What excludes an Alternative in Coherence Relations?

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Abstract

This paper identifies features that occur frequently in coherence relations labelled CHOSEN ALTERNATIVE. This achieves two goals: (1) to identify evidence for an argument being considered an alternative excluded from further consideration, and (2) to contribute to the automatic identification of coherence relations and their arguments. It is shown that the simplest of these features occur significantly more often in implicit CHOSEN ALTERNATIVE relations than in explicit CHOSEN ALTERNATIVE relations, where a connective helps signal this sense.

1 Introduction

There have been two main approaches to identifying what coherence relations can hold between the segments in a discourse. Knott (1996) calls one *theoretical*, grounded in a philosophical view of language, and the other *empirical*, grounded in the discourse connectives that can be taken as explicit expressions of coherence relations. Knott's own approach starts with the first, characterizing patterns of meaning-preserving *substitutability* between connectives — whether two connectives are freely substitutable wherever they occur as connectives (hence *synonyms*), contingently substitutable (one a *hyponym* of the other), or non-substitutable (hence *exclusive*). He then explains these patterns in terms of connectives being more or less specific with respect to one or more theoretically-motivated features and their (exclusive) values. In later work, Knott and Sanders (1998) show how the approach works for subsets of connectives in both English and Dutch. It does not, however, explain how the same coherence relations may be seen to hold when connectives are absent.

Automated approaches to recognizing coherence relations do not assume that their sense arises solely from connectives. Rather, these approaches take as evidence, lexical and syntactic features of the arguments of the coherence relation, nearby coherence relations, high-level text structure, etc. (Feng and Hirst, 2012; Ghosh et al., 2011; Hernault et al., 2010; Lin et al., 2010; Lin, 2012; Marcu, 2000; Marcu and Echihabi, 2002; Sagae, 2009; Sporleder and Lascarides, 2008; Subba et al., 2006). As one might expect, automated approaches use simple features that can be computed reliably. However, performance in recognizing coherence relations in the absense of connectives is still low, and significant improvement is unlikely to come from simply trying new Machine Learning methods over the same set of simple features. A bigger pay-off might come from identifying more predictive features. That is the goal of the current work.

The particular coherence relation of interest here is one that holds when the discourse connective *instead* is present, but can also hold when it isn't. In the Penn Discourse TreeBank 2.0 (Prasad et al., 2008), the sense is called CHOSEN ALTERNATIVE. It is defined as holding when "two alternatives are evoked in the discourse but only one is taken" — meaning still being considered while the other isn't (The PDTB Research Group, 2008).

Such a definition leads to two questions: What, if any, features suggest that the two arguments of a coherence relation denote *alternatives*, and what, if any, features indicate that one of them has been *excluded* from further consideration? As Sporleder and Lascarides (2008) argue, one should not assume *a priori* that the same features will be at work when a connective is present and when it isn't. However,

one satisfying outcome of the current effort is that when the most common features are present, an explicit connective is often absent. When the evidence is more subtle, explicit connectives are more often present.

The PDTB 2.0 provides a good basis for starting to address these questions because it contains over 40K manual annotations of coherence relations that are either signalled by explicit discourse connectives or that hold between adjacent sentences that lack such an explicit signal (Prasad et al., 2008). Additional evidence is taken from a corpus of >300 singly-annotated tokens of the discourse connective *instead* and its arguments gathered over several years (the *Instead Corpus*).

The paper is structured as follows: Section 2 presents the connective *instead* and its place in earlier approaches to coherence relations. It then presents the annotation of coherence relations in the PDTB 2.0. Within this framework, *instead* is taken to be an unambiguous signal of the coherence relation CHOSEN ALTERNATIVE, one of three types of ALTERNATIVE relations annotated in the PDTB 2.0. The section concludes by laying out the scope of the current study with respect to CHOSEN ALTERNATIVE, which is to argue for what characterizes the argument that serves as its *excluded alternative*. Section 3 describes several constructions that commonly appear there in explicit CHOSEN ALTERNATIVE. Section 4 then shows that three of them (negation markers, *downward-entailing* constructions, and event *modals*) are even more frequent in the even larger percentage of implicit CHOSEN ALTERNATIVE. Finally, Section 5 lays out some open issues and some thoughts on further work that should be done.

2 *Instead* and CHOSEN ALTERNATIVE

2.1 Background

As noted in the Introduction, approaches to coherence relations differ in whether they start from an abstract theory of what relations can hold between units of text, or from empirical data on the discourse connectives that serve as explicit ways of expressing those relations.

