because lower taxes stimulate the economy*. Yet, in the context, if (1.3) were spelled out like this it would, rhetorically, be laughably redundant. For, a challenge like that at (1.2) acts to license, or even to demand, a response which could start with 'because' – in other words, it is the move from the challenge to its substantiation which is associated with the discourse cue *because*. That is not to say that the *because* is not signalling a relationship between *p* and *q* – clearly it is; but the speech act which is generating this surface form is associated with the transition between the *Why* move at (1.2) and its (substantiating) response at (1.3). As shown above, this transition is illocutionarily connected to the rule application that connects *p* and *q* so the surface linguistic form in the dialogue move is appropriately associated with the entailment relationship in the argument<sub>1</sub> structure.

An analysis of more discourse cues and their relation to dialogue transitions (along the lines of the exemplary work of Knott (1996)) is very interesting, but far beyond the scope of the current research (for a connection between discourse cues and argumentation structure, see (Snoeck Henkemans et al. 2007)). It suffices now to note that the speech acts associated with transitions are not always completely implicit, and offers an exciting avenue to connecting discourse cues with the generation or navigation of argument<sub>1</sub> structure. What remains unclear, however, is the types of transitions that are available and the way in which it is possible to specify how generic transitional forms instantiated in argument<sub>2</sub> structures govern the creation and navigation of argument<sub>1</sub> structures. It is to this problem that we turn next.

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<sup>5</sup>Here, the use of the term 'entailment' is appealing to the strictly logical, proof-theoretic notion, rather than the much broader notion of textual entailment.



## 5. GOVERNANCE

A given instance of *substantiating*, such as that between (1.2) and (1.3) in (Ex1) meets the requirements and constraints, and fulfils the general form of, substantiating. But what does this general form look like? Clearly, given what we have encountered so far, substantiating forms a link between a challenge and its substantive response, in other words, a connection between two specific locution types. But there are three further, connected, aspects of the form.

The first is parameterisation – that is, the identification of the appropriate variables. We can emphasise this by analogy to rule forms. The relationship between rule forms and rule applications is exactly the same as the relationship between transition forms and transition applications, viz., an application is an instance of a form such that that instance is governed by, or fulfils the constraints of the form. Rule forms are described in, e.g. (Walton, 1997) in an intuitively parameterised style, and we can adopt a similar approach for transition forms. A first draft is presented in (T1').

(T1') Transition by substantiation

*(Input Proposition)* Proponent (opponent) poses the challenge *Why A?*

*(Output Proposition)* Opponent (proponent) asserts *B*.

But (T1') is inadequate, because it omits three key illocutionary components: the illocution of the first proposition, the illocution of the second, and the illocution of the transition itself. We might provide a revised version thus:

(T1'') Transition by substantiation (second version)

*(Input Proposition)* Proponent (opponent) utters *Why A?*

*(Illocution 1)* The Input Proposition constitutes challenging *A*

*(Output Proposition)* Opponent (proponent) utters *B*

*(Illocution 2)* The Output Proposition constitutes asserting *B*

*(Illocution 3)* This Transition constitutes arguing that *A* because of *B*

This second version is still not quite complete, however, as it omits a useful function of schematised inference in general, namely, the capturing of implicit material and outlining the ways to judge quality through critical questions. The following version of the scheme gives an example of how such extensions would be included:

(T1) Transition by substantiation (final version)

*(Input Proposition)* Proponent (opponent) utters *Why A?*

*(Constraint 1)* Proponent (opponent) has not previously uttered the Input Proposition

*(Illocution 1)* The Input Proposition constitutes challenging  $A$

*(Output Proposition)* Opponent (proponent) utters  $B$

*(Illocution 2)* The Output Proposition constitutes asserting  $B$

*(Illocution 3)* This transition constitutes arguing that  $A$  because of  $B$

*(CQ 1)* Is it the proponent's (opponent's) turn to speak at the Input Proposition?

...

There are many things that might be captured by critical question and implicit parts, but it is important that they should only capture those aspects that are intrinsic to the dialogue protocol itself. In particular, they should not capture features intrinsic to the inference between  $A$  and  $B$  (which are handled by the rule application between them) nor should they capture features intrinsic to the speech acts (which are handled by the illocutionary scheme applications).

T1 is clearly a very general scheme. In much the same way that argumentation schemes can be arranged in hierarchies of more and less specific mechanisms of presumptive inference, so too transitions can be more or less specific. One way of increasing specificity is to be constrain the way in which  $A$  relates to  $B$  – that is, it is possible to construct specific transition schemes which correspond to specific rule of inference schemes.

