Building arguments with argumentation: The role of illocutionary force in computational models of argument

Chris Reed
Simon Wells
Katarzyna Budzyńska
Joseph Devereux
arg.dundee.ac.uk
D. O’Keefe.  
Two concepts of argument.  

- argument₁ refers to an argument as a static object and is described by sentences such as “He prepared an argument”

- argument₂ refers to a dialogue or discussion and is described by sentences such as “they had an argument”
The Problem

How do we understand the connection between linguistic activity in dialogues (arguments$_2$) and the inferential structures (arguments$_1$) that are created, manipulated, updated and navigated by it?
Bob: We should lower taxes.

Wilma: Really! Why so?

Bob: Well, because lowering taxes will make people happy.
We should lower taxes

argument_1

Lowering taxes will make people happy

We should lower taxes

argument_2

Bob says, 'Lowering taxes will make people happy'

Wilma says, 'Why so?'

Bob says, 'We should lower taxes'
Lowering taxes will make people happy

We should lower taxes

Bob says, 'We should lower taxes'

Bob says, 'Lowering taxes will make people happy'

Wilma says, 'Why so?'

argumen\textsubscript{1}

argumen\textsubscript{2}
<table>
<thead>
<tr>
<th></th>
<th>Background</th>
<th>Types of Units</th>
<th>Main Relations</th>
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</thead>
</table>
| Argument\(_1\)   | logic      | propositions describing the world (in particular locutions) | - deductive rules  
|                  |            |                                                    | e.g. Modus Ponens  
|                  |            |                                                    | - argumentation schemes  
|                  |            |                                                    | e.g. appeal to witness testimony  
|                  |            |                                                    | - conflict schemes  
|                  |            |                                                    | e.g. logical contradiction  
| Argument\(_2\)   | dialectics | propositions describing locutions                  | - dialogue rules  
|                  |            |                                                    | e.g. protocols for PPD\(_0\)  
| Interaction      | pragmatics | elements of arg\(_1\) and arg\(_2\)                | - illocutionary schemes |
| between arg\(_1\) |            |                                                    |                                                     |
| and arg\(_2\)    |            |                                                    |                                                     |
upper ontology node
upper ontology

node

I-node

S-node
upper ontology

- node
  - I-node
  - S-node
    - RA-node
    - CA-node
upper ontology

node

I-node

S-node

RA-node

CA-node

forms ontology

form

scheme

inference scheme

conflict scheme

witness testimony
upper ontology

node

I-node  S-node

RA-node  CA-node

forms ontology

form

scheme

inference scheme

conflict scheme

witness testimony

Witness W asserts P

premise

conclusion

presumption

exception
Bob testifies that Harry was in Dundee

Witness Testimony #420

Harry was in Dundee

Witness W asserts P

Witness W testimony
Bob testifies that Harry was in Dundee

Witness Testimony #420

Harry was in Dundee

Witness W asserts P

CA-node

upper ontology

node

I-node

S-node

RA-node

CA-node

object layer

forms ontology

form node

scheme

inference scheme

conflict scheme

witness testimony

Witness W asserts P

premise

conclusion

presumption

exception
Bob testifies that Harry was in Dundee.
upper ontology

node

L-node

S-node

RA-node

CA-node

forms ontology

form node

scheme

inference scheme

witness testimony

Witness W asserts P

conflict scheme

premise

premise

conclusion

presumption

exception
upper ontology

node

I-node

S-node

RA-node

CA-node

L-node

TA-node

forms ontology

form node

scheme

premise

conclusion

presumption

exception

inference scheme

conflict scheme

witness testimony

Witness W asserts P
upper ontology

node

I-node

S-node

RA-node

CA-node

YA-node

L-node

TA-node

forms ontology

form node

scheme

inference scheme

conflict scheme

witness testimony

Witness W asserts P

premise

conclusion

presumption

exception
$I_2$: Lowering taxes will make people happy

Positive Consequences

$RA_1$

$I_1$: We should lower taxes
$I_2$: Lowering taxes will make people happy

Positive Consequences $\text{RA}_1$

$I_1$: We should lower taxes

$L_1$: Bob says, 'We should lower taxes'
$I_1$: We should lower taxes

$I_2$: Lowering taxes will make people happy

$L_1$: Bob says, 'We should lower taxes'

$L_2$: Wilma says, 'Why so?'
$I_1$: We should lower taxes

$I_2$: Lowering taxes will make people happy

$L_1$: Bob says, 'We should lower taxes'

$L_2$: Wilma says, 'Why so?'

$L_3$: Bob says, 'Lowering taxes will make people happy'
I_1: We should lower taxes

I_2: Lowering taxes will make people happy

L_1: Bob says, 'We should lower taxes'

L_2: Wilma says, 'Why so?'

L_3: Bob says, 'Lowering taxes will make people happy'

Why?
I_1: We should lower taxes

Positive Consequences $\text{RA}_1$

I_2: Lowering taxes will make people happy

L_1: Bob says, 'We should lower taxes'

L_2: Wilma says, 'Why so?'

L_3: Bob says, 'Lowering taxes will make people happy'
I₂: Lowering taxes will make people happy

L₃: Bob says, 'Lowering taxes will make people happy'

L₂: Wilma says, 'Why so?'

L₁: Bob says, 'We should lower taxes'

I₁: We should lower taxes

Positive Consequences RA₁
I₁: We should lower taxes

Positive Consequences RA₁

I₂: Lowering taxes will make people happy

Because

L₁: Bob says, 'We should lower taxes'

L₂: Wilma says, 'Why so?'