Rhetorical Structure Theory (Mann and Thompson, 1988) belongs to the first sort. In the first large corpus annotated in the framework of RST — the *RST Corpus* (Carlson et al., 2003) — coherence relations are annotated on the basis of definitions that do not link them with any particular discourse connectives (Carlson and Marcu, 2001). Still, examining the corpus for those elementary discourse units (EDUs) that begin *"Instead, ... "*, one finds eleven such EDUs: three in CONTRAST relations, four in PREFERENCE and two in ANTITHESIS relations (both being types of COMPARISON relations), one in a REASON relation and one in an ELABORATION relation. Given this, one can not associate the connective *instead* with any particular coherence relation (or relations, if it is ambiguous) because there is no record for why any of these relations has been taken to hold between EDUs other than their definitions.

Instead is one of the discourse connectives that Knott (1996) has analysed. He places it at a very high level of his substitutability structure, taking it to be specified only for the feature *polarity* with value *negative*. *Polarity* is defined in terms of a defeasible rule $P \rightarrow Q$. Given two segments A and C connected by a connective whose polarity is *positive*, $A=P$, $C=Q$ and the defeasible rule is specified to succeed. If the polarity of the connective is *negative*, $A=P$, C is inconsistent with Q, and the rule is specified to fail. If a connective is unspecified for *polarity*, then neither case holds. But *instead* having negative polarity does not provide any information about its arguments beyond the fact that the speaker must believe in the existence of such a rule and that it fails for the given arguments.

While Martin (1992) also approaches coherence relations from theory (here, systemic-functional grammar (Halliday and Hasan, 1976)), he illustrates each relation with one or more English connectives. One can see from this that he takes *instead* to convey the COMPARATIVE relation he calls REPLACEMENT. In later work on families of coherence relations and connectives in English and German, Stede (2012) similarly mentions both English *instead* and German *anstatt*, as both expressing the SUBSTITUTION relation, a sub-type of CONTRASTIVE RELATION. Both REPLACEMENT and SUBSTITUTION seem intuitively to represent the same notion as CHOSEN ALTERNATIVE in the Penn Discourse TreeBank.

2.2 The Penn Discourse TreeBank 2.0

As noted in the Introduction, the Penn Discourse TreeBank 2.0 (or PDTB 2.0) contains over 40K manual annotations of coherence relations over the *Penn Wall Street Journal Corpus*, over 18K signalled by explicit discourse connectives and over 16K holding between adjacent sentences that lack this explicit signal (Prasad et al., 2008). In the latter case, readers are taken to infer an *implicit* discourse connective relating the adjacent units, and their annotation includes an indication of the connective that best conveys the inferred relation. The remaining annotation includes around 5K tokens of *entity relations*, where the second sentence only serves to provide some further description of an entity in the first, akin to *entity-based coherence* (Knott et al., 2001), plus another 624 tokens in which the coherence relation is signalled by some alternative lexicalization (such as "that means") other than a conjunction or discourse adverbial and another 254 in which no relation is inferred as holding between the adjacent sentences.

Annotated for each coherence relation are its arguments, the one or more sense relations taken to hold between them, and any attribution relations taken to hold over either the relation as a whole or either of its arguments.

All coherence relations have two and only two arguments. When a relation is realised with an explicit connective or alternative lexicalization (ALTLEX), one of those arguments derives from the clause that is syntactically bound to the connective. In the PDTB 2.0, this is called **Arg2**. The other argument, called *Arg1*, may be linked syntactically to **Arg2** if the connective is a subordinating conjunction or coordinating conjunction (Ex. 1). Or it may be elsewhere in the sentence or previous discourse, if the connective is a discourse adverbial (Ex. 2). If the coherence relation is realized through sentence adjacency and an *implicit connective*, the second sentence is taken to provide **Arg2** and the first sentence, *Arg1*.