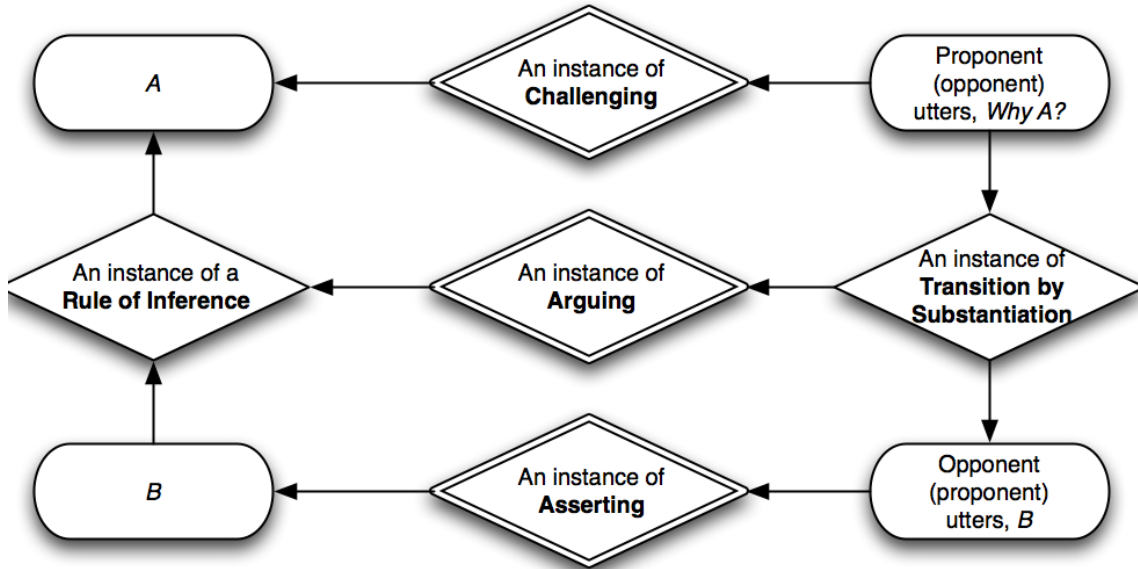
The transition scheme form (T1) is now sufficiently developed that it can be used – but it is still not clear how it should be put to use. One possibility is to develop a formal, syntactic account (such as is popular in Artificial Intelligence), but here, for purposes of clarity and brevity, we instead show how the scheme can be employed using an informal diagrammatic explanation. In order to explicate the latent diagrammatic structure in (T1), it is first helpful to recast the first two illocutionary components of the scheme. Where in (T1), the illocutions refer to the constitutive relation between the utterance and its illocutionary force, we might instead cast them as graphical constraints, in which the application of illocutionary force is reified and serves to connect components of argument<sub>2</sub> with components of argument<sub>1</sub>:

*(Illocution 1)* Proposition 1 is connected to a proposition,  $A$ , through the illocutionary force of challenging

*(Illocution 2)* Proposition 2 is connected to a proposition,  $B$ , through the illocutionary force of asserting

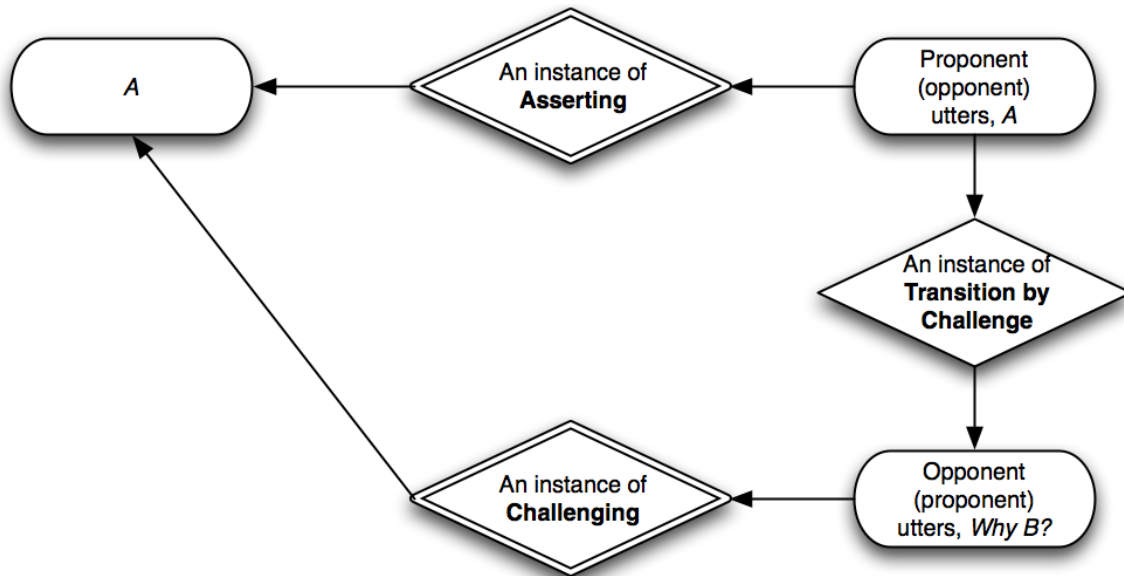
(*Illocution 3*) This transition is connected to a rule application from *B* to *A*, through the illocutionary force of arguing

