

Argument Corpora, and Argument Mining and Analytics (PART 1)

**Katarzyna Budzynska^{1,2}
& Chris Reed^{2,1}**

Centre for Argument Technology (www.arg.tech)

¹Institute of Philosophy & Sociology, Polish Academy of Sciences

²University of Dundee, UK

ARG-tech (Warsaw & Dundee)



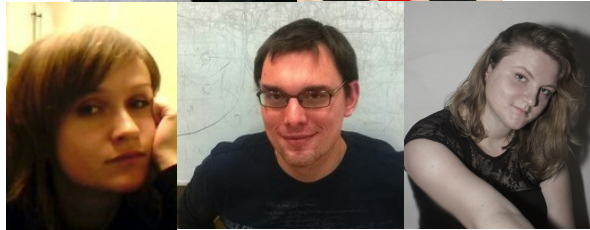
Kasia Budzynska (PL, UK)

Rory Duthie (UK)

Basia Konat (UK, PL)

Marcin Koszowy (PL)

Olena Yaskorska (PL)



Chris Reed (UK, PL)

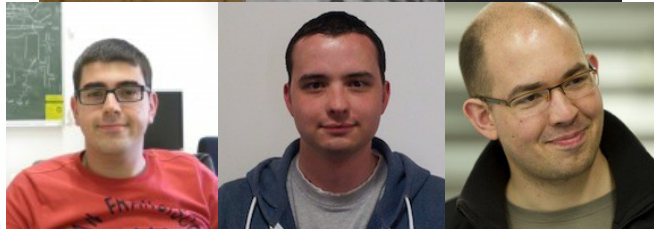
Mathilde Janier (UK)

John Lawrence (UK)

Martín Pereira Fariña (UK)

Mark Snaith (UK)

Jacky Visser (UK)



Argument Mining

(Budzynska & Villata 2017)

Before 2014: fewer than 10 papers

After 2014:

- 1) *From Real Data to Argument Mining*, 12th ArgDiaP Conference, Polish Academy of Sciences, Warsaw, Poland, 23-24 May 2014. (22 papers)
- 2) *1st Workshop on Argumentation Mining*, 52nd Annual Meeting of the Association for Computational Linguistics, Baltimore, US, June 26, 2014 (18 papers)
- 3) *SICSA Workshop on Argument Mining: Perspectives from Information Extraction, Information Retrieval and Computational Linguistics*, ARG-tech, Dundee, Scotland, 9-10 July 2014. (ca. 25 participants)
- 4) *Frontiers and Connections between Argumentation Theory and Natural Language Processing*, Bertinoro (Forlì-Cesena), Italy, 21-25 July 2014.
- 5) *2nd Workshop on Argumentation Mining*, 53rd Annual Meeting of the Association for Computational Linguistics, Denver, US, June 04, 2015 (16 papers)
- 6) *Arguments in Natural Language: The Long Way to Analyze the Reasons to Believe and the Reasons to Act*, 1st European Conference on Argumentation, Lisbon, 9-12 July 2015
- 7) *Natural Language Argumentation: Mining, Processing, and Reasoning over Textual Arguments*, Dagstuhl Seminar, April 17 – 22 , 2016
- 8) *3rd Workshop on Argumentation Mining*, 54th Annual Meeting of the Association for Computational Linguistics), Berlin, Aug 12, 2016 (20 papers)

(1/4) Foundations

(1a/4) Arguments and Dialogue: Theoretical Foundations

(Budzynska & Reed, 2011)

Inference Anchoring Theory, IAT

DIALOGUE:

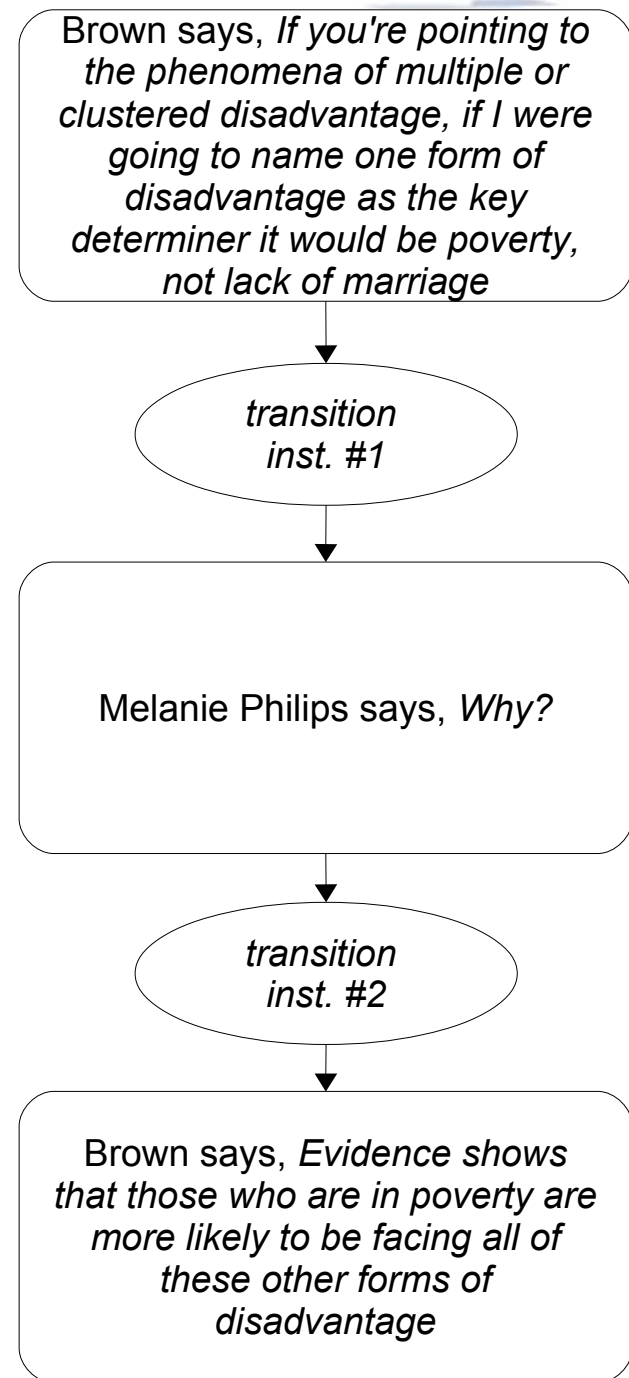
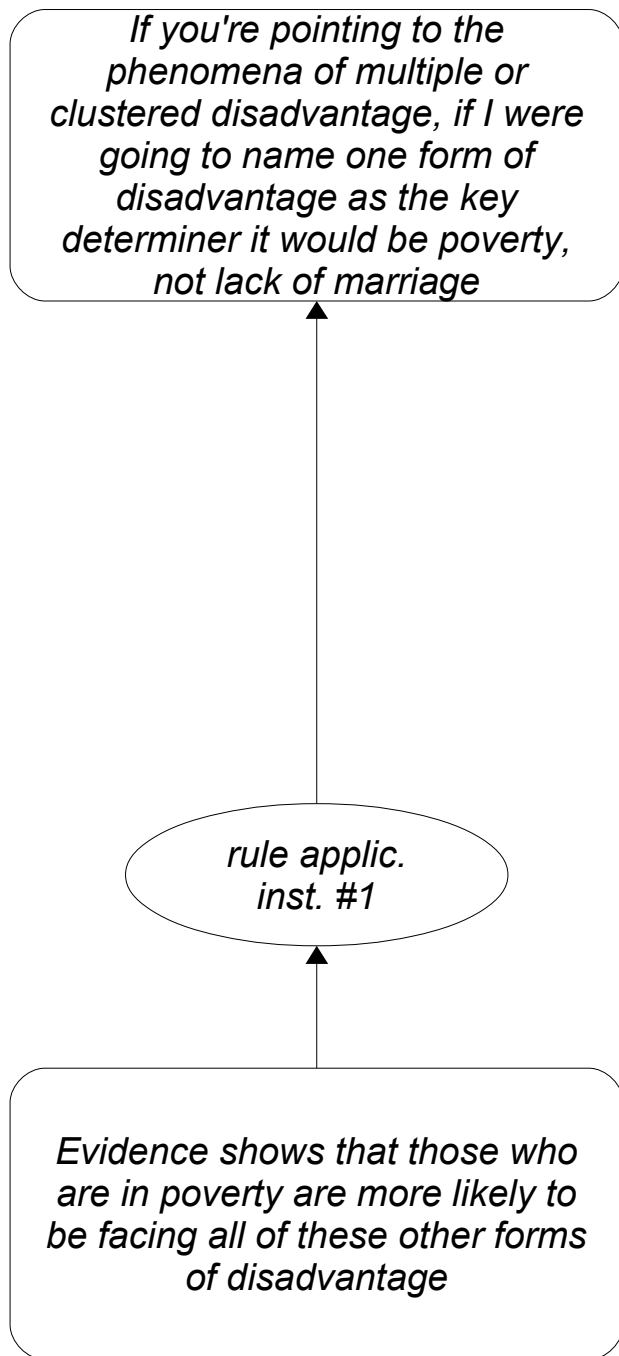
(a) Alexander Brown said, *If you're pointing to the phenomena of multiple or clustered disadvantage, if I were going to name one form of disadvantage as the key determiner it would be poverty, not lack of marriage.*

