

Hindi Discourse Relation Bank Annotation Guidelines

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1 Introduction

1.1 Background and Overview

Identifying and processing discourse relations is one of the important parts of discourse understanding. The Penn Discourse Treebank(PDTB) is a resource built on discourse structure in Webber and Joshi (1998), where discourse connectives are treated as discourse-level predicates that take two abstract objects such as events, states, and propositions (Asher, 1993) as their arguments. As part of the annotation, discourse connectives are identified in raw text and their arguments and semantics are annotated. Unlike sentence level predicates, which have multiple arguments, discourse connectives always take two arguments.

Following the completion of the PDTB, further interest in cross-linguistic studies in discourse relations has led to the initiation of similar discourse annotation projects in several languages, such as Chinese (Xue, 2005), Czech (Mladová et al., 2008), and Turkish (Deniz and Webber, 2008). This report describes the annotation guidelines for Hindi Discourse Relation Bank (HDRB) in detail. These guidelines are the result of our efforts to find out how far the underlying framework of the PDTB and its annotation guidelines can be adapted for Hindi. Discourse connectives in the HDRB include Explicit discourse connectives, which are drawn primarily from well- defined syntactic classes, and Implicit discourse connectives, which are inserted between those sentence pairs that have a relation, but that relation is not explicitly expressed by any of the syntactically-defined set of Explicit connectives. In the latter case, the reader must attempt to infer a discourse relation between the sentence pair, and “annotation” consists of inserting a connective expression that best conveys the inferred relation. Connectives inserted in this way to express inferred relations are called Implicit connectives. Multiple discourse relations (Webber et al., 1999) can also be inferred, and are annotated by inserting multiple Implicit connectives.

Sentence-pairs between which annotators found no Implicit connective to be appropriate are further distinguished as: (a) AltLex, where a discourse relation is inferred, but insertion of an Implicit connective leads to redundancy in its expression due to the relation being alternatively lexicalized by some other expression, (b) EntRel, where no discourse relation can be inferred and where the second sentence only serves to provide some further description of an entity in the first sentence (akin to entity-based coherence (Knott et al., 2001)) and (c) NoRel, where neither a discourse relation nor entity-based coherence can be inferred between the adjacent sentences.

Because there are no generally accepted abstract semantic categories for classifying the arguments to discourse connectives as have been suggested for verbs (e.g., agent, patient, theme, etc.), the two arguments to a discourse connective are simply labelled Arg2, for the argument that appears in the clause that is syntactically bound to the connective, and Arg1, for the other argument.

For Explicit connectives, the text spans denoting the connective and its arguments are marked. Apart from this, its sense is also annotated. In case of Implicit connectives, an appropriate connective expression is inserted wherever inferred. After that, its arguments and sense are marked. Annotation for AltLexes is same as that of Explicit connectives. No senses are provided for EntRel and NoRel since no discourse relations are inferred for these. Sense labels are drawn from a hierarchical classification - a three- level hierarchy grouping connectives into classes, types and subtypes - and are annotated as features on connectives.

The annotation guidelines described in this report takes the guidelines followed for the PDTB (Prasad et al, The Penn Discourse Treebank 2.0 Annotation Manual, December 2007) as the base and then deviates from it wherever necessary because of the difference in the nature of the two languages. We also discuss the refinements made in the PDTB guidelines to make them clearer to help us achieve consistency in our annotation.

1.2 Source Corpus

All the source corpus texts are taken from the Hindi newspapers. They comprise news articles from several domains, such as politics, sports, films, etc. Since HDRB is a substantial subset of the corpus selected for syntactic dependency annotation, it is expected to provide a valuable enriched resource for NLP applications aiming to combine sentence and discourse-level processing, as well as for linguistic research, including cross-linguistic studies.

1.3 Notation Convention

Annotated Explicit connectives are underlined, and Implicit connectives are indicated by the marker, “Implicit =”. For the arguments of connectives, the text whose interpretation is the basis for Arg1 appears in *italics*, while that of Arg2 appears in **bold**. In Example (1), the Adverbial इस दौरान is an Explicit connective that establishes a Temporal relation between जाएजा लेना (to inspect) (Arg1) and समीक्षा करना (to analyse) (Arg2). In Example (2), the Implicit connective इसलिये (so) has been inserted to express the inferred consequence relation between the first and second sentences, i.e. between Arg1 and Arg2.

Prime Minister Manmohan Singh will analyse this for the first time in the meeting with his ministers. During this, in NCMP, the progress of the promises in the areas of politics, society and economy will be discussed.

- (1) प्रधानमंत्री मनमोहन सिंह पहली बार अपने सभी मंत्रियों की बैठक में इसका जाएजा लेंगे। इस दौरान एनसीएमपी में राजनीतिक, सामाजिक और आर्थिक क्षेत्र में किए गए वादों की प्रगति की समीक्षा की जाएगी। (2484369:906)

An inserted Implicit Connective or AltLex is represented by “Implicit=” or “AltLex=”. While if an AltLex is already present in the text then it is shown as “AltLex[expr]” “EntRel” and “NoRel” are also underlined and are shown in between the two arguments.

Communist Parties were constantly pressurizing the government for increasing the budget in the areas of education, health and employment. All these areas have been considered in the budget.

- (2) वामदल लगातार सरकार पर शिक्षा, स्वास्थ्य व रोजगार क्षेत्रों में बजट प्रावधान बढ़ाने के लिए दबाव बनाए हुए थे। Implicit = इसलिये बजट में इन सभी क्षेत्रों पर ध्यान दिया गया है। (2484370:1019)

In Section 5, we show the annotation of senses for connectives, where they appear at the end of the example in parentheses and reflect the hierarchical classification of the annotated sense.