We can thus view (T1) as a graphical template, as in Figure 1:



**Figure 1.** The diagrammatic template for *Transition by substantiation*

The template in Figure 1 can then be overlaid **onto** existing graphical structures corresponding to existing arguments (arguments<sub>1</sub> and arguments<sub>2</sub>). So, for example, if at the point that this transition is enacted, our notebook of arguments already includes proposition *A*, then our template is overlaid so that the item in the top left of Figure 1 is anchored to proposition *A* in our notebook. All of the new material dictated by the template (that is, by the form of transition by substantiation) is then connected to it. Similarly, it may be that a larger part of the template already exists. A good example might be to consider *Transition by challenge*, summarised diagrammatically in Figure 2:



**Figure 2.** The diagrammatic template for *Transition by challenge*

Transition by challenge is a rather simpler scheme, and has no implicit speech act associated with it. But what is important is that the bottom-most three components in Figure 1 can correspond to the topmost three in Figure 2. So a dialogue in which a challenge is responded to, and then that response is itself challenged can be seen as the application of the first template followed by the overlaying of the second template. In this way, the process of a (legal) dialogue can be seen as the overlaying of one transition scheme after another, each template adding in a little more of the detail of the unfolding argument<sub>1</sub> and argument<sub>2</sub> structures. Equally, to see it from the opposite perspective, a dialogue game specification – or at least, the protocol component made up of locution and structural rules – corresponds to a set of transition schemes.

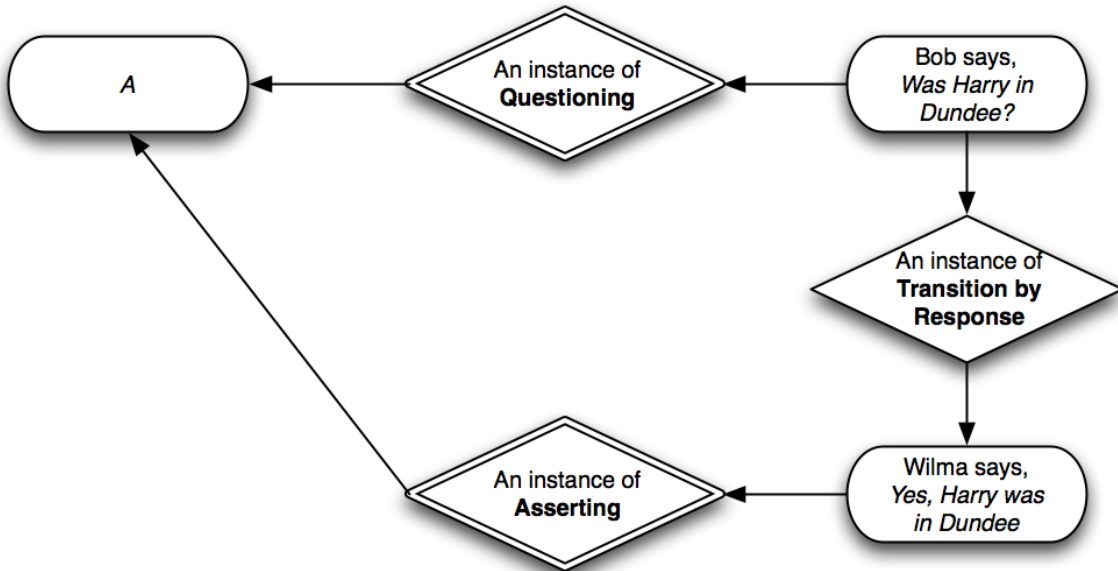
Different dialogue games thus have different sets of transitions. This variety gives rise to an important and surprising phenomenon. Two consecutive utterances in one dialogue game may enact a different transition in that dialogue game than they would in another dialogue game – even if those two utterances fulfil the constitutive conditions of the same speech acts. An example will serve to clarify. The example turns upon the fact that under normal conditions, making an assertion does not, by itself, constitute argumentation. In (Ex3), for example, there is no argument being provided, merely a speech act of assertion in response to a question:

(Ex3)

(3.1) Bob: Was Harry in Dundee?