(1) Several years ago he gave up *trying to persuade Miami to improve its city-owned Orange Bowl*, **and** <u>instead</u> **built his own $100 million coliseum with private funds**. [wsj_0126]

(2) The tension was evident on Wednesday evening during Mr. Nixon's final banquet toast, normally an opportunity *for reciting platitudes about eternal friendship*. <u>Instead</u>, **Mr. Nixon reminded his host, . . . , that Americans haven't forgiven China's leaders for the military assault of June 3-4 that killed hundreds, and perhaps thousands, of demonstrators**. [wsj_0093]

The senses used in annotation are drawn from a hierarchy of semantic classes whose top level consists of four abstract classes: TEMPORAL, CONTINGENCY, COMPARISON and EXPANSION. Each of these is further divided into several types, which may themselves be further divided into sub-types (The PDTB Research Group, 2008). Annotators could associate one or more senses with each explicit or implicit connective or ALTLEX, with each sense at the level of sub-type or type, if the annotator couldn't decide among its sub-types.

In the PDTB 2.0, 108 of the 112 tokens of *instead* are annotated EXPANSION.ALTERNATIVE.CHOSEN ALTERNATIVE (here, simply CHOSEN ALTERNATIVE). Its higher sense type ALTERNATIVE is taken to hold "when the two arguments denote alternative situations" (The PDTB Research Group, 2008) and its sister sub-types are CONJUNCTIVE (taken to hold when both alternatives are possible) and DISJUNCTIVE (taken to hold when only one alternative needs to be possible). CHOSEN ALTERNATIVE itself is taken to hold when "two alternatives are evoked in the discourse but only one is taken".

Of the four tokens not annotated as CHOSEN ALTERNATIVE, Ex. 3 is annotated ALTERNATIVE rather than the more specific ALTERNATIVE.CHOSEN ALTERNATIVE, though it is hard to imagine the annotators being uncertain about which sub-type holds, Examples 4–5 have been annotated COMPARISON.CONTRAST and Ex. 6, COMPARISON.CONTRAST.JUXTAPOSITION. The latter is defined in terms of a comparison between a shared property having values taken to be *alternatives*. While there will be more to say about CONTRAST versus CHOSEN ALTERNATIVE in Section 5, there is no reason not to consider all four as instances of CHOSEN ALTERNATIVE, if only for considering the set of features its first argument dispays, which are no different than other instances of *instead*.

(3) *The group didn't make a formal offer*, **but** <u>instead</u> [EXPANSION.ALTERNATIVE] **told UAL's advisers before the most-recent board meeting that it was working on a bid valued at between $225 and $240 a share**. [wsj_1010]

(4) *At the 50%-leveraged Zenith Income Fund, portfolio manager John Bianchi recently dumped Mesa Petroleum, Wickes and Horsehead Industries, among others*, …**Because of the recent junk-market turmoil, the fund is considering investing in other issues** <u>instead</u> [COMPARISON.CONTRAST], **including mortgage-backed bonds**. [wsj_0983]

(5) This ministry has done nothing *to correct the misunderstandings and misperceptions that are at the root of Japan's deteriorating image*. <u>Instead</u>, **it seems to be using foreign pressure and even the trade conflict to expand its sphere of influence vis a vis other ministries**.

(6) *It presents no great issue of legal principle, no overriding question of family law or the law of contempt*. <u>Instead</u> [COMPARISON.CONTRAST.JUXTAPOSITION], **it turns on the disputed and elusive facts of "who did what to whom"**. [wsj_0946]

2.3 The Scope of the Current Study

The current study addresses the second question raised in Section 1: What, if any, features indicate that one of the *alternatives* of a CHOSEN ALTERNATIVE relation has been *excluded* from further consideration? This is of practical, as well as of theoretical interest because in English, the *excluded alternative* derives from *Arg1* of the relation.[1] <u>Because this argument is not syntactically linked to the connective, its location and identity is more difficult for automated methods to determine</u> (Webber et al., 2012). Also, for implicit coherence relations, the same features that can be used to identify *Arg1* of an explicit CHOSEN ALTERNATIVE may also be used to suggest that CHOSEN ALTERNATIVE holds in the absense of an explicit connective.

3 Features manifest in CHOSEN ALTERNATIVE

For brevity, instances of CHOSEN ALTERNATIVE that have an explicit connective will simply be called explicit CHOSEN ALTERNATIVE, while those that lack an explicit connective associated with this sense will be called implicit CHOSEN ALTERNATIVE.

This analysis of features characteristic of the arguments of explicit and implicit CHOSEN ALTERNATIVE is based on 289 multiply-annotated tokens in the PDTB 2.0 (118 explicit and 171 implicit), and seven multiply-annotated tokens in the BioDRB corpus (Prasad et al., 2011). The *Instead Corpus* mentioned in Section 1 is used as a source of shorter, simpler examples.