2 Explicit Relations

2.1 Identifying Explicit Connectives

Explicit connectives are taken from the following syntactic categories for annotating the HDRB relations.

- *Coordinating Conjunctions*: E.g. और (and), लेकिन (but), तथा (and), etc. are examples of coordinating conjunctions. They conjoin clauses or phrases of the same syntactic status. They can also occur as paired lexical items such as न केवल...बल्कि (not only..but also).

From 5th January, 5 Sukhoi-30 air-planes were to be placed on the base by the Air-Force, but the storm that came in Sunday has ruined the project for now.

- (3) वायुसेना की 5 जनवरी से बेस पर दो सुखोई-30 विमान तैनात किए जाने थे, लेकिन रविवार को आए तूफान ने इस योजना पर फिलहाल पानी फेर दिया है । (2484406:798)

Indian Weather Department knew about the Tsunami in time and it also got to know about the earthquake tremor. But instead of taking precautionary measures, the weather department misled the people while falsifying the news of earthquake in Southern India.

- (4) भारतीय मौसम विभाग को सुनामी की खबर समय रहते लग गई थी और दक्षिण भारत में भूकंप के झटके का भी पता चल गया था। पर एहतियाती कदम उठाने की जगह मौसम विभाग ने दक्षिण भारत में भूकंप की सूचना को झुठलाते हुए लोगों को गुमराह किया । (2484404:262)

There is no new project for small business and cut-offs in the custom duty would have a direct effect on the domestic businesses.

- (5) लघु उद्योग के लिए नई योजना नहीं है और कस्टम ड्यूटी में कटौती का सीधा असर घरेलू उद्योग पर पड़ेगा । (2484370:1678)

Not all instances of Coordinating conjunctions are discourse connectives. In Example (6), और conjoins two NPs and is not a discourse connective.

He said that the problem is of delivering the building material from here via ships and planes.

- (6) उन्होंने कहा कि समस्या जहाजों और विमानों से यहां से निर्माण सामग्री लाने की है । ()

- *Subordinating Conjunctions*: These are the lexical items conjoining finite adverbial clauses to their matrix clauses. They typically occur clause-initially, although some could occur clause-medially as well. As with coordinating conjunctions, the subordinating conjunctions have both single (e.g., क्योंकि (because)) and paired forms (e.g., अगर...तो (if.. then)), but unlike the coordinating conjunctions, one of the elements in a paired subordinating conjunction can be implicit. E.g. अगर...तो, इसलिये, क्योंकि, etc.

If your total income is 5 lakh rupees and you donate 50 thousand rupees to the Prime-Minister Relief fund then for Income tax related calculation your income is assumed to be 4 lakh 50 thousand.

- (7) यदि आपकी कुल आय 5 लाख रुपए है और आप 50 हजार रुपए प्रधानमंत्री राष्ट्रीय सहायता कोष में दान करते हैं तो आयकर संबंधी गणना के लिए आपकी कुल आय 4 लाख 50 हजार मानी जाएगी । (2484411:868)

At morning 9 AM, it was not possible to see 50 Mts. ahead in Safdarjung area. Thus there was nearly no traffic on the roads in morning.

- (8) सुबह नौ बजे सफदरजंग इलाके में पचास मीटर तक भी नहीं देखा जा सकता था। इसलिए सुबह सड़कों पर यातायात न के बराबर रहा। (2484407:2010)

On Sunday, along with the destructive sea waves, the Tsunami not only did bring the terrifying atmosphere but it also destroyed the plan of Indian Air-force to make a big fighter base on this island.

- (9) रविवार को प्रलयकारी समुद्री लहरों के साथ सुनामी अपने साथ न केवल भारत के कार निकोबार द्वीप पर दहशत का माहौल लेकर आया बल्कि इसने भारतीय वायुसेना की इस द्वीप में एक बड़ा लड़ाकू बेस बनाने की योजना के भी परखचे उड़ा दिए हैं। (2484406:237)

As shown in example (9), subordinating conjunctions can also appear inside one of its argument.

- *Sentential Relatives*: These are relative pronouns that conjoin a relative clause with its matrix clause. As the name suggests, only relatives that modify verb phrases are treated as discourse connectives, and not those that modify noun phrases. Some examples are जिससे (so that), जिसके कारण (because of which), etc.

In Palam area, extreme fog came over in the morning, due to which it became impossible to see at a distance of five hundred metres.

- (10) पालम क्षेत्र में तड़के जबरदस्त कोहरा छा गया जिसके कारण पांच सौ मीटर की दूरी कर भी दिखना बंद हो गया। (2484410:988)

- *Adverbials*: These are Adverbial (ADVP) and Postpositional (PP) phrases which act as discourse connectives. Some examples of these are सो, फिर, नहीं, वास्तव में, तभी etc.

For now, Chief-minister Narendra Modi is silent on this topic. On the other hand, Opposition's minister Amarsingh Chowdhary has said that looking at the attitude of the regional ministers, Modi's departure is decided.

- (11) मुख्यमंत्री नरेंद्र मोदी ने फिलहाल इस मामले पर चुप्पी साध रखी है। वहीं विपक्ष के नेता अमरसिंह चौधरी ने कहा है कि विधायकों के तेवरों को देखते हुए मोदी का जाना तय है। (2484410:988)

Defence Minister Pranab Mukherjee has confirmed the death of 27 air-force officers due to natural calamity on Tuesday. Other than this 75 to 100 people are missing.

- (12) रक्षा मंत्री प्रणब मुखर्जी ने प्राकृतिक आपदा की चपेट में आकर 27 वायुसैनिकों के मारे जाने की मंगलवार को पुष्टि की है। इसके अलावा 75 से 100 लोग लापता हैं। (2484406:523)

(11) is an example of an ADVP discourse adverbials while Ex (12) illustrates PP adverbial functioning as a discourse connective.