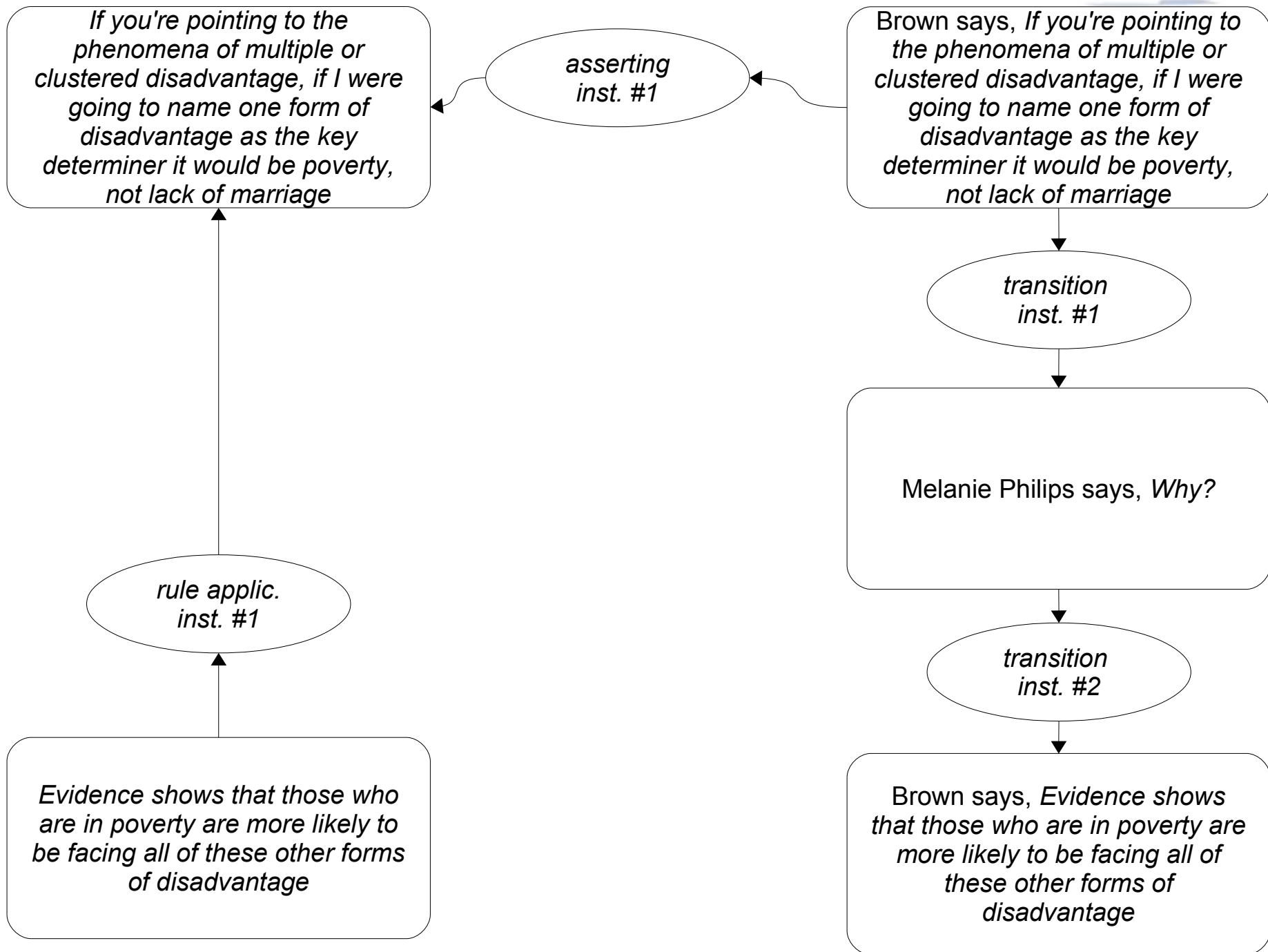
(b) Melanie Philips said, *Why?*

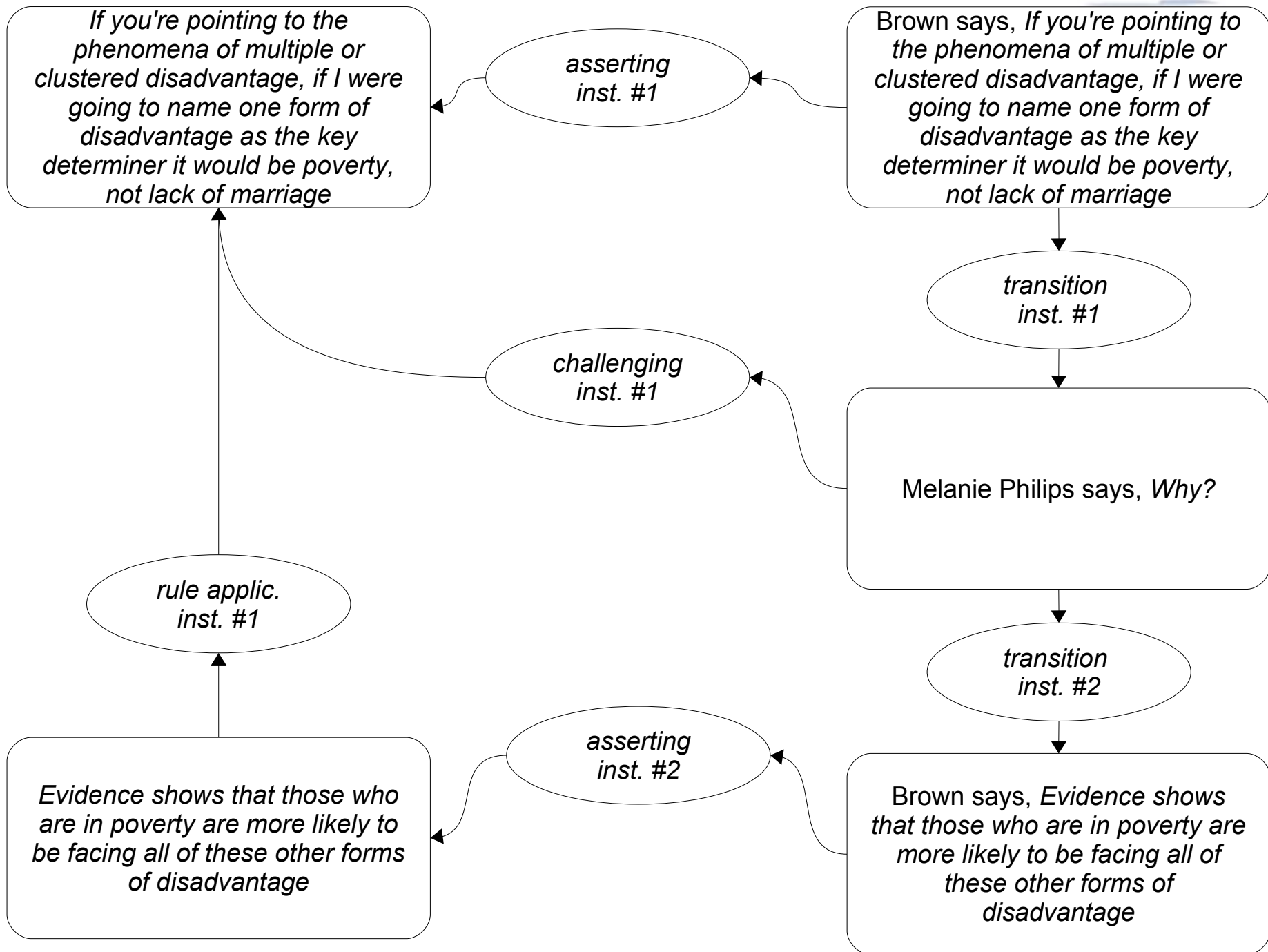
(c) Alexander Brown said, *Evidence shows that those who are in poverty are more likely to be facing all of these other forms of disadvantage.*

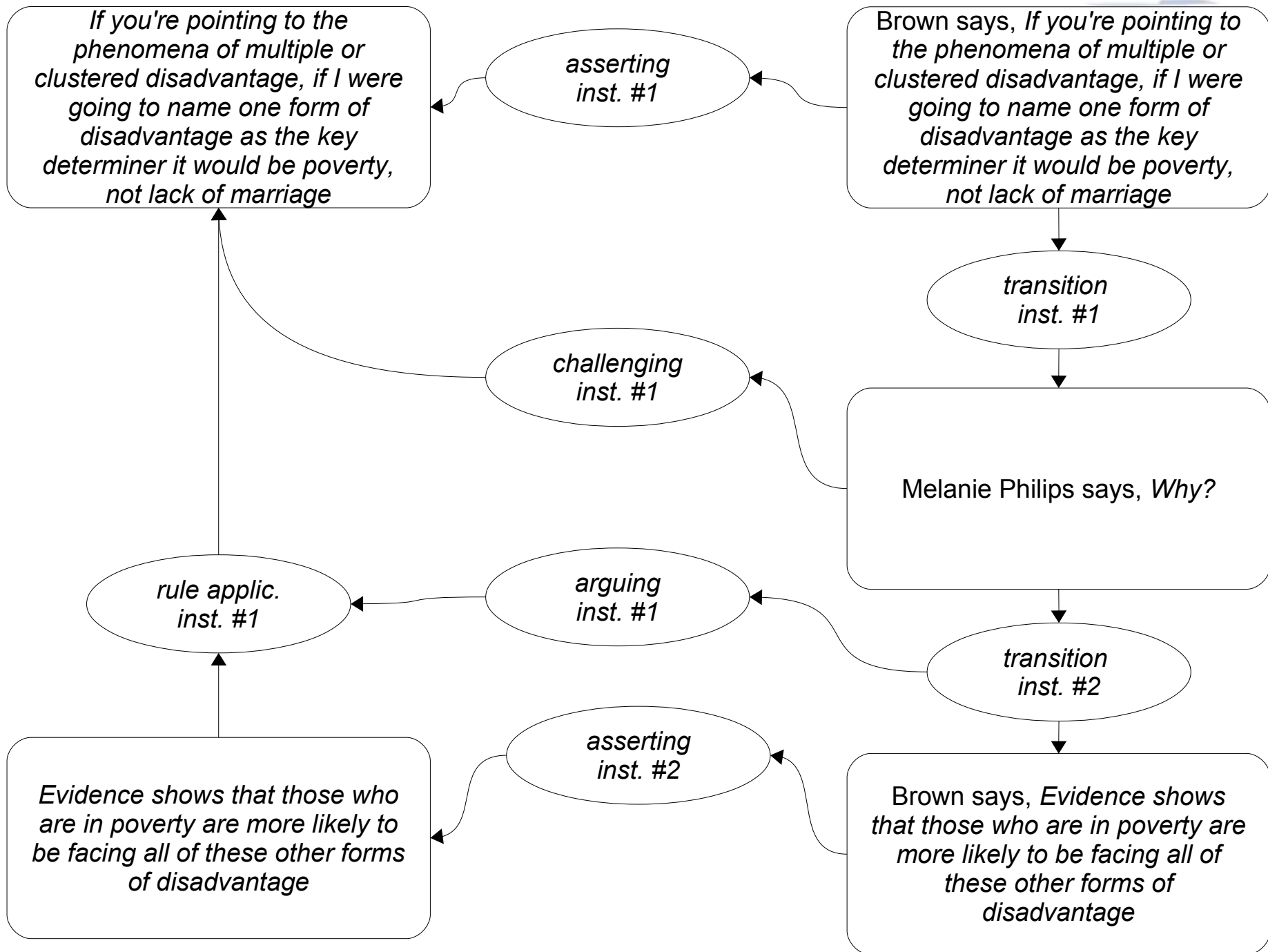
ARGUMENTATION (INFERENCE):