<u>Approximately 70% of the cases of explicit CHOSEN ALTERNATIVE in the PDTB and BioDRB manifest features discussed in Sections 3.1–3.3 below. And ∼87% of the even larger number of implicit CHOSEN ALTERNATIVE do the same (Section 4).</u>

3.1 Negation markers

Of the 118 tokens of explicit CHOSEN ALTERNATIVE, the largest subset have an explicit *negation* marker associated with *Arg1*. Such a marker is sufficient to allow the sense that *Arg1* is an alternative that is no longer in consideration. Negation markers here include *not* (Ex. 8), *no* (Ex. 9), *never* (Ex. 10), and *no one*.

(8) If the flex is worn, *do not use insulating tape to repair it*. <u>Instead</u>, **you should replace it …**.

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[1] Paola Merlo has suggested [personal communication] that this doesn't hold in all languages. She identifies the connective *invece* as expressing CHOSEN ALTERNATIVE in Italian and the closest in meaning to English *instead*. While *Invece* allows either alternative in *Arg1* (Ex. 7), cases like (7b) do not occur in English.

(7) a. John non ha mangiato gli spinaci. <u>Invece</u> Maria si'.
       (John didn't eat spinach. <u>Instead</u> Mary did.)

   b. John ha mangiato gli spinaci. <u>Invece</u> Maria no.
       (John ate spinach. *<u>Instead</u> Mary didn't.)

(9) *There are no separate rafters in a flat roof*; <u>instead</u>, **the ceiling joists of the top story support the roofing**.

(10) *Sue Grafton has never bowed to fad or fashion.* <u>Instead</u>, **she's kept her whip-smart private investigator, Kinsey Millhone, focused on modestly scaled domestic crimes . . .**.

That the negation marker is critical to interpreting *Arg1* as excluded from consideration, can be seen by the infelicity of similar examples without the negation marker.

(11) If the flex is worn, *use insulating tape to repair it.* ***<u>Instead</u>, you should replace it . . .**.

(12) *There are separate rafters in a flat roof*; ***<u>instead</u>, the ceiling joists of the top story support the roofing**.

(13) *Sue Grafton has bowed to fad or fashion.* ***<u>Instead</u>, she's kept her whip-smart private investigator, Kinsey Millhone, . . .**.

3.2 Downward Entailment

Since negation markers are *downward entailing* (DE), one might check whether all DE constructions can exclude *Arg1* of explicit CHOSEN ALTERNATIVE from consideration, or if not all, whether a larger set of DE constructions than just negation markers can do so.

Constructions that are *downward entailing* ($\Downarrow$) support valid reasoning from a set to a member. Ones that are *upward entailing* ($\Uparrow$) support valid reasoning in the opposite direction, from a member to a set. Upward entailment means that one can reason from *John owns a beagle* to *John owns a dog*. Negation markers, being downward entailing, support valid reasoning from *John doesn't own a dog* to *John doesn't own a beagle*.

In the corpora analyzed in this study, the second largest set of explicit CHOSEN ALTERNATIVE relations have a DE predicate associated with *Arg1* that is other than a negation marker. Examples 14–15 below show two of them: *reject* (from *John **rejected** dogs*, conclude *John **rejected** beagles*) and *too <modifier>* (from *John was **too ill** to own a dog*, conclude *John was **too ill** to own a beagle*).

(14) *In India, he **rejects** the identification of Indianness with Hinduism, ...* <u>Instead</u> **he champions Mr Tagore's view . . .**. [The Economist, 18 June 2005]

(15) *The current system is too bureaucratic . . . .* <u>Instead</u>, **research councils should "pay the full costs of the projects they fund . . ."**. [Research Fortnight, 28 April 2004]

Other DE predicates that appear in *Arg1* of explicit CHOSEN ALTERNATIVE in the PDTB or BioDRB are shown in Figure 1: This list, although long, is only a subset of DE constructions. What about other ones? Since neither dictionaries nor other lexical resources record direction of entailing as a property, Danescu-Niculescu-Mizil et al. (2009) attempted to extract DE constructions from the large BLLIP corpus (LDC catalogue LDC2000T43), using cooccurence with *Negative Polarity Items* (NPI) like "any" as a cue.