- *Subordinators*: In contrast to the subordinating conjunctions, elements introducing non-finite subordinate clauses are called subordinators. E.g. -कर, -के बाद, -हुए.

After Baa went, he called the boy near him.

(13) बा के जाने के बाद उन्होंने उस लड़के को अपने पास बुलाया

.. and while playing forgets that if his friend didn't allow him to touch his toy too, then how bad he would have felt.

(14) . और खेलते हुए यह भूल जाता है कि यदि उसका मित्र भी उसे अपने खिलौने को हाथ लगाने नहीं देता तो उसे कितना बुरा लगता ।

Having heard Baa's speech Gandhiji felt ashamed inside.

(15) बा की बातें सुन कर मन-ही-मन गांधीजी बहुत लज्जित हुए

The non-finite clause markers are either postpositions (Ex.10), particles following verbal participles (Ex.11), or suffixes marking serial verbs (Ex 12).

- *Particles*: In Hindi, some particles act as connectives in their specific usages. Examples of particles are भी, ना, ही, etc. We have seen भी acting as discourse connectives so far. In Hindi, भी has following functions.

Function 1: Emphatic Particle:

(16) जो भी परिश्रम करेगा उसे सफलता मिलेगी

(17) उसने कुछ भी नहीं खाया

In above sentences, भी emphasizes the entities जो and कुछ and is not treated as a discourse connective as it does not connect two abstract objects.

Function 2: Particle suggesting Inclusion: It can conjoin nouns, adverbs, adjectives as well as events. We take it to be discourse connective only in cases where it suggests inclusion of two abstract objects. As shown in Example (18),

People are looking at this as a form of growing relation between the two countries. Kashmiri people are also taking important political lesson from this.

(18) लोग इसे दोनों देशों के बीच बढ़ते रिश्ते के रूप में देख रहे हैं कश्मीरी लोग इससे महत्वपूर्ण राजनितिक सबक भी ले रहे हैं

In Example (19) and Example (20) भी suggests inclusion of two entities.

Mohan will also go to school.

(19) मोहन भी स्कूल जाएगा ॥

Mohan will go to school too.

(20) मोहन स्कूल भी जाएगा ॥

Apart from भी, we have observed that ना can also behave as a connective.

Today mother made sweet-dish. It was brother's birthday.

(21) आज मां ने हलवा बनाया था । भाई का जन्मदिन था ना ।

2.2 Parallel Connectives

Parallel connectives are pairs of connectives where one part presupposes the presence of the other, and where both together take the same two arguments. Such connectives are listed as distinct types and are annotated discontinuously.

On Sunday, along with the destructive sea waves, the Tsunami not only did bring the terrifying atmosphere but it also destroyed the plan of Indian Air-force to make a big fighter base on this island.

- (22) रविवार को प्रलयकारी समुद्री लहरों के साथ सुनामी अपने साथ न केवल भारत के कार निकोबार द्वीप पर दहशत का माहौल लेकर आया बल्कि इसने भारतीय वायुसेना की इस द्वीप में एक बड़ा लड़ाकू बेस बनाने की योजना के भी परखचे उड़ा दिए हैं (2484406:237)

If this potato of Canda, famous for chips, proves worthy of production here then according to an agreement many farmers of the valley would cultivate it their farms.

- (23) यदि उत्पादन में भी चिप्स के लिए मशहूर कनाडा का यह आलू यहां ठीक उतरा तो एक करार के तहत घाटी के कई किसान इसे अपने खेतों में बीजेंगे। (2479527:641)

According to Venkaiah, Solanki has accepted that he has made a mistake by expressing his opposition publically. But party has issued him a notice for giving a statement in front of the media.

- (24) हालांकि वेंकैया के अनुसार सोलंकी ने माना कि सार्वजनिक रूप से विरोध व्यक्त करके उनसे गलती हो गई। लेकिन पार्टी ने मीडिया के सामने बयान देने के कारण उन्हें कारण बताओ नोटिस जारी किया है। (2484410:1809)

2.3 Conjoined Connectives

Two connectives together form a new connective whose meaning differs from both the constituents.

2.4 Modified Connectives

Connectives are co-occurring and one of them is contributing in the semantics while the other does not have a strong role. The latter can be removed without changing the semantics but the former cannot be.

The UPA government with Congress in lead has yet to decide whether to keep Vohra for continuing the talk process or to get someone else for his position.

- (25) कांग्रेस नेतृत्व वाली यूपीए सरकार को अभी तय करना बाकी है कि वार्ता प्रक्रिया जारी रखने के लिए वोहरा को पद पर बनाए रखा जाए या फिर उनके स्थान पर किसी और को लाया जाए। (2477219:1295)

2.5 Independently Co-occurring Connectives

Both connectives are independent and each one has its own semantics and arguments. Although they may have same set of Arguments, they are marked separately because of the different senses they invoke.

2.6 Linear order of Connectives and Arguments

Connectives and their arguments can appear in any relative order. For the subordinating conjunctions, since the subordinate clause is bound to the connective, Arg2 corresponds to the subordinate clause, and hence the linear order of the arguments can be Arg1-Arg2 (Ex. 26), Arg2-Arg1, or Arg2 may appear between discontinuous parts of Arg1, depending on the relative position of the subordinate clause with respect to its matrix clause.

To reduce the fear in people it is important to tell that there is no chance of earthquake in their area. Thus, this information was emphasized to be broadcasted on the telephone by the Department.

- (26) लोगों का भय कम करने के लिए यह बताना जरूरी होता है कि उनके क्षेत्र में भूकंप आने की संभावना नहीं है। अतः विभाग द्वारा टेलीफोन पर तुरंत इस सूचना को प्रसारित करने पर जोर दिया गया। (2484404:1434)

No example encountered for Arg2-Arg1 and for Arg2 occurring between discontinuous parts of Arg1 in subordinating conjunctions.

