

# Argument as Narrative

*a position paper*

Computational Models of Narrative Workshop  
at LREC 2012

Istanbul, Turkey  
May 27, 2012

Adam Wyner, University of Liverpool

# Outline

- What – arguments are ubiquitous.
- Why – move to identify and extract not just entities, events, opinions, but *arguments*. Useful for reasoning.
- Problem – what is a well-formed argument?
- How – *narrative coherence* using argument recognition task, text analysis, other narrative components.
- Elements
- Further

# Arguments are Ubiquitous

- People argue in courts, newspaper editorials, political debates, making plans, making consumer choices, scientific research....
- Arguments are complex:
  - State a position (conclusion).
  - Justify the position (premises and exceptions).
  - State why the other person's position or justifications are wrong (rebuttal, premise-attack, rule attack).

# Arguments in Science

## Orthographic Processing in Baboons (*Papio papio*)

Jonathan Grainger,\* Stéphane Dufau, Marie Montant, Johannes C. Ziegler, Joël Fagot

Skilled readers use information about which letters are where in a word (orthographic information) in order to access the sounds and meanings of printed words. We asked whether efficient processing of orthographic information could be achieved in the absence of prior language knowledge. To do so, we trained baboons to discriminate English words from nonsense combinations of letters that resembled real words. The results revealed that the baboons were using orthographic information in order to efficiently discriminate words from letter strings that were not words. Our results demonstrate that basic orthographic processing skills can be acquired in the absence of preexisting linguistic representations.

**R**eading is a complex process that starts with the extraction of detailed visual information, which is used to access the sounds (phonology) and the meanings (semantics) of words. Before they process the pho-

nological and semantic information, readers of languages that use an alphabetic script must first process the elementary visual features of the word's constituent letters and assign these different letter identities to specific positions in the

word. The computation of letter identities and their relative positions is referred to as orthographic processing, and there is a large consensus today that such processing represents the first "language-specific" stage of the reading process that follows the operations involved in the control of eye movements (bringing words into the focus of central vision) and early visual processing (enabling visual feature extraction; Fig. 1A) (1–4). In the present study, we examined whether the ability to efficiently process orthographic information can operate in the absence of prior linguistic knowledge.

Orthographic processing lies at the interface between the visual processing and the linguistic processing involved in written language

CNRS and Aix-Marseille University Laboratoire de Psychologie Cognitive, Fédération de Recherche 3C, Brain and Language Research Institute, Aix-Marseille University and CNRS, 3 Place Victor Hugo, 13331 Marseille, France.

\*To whom correspondence should be addressed. E-mail: jonathan.grainger@univ-amu.fr

# Arguments in Politics

## ***When should the referendum be held?***

**70%** of respondents agreed with the UK Government that the referendum should take place sooner rather than later, including a large number of businesses based in Scotland:

As a reasonably large employer in Scotland, I feel that the referendum should take place as soon as possible. - **A Boyd Tunnock of Tunnock's**

In a survey of our members, only 22% favoured Autumn 2014 and 72% expressed a preference for an earlier date. Those who commented emphasised the uncertainty and harm to investment that they believe a delay would bring - **Scottish Engineering**

Our sector is a global sector, in its ownership, in its supply chain, its customers, its employees and it is difficult to see how the current environment adds to stability nor how it provides any certainty, consequently companies have a clear preference for the referendum being held as soon as is practical. - **ADS Scotland** (trade organisation advancing the UK Aerospace, Defence, Security and Space industries)

I am not clear as to why the referendum needs to be delayed until 2014. The terms of the debate are already clear and I am not sure what is expected to change in the next two years. - **email from a member of the public**

There is no doubt that the on-going debate about devolution and independence is having a destabilising effect on future planning and the uncertainty is affecting decisions about investment into Scottish projects. As a result, the MSA would support the holding of a definitive referendum as soon as possible. - **Motorsports Association**

# Arguments about What to Buy

★★★★★ **Stunning camera**, 27 Aug 2011

By [A. Reader](#)

**This review is from:** Canon PowerShot SX220 HS Digital Camera - Grey (12.1MP, 14x Optical Zoom) 3.0 Inch LCD (Electronics)

I adore this camera. Why? Because I get a higher percentage of good shots out of it than from any other camera I have, and that includes a few DSLRs, and the video is ridiculously good. Is the image quality as good as a DSLR or even a micro 4/3 system camera? No, but it's not far off, and a shot that's perfectly exposed and focused and free of camera shake on a smaller sensor like this beats not getting a picture at all by a long way. The SX220HS is my constant companion and lives in a pouch on my belt.

I've spent 30 years in photography, since buying my first Russian Zenit E around 1979, including being a semi-pro at one point. I know all about aperture/shutter speed/ISO ratios, exposure values, incident light metering, parallax error, Hurter & Driffield scales, flash guide numbers, the difference between depth of field and depth of focus, Ansel Adams's zone system, blah blah blah. When I'm taking a photo, I don't want to think about any of that stuff, I want to be enchanted by a scene and have a decent reproduction of it when I get home. With this camera, I get that. When I pull it out, I know I'm almost certain to get the picture I want. Canon have done an amazing job with it.