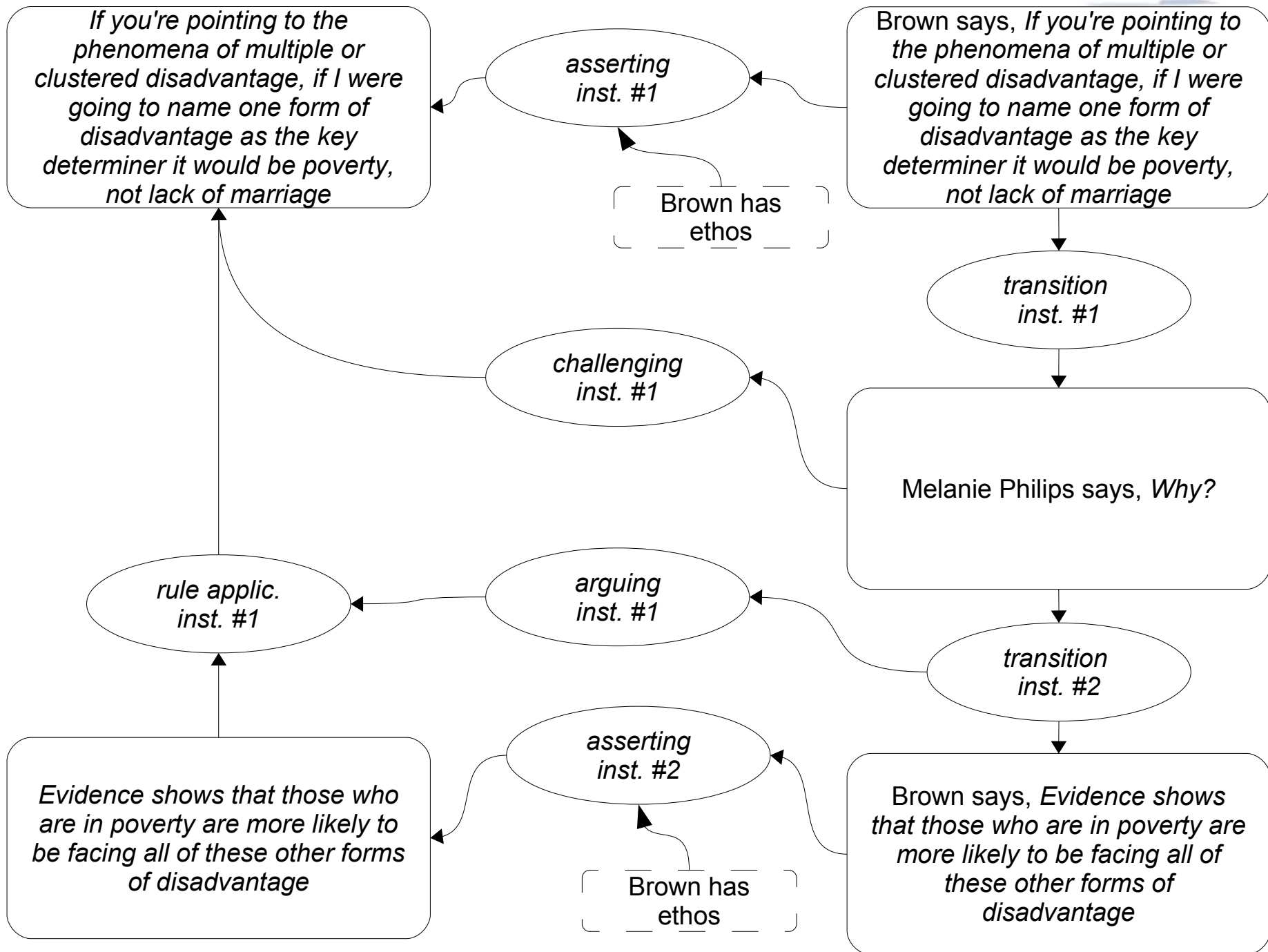
(Arg1) *If you're pointing to the phenomena of multiple or clustered disadvantage, if I were going to name one form of disadvantage as the key determiner it would be poverty, not lack of marriage because Evidence shows that those who are in poverty are more likely to be facing all of these other forms of disadvantage.*











Inference Anchoring Theory, IAT

DIALOGUE:

(a) Alexander Brown said, *If you're pointing to the phenomena of multiple or clustered disadvantage, if I were going to name one form of disadvantage as the key determiner it would be poverty, not lack of marriage.*

(b) Melanie Philips said, **Why?**

(c) Alexander Brown said, *Evidence shows that those who are in poverty are more likely to be facing all of these other forms of disadvantage.*

ARGUMENTATION (INFERENCE):

(Arg1) *If you're pointing to the phenomena of multiple or clustered disadvantage, if I were going to name one form of disadvantage as the key determiner it would be poverty, not lack of marriage **because** Evidence shows that those who are in poverty are more likely to be facing all of these other forms of disadvantage.*

(1b/4) Arguments and Dialogue: Technical Foundations

(Lawrence et al. 2017b; Reed et al. 2017)

Treat it like any other text mining problem:

*Annotate data, train classifier or build rules,
tweak & repeat.*

Moens, Boiy, Palau & Reed, 2007

Basic approach

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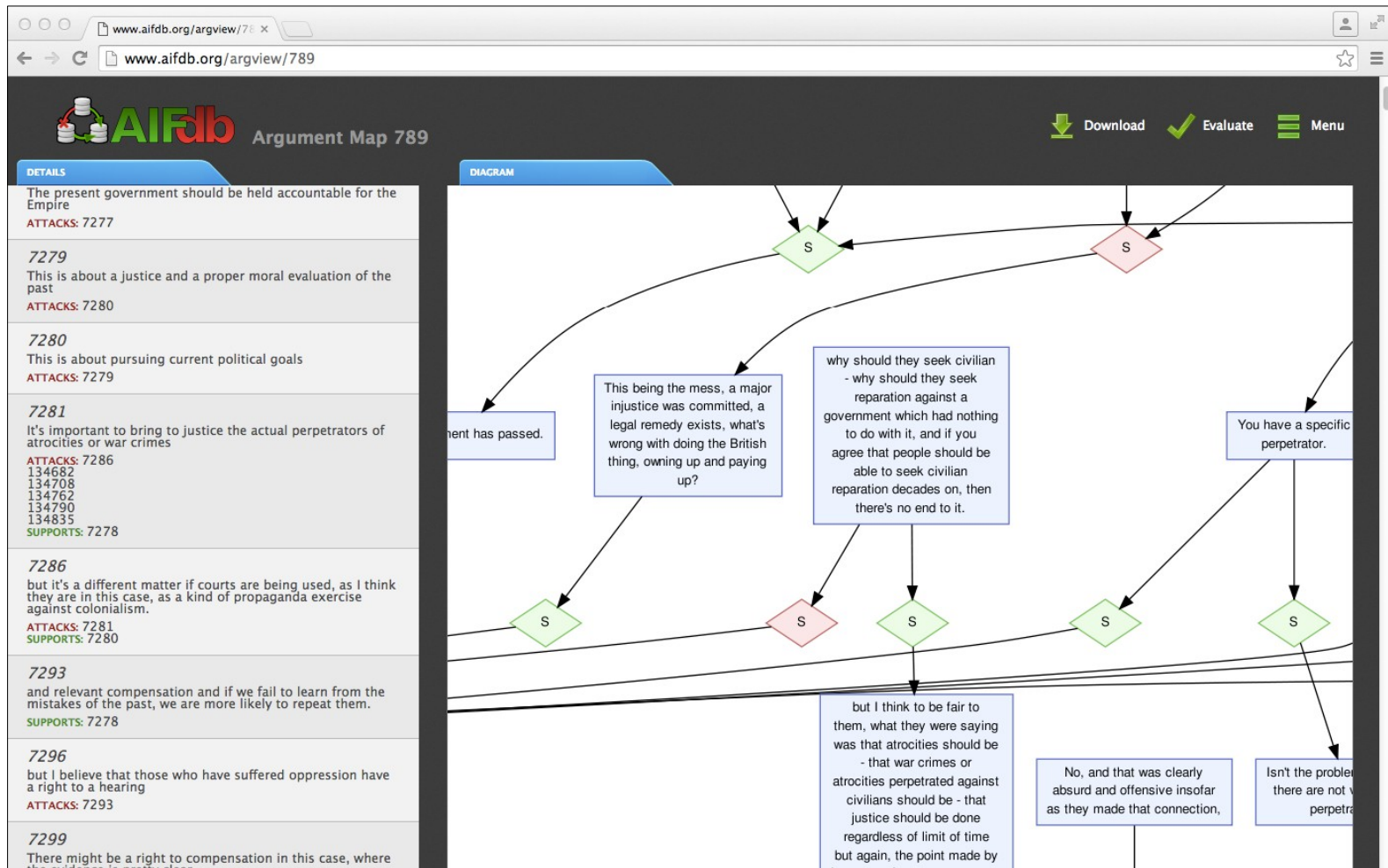
Basic approach

Treat it like any other text mining problem:

