How Natural is Argument in Natural Dialogue?

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Abstract

Exposed disagreement is extremely rare in natural dialogue. Although informal argumentation features frequently in natural dialogue, the ways in which individuals make and evidence claims and position their opinions in relation to those of others is often achieved through more subtle and oblique methods. This makes natural dialogue distinct from more formal or institutionalised contexts. With increasing availability of natural dialogue datasets and with increasingly diverse contexts within which the application of argumentation modelling could be beneficial, being able to identify and interpret argumentation in natural dialogue becomes more important; so too does an understanding of why argumentation is enacted differently in natural dialogue and how factors such as politeness impact upon this. In this paper we highlight some of the ways in which argumentative content is produced differently in natural dialogue compared to formalised debate contexts and highly structured documents. We present some initial findings that demonstrate how existing models such as the Penn Discourse Treebank need further development if they are to adapt to the more dialogic data created on the social web.

1 Introduction

In natural dialogue individuals take to care to make statements in such a way as to not cause offence, especially when presenting a stance that may be contrasting or challenging to another speaker's prior contribution. Exposed disagreement is rare in natural dialogue and the ways in which individuals present their own and others' positions on a given topic are influenced by efforts to maintain politeness.

Computational modelling of argumentation has typically drawn on textual data from institutional contexts such as academia, politics or law and online data from product review and debate sites. In contexts such as legal or parliamentary debate stylised language, rhetoric and persuasion are employed, and arguments are typically prepared in advance. In natural dialogue it is often through the process of dialogue that individuals come to know and refine their own opinions, as well as those of others, making natural dialogue a particularly rich source for understanding opinion formation. In these aforementioned contexts the expectation is established that opinions will be freely expressed and there is no social obligation to mitigate the impact of exposing contrary opinions. In natural dialogue, this predefined expectation for argumentation is often not present, and the implications of challenging another person's opinion can be potentially problematic. Social interactions involve the management of a person's public self image, or *face*, in Erving Goffman's terms.

In order to access the abundance of informal argumentation that is increasingly taking place on the social web, closer attention should be paid to how opinion, agreement and disagreement are enacted in natural dialogue. In particular, we suggest that a starting point is empirical studies of face-to-face dialogue. Furthermore, as emerging applications of online technologies are used in ever diverse contexts in which inter-personal relationship management is important, such as health care dialogues, understanding the social dynamics of dialogue and disagreement is ever more crucial.

This work contributes to the existing literature on Computational Models of Natural Argument by addressing how the processes of disagreeing with a conversational partner is executed in natural dialogue. We demonstrate that explicit disagreement is quite rare in natural dialogue and highlight some of the more implicit mechanisms that are used to position a stance as oppositional, and achieve disagreement without enacting disagreement in the more recognisable forms. We discuss how politeness theory can guide our interpretations of interactions and demonstrate the interactional significance of paralinguistic features, such as hesitations and disfluencies. Finally, we present some preliminary findings on how discourse relations manifest differently in natural dialogue compared to

news articles.

2 Related work

Classifying and extracting argumentative content automatically has been demonstrated in such contexts as parliamentary debate [11], legal documents [10], news articles [9] and online debate forums [1, 3]. While there is some work addressing dialogic argumentative interactions, the focus so far has been on highly structured argumentative texts. Previous work has shown that discourse relations are closely related to argumentative relations, most notably led by the creation of two annotated corpora, the Rhetorical Structure Theory Discourse Treebank (RST-DT) [5] and the Penn Discourse Treebank (PDTB) [13]. Such annotated corpora have been valuable resources for training automatic classifiers, but as the source material for both is news articles, how useful they will be for natural dialogue is unclear. Recent consideration of how to develop effective approaches to argumentation on the social web, has emphasised that dialogue is structured differently, and warns that meaning may be lost if messages are extracted individually and out of context [14].

Furthermore, as we will demonstrate in this paper, argumentation in natural dialogue relies much more heavily on vague and implicit arguments, which are challenging to identify through existing argument mining methods. Machine learning approaches, such as [2], which include textual entailment, stance alignment and semantic textual similarity analysis have gone some way to improve performance, but are typically applied to highly structured datasets, i.e. forum posts labeled in support or attack of a given argument. Argumentation in 'online dialogue' [1], although arguably more closely aligned to natural dialogue as the content is generated on forums by those not specifically trained in rhetoric and debate, is still distinct in a number of ways: the structured post-and-response format, the time available for formulation and consideration before publishing, and (in many cases) explicit meta-tagging of content as 'support' of 'attack' of an argument. A corpus study highlighted that the markers of agreement and disagreement employed in the Internet Argument Corpus, were very uncommon in naturally occurring conversation [7]. In natural conversational dialogue data the strategies used in argumentation are likely to be more diverse and less formalised. If argumentation frameworks can also account for and adapt to such data, they will be applicable to more contexts; in order to tap into the wealth of data available via social media and other online sources, it is necessary to adapt argumentation models for the conversation of the lay commentator, not just the trained professional.