The order of the arguments for adverbials and coordinating conjunctions is typically Arg1-Arg2 since Arg1 usually appears in the prior discourse. But as Example (28) shows, Arg1 of a discourse adverbial can also appear within Arg2, which is then annotated as two discontinuous spans.

In Example (29), Arg2 occurs in between Arg1 :

RJD leaders who were giving explanations came into an aggressive mood after George was accused.

- (27) सफाई देते घूम रहे राजद नेता आज जैज पर भी ऐसा आरोप लगने के बाद अचानक आक्रामक मुद्रा में आ गए हैं (2479531:1602)

In Example (28), Arg1 occurs in between Arg2 :

So that the havoc caused by the Tsunami doesn't affect the Tourism, (for this) the central government has hastened the efforts.

- (28) केंद्र सरकार ने सुनामी लहरों से हुए हादसे का असर पर्यटन उद्योग पर न पड़े इसके लिए कोशिश तेज कर दी है (2484403:243)

The position of connectives in the argument clause they modify can be initial or medial, for sub-ordinating and coordinating conjunctions, but adverbials may occur medially or finally in Arg2, as shown below:

In Example (29), Subordinating conjunction occurs medially in Arg1 :

It is being told that Raj wanted that if Supremo wants to save the party, then he needs to make changes in the organisation.

- (29) बताया जाता है कि राज चाहते थे कि सुप्रीमो यदि पार्टी बचाना चाहते हैं, तो उन्हें संगठन में तत्काल फेरबदल करनी चाहिए (2479623:1917)

The above phenomenon is also applicable for occurrence of adverbial connectives .

2.7 Location of Arguments

There is no restriction on how far an argument can be from its corresponding connective. So arguments can be found in the same sentence as the connective(Ex. 30, 31), in the sentence immediately preceding that of the connective(Ex. 32, 33), or in some non-adjacent sentence.

Lahol-Potato Association's President Norebu Borongappa has said that if Tuber's Production keeps according to the pact, then according to an agreement, it will be delivered to Miekens Company via the marked farmers of the valley.

- (30) लाहौल-पटैटो सोसाइटी के अध्यक्ष नोरबू बारोंगप्पा का कहना है कि ट्यूबर का उत्पादन यदि जर्निशन के अनुरूप रहा तो एक करार के तहत घाटी के चिन्हित किसानों के जरिए इसकी आपूर्ति मीकन्स कंपनी को की जाएगी। (2479527:1333)

Borongappa told that the rate is being decided with the company very soon and just after this agreement Lahol's farmers will get Miekens company in the form of a permanent customer for their production.

- (31) बारोंगप्पा ने बताया कि कंपनी के साथ जल्द ही रेट तय किया जा रहा है और इस करार के होते ही लाहौल के किसानों को अपने इस उत्पाद के लिए स्थायी ग्राहक के रूप में मीकन्स कंपनी मिल जाएगी। (2479527:2087)

Having come to Kashmir, they procured a Permanent Resident Proof with the help of the officials. After that, they also bought land here.

- (32) कश्मीर आकर उन्होंने अधिकारियों की मिलीभगत से स्थायी निवासी होने का प्रमाण हासिल किया। इसके बाद यहां जमीन-जायदाद भी खरीदी (2484409:610)

On the basis of the report submitted by the Sub-Divisional Magistrate of Mendhar and the sub-officer of Punch, Jammu's Divisional Officer V.R.Sharma ordered to dissolve the Permanent Residential Proof of Julfikar and his family. By the way, Julfikar's family kept claiming themselves to be indian residents.

- (33) मेंधर के सब-डिवीजनल मजिस्ट्रेट और पुंछ के उपायुक्त द्वारा सौंपी गयी रिपोर्ट के आधार पर जम्मू के डिवीजनल आयुक्त वी.आर. शर्मा ने जुल्फिकार और उसके परिवार का स्थायी निवासी वाला प्रमाण रद्द करने का आदेश दिया। वैसे जुल्फिकार का परिवार खुद को भारतीय नागरिक बताता रहा। (2484409:1719)

The planet seen near the Koku-Tau-4 takes nearly forty lakh years in formation. which is formed from the con-
volution of rocky surface and gas. It can be assumed from the optional explanation that gas is accumulated fast.
Bose said that if this is true then there lies deep meaning inherited in the context of planetary system. By this,
information related to many main principles of planetary formation can be obtained.

- (34) कोकू ताउ-4 के पास देखे गए ग्रह को बनने में लगभग चालीस लाख साल का समय लगता है। जो चट्टानी सतह और गैस के संवर्धन से बनता है। वैकल्पिक स्पष्टीकरण से माना जा सकता है कि गैस शीघ्र संचित हो जाती है। बॉस ने कहा कि अगर यह सच है तो इसमें ग्रहीय प्रणाली के

संदर्भ में ‘गूढ़ निहितार्थ’ है। इससे ग्रहीय निर्माण के कई मुख्य सिद्धांतों से संबंधित कई जानकारी मिल सकती हैं। (2484408:1775)

Adverbials that access their arguments through their anaphoric property could have more than one adjacent or non-adjacent antecedents. In such case, the antecedent which is the closest to the connective is annotated as the argument. If a relation is not explicitly present between the earlier antecedents then appropriate implicit connectives are inserted between them to show relations.

In the document submitted to the parliamentary committee, it is said that on 6:29 - 26th december, an earthquake of 8.6 rating hit the west coast of Sumatran Island group. From 6:29 to 7:00 digital statistics were downloaded from the representative centres, which took nearly half an hour. During this, news related to the devastation of earthquake and the sea waves were being broadcasted on many channels in television.