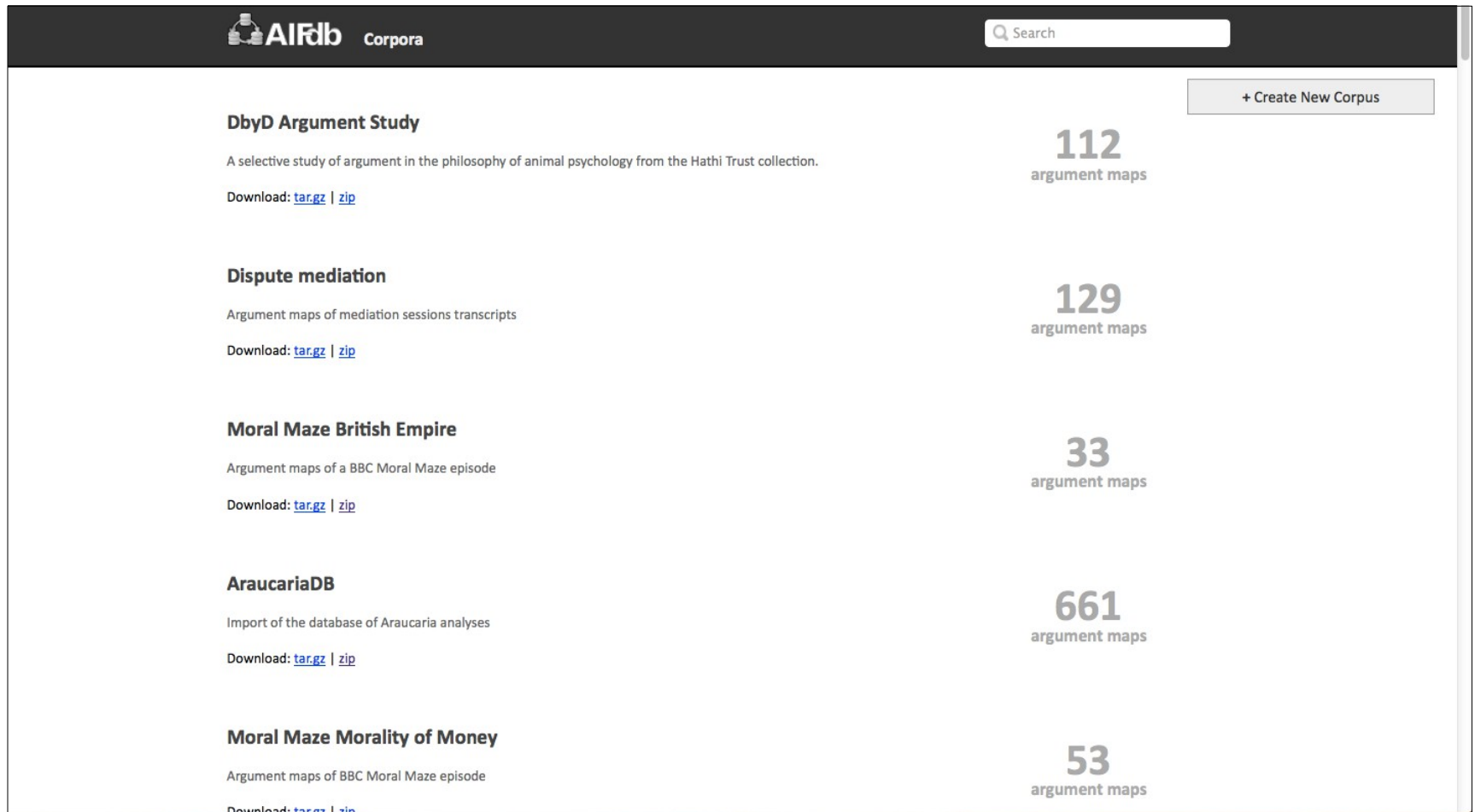
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tweak & repeat.*

Moens, Boiy, Palau & Reed, 2007

Solving the **brute** problem



Solving the **brute** problem

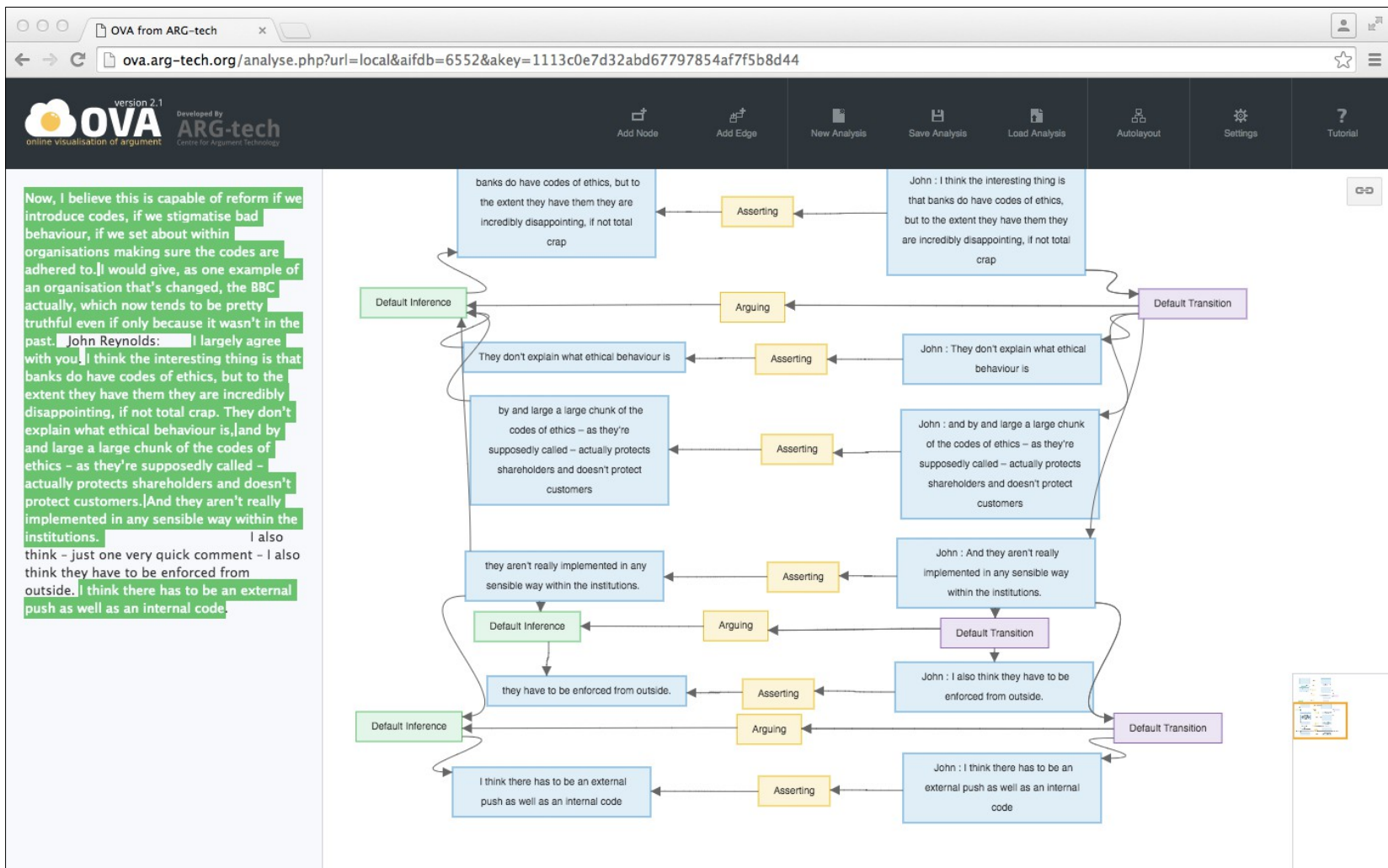


The screenshot shows the homepage of the corpora.aiadb.org website. The header is dark with the AIADB logo and a search bar. A '+ Create New Corpus' button is in the top right. The main content area lists five corpora, each with a title, description, download links, and a count of argument maps.

Corpus Name	Description	Download Links	Argument Maps Count
DbyD Argument Study	A selective study of argument in the philosophy of animal psychology from the Hathi Trust collection.	tar.gz zip	112
Dispute mediation	Argument maps of mediation sessions transcripts	tar.gz zip	129
Moral Maze British Empire	Argument maps of a BBC Moral Maze episode	tar.gz zip	33
AraucariaDB	Import of the database of Araucaria analyses	tar.gz zip	661
Moral Maze Morality of Money	Argument maps of BBC Moral Maze episode	tar.gz zip	53

corpora.aiadb.org

Solving the **brute** problem



ova.arg.tech

Solving the **brute** problem

argublogging.com

ArguBlogging

from ARG:dundee

ArguBlogging allows you to agree and disagree with opinions expressed anywhere online. Your arguments are presented not just as text, but also as elements of the [Argument Web](#): a richly structured interconnected web of debates and disputes, arguments and counterarguments. The arguments you contribute via argublogging can be used by other Argument Web tools to automatically express opinions, to teach students how to think better, to help the public navigate complex issues, and to conduct academic research into the way argument works.

Try ArguBlogging as a guest

Drag the guest bookmarklet to your bookmark toolbar:



Select some text on a web page, and click the ArguBlogging button to start argublogging and see the result on the [quest blog](#).

OR

Register for ArguBlogging

Give your email and a password so that we can store OAuth keys that allow argublogging to post to your blog

Email:

Password:

Register >>

[Already registered?](#)

The application currently supports two popular blogging platforms: tumblr and Blogger. Publishing permissions are handled using OAuth, so there is never any need for you to provide us with your passwords – just grant the argublogging application access to your blog when prompted.

When you encounter text online with which you want to agree or disagree, highlight it, and click the ArguBlogging button. After posting your opinion to your blog, you can also view it as a part of a conversation in the ever growing debate that is the Argument Web.

