

# Within reason: Categorising enthymematic reasoning in the balloon task

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## Abstract

In dialogue, people often use reasoning that relies on information not explicitly present in the discourse, or *enthymemes*. We report on a preliminary corpus study to categorise the enthymematic arguments used in text chat discussions of a moral dilemma; the *balloon task*.

## 1 Introduction

When engaging in conversation we sometimes use arguments. This tendency is stronger in some types of dialogue, but is present even in everyday conversation, as discussed in (Breitholtz, 2014) and (?). The type of arguments we use in conversation are almost always *enthymematic*, that is they need to be supplied with information that is not explicitly present in the discourse, but only in the minds of the language users. In rhetoric it is thus important to choose the enthymemes you use as a speaker to tap into patterns of reasoning that are recognised and accepted by the audience. In this paper we try to investigate the types of arguments used in 11 argumentative dialogues on the same topic.

## 2 Method

### 2.1 Corpus

The corpus of data consisted of 11 online, text-based dialogues between pairs of native English speakers, collected using the DiET chat tool (Healey et al., 2003), at Queen Mary University of London.

Participants discussed the *balloon task* – an ethical dilemma requiring agreement on which of three passengers should be thrown out of a hot air balloon that will crash, killing all the passengers, if one is not sacrificed. The choice is between Nick, a scientist, who believes he is on the brink of discovering a cure for cancer, Susie, a woman who

is 7 months pregnant, and Tom, her husband, the pilot. This task has been used for studying many aspects of dialogue, as it is known to stimulate discussion (Howes et al., 2011).

### 2.2 Annotations

The corpus was annotated for arguments regarding who to save and who to throw out. For each claim that someone should be saved and thrown out we also noted what seemed to be at the core of the enthymeme, that is, the gist of the argument. For example, one participant wants to throw Susie out with the motivation that the potential of her unborn baby is uncertain.

## 3 Results and Discussion

		Nick	Susie	Tom	Total
All	Throw	184	27	51	262
	Save	75	78	78	231
Threw Nick	Throw	132	14	22	168
	Save	39	58	57	154
Threw Tom	Throw	18	6	25	49
	Save	14	9	1	37

Table 1: Number of turns containing a reason to save or throw each person

Of 1983 turns in total, 1496 (26%) contained reasoning about who to keep in the balloon or who to throw out. Interestingly, as can be seen from Table 1, although participants supply approximately as many turns containing arguments to save each person, they provide a far higher proportion of turns which offer arguments for throwing Nick. This is in line with the fact that of the 11 pairs, 7 opted to throw Nick. 3 pairs opted to throw Tom, and one pair did not reach agreement with one participant opting to throw Nick, and the other Susie.

### 3.1 Arguments used

As shown in Table 2, there are a number of different arguments employed by participants in justifying their decision of who to throw out of the balloon and who to save. Some of these occur in most of the dialogues, such as the reasoning that Nick only believes he is on the brink of a cure for cancer (see e.g. 1), whilst others are rarer, such as the reasoning that the balloon losing height is Tom’s fault (see e.g. 2). Similarly, some reasons are specifically tailored to one of the people, and others can be used to justify different conclusions, such as the speculation about who is heaviest ‘weight’ (see the examples in 3, taken from different dialogues).

	Nick	Tom	Disagree	Total
Nick can save lives	30	12	21	63
Tom can fly	41	13	5	59
Nick only believes	29	10	19	58
Nick has notes	28	1	2	31
Susie family	25	1	5	31
Nick has team	22	4	4	30
Susie is two people	17	8	5	30
Tom family	18	9	3	30
Tom can explain flying	8	10	0	18
Emotive	12	2	2	16
Least important	10	1	3	14
Nick is nice	12	1	0	13
Susie is teacher	9	0	4	13
Tom’s fault	6	6	0	12
Nick family	7	1	1	9
Nick isn’t nice	9	0	0	9
Unborn baby potential	5	0	4	9
Weight	8	2	0	10
Media response	8	0	0	8
Nick could fly	3	0	3	6
Susie is weak	6	0	0	6
Nick might be father	1	2	0	3
Susie Tom couple	1	2	0	3
Nick can explain	0	0	2	2
Nick can help after	2	0	0	2
Nick is old	2	0	0	2
Tom duty	0	1	0	1
Total	319	86	83	488

Table 2: Gloss of reasons given

- (1) A he ‘believes’ he is on the brink  
 A his research might be dudd  
 R he could be bluffing

- (2) F cos hes a balloon pilot and therefore he would of known the consequences of the balloon in the first place  
 T if the dr is twice the size of tom, that would guarantee their extra height  
 (3) P but then the woman may also be heavier because she is carrying a child.....

### 4 Conclusions and Future work

We intend to investigate whether this categorisation of enthymematic reasoning in the balloon task is robust, and can be used to predict or influence who participants will throw off the balloon. We will extend the preliminary work presented here to face-to-face dialogue, and also to see if the reasoning deficits described in patients in schizophrenia (Langdon et al., 2010) can be accounted for by enthymemes and their underlying topoi. We propose to test this using an existing corpus, using a variant of the balloon task between either three healthy control participants or two healthy control participants and one patient with schizophrenia (Lavelle et al., 2012).

### Acknowledgments

Thanks to Shauna Colcannon for the availability of the corpus.

### References

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