Figure 2 shows the 55 most frequent DE lemmas that Danescu-Niculescu-Mizil et al. (2009) extracted from the corpus: Four are *negation markers* or contain them (cannot, never, nobody, nothing), twelve have attested occurences in *Arg1* of *instead* in the PDTB or BioDRB (as indicated in Figure 1), and all but two of the others (*compensate for* and *essential for*) can be found on the web in similar *Arg1* position as the attested forms. Why does neither *compensate for* nor *essential for* seem to license an alternative being excluded from consideration, as in

(16) Olivia compensates for eating by exercising. *<u>Instead</u> she ??

(17) Talent is essential for singing. *<u>Instead</u> ???

First, observe that all the DE constructions in Figure 1 and all the lemmas in Figure 2 except for *compensate for* and *essential for* are negative assertions: e.g., *bar*, *block*, *prevent*, and *prohibit* assert that something does **not** occur. In contrast, what is negative in *compensate for* and *essential for* is what they presuppose: *Compensate for* presupposes that one has done something that one should **not** have; *essential for* presupposes that something **cannot** occur without it. While a negative presupposition is sufficient to allow cooccurence with NPIs, as in

abandon	deny	leave	renounce
absence	disagree	less	resist
avoid	discourage from	little	scoff at
banish	dispense with	lose	shy away
be/remain disdainful	dismiss	miss the chance	stop
be futile	do away	miss the opportunity	suspend
be/remain oblivious	drop plans	omit	swear off
be/remain unconvinced	eliminate	pass up	tone down
call off	eschew	prevent X from	vault over
cease	fail	put off	veto
cut X off	give up	rebuff	waste
dare not	hurt	refuse	withdraw
decline	ignore		

Figure 1: DE constructions found in *Arg1* of explicit CHOSEN ALTERNATIVE

absense of **	defer	hardly	premature to	rule out	veto **
absent from	deny **	lack	prevent	skeptical	wary of
anxious about	deter	innocent of	prohibit	suspend **	warn about
avoid **	discourage **	minimize	rarely	thwart	whenever
bar	dismiss **	never *	refrain from	unable to	withstand
barely	doubt	nobody *	refuse **	unaware of	
block	eliminate **	nothing *	regardless	unclear on	
cannot *	essential for	oppose	reject	unlike	
compensate for	exclude	postpone	reluctant to	unlikely	
decline **	fail **	preclude	resist **	unwilling to	

Figure 2: The 55 most common downward entailing lemmas that Danescu-Niculescu-Mizil et al. (2009) found in the BLLIP corpus. * marks *negative* constructions (Section 3.1), and ** marks lemmas also identified as DE constructions in *Arg1* of *instead* in Figure 1.

(18) An online presence is essential for any business today.
[www.alpha360.net/online-presence-essential-business-today]

(19) The car's on-board diagnostic systems compensate for any of these blends to keep it running according to manufacturer's specifications. [http://auto.howstuffworks.com]

it is insufficient to license the exclusion of an alternative from further consideration: That requires a negative assertion. Of course, *compensate for* and *essential for* are not alone in this: The same holds for *repent*, *atone*, *repair*, *make amends for*, etc. All have negative presuppositions and so can cooccur with NPIs, but do not make a negative assertion, so do not license an excluded alternative.

While I will continue to refer to DE predicates as evidence for alternatives being excluded from consideration, I only mean those DE predicates that make a negative assertion and not those that only have a negative presupposition.

3.3 Modals

The third largest set of explicit CHOSEN ALTERNATIVE have a *modal* associated with *Arg1*. However, because there are so many different modals, it makes sense to examine whether all of them license the *excluded alternative* of this relation, and for those which do, it makes sense to examine why they can do so.

Palmer (2001) divides modality into two types:

- *propositional modality*, involving the speaker's attitude towards the factual status of a proposition, as in Ex. 20;

- *event modality*, involving events that are not actualized, but are merely potential, as in Ex. 21.

(20) Kate **must** be eating dinner at home tonight. (Otherwise, you would see her at that table.)

(21) Kate **must** eat dinner at home tonight. (She hasn't spent any time with her children yet this week.)

Palmer further divides *event modality* into:

- *deontic modality*, involving obligation or permission, and conditional factors "that are *external* to the individual"

- *dynamic modality*, involving factors "internal to the individual" (including purpose, wishes, effort, fears, etc.)

Both types of event modality are found associated with *Arg1* of CHOSEN ALTERNATIVE relations. Ex. 22–23 illustrate *deontic modals* (obligation and permission), while Ex. 24–25 illustrate *dynamic modals* (want/wish/desire/hope and effort).