- (35) संसदीय समिति को सौंपे गए दस्तावेज में कहा गया है कि 26 दिसंबर 2004 को 6 बजकर 29 मिनट पर सुमात्रा द्वीप समूह के पश्चिमी तट पर 8.6 तीव्रता का भूकंप आया। 6.29 से 7.00 बजे तक ‘प्रतिनिधि केंद्रों से डिजिटल आंकड़े डाउनलोड किए गए, जिसमें लगभग आधा घंटा लग गया।’ इस बीच टेलीविजन के विभिन्न चैनलों पर भूकंप और समुद्री लहरों के कहर के बारे में समाचार प्रसारित होने लगे थे। (2484404:838,940)

2.8 Types and Extent of Arguments

2.8.1 Simple Clauses

The simplest syntactic realization of an abstract object as a connective’s argument is taken to be a clause, tensed or non-tensed. Further, the clause can be a matrix clause, a complement clause, or a subordinate clause. Some examples of single clausal realizations are shown in the examples below. For clause types such as non-finite clauses and relative clauses, the argument selection assumes the presence of implicit subjects and traces of extracted complements available in the syntactic structure of the clause in the syntactic tree bank, so that a complete description of the argument can be derived from the links to the syntactic tree bank.

So that the havoc caused by the Tsunami doesn’t affect the Tourism, (for this) the central government has hastened the efforts.

- (36) केंद्र सरकार ने सुनामी लहरों से हुए हादसे का असर पर्यटन उद्योग पर न पड़े इसके लिए कोशिश तेज कर दी है। (2484403:243)

From 5th January, 5 Sukhoi-30 air-planes were to be placed on the base by the Air-Force, but the storm that came in Sunday has ruined the project for now.

- (37) इसके तहत वायुसेना की 5 जनवरी से बेस पर दो सुखोई-30 विमान तैनात किए जाने थे, लेकिन रविवार को आए तूफान ने इस योजना पर फिलहाल पानी फेर दिया है (2484406:798)

RJD leaders who were giving explanations came into an aggressive mood after George was accused.

- (38) सफाई देते घूम रहे राजद नेता आज जैज पर भी ऐसा आरोप लगने के बाद अचानक आक्रामक मुद्रा में आ गए हैं (2479531:1602)

2.8.2 Non-Clausal Arguments

VP coordinations: In PDTB, conjuncts between VP coordinates are not annotated as distinct discourse connectives. However, in HDRB we are annotating conjunction in a coordinated verb phrase as discourse connective. One or more verb phrases within the coordinated structure can be annotated as the argument of another connective. However, the shared sentential arguments of the VP coordinates are included in the argument selection only for the first VP coordinate. Example (39) and Example (40) are examples of connective और and या functioning as VP level coordinators.

He denied the accusations and said that he will file a case in it's answer.

- (39) उन्होंने आरोपों को 'झूठा' करार दिया और कहा कि वह इसके जवाब में मामला दायर करेंगे। (2479531:1352)

During this, Lok JanShakti Party's president RamVilas Paasvan said that whether Election Conduct Manual has been violated or not, it is Election Commission's work to decide this.

- (40) इस बीच, लोक जनशक्ति पार्टी के अध्यक्ष रामविलास पासवान ने कहा है कि चुनाव आचार संहिता का उल्लंघन हुआ है या नहीं, यह तय करना चुनाव आयोग का काम है। (2479531:2585)

Nominalizations: In Hindi, event nouns can be turned into verbs using light verbs such as करना, होना. We take all such nouns to be arguments of connectives.

- (41) सुरक्षाकर्मियों द्वारा की बदतमीजी के चलते बिपाशा का गुस्सा सातवें आसमान पर जा पहुंचा (2474838:421)

Anaphoric expressions denoting abstract objects: An anaphoric expression which refers to an abstract object can be denoted as an argument. We assume that, such expression could be resolved to the abstract object using an independent mechanism for anaphora resolution.

The planet seen near the Koku-Tau-4 takes nearly forty lakh years in formation. which is formed from the con-
volution of rocky surface and gas. It can be assumed from the optional explanation that gas is accumulated fast.
Bose said that if this is true then there lies deep meaning inherited in the context of planetary system.

- (42) कोकू ताउ-4 के पास देखे गए ग्रह को बनने में लगभग चालीस लाख साल का समय लगता है। जो चट्टानी सतह और गैस के संवर्धन से बनता है। वैकल्पिक स्पष्टीकरण से माना जा सकता है कि गैस शीघ्र संचित हो जाती है। बॉस ने कहा कि अगर यह सच है तो इसमें ग्रहीय प्रणाली के संदर्भ में 'गूढ़ निहितार्थ' है। (2484408:1704)

2.9 Minimality Principle

In addition to single clauses, abstract object arguments of connectives can also be realized as multiple clauses and multiple sentences. Multiple clause and multiple sentence arguments can also be annotated discontinuously if they so appear in the text.

According to NDFB's speaker S.Sarjarang, Centre and Assam should consider his proposal. On not doing so, he will rethink over his decision of his struggle cessation. Other than that, the outlawed organisation asked to stop all the campaign's against him.