The web is an increasingly social space, in which huge quantities of informal interactions are captured, many of which feature argument structures and 'could provide real insight into the stated beliefs and reasoning of people into the large problems that are increasingly effecting our society' [15]. The need for new and adapted approaches for argumentation on the social web has been acknowledged [14, 15]. Data on the social web is often more closely aligned with conversational dialogue in structure than written text; consequently, the importance of developing systems that can interpret incremental, fragmentary and colloquial content is essential. In order to create intelligent systems that can interpret a wider range of strategies used by people in the process of argumentation, that will apply to multiple contexts beyond formal argumentation contexts such as law, we need to better understand the way in which argumentation is performed in everyday contexts. This is particularly essential as argumentation begins to spread to diverse contexts such as pedagogy, health consultation and e-democracy.

2.1 Politeness and social conventions

Qualitative studies show that exposed disagreement is generally avoided in conversation [12]. This is normally attributed to politeness strategies that mitigate potentially face threatening behaviour [4]. Disagreeing or expressing a view in opposition to that of your interlocutor can be socially problematic. Brown and Levinson [4] explain the predisposition for the avoidance of disagreement in terms of *face*, i.e. the public self-image or identity of an individual in interaction with others [8]. Direct challenges to a speaker can constitute a *Face Threatening Act*, i.e. it can threaten the hearer's public identity. Conversation Analysis (CA) has also shown that when people produce initial assessments of situations or events, positive responses are made more quickly and clearly than negative or unaligned responses. Negative responses are normally produced more slowly and are often prefaced with some form of agreement (e.g. 'Oh yes... but'); the negative assessment is often delayed by several turns and produced with some sort of mitigating account [12]. Although research has shown that incivility occurs more freely online, the negative social impact of exposed and unmitigated disagreement persists in computer mediated dialogues between acquaintances [6].

3 Argumentation in natural dialogue

How people enact disagreement is socially important, and more often than not it is achieved through subtle means. Politeness theory suggests that interlocutors employ strategic conflict avoidance techniques to mitigate the effect of any disagreement that may surface. Care is taken to make disagreement indirect, thus making a rubric for identifying disagreement challenging.

3.1 The span of disagreement in natural dialogue

In natural dialogue, because of the preference to minimise disagreement and emphasise agreement, speakers often de-

```
    A: D'yuh li:ke it?
(+) D: .hhh Yes I do like it= (-)
    D: =although I rreally::=
    C: =Dju make it?
    A: No We bought it, It?s a .hh a
       Mary Kerrida print.
    D: 0:h (I k-)=
    A: =Dz that make any sense to you?
    C: Mn mh.  I don' even know who
       she is.
    A: She's that's, the Sister
       Kerrida,  who,
    D: Oh that's the one you to:ld me
       you bou:ght.=
    C: Oh-
    A: Ye:h
    D: Ya:h.
    A: Right.
       (1.0)
    A: It's worth something,
       (1.0)
    A: There's only a hundred of'm
       (0.5)
    D: Hmm
    E: which picture is that.
    A: The one that saysLife.
       (1.5)
    A: ( ).
(-) D: 'hhh Well I don't- I'm not a
       great fan of this type of a:rt.
       There are
       certain ones I see thet I like,
       But I like the w- =
    E: =Is there ano thu way of
       spelling Life?.
(-) D: -more realistic-.
    A: hhmh!
    E: That's all I wd loo(hh)k fo(h),
    D: hh!
(-) D: Yih d-know why don't got fer
       this type of uh:  art, Becuz
       it- it
       strikes me ez being the
       magazine adverti:sement yt:pe.
       Which some
       uh-uh some a' them are really
       great.  But tuhm I-my, taste in
       art is
       for the more uhit-t-treh- it
       tends tuh be realistic.
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Example 1: Evaluation of a new artwork from (JS:I. -1) [12]

lay the delivery of *dispreferred* responses. CA is an approach that without introducing additional theory, looks at language used by the speakers to interpret the sequential meaning of the language. CA has shown that when people produce a response to a previous assessment, if the content is positive it is made more quickly and directly than if it is an unaligned response that might challenge the prior speaker's face. Negative or dispreferred responses are typically prefaced with a delay or an agreement token [12]. Consequently, argumentative content can span quite a number of turns in a dialogue, and failing to consider this fully could lead to misinterpretation and false classification of stance. Disagreements can be socially problematic and so speakers often delay issuing contrasting or challenging propositions. This can be signalled through turn initial hesitations, disfluencies and discourse markers, or by prefacing any disagreement content with an agreement. This can make automatic extraction of disagreement from natural dialogue extremely challenging.

Consider example 1; in this transcription, Evaluation of an artwork, taken from (JS:I. -1) [12], participant A is inviting the others to provide their opinions on the artwork at which they are currently looking. Critical assessments are indicated in the transcript by Pomerantz with a '-' sign, while a '+' sign indicates a positive assessment. The way in which A structures their questions, 'D'yuh li:ke it?', constrains the range of appropriate responses to a polar yes/no response. D, although issuing a slight hesitation (as indicated in the transcript as 'hhh'), provides a positive appreciation in the turn directly following the initial question. Notably, this is followed by the contrastive conjunctive 'although', which initiates D's next turn, and provides some indication that they have more to add on this subject. However, it is not until some 18 turns later that D manages to contribute that they are 'not a great fan of this type of art'. In the final turn of the example D explains that that they find it reminiscent of a magazine advertisement, and state that their taste in art is more realistic. Without ever directly saying that they do not like it, it becomes clear that they don't despite having explicitly said that they do.

A great deal of conversational context must be taken into account in order to identify the position each speaker is taking. The polar interrogative that A initially offers, leaves D with the choice of being polite, and providing the preferred response, or offering a more accurate but dispreferred response (i.e. that she doesn't like the artwork), which directly positions her in opposition to her interlocutor. As this example highlights, offering an opinion can be significantly affected by the social factors of the interaction. If we had considered only the first two lines a different summary of the discussion would have been concluded (example 2):