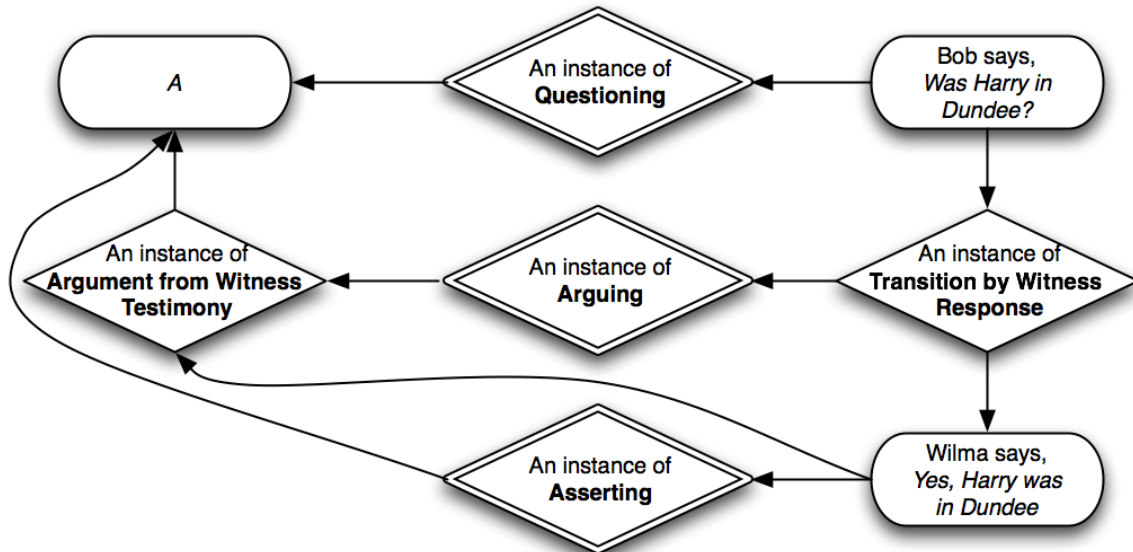
(3.2) Wilma: Yes, Harry was in Dundee

Figure 3 shows how we might analyse (Ex3) according to some loose, informal dialogue game that Bob and Wilma might be playing whilst chatting in a bar:



**Figure 3.** An analysis of (Ex3) as a chat in a bar

Figure 3 analyses Bob's utterance as a question, and then, via the transition of responding, Wilma's assertion in response. There is no inferential structure invoked by virtue of this transition. Compare this, however, with exactly the same dialogue in a different context: this time, Bob and Wilma are not friends, but prosecutor and witness for the prosecution. Here, the context delivers to us that a prosecutor is aiming to elicit arguments based on witness testimony in support of his own claims. Often his own claims are left implicit – specifically, they are left implicit in the words of the witnesses examined. An analysis for this context is shown in Figure 4.



**Figure 4.** An analysis of (Ex3) as an exchange between prosecutor and witness for the prosecution

Figure 4 is interesting because it shows the way in which the underlying theory allows propositions to play a role either in argument<sub>2</sub> structure or in argument<sub>1</sub> structure (or both simultaneously). But this duality is peripheral to the point that is made by Figure 4, namely, that precisely in virtue of the fact that the transition from Bob's utterance to Wilma's utterance is one of friendly-witness response, we can induce the argumentative structure that is being created by the prosecutor. That is, it is as a result of (Ex3) being played out in a courtroom rather than in a bar that we can see that argumentation is being offered.

The conclusion of these analyses is that we cannot simply look at the surface form of a dialogue in order to be able to determine whether or not an inference is being invoked. Instead we must also look at the dialogical context: it is the type of game that is being played that determines the transitions that are enacted, and thereby the templates of propositions and illocutionary and inferential connections between them.

## 6. CONCLUSION

The great notebook of arguments used to motivate the relationships between arguments<sub>1</sub> and arguments<sub>2</sub> in Section 1 is not just a useful thought experiment. Building, in software, the infrastructure for exactly that is the goal of a major new initiative in Artificial Intelligence: the construction of the Argument Web (Rahwan et al., 2007). Around that infrastructure are many different software applications that support authoring of arguments, analysis of arguments, dialogue execution, argument search and so on. In order for the Argument Web to become a reality, we need a balance between rigorous theory development and practical pragmatism in engineering. This paper has shown how existing research in the area of dialectics and dialogue games can be used to govern the ways in which illocutionary connections between dialogue moves and argument<sub>1</sub> structures can be created, and thereby, how inferences in argument<sub>1</sub> structures can be established.

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