- (43) एनडीएफबी के प्रवक्ता एस सरजारंग के मुताबिक केंद्र और असम को उनके प्रस्ताव पर ध्यान देना चाहिये । ऐसा नहीं करने पर वह अपने संघर्ष विराम के फैसले पर फिर से विचार करेंगे । इसके अलावा प्रतिबंधित संगठन ने उनके खिलाफ जारी सभी अभियानों को रोकने को कहा ।
- (44) नेपाल में हाल में हुई नए राजनीतिक घटनाक्रम पर भारत ने कहा है कि वहां के नरेश ज्ञानेंद्र द्वारा देश में आपातकाल हटाए जाने व राजनीतिक बंदियों के छोड़े जाने के आशवासन के बाद ऐसा किया जाना दुःखद है। इस बारे में राज्यसभा में एक प्रश्न के जवाब में विदेश मंत्री नटवर सिंह ने कहा कि नेपाल नरेश ज्ञानेंद्र द्वारा प्रधानमंत्री मनमोहन सिंह व उन्हें देश में आपातकाल हटाए जाने, राजनीतिक कैदियों के छोड़े जाने व लोकतांत्रिक प्रक्रिया जल्द शुरू किए जाने के आशवासन देने के बाद यह कार्रवाई करना खेद जनक है। नटवर सिंह ने कहा कि सरकार नेपाल के साथ संबंधों की लगातार समीक्षा कर रही है। उन्होंने कहा कि नेपाल नरेश ने अपने देश में प्रेस की आजादी व भारतीय चैनलों पर से प्रतिबंध हटाने का भी आशवासन दिया था। Implicit = इस प्रकार सिंह माकपा के नीलोत्पल बसु द्वारा उठाए गए प्रश्न का जवाब दे रहे थे। बसु ने कहा कि पूर्व प्रधानमंत्री देऊबा की गिरफ्तारी व प्रमुख वामपंथी नेता के अंतिम संस्कार के दौरान वहां की गैड कार्रवाई को देखते हुए भारत को नेपाल का समर्थन नहीं करना चाहिए।
- (45) पहाड़ों की यह सर्दी मैदानी इलाकों को भी कंपकंपा गैड। शीतलहर ने यूं तो समूचे उत्तर भारत को प्रभावित किया लेकिन इसका सबसे अधिक असर आज राजस्थान के पिलानी जिले में देखा गया। यहां पारा लुढ़कर शून्य डिग्री हो गया है। इसके अलावा माउंट आबू में तापमान दो डिग्री रहा। यहां कल रात तापमान शून्य था। चुरु में तीन, ढोलपुर में पांच, भरतपुर व गंगानगर में छह और जयपुर में सात डिग्री दर्ज किया गया। जबकि राष्ट्रीय राजधानी दिल्ली में मंगलवार को इस मौसम की सबसे अधिक ठंड पड़ी। यहां न्यूनतम तापमान 5-1 डिग्री सेल्सियस रहा जोकि सोमवार को 5-7 था।

There are no restrictions on how many or what types of clauses can be included in these complex selections, except for the Minimality Principle, according to which only as many clauses and/or sentences should be included in an argument selection as are minimally required and sufficient for the interpretation of the relation. Any other span of text that is perceived to be relevant (but not necessary) in some way to the interpretation of arguments is annotated as supplementary information, labelled Sup1 and Sup2, for Arg1 and Arg2 respectively.

2.10 Conventions

This section describes certain conventions that we have followed in the annotation. For such cases, we do not make any claims about whether and how they contribute to the interpretation of the relations. They were mostly adopted for convenience of annotation.

2.10.1 Clause-internal complements and non-clausal adjuncts

For all clauses that are selected as arguments of connectives, all complements of the main clausal predicate and all non-clausal adjuncts adverbs complementizers, conjunctions and relative pronouns modifying the clause are obligatorily included in the argument even if these elements are not necessary for the minimal interpretation of the relation.

Non-clausal attributing phrases are also included obligatorily in the clausal argument they modify.

2.10.2 Punctuation

All punctuation at the boundaries of connective and argument selections is included in the argument text. This is different from the PDTB where the punctuations at the boundaries of connectives and arguments were excluded due to the limitation of the annotation tool.

3 Implicit Relations

3.1 Annotation of Implicit Connectives

As in the PDTB, the goal of annotating Implicit connectives is to capture the relations between abstract objects that are not realized explicitly in the text (by one of a set of the lexically-defined Explicit connectives - see Section 2.1) and are left to be inferred by the reader.

I don't think that this inspection committee would bring out any special inference and there will be any action against Natvar Singh. Because Manmohan Singh has already given Natvar Singh a clean chit.

- (46) मुझे नहीं लगता कि इस जांच आयोग का कोई खास नतीजा निकलेगा और नटवर सिंह के खिलाफ कोई कार्रवाई होगी । Implicit = क्योंकि मनमोहन सिंह नटवर सिंह को पहले ही क्लीन चिट दे चुके हैं ।

All the players of this game are greater than Sachin Tendulkar. Therefore, it is impossible for anyone to clean bold them.

- (47) इस गेम के सारे खिलाड़ी सचिन तेंदुलकर से भी महान हैं । Implicit = इसलिए इनको क्लीन बोल्ड करना किसी के बस की बात नहीं ।

Volkar's report is wrong according to me and the reason for this is Volkar's constantly changing statements. As an example, sometimes he says that 'I have given Natvar and Congress a Notice', and sometimes he goes against his own statement.

- (48) वोल्कर की रिपोर्ट मेरे हिसाब से गलत है और उसका कारण है वोल्कर के लगातार बदलते वक्तव्य । Implicit = उदाहरण के तौर पर कभी वे कहते हैं कि मैंने नटवर सिंह और कांग्रेस को नोटिस दिया तो कभी अपनी ही कही बात से मुकरते हैं ।

In the PDTB, such inferred relations are annotated between adjacent sentences within the same paragraph, but for HDRB, we have decided to annotate such relations for the following cases:

- Between adjacent sentences including the ones across paragraphs
- Between non-adjacent sentences wherever inferred
- Intra-sententially whenever the two abstract objects are delimited by a comma (","), a semi-colon (";") or a colon (":")

All implicit relations are marked by the insertion of a connective expression that best expresses the inferred relation.

Inserting implicit connectives might not always make a natural sentence. But, we insert connectives at all such places where we can infer the sense that could be conveyed by the connective being inserted.