```
A: D'yuh li:ke it?
D: .hhh Yes I do like it= (-)
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Example 2: Detail of Evaluation of a new artwork from

By examining only this segment we could conclude that

A and D both like the painting. D's response taken in isolation could lead to erroneous analysis; if the full context of the dialogue *is* included, then a different interpretation is possible. However, even if we manage to extract all of the propositional content from the dialogue, it is still difficult to make a accurate interpretation (example 3).

```
A: Do you like it?
D: Yes I do like it.  I'm not a
   great fan of this type of art.
   It strikes me as being the
   magazine advertisement type.
   Some magazine advertisement
   type art is great.  But my,
   taste in art is for the more
   realistic.
```

Example 3: Summary of Evaluation of a new artwork from

From example 3, it would be valid to conclude that D likes this artwork, although in general they are not a fan of this style of work as they prefer more realistic art. 'Yes I do like it', is direct and seemingly unequivocal; thus, when interpreting it alongside the summarised content, it carries more weight and seems more directly connected to the original question than what follows. However, when considering the full transcript, the dialogue reads quite differently, and the likelihood that D simply says they like it out of politeness, before providing an account for why they don't, seems much more plausible. This example highlights the importance of paralinguistic features, such as hesitation. Before D asserts that they do like the artwork they issue a breathy hesitant delay. While this may seem like noise in the data, it is actually an important indicator that D is struggling to formulate and appropriate response. Such paralinguistic content can prove vital to an accurate interpretation of the interaction.

Making and responding to assessments and assertions occurs frequently in natural dialogue. When responding to an initial assessment, an agreement may be signalled by repeating back the original assessment, but subtle details such as whether it is an exact repeat or a modified repeat can signal whether it is a strong agreement or weaker variation, modifying or downgrade the original assessment or even acting as a disagreement. Example 4, taken from [12], illustrates a disagreement. A pause and delay, '(hhhhh) well', is inserted, followed by a partial agreement, before the contrastive conjunctive 'but' is uttered, signalling that this is not in fact an agreement. Such mechanisms enable the speaker to take some time to formulate their disagreement, to search for a tactful way to deliver it, and prevent the response coming across as blunt or aggressive.

Pomerantz highlights that people have a tendency to minimize disagreements; respondents to initial assessments employ backdowns to hint at disagreement while still leaving *room to avert it*, that is, the conversant can resume with a modified assessment that may lead onto agreement. As such, there are times when honest appraisals are simply not a part of interaction: 'It is not only that what would be a disagreement might not get said, but that what comes to be said may be said as an agreement' [12]. In addition to hesitation, speaker B also uses the discourse marker *well* in line 3. A turn-initial *well* typically (but not exclusively) indicates that a disagreement is forthcoming or what follows will be in some way contrary to a prior statement [12]. Speaker B performs an initial agreement, signalled through a turn-initial *No* (typically regarded as a marker of disagreement) and a repeat back 'they take working at', before delivering a contrasting point of view, namely that certain traits are innate. In response, speaker A begins with a token agreement, chiming in with accord, before reverting back to their previous, contrary stance: 'I think it can be developed too'. By adding 'too' at the end of the utterance, it enables A to maintain their line of argument while conceding to the possibility that they both could be right, thus mitigating any face threat and enabling the difference of opinions to be left unresolved.

```
A: cause those things take working
   at,
   (2.0)
B: (hhhhh) well, they do, but
A: They aren't accidents,
B: No, they take working at, But
   on the other hand, some people
   are born with uhm (1.0) well
   a sense of humor, I think it's
   something you are born with
   Bea.
A: Yes.  Or it's c- I have the-
   eh yes, I think a lotta people
   are, but then I think it can be
   developed too.
```