Solving the **brute** problem

argublogging.com

arvina.arg.tech

ArguBlogging

from ARG:dundee

arvina by ARG-tech

arvina.arg.tech/dialogue.php?d=946&p=1425&n=6

Search

arvina

Participants

- Mary Test
- ConfBias Agent
- InfCrit Agent
- CausBias Agent
- David Test

Live Discussion Map

Click to view

Mary Test
How do we know that "we know X and Y met in June"?

David Test
Informant Report: "we know X and Y met in June" because of "Z has told us that he saw them meet"

InfCrit Agent
Vested interest "Do they have anything to gain by claiming that?"

Mary Test
Support: "Do they have anything to gain by claiming that?" because "X and Z are in competition for the ministerial post"

ConfBias Agent
Is there any evidence for thinking it's not the case that "we know X and Y met in June"?

PROCESSING

arvina by ARG-tech

Solving the **brute** problem

argublogging.com

arvina.arg.tech

argugrader.com

The screenshot shows a web browser window with the URL `arvina.arg.tech/dialogue.php?d=946&p=1425&n=6`. The page features the **arvina** logo and a large banner for **argugrader** with the tagline "because critical thinking isn't multiple choice" and a "Get Started" button. Below the banner, the "How it works" section is divided into three parts: Analysis, Grading, and Feedback.

Analysis

Students use any Argument Web tool for conducting analysis (OVA, iLogos, Rationale, etc.)

Grading

Student work submitted to argugrader.com. Comparison initiated between student analysis and tutor's model answer. Individual units compared (within tutor-specified tolerance). Structural connections compared (with charitable matching).

Feedback

Marks entered into spreadsheet or student management system. Feedback generated for students.

Solving the **brute** problem

argublogging.com

arvina.arg.tech

argugrader.com

analytics.
arg-tech.org



Solving the **brute** problem

Interoperably share & re-use:

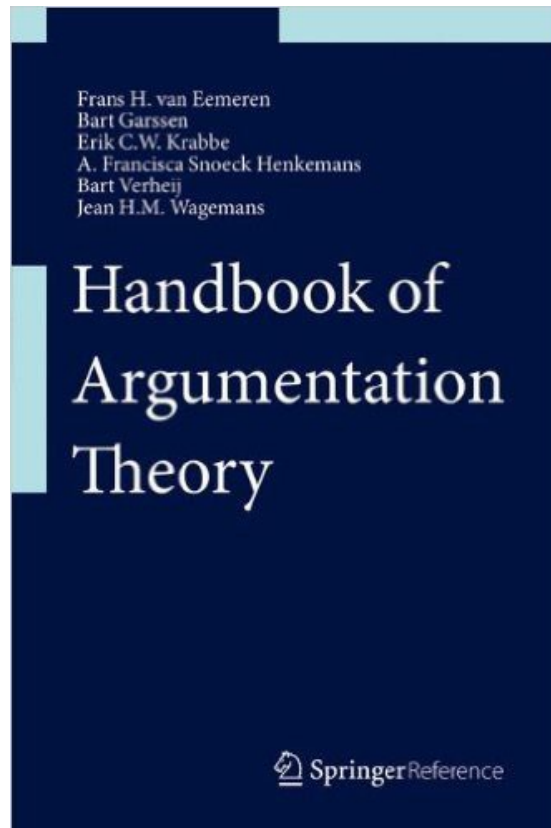
- Language of Opposition – Rutgers/Columbia
- Microtext corpus – Potsdam
- Internet Argument Corpus (IAC) – Santa Cruz
- Erulemaking corpus – Cornell
- Araucaria Corpus – Dundee
- Araucaria-PL Corpus – Warsaw
- MM2012 Corpus – Dundee
- *plus over 30 other corpora*

Solving the **brute** problem

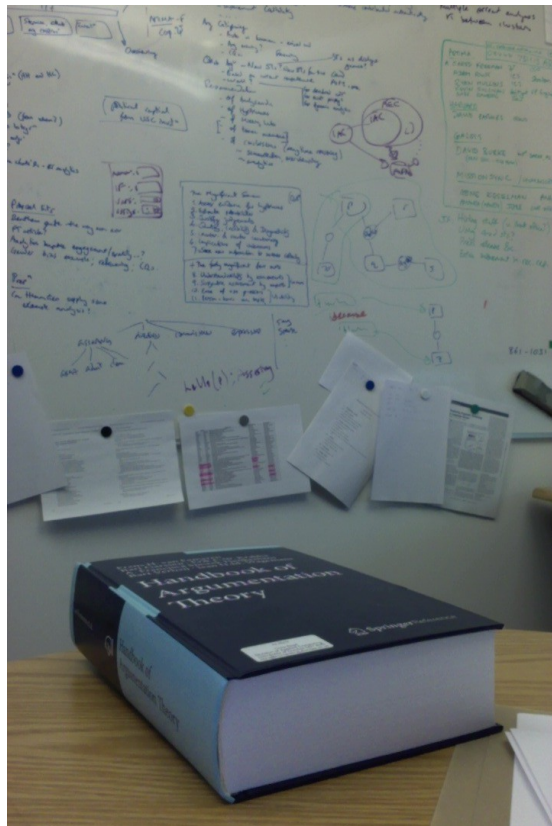
On the AIFdb servers at Dundee:

- 1.5m words
- 14 languages, 4 scripts
- 50k annotated arguments
- 300-500 unique users per month