The video is astounding. When I upload it, I view it on a large screen, not a little laptop, so any flaws would be immediately apparent. I uploaded a few to Youtube for a friend to see, and she emailed me back, 'They are so clear!'

# Deatabase

## THIS HOUSE WOULD BAN GAMBLING

Gambling is the betting of money on an outcome that is wholly or largely random. It includes things like bingo, roulette, raffles, lotteries, scratch-cards and slot machines. Some definitions of gambling would not include activities like betting on horse racing – as this arguably involves a large element of knowledge and skill to predict what is likely to happen. Card games are a grey area. Some card games, such as poker, have a considerable element of skill. It is therefore arguable that they should not be considered gambling. Other card

[Read more](#)

### POINTS FOR

### POINTS AGAINST

#### Gambling is addictive and psychologically harmful

#### Gambling leads to the disintegration of families

#### POINT

Gambling can have a devastating effect on families. The most obvious effect is financial as one partner uses all their money on gambling the other needs to support the whole family or the gambler may even gamble away joint savings. Psychologically there is a relationship between gambling and various psychiatric and alcohol disorders. This is also an impact on friends, who do not want to be tied into supporting gambling financially or

#### COUNTERPOINT

Treatment programs can address the problems of those who are addicted, and many casinos offer "Self-Exclusion Programs", where individuals can effectively "ban" themselves from casinos. This could be the initiative of either the gambler or their family or friends.

[discuss this](#)

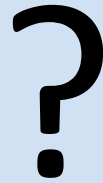
[improve this](#)

# Prescriptive, Normative Specification of Argument

- An argument is a classical, logic syllogism:
  - Every man is mortal, Socrates is a man, so therefore, Socrates is mortal.
- An argument is an Argumentation Scheme:
  - Professor Hayes is an expert in Astrophysics; and Professor Hayes states that the Andromeda galaxy is 2.7 million light-years from our galaxy; and that Andromeda galaxy is 2.7 million light-years from our galaxy is an astrophysical statement; so therefore, Andromeda galaxy is 2.7 million light-years from our galaxy.



# Empirically-based Specification of Argument



- What is the relation between the premises and the conclusion?
- What are the relations between the premises?
- *What are the underlying well-formedness conditions on arguments?*

# How to Identify and Extract Arguments?

- From a mass of available textual data, we want to:
  1. Identify arguments and their components from non-arguments (classification).
  2. Extract them (using rule-based or statistical approaches).
  3. Reconstruct them for formal evaluation and reasoning.
- 1 and 2 are difficult problems; there has been substantial work on 3 (formal logic and defeasible reasoning).
- 1 feeds 2, so 1 is primary.

# Proposal – Big Picture

- *Arguments as 'persuasive', 'motivating', or 'conflict' narratives.*
- Apply analytic frameworks and tools from *narrative coherence* to begin to address 1.
- Use argument v. non-argument classification tasks (psycholinguistic tests) to identify cognitively relevant elements.
- Decompose the large, complex problem into smaller, manageable subproblems. Engineer text analytic solutions.

# Argument v. Non-argument Recognition "canned"

- Professor Hayes is an expert in Astrophysics; and Professor Hayes states that the Andromeda galaxy is 2.7 million light-years from our galaxy; and that Andromeda galaxy is 2.7 million light-years from our galaxy is an astrophysical statement; so therefore, Andromeda galaxy is 2.7 million light-years from our galaxy.

# Argument v. Non-argument Recognition "canned"

- Six teenagers were arrested after a crime spree; and it's traditional to have a Thanksgiving meal with a family; so, therefore, earthquakes can be expected in San Francisco.
- Britain's Engelbert Humperdinck will open the proceedings as 26 countries compete in the final of this year's Eurovision Song Contest in Baku later. The 76-year-old will be the first to perform in Azerbaijan's Crystal Hall, with his ballad Love Will Set You Free. Sweden's Euphoria - a club hit by singer Loreen that has already topped the charts in four countries - is among the frontrunners for the prize. A combination of points from televoting and national juries decides the winner.

# Missing Elements Recognition

- Professor Hayes [redacted] Astrophysics; and Professor Hayes [redacted] Andromeda galaxy is 2.7 million light-years from our galaxy; and that Andromeda galaxy is 2.7 million light-years from our galaxy is an astrophysical statement; so therefore, Andromeda galaxy is 2.7 million light-years from our galaxy.
- Professor Hayes is an expert [redacted]; and Professor Hayes states that the Andromeda galaxy is 2.7 million light-years from our galaxy; and that Andromeda galaxy is 2.7 million light-years from our galaxy is a [redacted] statement; so therefore, Andromeda galaxy is 2.7 million light-years from our galaxy.