(22) *Charles Kennedy's advisors should have told him the truth.* <u>Instead</u>, **they covered up for him to an unacceptable extent and for far too long**. [The Economist, 14 January 2006]

(23) *Lynn Sherr could have availed herself of one of the 10.4m private pools in the United States.* <u>Instead</u>, **she became determined to swim the Hellespont in western Turkey**. [The Economist, 2 June 2012]

(24) *Anne Compoccia wanted to be a nun.* <u>Instead</u>, **she found herself in prison for embezzling city funds**. [http://www.nytimes.com/2002/12/22/nyregion/22DECA.html?todaysheadlines]

(25) *Lyndon B Johnson was trying to have the parallel presidency that Dick Cheney secured for himself under a compliant George Bush.* <u>Instead</u>, **he was consigned to an office in the Executive Office Building**. [NYRB, 2012]

On the other hand, while Palmer (2001) further divides *propositional modality* into:

- *epistemic modality*, involving the speaker's *judgment* about the factual status of a proposition;

- *evidential modality*, involving the speaker's *evidence* for the factual status of a proposition.

neither seems appropriate in the argument conveying the alternative that is excluded from consideration, and there are no such tokens in the PDTB 2.0, the BioDRB, or the *Instead Corpus*. The examples in (26) illustrate the inappropriateness of *instead* with *epistemic modals*, while those in (27) show the same is true of *evidential modals* (where *they* in Example 27b should be taken as generic, for this to be evidential).

(26) a. John always arrives promptly, so he **must/may** have been delayed. ***<u>Instead</u>**, he decided not to come.

    b. John has a senior pass, so he **must/may** be over 60. ***<u>Instead</u>**, he's not.

(27) a. John seems to have left the house. ***<u>Instead</u>**, he has locked himself in the lavatory.

    b. They say John drinks. ***Instead**, he smokes weed.

This pattern suggests that modals associated with the *excluded alternative* of a CHOSEN ALTERNATIVE relation are ones that mark their associated state-of-affairs as not holding. In her study of alternatives in disjunction, Mauri (2008) uses the term *irrealis* to describe an alternative that doesn't hold. If we follow Mauri, then we can say that *Event modals* mark their associated SoA as *irrealis* because neither factors external to the individual (obligations, permissions, etc.) nor factors internal to the individual (purposes, wishes, effort, fear, etc.) can guarantee that the SoA will come to pass.

3.4 Other features

In addition to these three constructions that appear frequently with excluded alternatives are some other sets that can be characterized by lexico-syntactic features. One is a set of predicates that specify an actual state-of-affairs (SoA) that lead one to *expect* some particular next SoA. While expected, this next SoA does not hold, and so is *irrealis*. Thus, while not modals, these predicates can be associated with alternatives that are excluded from consideration for the same reason as modals can. Among such predicates are *expect* (Ex. 28), *encourage* (Ex. 29), and *prepare to* (Ex. 30).

(28) *They expected a new barrage of demands that Japan do something quickly to reduce its trade surplus with the U.S.* <u>Instead</u>, **they got a discussion of the need for the U.S. and Japan to work together ...** [wsj_2321]

(29) *Their broker encouraged them to take a month in Europe*; <u>instead</u> **they moved to South Carolina, where they began building a dream house on the beach**. [NYTimes, 14 July 2002]

(30) A gynecologist is slain at home by his wife, *who was preparing to serve him coq au vin that evening*. <u>Instead</u>, **she thrusts a kitchen knife through his heart**. [NYTBR, 4 May 2003]

Other state-expecting predicates found in *Arg1* of explicit CHOSEN ALTERNATIVE include: *anticipate*, *be about to*, *plan*, *promise*, *propose*, *raise expectations*, *suggest* and *wait for*. As with downward entailing, state-expecting is not a feature marked in dictionaries, and one may simply have to search for examples in a large corpus based on what it cooccurs with.