Congress leaders are now friends with bribers. Because wherever there is talk about bribery, Congress or it's (some) leader has it's name in front lines. Overmore, previously, this was limited to inside the country but Nat-var has gone one step ahead and is registering his name in the international arena.

- (49) कांग्रेस के नेताओं की दोस्ती अब रिश्तदाताओं से हो गई है। जहां कहीं भी रिश्त की बात होती है, कांग्रेस या उसके किसी नेता का नाम सबसे पहले होता है। Implicit = उपर से पहले यह केवल देश के अंदर तक सीमित था लेकिन नटवर एक कदम आगे बढ़कर अंतरराष्ट्रीय परिदृश्य में अपना नाम दर्ज करवा रहे हैं।

Here, the inserted connective ‘उपर से’ looks awkward at its place but it does capture the sense of ‘conjunction’ which is inferred between the two arguments. Similarly in the English example below,

- (50) a. John wanted to go to NY
b. (but) Even though he left early he got stuck in traffic
*c. (but) He left early but he got stuck in traffic

Here, the first argument is sentence a. If the second argument of the relation is c, then the inserted “but” sounds awkward at its place. This is because of the syntactic pattern of c. But, we must insert a connective here to capture the relation between a and c. b and c convey the same thing but because they are syntactically different, the inserted connective (but) looks natural for b and not for c.

Multiple relations are annotated when they are inferred by the reader. It includes case for more than one Implicit Relations. It also includes case for Implicit Relations in addition to Explicit Relations, where the inferred sense is not expressed by the Explicit Relation already present.

Following is the example :

There was heavy resentment among the Muslims due to the role of Modi in Gujrat riots and they heavily voted for BJP opposers.

- (51) गुजरात के दंगों में मोदी सरकार की भूमिका के कारण मुसलमानों में भारी नाराजगी थी और Implicit = इसलिये उन्होंने भाजपा विरोधियों को जमकर वोट डाले। (2484410:1266)

Apart from annotating Implicit relations by inserting a connective that best describes the relation, three predefined labels (AltLex, EntRel and NoRel) are used where an implicit connective could not be provided. AltLex for cases where the insertion of an Implicit connective to express an inferred relation led to a redundancy in the expression of the relation; EntRel for cases where only an entity-based coherence relation could be perceived between the sentences; and NoRel for cases where no discourse relation or entity-based coherence relation could be perceived between the sentences.

One point to be noted here is that, in case of Hindi, we found it quite difficult to find suitable connective expressions in case of Expansion class of senses. So, we have also allowed the insertion of AltLexes (explained in section 4.1) wherever annotators find them suitable. We intend to come up with a list of such AltLexes which are most commonly used and suffice for describing the semantics and then ask annotators to use that list later as a closed class.

3.2 Unannotated Implicit Relations

Because of time and resource constraints, there are certain cases for which we do not plan to annotate implicit relations where they otherwise could have been.

3.2.1 Intra-sentential Relations

We are not going to annotate Implicit relations between adjacent clauses in the same sentence not separated by a comma (‘,’) , semi-colon (‘;’) or colon (‘:’)

4 Non-Insertability of an Implicit Connective

In many cases, an Implicit connective cannot be inserted between sentences. These have been classified into 3 types: AltLex, EntRel, and NoRel. We describe each of these types below. These labels are considered for a relation in the order given below.

4.1 AltLex (Alternative Lexicalization)

These are cases where a discourse relation is inferred between sentences but where providing an Implicit connective leads to redundancy in the expression of the relation. This is because the relation is alternatively lexicalized by some “non- connective expression”. Such expressions include

- those which have two parts, one referring to the relation and another anaphorically to either of the arguments or both;

He says that it feels good to come in contact of the outer world. Before this, out only attention was on hunting. Not only this, Jiroki tells that having come in the contact of the outer world, he got to know about the movies.

(52) वह कहते हैं बाहरी दुनिया के संपर्क में आकर अच्छा लग रहा है। इससे पहले हमारा सारा ध्यान शिकार पर था। AltLex [यही नहीं] जिरोकी बताते हैं कि बाहरी दुनिया के संपर्क में आने से ही उन्हें फिल्मों के बारे में भी पता चला। (2580872:3225)

- those which have just one part referring anaphorically to either of the arguments or both; **example of this category was not found.**
- those which have just one part referring to the relation.

Information about the comets can be obtained by it's study. It is considered that the presence of water on Earth is related to the comets.

(53) इसके अध्ययन से पुच्छल तारों के बारे में जरूरी जानकारी मिल सकती है। AltLex [समझा जाता है कि] पृथ्वी पर पानी की मौजूदगी का पुच्छल तारों से संबंध है। (2484408:2389)

Note that the annotation does not make any further distinctions between different types of AltLex expressions. Unlike connectives, AltLexes are part of the argument structure of the verb of their clause, so the argument is marked including the AltLex expression. In following examples, AltLexes are underlined.

Annotation of the arguments of AltLex follows the same guidelines as for arguments of Explicit connectives. That is, they can be discontinuous, and they must include all and only the amount of text minimally required for interpreting the relation.

4.2 EntRel (Entity-based Coherence)

EntRel captures cases where the implicit relation between adjacent sentences is not between their AO interpretations, but is rather a form of entity-based coherence (Knott et al., 2001) in which the same entity is realized in both sentences, either directly or indirectly or via reification of an abstract object (AO) mentioned in first sentence.

Arguments selections for EntRel are subject to Adjacency Constraint (though the selection can be discontinuous). However, in cases where a sentence is not related to any other sentence in it's discourse through any of the relations (Explicit, Implicit or AltLex), it is allowed to annotate Non-Adjacent Sentences with EntRel for clearly observable Entity-Based Coherence.