L₃: Bob says, 'Lowering taxes will make people happy'
\( I_1 : \text{We should lower taxes} \)

Positive Consequences \( RA_1 \)

\( I_2 : \text{Lowering taxes will make people happy} \)

\( L_1 : \text{Bob says, 'We should lower taxes'} \)

\( L_2 : \text{Wilma says, 'Why so?'} \)

\( L_3 : \text{Bob says, 'Lowering taxes will make people happy'} \)

Response \( TA_2 \)

Challenge \( TA_1 \)
A two-minute introduction to Speech Act Theory

J. L. Austin, *How to Do Things with Words*,


J. Searle and D. Vanderveken, *Foundations of Illocutionary Logic*,

• A speech act $F(A)$:
  - an illocutionary force $F$ - expresses a communicative intention
  - a propositional content $A$.

• For example:
  *claim*(A), *why*(A), *warn*(A), *promise*(A), *argue*(A), etc.
  John may utter $A$ with a force of asserting, asking, warning, promising, arguing, etc.
A two-minute introduction to Speech Act Theory


(1) **assertives**: S's belief
   e.g. claiming, conceding, testifying, deducing, arguing, denying, criticizing, rebutting.

(2) **directives**: attitude about a possible future H's act
   e.g. asking, commending, requesting, advising.

(3) **commissives**: S's intention to do something
   e.g. promising, threatening, offering.

(4) **acknowledgments**: feelings toward H
   e.g. apologizing, congratulating, thanking.
A two-minute introduction to Speech Act Theory


The constitutive rules - determine what constitutes a successful speech act

1) *propositional content rules:*
   some illocutions can only be achieved with an appropriate propositional content,
   e.g. a promise may refer only to what is in the future and under the control of a speaker,

2) *preparatory rules:*
   determine what a speaker presupposes in performing a speech act,
   e.g. a speaker cannot marry a couple unless he is legally authorized to do so,

3) *sincerity rules:*
   tell what psychological state is expressed
   e.g. an assertion expresses belief, a promise expresses an intention to do something
   a speech act is sincere only if a speaker is actually in this state,

4) *essential rules:*
   determine what a speech act consists in essentially,
   e.g. a promise commits a speaker to perform an act expressed in a propositional content.
A two-minute introduction to Speech Act Theory

A speech act can be felicitous or infelicitous depending on whether or not it successfully performs a given action.

The promise “I met you yesterday” is infelicitous - it does not fulfill the propositional content condition: the propositional content does not refer to a future action.
I₁: We should lower taxes

Positive Consequences RA₁

I₂: Lowering taxes will make people happy

L₁: Bob says, 'We should lower taxes'

L₂: Wilma says, 'Why so?'

Response TA₂

L₃: Bob says, 'Lowering taxes will make people happy'

Challenge TA₁

L₁: Bob says, 'We should lower taxes'
I₂: Lowering taxes will make people happy

I₁: We should lower taxes

Positive Consequences RA₁

L₃: Bob says, 'Lowering taxes will make people happy'

L₂: Wilma says, 'Why so?'

Challenge TA₂

Responsive TA₂

asserting YA₄

L₁: Bob says, 'We should lower taxes'
I₂: Lowering taxes will make people happy

L₃: Bob says, 'Lowering taxes will make people happy'

L₂: Wilma says, 'Why so?'

L₁: Bob says, 'We should lower taxes'

I₁: We should lower taxes

Positive Consequences RA₁

asserting YA₄

questioning YA₂

asserting YA₁

Response TA₂

Challenge TA₁

object layer
I₂: Lowering taxes will make people happy

I₁: We should lower taxes

Positive Consequences RA₁

asserting YA₄

L₃: Bob says, 'Lowering taxes will make people happy'

Response TA₂

arguing YA₃

L₂: Wilma says, 'Why so?'

Challenge TA₁

questioning YA₂

asserting YA₁

L₁: Bob says, 'We should lower taxes'
S asserts p to H

p

S is authorized to perform the assertion of p
S says u to H
u counts as an undertaking to the effect that p represents an actual state of affairs
S has evidence for the truth of p
It is not obvious to both S and H that H knows p
S believes p
S says u to H

u counts as an undertaking to the effect that p represents an actual state of affairs

S has evidence for the truth of p

It is not obvious to both S and H that H knows p

S believes p

L₁: Bob says, 'We should lower taxes'

I₁: We should lower taxes

asserting Y₁₁
S says u to H

u counts as an undertaking to the effect that p represents an actual state of affairs

p

S has evidence for the truth of p

It is not obvious to both S and H that H knows p

S believes p

L₁: Bob says, 'We should lower taxes'

'We should lower taxes' counts as an undertaking to the effect that we should, in fact, lower taxes

I₁: We should lower taxes

Bob has evidence that 'We should lower taxes' is true

It is not obvious to both Bob and Wilma that Wilma knows that we should lower taxes

Bob believes that we should lower taxes
Conclusions

A linguistically grounded conceptualisation of the connection between a dialogue and its domain of discourse

Illocutionary relations can be schematised in a way that is similar to inferential and dialogical relations
- implicit propositions made available
- general forms represented and then specific examples instantiated

With the link between arguments$_1$ and arguments$_2$ in place
- we can automatically generate arguments$_1$ from dialogues
- we can automatically produce novel, naturalistic dialogues from argument$_1$ structures