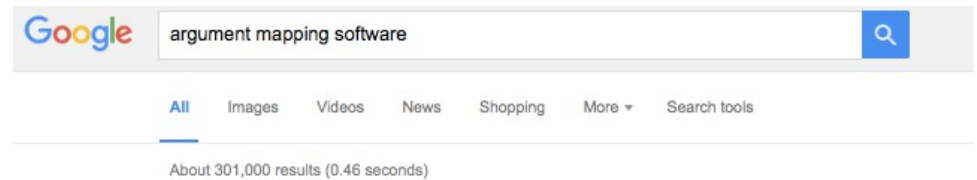
Solving the **subtle** problem



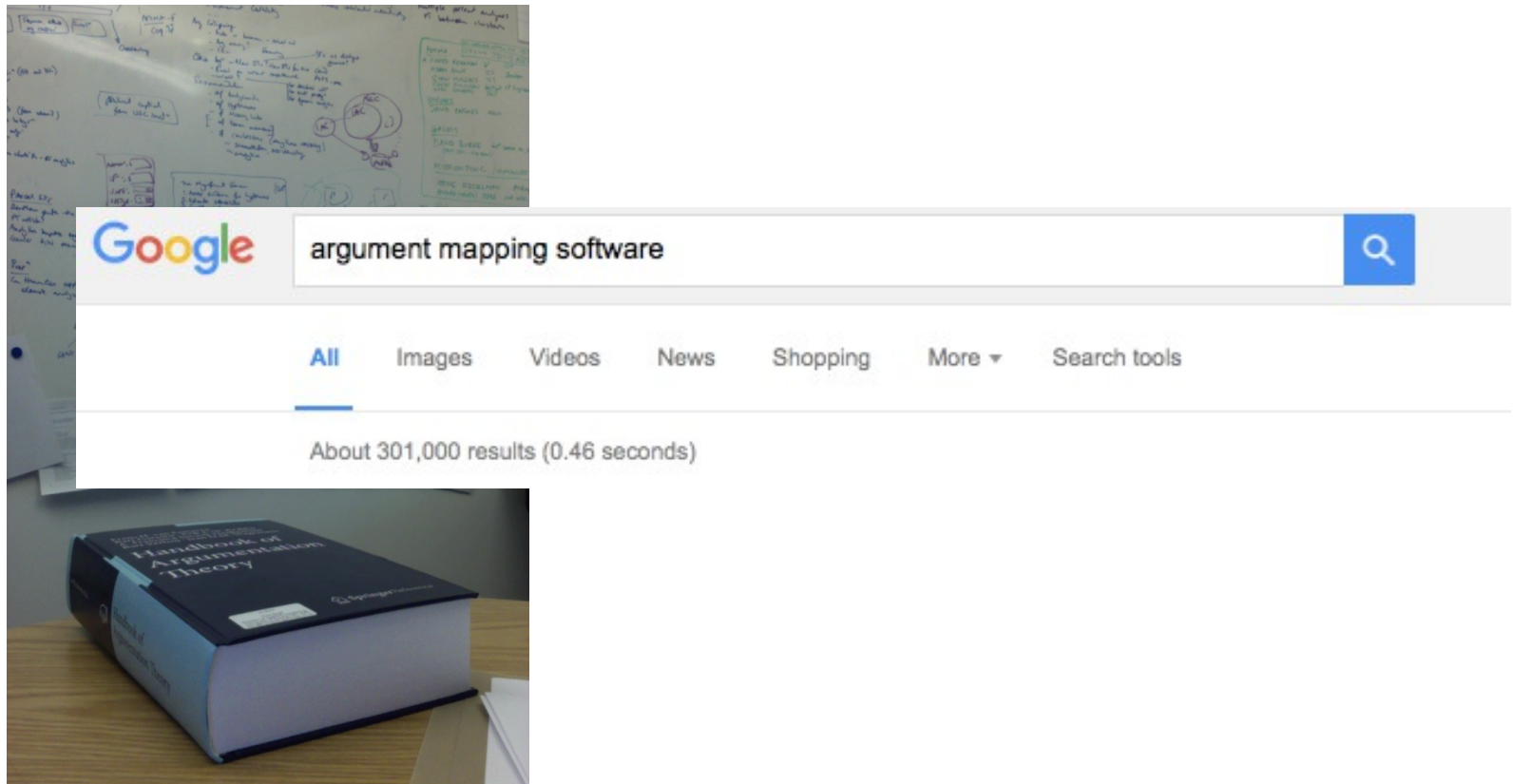
Solving the **subtle** problem



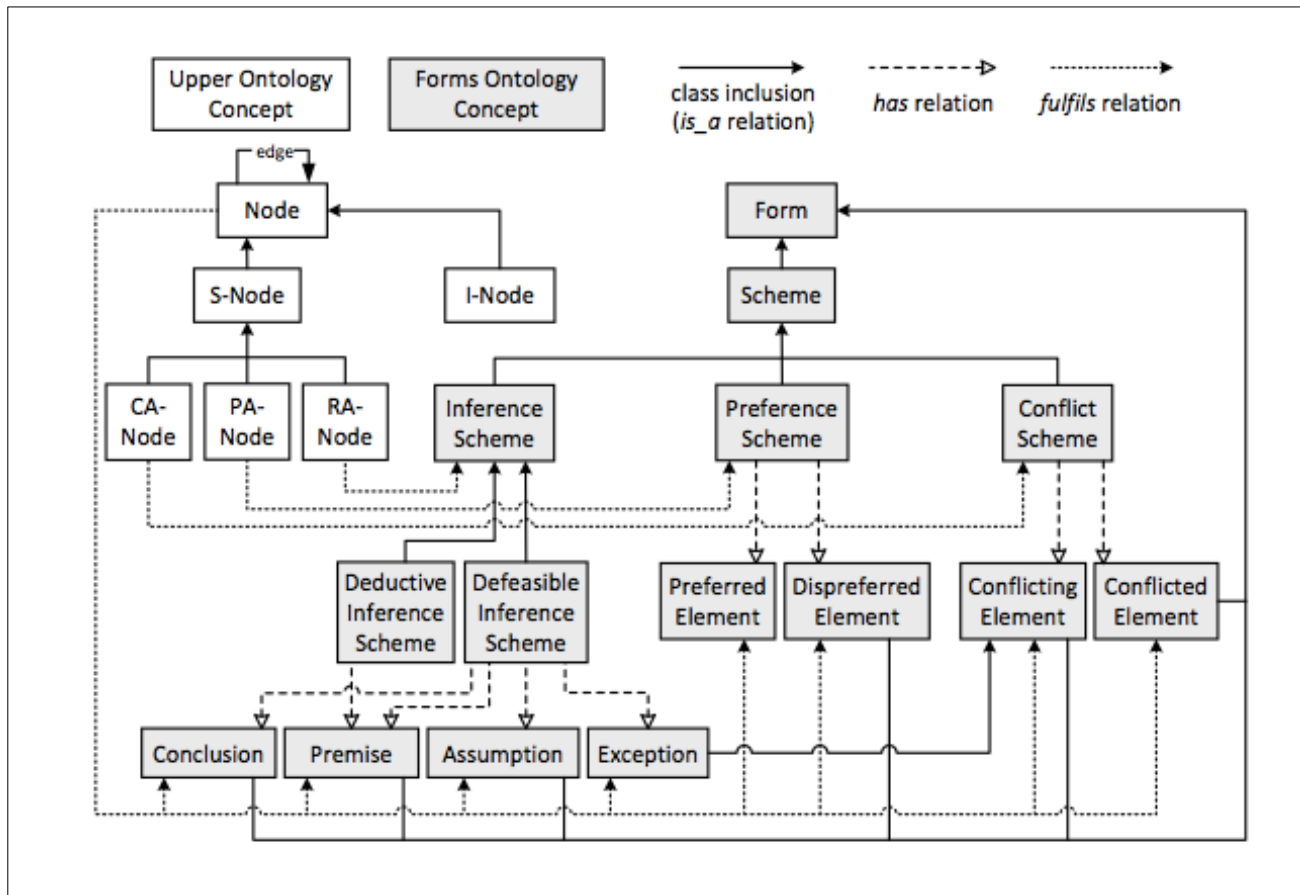
Solving the **subtle** problem



Solving the **subtle** problem



Solving the **subtle** problem



AIF: Argument Interchange Format
Artificial Intelligence 2007

Solving the **subtle** problem

Node Type	Description
------------------	--------------------

I	propositional information contained in an argument, such as a conclusion, premise, data etc.
---	--

L	subset of I-nodes referring to propositional reports specifically about discourse events
---	--

RA	application of a scheme of reasoning or inference
----	---

CA	application of a scheme of conflict
----	-------------------------------------

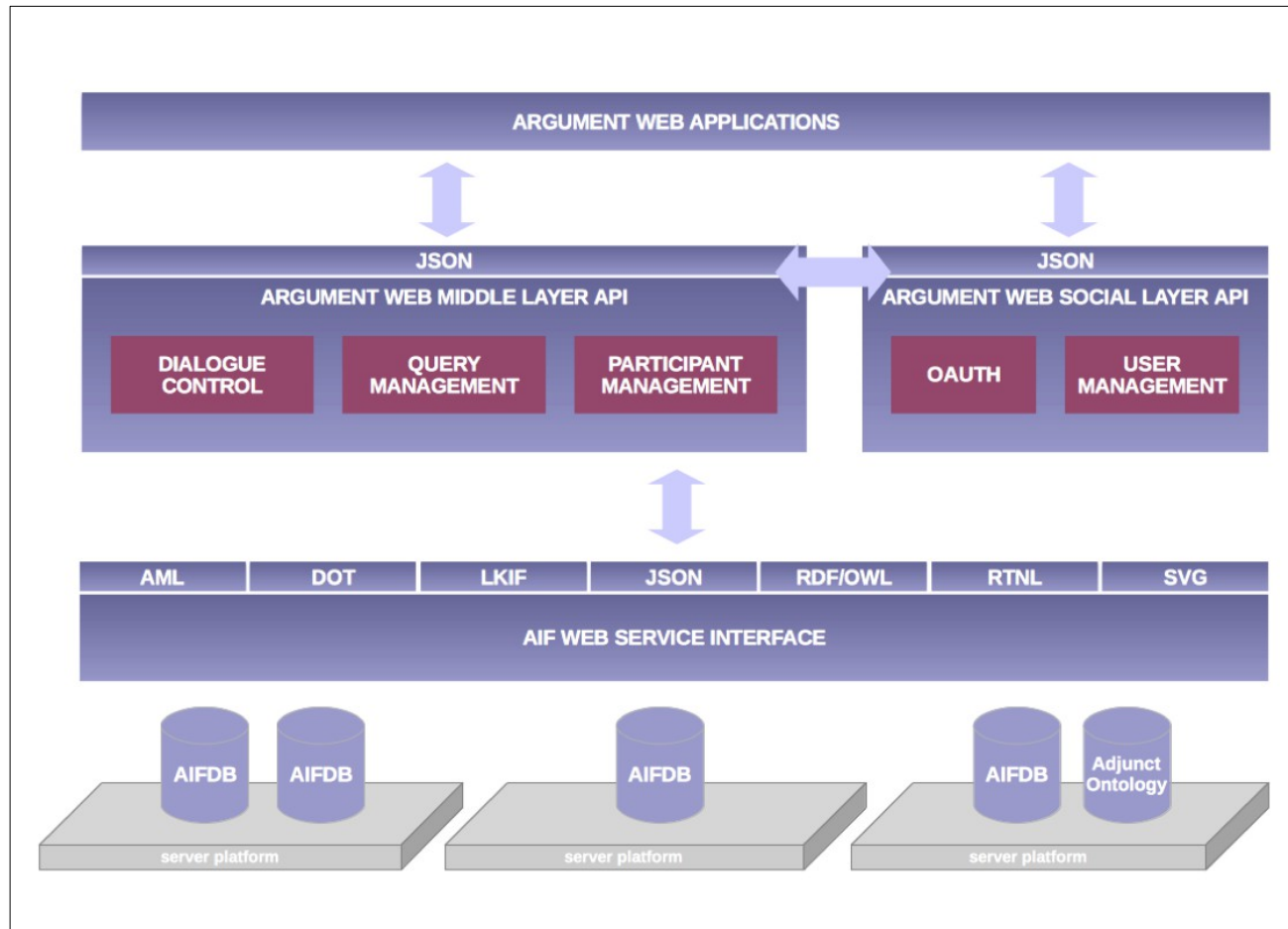
MA	application of a scheme of rephrasing
----	---------------------------------------

YA	application of a scheme of illocution describing communicative intentions which speakers use to introduce propositional contents
----	--

TA	application of a scheme of interaction or protocol describing relations between locutions
----	---

AIF and IAT

Solving the **subtle** problem



Argument Web
CACM 2013

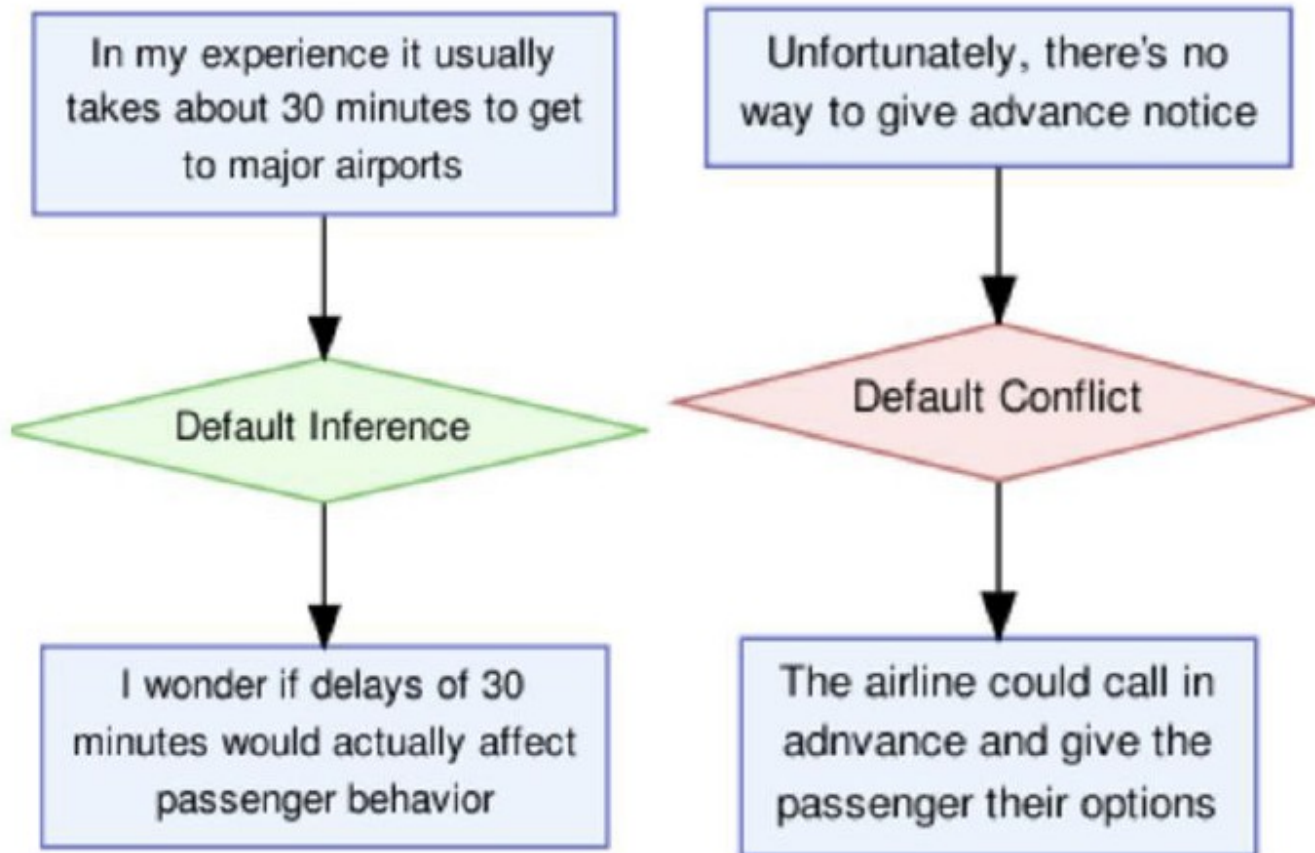
(2/4) Argument Structures for Corpus Analysis