Example 4: Example of a disagreement from [12]

These two extracts highlight many of the devices, such as hesitation, negation, and discourse markers, that are employed when managing disagreement in natural dialogue. They also demonstrate how a disagreement can be withheld initially and argumentative content can span across multiple turns, making the process of delimiting relevant context problematic. The importance of context is evident throughout; the turn-initial 'no', without the consideration of the previous turn, which features a negative verb (aren't), could easily be misleading, but example 1 demonstrated that context often spans more than adjacent turns.

4 Studying disagreement in natural dialogue

The CA observations, as demonstrated by the examples in section 3, highlight the ways that people normally make effort to avoid exposing disagreements directly (unless of course they intend to be abrupt or confrontational). In natural dialogue the presentation of opinions, evidence and counterclaims, are not always marked as agreement or disagreement, rather they often remain implicit and can span over many turns of talk. In addition to this, dialogue is fragmentary and metalinguisitic features (e.g. discourse markers) can be highly context dependent, making modelling argumentation in natural dialogue particularly challenging. One alternative approach may be to include more lexical features that relate to stance and politeness in computational models of argumentation. These linguistic features are particularly important in dialogue as they enable a speaker to position an utterance in opposition to a prior proposition without necessarily enacting a direct challenge or disagreement. Better understanding the ways in which individuals construct argumentative content, whilst still adhering to norms of politeness, could be extremely beneficial for computational argumentation models of natural dialogue. If we look to face-to-face dialogue as a starting point, and think more about politeness and the socially problematic aspects of dialogue we may be able to understand the challenge at hand better and approach it in a more sophisticated manner.

Two main objectives that our future work will set out to achieve therefore, will be: to develop a more robust framework of what argumentation *does* look like in natural dialogue, and to explore the limitations of existing models. In order to establish whether existing argumentation models are less suited to natural dialogue a preliminary corpus approach was developed using the British National Corpus (BNC). Although these are very preliminary results, they provide helpful indicators of some of the most crude differences between natural dialogue and more formal debate data.

An initial cursory comparison of the 'spoken demographic' sample of the BNC with the Penn Discourse Tree Bank (PDTB) corpus highlights some of the differences observed in natural dialogue when compared to news articles. Discourse connectives are key to interpreting argument structure and deducing the relationship between argument content items. The explicit connective *for example* does not occur at all in the spoken demographic portion of the BNC, but occurs 196 times as an explicit connectives in the PDTB. In the PDTB corpus, assertion propositions, indicated by communicative verbs (say, mention, claim, argue), account for the overwhelming majority of relationships between agents in the corpus (98%), with the other *types* (beliefs, factives and eventualities) occurring very infrequently. However, in the BNC, propositional attitude markers, such as *think, believe, feel, expect, suppose,* and *imagine*, are a key resource through which individuals present their own stance in conversation. If we take the propositional attitude verb *think*, there are 14264 instances in 150 of a total 153 files; *think* occurs in nearly every conversation file in the demographic portion of the BNC. *Believe*, while slightly less common, still features in 116 of 153 transcripts. While the espousal of internal states and subjective positioning may be inappropriate in a news article, in dialogue it is a key resource for positioning your argument, and can also act as a form of hedging, helping *face management*. These very preliminary insights suggest that more detailed investigation of how argumentation in natural dialogue is marked could be very useful, particularly if applied to CMC data from informal contexts.

5 Conclusion

In this paper we have highlighted some of the ways in which argumentative content is produced differently in natural dialogue compared to formalised debate contexts. Some initial findings were presented that demonstrate how existing models such as PDTB need further development if they are to adapt to conversational data created on the social web. We emphasise the importance of considering social factors, such as politeness, when modelling disagreement in natural dialogue and offer some potential ways to interpret and account for this in interactional data.

Acknowledgments

This work was funded by EPSRC through the Media and Arts Technology Programme, an RCUK Doctoral Training Centre EP/G03723X/1.

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