# Missing Elements Recognition













- Professor Hayes is an expert in Astrophysics; [redacted] Professor Hayes states that the Andromeda galaxy is 2.7 million light-years from our galaxy; [redacted] that Andromeda galaxy is 2.7 million light-years from our galaxy is an astrophysical statement; [redacted] Andromeda galaxy is 2.7 million light-years from our galaxy.
- Professor Hayes is an expert in Astrophysics; and Professor Hayes states that the Andromeda galaxy is 2.7 million light-years from our galaxy; and that Andromeda galaxy is 2.7 million light-years from our galaxy is an astrophysical statement [redacted].

# Points to Investigate

- Is there a 'characteristic' temporal or aspectual structure in comparison with other textual types? (HeidelTime)
- Is there narrowly prescribed 'domain' knowledge? What entities, properties, and relations appear in an argument? (NER, Event extraction, Ontology construction)
- What roles do rhetorical relations play? E.g. *therefore, since, because, ....* Explicit/implicit. (RST)
- Are there specific 'semantic roles' that participants have?
- How do pronominal anaphora and ellipsis support argument coherence? (DRT)
- Sentence entailment and contradiction (TREC).



# Preliminary Investigations with GATE

 Document Reset PR	Document Reset PR
 ANNIE English Tokeniser	ANNIE English Tokeniser
 ANNIE Sentence Splitter	ANNIE Sentence Splitter
 ANNIE POS Tagger_000EF	ANNIE POS Tagger
 GATE Morphological analyser_0010E	GATE Morphological analyser
 Flexible Gazetteer_0010F	Flexible Gazetteer
 DiscourseIndicatorsJAPE	JAPE Transducer
 VPChunker	ANNIE VP Chunker
 Noun Phrase Chunker_0006E	Noun Phrase Chunker
 ANNIE NE Transducer_0006F	ANNIE NE Transducer
 SentimentJAPE	JAPE Transducer
 NegPosJAPE	JAPE Transducer

# Preliminary Investigations with GATE

point 1. Gambling is simply a leisure pursuit.

point

People have free will and should be allowed to spend their money on whichever leisure pursuits they choose. Gamblers know that, overall, they are likely to lose money. They gamble because it is a leisure pursuit that they enjoy.

There is nothing irrational about this. Some people get an enjoyable thrill from the remote possibility that they might win a huge prize - even if he or she loses, they enjoy the experience. Some forms of gambling are highly sociable. For example, many people are involved in gambling and go to bingo halls (or equivalent) to spend time with friends, and some types of gambling are interlinked with other leisure pursuits such as horse racing. Society accepts people spending money on other leisure pursuits with no material benefits (e.g. cinema tickets, watching sport). Gambling should not be any different. It is patronizing to suggest that people should not be able to choose how they spend their money or their leisure time.

- ConclusionIndicator
- Date
- Lookup
- NegOne
- NegThree
- NegTwo
- Negative
- NounChunk
- Percent
- PosFour
- PosOne
- PosThree
- PosTwo
- Positive
- PremiseIndicator
- Sentence
- SpaceToken
- Split
- Token
- Unknown
- VG

# Preliminary Investigations with GATE

## Point

People have free will and should be allowed to spend their money on which ever leisure pursuits they choose. Gamblers know that, overall, they are likely to lose money. They gamble because it is a leisure pursuit that they enjoy.

Type	Set	Start	End	Id	Features
ConclusionIndicator		4595	4600	3669	{rule=DiscourseIndicator}
VG		4614	4616	3823	{tense=SimPre, type=FVG, voice=active}
ConclusionIndicator		4644	4649	3670	{rule=DiscourseIndicator}
VG		4658	4662	3824	{tense=SimPre, type=FVG, voice=active}
Positive		4663	4667	4595	{rule=Poss}
VG		4677	4694	3825	{tense=BeVBN, type=MODAL, voice=none}
Positive		4687	4694	4596	{rule=Poss}
VG		4695	4703	3826	{tense=Inf, type=NFVG, voice=active}
VG		4752	4758	3827	{tense=SimPre, type=FVG, voice=active}
VG		4769	4773	3828	{tense=Inf, type=NFVG, voice=active}
VG		4794	4797	3829	{tense=SimPre, type=FVG, voice=active}
VG		4805	4812	3830	{tense=Inf, type=NFVG, voice=active}

# Next Steps

- Develop a working corpus of arguments (Debatabase).
- Identify corpora for comparison (newspaper, fictional stories, scientific articles,.....).
- Do argument v. non-argument recognition tasks.
- Pick some topic(s) to comparatively investigate, e.g. temporal and rhetorical relations.
- Collaborate!

# Thanks for your attention!

- Questions? Suggestions?
- Contact:
  - Adam Wyner, [azwyner@liverpool.ac.uk](mailto:azwyner@liverpool.ac.uk)
- Acknowledgements - The author was supported by the FP7-ICT-2009-4 Programme, IMPACT Project, Grant Agreement Number 247228. The views expressed are the author.