(2a/4) Basic Argument Structures

Two types

- **Support** (argumentation, Default Inference, RA) - holds between two propositions when one proposition provides a reason to accept another proposition. In other words, for a given claim p , a supporting claim q can be used to reply to the question “Why p ?” (“Because q ”).
- **Conflict** (Attack, Default Conflict, CA) - holds between two propositions which cannot be both true at the same time. Speakers use conflicting propositions to attack another speaker's claims by means of providing counter-claims.

Two types of arguments



Example 1

- Discussion Board in BB: **Is technology destroying imagination?**

I think it is entirely dependant on how people use the internet which shapes the way they think. The internet can be used to inspire people. Things can be seen, read about, watched, listened to at the user's convenience. The internet can also be used to learn an entire spectrum of new information. There is a valid point though that some websites do not offer many positive outcomes.

Argument map in OVA+ (ova.argtech.org)

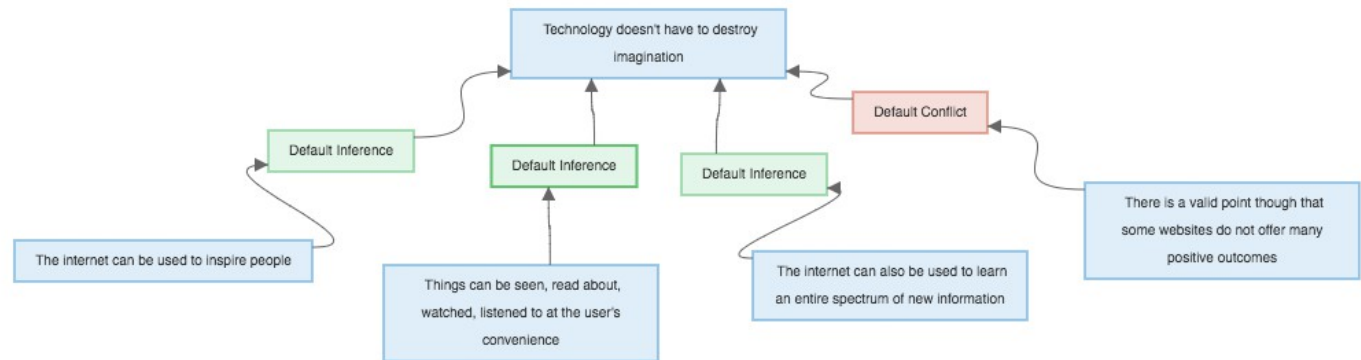
MAIN CLAIM: Technology doesn't have to destroy imagination

PRO-ARGUMENT 1: The internet can be used to inspire people.

PRO-ARGUMENT 2: Things can be seen, read about, watched, listened to at the user's convenience.

PRO-ARGUMENT 3: The internet can also be used to learn an entire spectrum of new information.

CON-ARGUMENT: There is a valid point though that some websites do not offer many positive outcomes



How are arguments signalled linguistically?

Is technology destroying imagination?

I think it is entirely dependant on how people use the internet which shapes the way they think. The internet can be used to inspire people. Things can be seen, read about, watched, listened to at the user's convenience. The internet can also be used to learn an entire spectrum of new information. There is a valid point though that some websites do not offer many positive outcomes.

(1) Discourse indicators?

Is technology destroying imagination?

I think it is entirely dependant on how people use the internet which shapes the way they think. The internet can be used to inspire people. Things can be seen, read about, watched, listened to at the user's convenience. The internet can **also** be used to learn an entire spectrum of new information. There is a valid point **though** that some websites do not offer many positive outcomes.

(2) Topic similarity?

Is **technology** destroying imagination?

I think it is entirely dependant on how people use the **internet** which shapes the way they think. The internet can be used to inspire people. Things can be seen, read about, watched, listened to at the user's convenience. The internet can also be used to learn an entire spectrum of new information. There is a valid point though that some websites do not offer many positive outcomes.

(2) Topic similarity?

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(1+2) Discourse indicators + topic similarity?

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(3) Sentiment?

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(3) Sentiment (positive = support, and vice versa)?

Where should we go for holidays?

Warsaw has many great bars which are cheap.

(3) Sentiment (positive = support, and vice versa)?

Where should we go for holidays?

Warsaw has many great bars which are cheap.

(3) Sentiment (positive = support, and vice versa)?

Where should we go for holidays?

- “We should go to Warsaw.” “Warsaw has many great bars which are cheap.” **Support**
- “We should go to Copenhagen.” “Warsaw has many great bars which are cheap.”

(3) Sentiment (positive = support, and vice versa)?

Where should we go for holidays?

- “We should go to Warsaw.” “Warsaw has many great bars which are cheap.” **Support**
- “We should go to Copenhagen.” “Warsaw has many great bars which are cheap.” **Attack**

(4) Txt span or relation?

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(4) Txt span or relation? (Specific domains)

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Where should we go for holidays?

- “We should go to Warsaw.” “Warsaw has many great bars which are cheap.” **Support**
- “We should go to Copenhagen.” “Warsaw has many great bars which are cheap.” **Attack**

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(4) Txt span or relation? (Specific domains)

~~Where should we go for holidays?~~

- “We should go to Warsaw.” “Warsaw has many great bars which are cheap.” **Support**
- “We should go to Copenhagen.” “Warsaw has many great bars which are cheap.” **Attack**
- “Warsaw has many great bars which are cheap.” **???**

(4) Txt span or relation? (argument = txt span?)

“I love bananas”

(4) Txt span or relation? (argument = txt span?)

- “What fruits do you like?” “I love bananas.”
- “We should visit Philippines. I love bananas and in Philippines they grow amazing baby bananas, best in the world.”
- “Chris hates bananas.” “He loves them!”

(4) Txt span or relation? (argument = txt span?)

- “What fruits do you like?” “I love bananas.” **Not Argument**
- “We should visit Philippines. I love bananas and in Philippines they grow amazing baby bananas, best in the world.” **Support**
- “Chris hates bananas.” “He loves them!” **Conflict**

(4) Txt span or relation?

(If argument = relation, then...)

- Not only convergent, but also linked and serial arguments, or even unrelated text
- Long-distance relations

(4) Txt span or relation?

(If argument = relation, then...)

- **Not only convergent, but also linked and serial arguments, or even unrelated text**
- Long-distance relations

(4) Example 2: Not only convergent

Is technology destroying imagination? I think that, firstly, it depends on with what aim people are using technologies. Speaking about youngsters who spend most of their time on the computer playing computer games or just chatting in different chats and forums, I strongly believe that they are destroying their imagination. They do not see anything around besides their computer or game console. But if we speak about people who are using technologies with reasonable causes such as working or studying, this part of society does not destroy their imagination. On the contrary, they are evolving that.

(4) Example 2: Not only convergent

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(4) Example 2: Not only convergent

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1. **Speaking about youngsters who spend most of their time on the computer playing computer games or just chatting in different chats and forums, I strongly believe that they are destroying their imagination**
2. **They do not see anything around besides their computer or game console**
3. **if we speak about people who are using technologies with reasonable causes such as working or studying, this part of society does not destroy their imagination**
4. **they are evolving that**