A second set comprises **Arg2** of non-factual *if* clauses and constructions indicating hypotheticals such as sentence-initial *Had*. Although downward entailing, they seem sufficiently different from the DE predicates to warrant separate mention. The three examples of this in the PDTB 2.0 include:

(31) *If government or private watchdogs insist, however, on introducing greater friction between the markets (...)*, the end loser will be the markets themselves. <u>Instead</u>, **we ought to be inviting more liquidity with cheaper ways to trade and transfer capital among all participants**. [wsj_0118]

Feature	Implicit tokens	Explicit tokens
Negation marker	**116 (67.8%)**	47 (39.8%)
Downward-entailment	24 (14.0%)	18 (15.3%)
Event Modal	9 (5.3%)	13 (11.0%)
Other	22 (12.9%)	**40 (33.9%)**
Total	171	118

Table 1: Absolute and relative frequency of features found in the excluded alternative of CHOSEN AL-TERNATIVE relations in the PDTB 2.0. Other includes state-expecting predicates and if clauses. Bold indicates the largest differences.

4   Implicit Chosen Alternatives

Having described features commonly found on *Arg1* of explicit CHOSEN ALTERNATIVE that are usually, but not always, signalled by *instead*, I now turn to the even larger number of implicit CHOSEN ALTERNATIVE relations in the PDTB 2.0 and BioDRB. Here, the three features that are most common with explicit CHOSEN ALTERNATIVE are even more common with implicit CHOSEN ALTERNATIVE — negation markers (Ex 32), DE predicates (Ex 33), and event modals (Ex 34):

(32) *It isn't just exercise gear that isn't getting a good workout*. **The fitness craze itself has gone soft**, the survey found. [wsj_0409]

(33) *Copper futures prices failed to extend Friday's rally*. **Declines came because of concern that demand for copper may slow down**. [wsj_0437]

(34) . . . Ortega indicated *that renewed U.S. military aid to the Contras could thwart the balloting*. He said **U.S. assistance should be used to demobilize the rebels**. [wsj_0174]

Table 1 shows just how much more common they are, both with respect to absolute and relative frequency. In fact, with an implicit CHOSEN ALTERNATIVE, either a negation marker, DE predicate or event modal is present ∼87% of the time.

5   Conclusion

I have left three questions unresolved:

1. What is behind the view that *instead* is evidence for a type of COMPARISON relation (Martin, 1992) or a type of CONTRASTIVE relation (Stede, 2012) and behind the decision of PDTB 2.0 annotators to label three of the 112 tokens of *instead* as conveying a COMPARISON.CONTRAST relation?

2. Are the features that allow *Arg1* to be interpreted as an excluded alternative, sufficient to label an implicit discourse relation as having the sense CHOSEN ALTERNATIVE, or do negation markers, DE constructions, event modals and other less frequent licensers of excluded alternatives occur in *Arg1* of other constructions?

3. What features suggest that the two arguments of a coherence relations denote *alternatives*?

With respect to the first question, researchers since Mann and Thompson (1988) have drawn a distinction between SEMANTIC and PRAGMATIC relations, which Moore and Pollack (1992) call INFORMATIONAL and INTENTIONAL, respectively. Moore and Pollack (1992) make a convincing arguement that relations of both types can hold simultaneously. With respect to *instead*, I think it can be argued that it conveys a purely informational relation. That is, *instead* (when it is not in construction with *of*, followed by the alternative being excluded) is *anaphoric*: Its excluded alternative must be derived from the (previous) discourse context. The most common thing that a speaker does with this excluded alternative may be to

compare or contrast it with the alternative still in consideration, so that COMPARISON or CONTRAST become the most common intentional relation to hold when *instead* is used. But other intentional relations are possible, as evidenced by the many instances of explicit *and instead*, *because instead*, and *so instead*, etc. (again, not in construction with *of*). This will be discussed in a companion paper.

As for the second question, negation markers, DE constructions, event modals and state-expecting predicates are indeed found in the first (and second) arguments of relations other than CHOSEN ALTERNATIVE, including purely temporal relations (Example 35) and causal relations (Example 36):

(35) *they may not buy new episodes*, <u>when</u> [TEMPORAL.SYNCHRONY] **their current contracts expire** [wsj_0060]

(36) *The president could probably not avoid this restriction by choosing people willing to serve without pay* <u>because</u> [CONTINGENCY.CAUSE.REASON] **the Anti-Deficiency Act prohibits voluntary service to the government** [wsj_0112]

So a procedure for recognizing *Arg1* of a CHOSEN ALTERNATIVE relation would use the absense of all these features as evidence against a possible candidate.

As for the third question – deciding whether two arguments can and should be interpreted as alternatives – it may be that this does not have to be addressed independently, but rather falls out as a consequence of strong lexico-syntactic cues. This too will be discussed in a companion paper.

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