(4) Example 2: Not only convergent

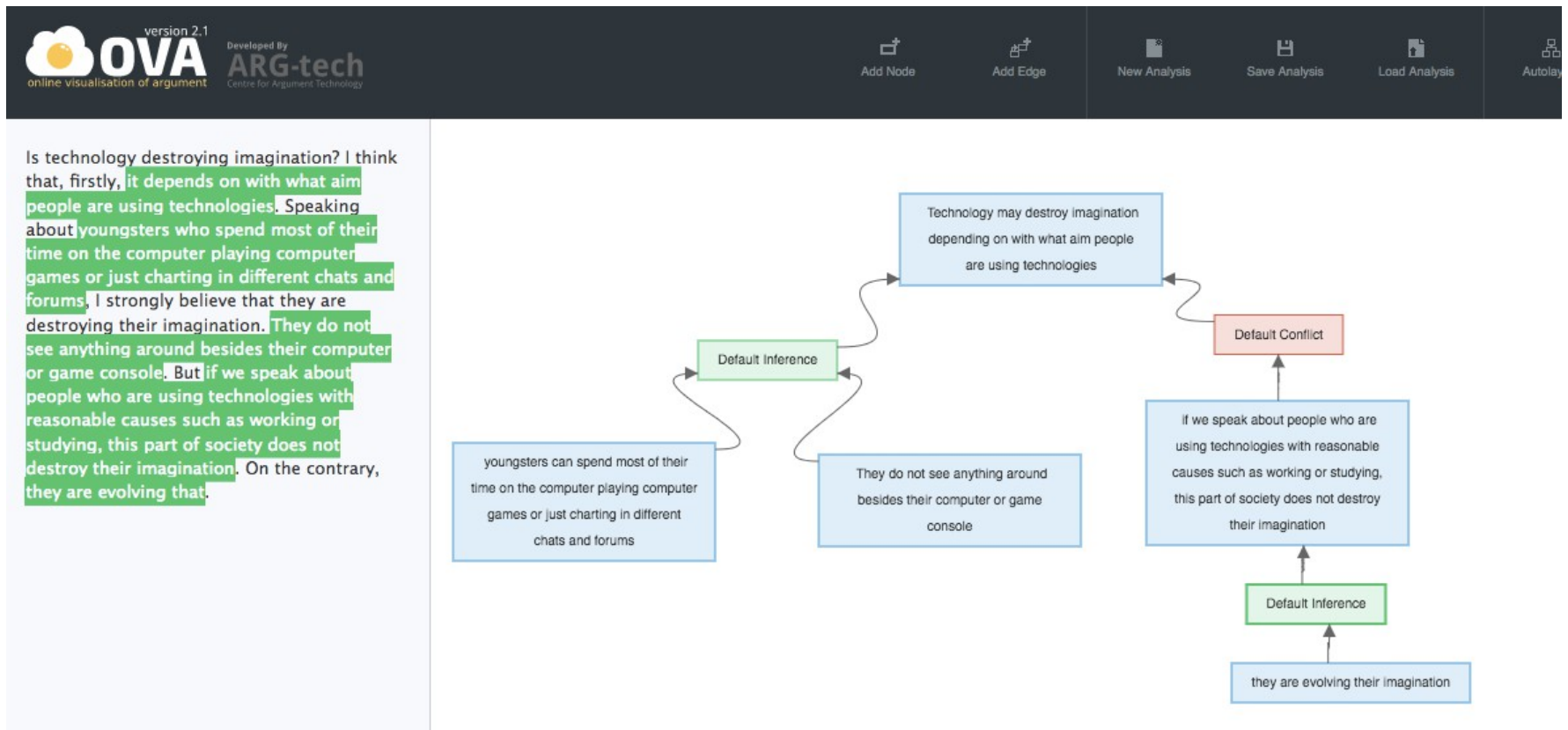
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(4) Analysis/SenseMaking/Summary: What the speaker is advocating?

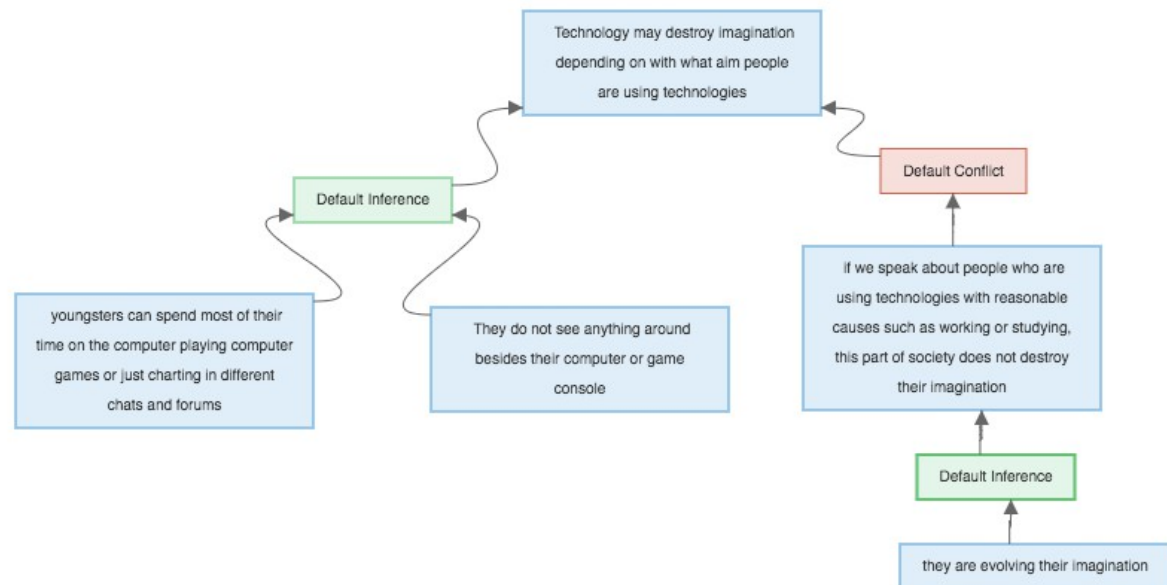
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(4) Graph-based AIF argument map



(4) Analysis/SenseMaking/Summary: What the speaker is advocating?

Is technology destroying imagination? I think that, firstly, it depends on with what aim people are using technologies. Speaking about youngsters who spend most of their time on the computer playing computer games or just chatting in different chats and forums, I strongly believe that they are destroying their imagination. They do not see anything around besides their computer or game console. But if we speak about people who are using technologies with reasonable causes such as working or studying, this part of society does not destroy their imagination. On the contrary, they are evolving that.



(4) Txt span or relation?

(If argument = relation, then...)

- Not only convergent, but also linked and serial arguments, or even unrelated text
- **Long-distance relations**

(4) Txt span or relation?

(If argument = relation, then...)

“Meta-talk in mediation” Corpus (Janier & Reed, 2016a; 2016b; 2017; Janier et al. 2016)

- <http://corpora.aifdb.org/metatalk>
- 2,862 ADUs, 446 supports, 73 conflicts

Eric: It's my team.

George: It's your team, exactly.

Mildred: Maybe.

George: There are obviously discussions that need to happen around the team. Would that be a fair statement?

Viv: Yes.

Eric: Oh, I want Viv to be a productive member, but it's not for me to actually

George: The team...

Mildred: Contribution to the team? Would that be a [Crosstalk 0:16:12].

Viv: [I would have assumed] they're my team. I mean, I thought we were equals.

(4) Txt span or relation?

(If argument = relation, then...)

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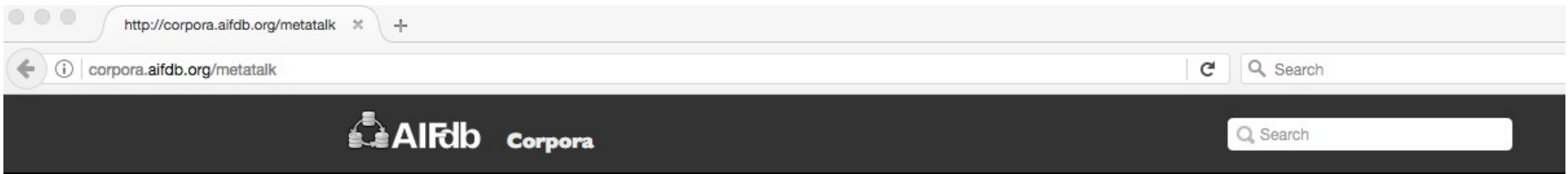
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(4) Txt span or relation?

(If argument = relation, then...)

Meta-talk in mediation Argument maps of meta-talk in dispute mediation Download: tar.gz zip	146 argument maps
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MM2012a Argument maps of 4 transcripts from the 2012 Moral Maze corpus Download: tar.gz zip	171 argument maps

(4) Txt span or relation?



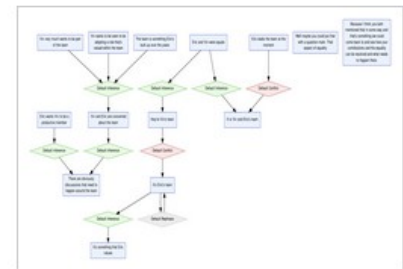
Meta-talk in mediation

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Argument Map 4815

Viv and Eric are concerned about the team Viv very much wants to be part of the team Viv wants to be seen to be adopting a role that's valued within the team The team is something Eric's built up over the years It's something that Eric values It's Eric's team There are obviously discussions...

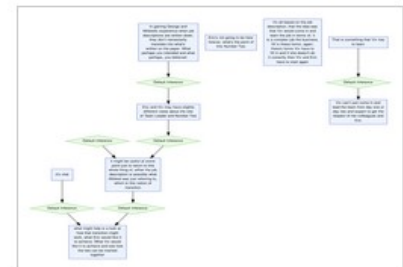
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Argument Map 4820

Eric and Viv may have slightly different views about the role of Team Leader and Number Two In gaining George and Mildred's experience when job descriptions are written down, they don't necessarily translate into what's written on the paper. What perhaps you intended and what perhaps, you...

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Argument Map 4823

xxx is how Viv and Eric communicate that and the aspects of the job Eric tries to speak to Viv Viv's assertive to Eric there's an example there, Viv just doesn't want to listen Viv, Eric, Mildred and George should put even something as general as communication and how that is achieved between...

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(4) Txt span or relation?

George: The one main interesting point I noticed, both of you were concerned about the team. You very much want to be part of the team; you want to be seen to be adopting a role that's valued within the team. The team is something you've built up over the years. Eric: That's right. George: It's something that you value; it's what makes [0:15:52] Eric: It's my team. George: It's your team, exactly. Mildred: Maybe. George: There are obviously discussions that need to happen around the team. Would that be a fair statement? Viv: Yes. Eric: Oh, I want Viv to be a productive member, but it's not for me to actually [0:16:07]. George: The team... Mildred: Contribution to the team? Would that be a [Crosstalk 0:16:12]. Viv: [I would have assumed] they're my team. I mean, I thought we were equals. George: Okay. Viv: Not our team? Eric: Well I lead the team at the moment... [Crosstalk 0:16:22]. Viv: The team is a [feature 0:16:23]. Mildred: Well maybe you could put that with a question mark. That aspect of equality. Because I think you both mentioned that in some way and that's something we could come back to and see how your contributions and the equality can be resolved and what needs to happen there.