EntRel annotations are not associated with any sense. The “minimality” constraint restricts the selection to be minimal up to the level of a finite clause. In particular, for EntRel we only identify the minimal set of sentences that mention the entities reified in the Arg2 sentence.

On wednesday, a local court dismissed the abasement petition filed against Human Resource Development Minister Arjun Singh. The petition was filed on 15 September by the president of RSS's Tamilnadu branch, Durai Shankar

- (54) एक स्थानीय अदालत ने बृहस्पतिवार को केंद्रीय मानव संसाधन विकास मंत्री अर्जुन सिंह के खिलाफ दायर मानहानि की याचिका को रद्द कर दिया। EntRel याचिका 15 सितंबर को आरएसएस की तमिलनाडु इकाई के अध्यक्ष दुरई शंकर द्वारा दायर की गई थी। (2484369:276)

Pakistan has related this topic to some such conditions, which cannot be accepted.

- (55) पाकिस्तान ने इस मुद्दे को कुछ ऐसी शर्तों के साथ जोड़ दिया है EntRel जिन्हें स्वीकार नहीं किया जा सकता। (2484405:361)

From 6:29 to 7:00 digital statistics were downloaded from the representative centres, which took nearly half an hour

- (56) 6.29 से 7.00 बजे तक प्रतिनिधि केंद्रों से डिजिटल आंकड़े डाउनलोड किए गए, EntRel जिसमें लगभग आधा घंटा लग गया। (2484404:910)

It's age is 10 lakh years and it is being considered as the youngest planet till now. There is a lot of enthusiasm among the astronomical scientists by this discovery of American Space Agency NASA's Pitzer Telescope.

- (57) उसकी उम्र दस लाख वर्ष है और उसे अभी तक का सबसे नवजात गया ग्रह माना जा रहा है। EntRel अमेरिकी अंतरिक्ष एजेंसी नासा के पिट्जर टेलीस्कोप की इस ताजा खोज से खगोल विग्यानियों में काफी उत्साह है। (2484408:252)

4.3 NoRel (No Relation)

These are cases where no discourse relation or entity-based coherence relation can be inferred between adjacent sentences.

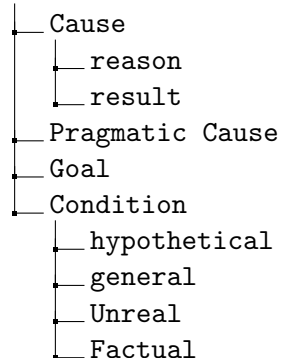
Although senior officers have assured an investigation of the complete matter, but no action has been taken against the guards in reference to the misbehaviour against Bipasha. Prakash Jha's new movie 'Apaharan' is also being premiered in the Movie Festival.

- (58) हालांकि वरिष्ठ अधिकारियों ने पूरे मामले की जांच की बात कही है लेकिन बंगाली बाला के साथ बदतमीजी के चलते अभी गार्ड के खिलाफ कोई कार्रवाई नहीं की गई। NoRel फिल्म महोत्सव में प्रकाश झा की नई फिल्म अपहरण का भी प्रीमियर होना है। (2474838:911)

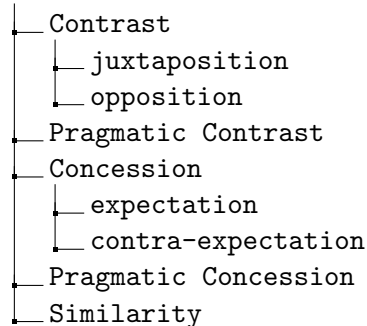
5 Sense Hierarchy

Broadly, we follow the PDTB sense classification in that we take it to be a hierarchical classification, with the four top level sense classes of “Temporal”, “Contingency”, “Comparison”, and “Expansion”. Further refinements to the top class level are provided at the second type level and the third subtype level. However, we have made some significant changes and additions to the PDTB sense classification. A figure below shows the sense hierarchy :

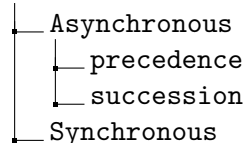
CONTINGENCY



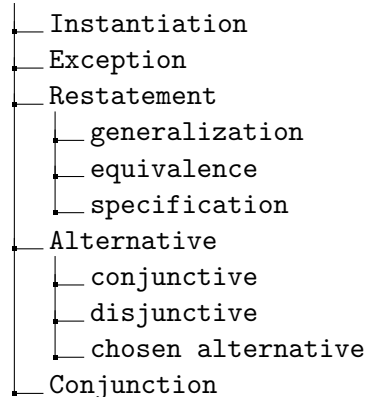
COMPARISON



TEMPORAL



EXPANSION



5.1 Class Contingency

This class covers all those relations where the situations described the arguments of the connective are causally related to each other.

5.1.1 Type Goal

This relation holds between two abstract objects when either arg1 or arg2 describes goal of the action denoted in the other argument. The syntactic test for **this relation is that the aspect of the verb in the argument describing the goal does not say whether the goal was achieved or not and motivates the other argument.**

Women Congress President Rita Bahuguna Joshi says that this has been emphasized in the training camp that women should be able to face problems in every field and they could grow leadership qualities. So that, they don't let go of any opportunity to grow forward in life.

- (59) महिला कांग्रेस की अध्यक्ष रीता बहुगुणा जोशी का कहना है कि प्रशिक्षण शिविर में इस बात पर जोर दिया है कि महिलाएं हर क्षेत्र में मुश्किलों का सामना कर सकें और उनमें नेतृत्व के गुण पैदा हो सकें। ताकि जीवन में आगे बढ़ने का कोई भी मौका वे अपने हाथ से न जाने दें (2479626:1362)

Congress High Commission also wants that there is a wave generated in the country by Congress's Mission. The image of this party is of a party that fights for the rights of women.

- (60) कांग्रेस आलाकमान यह भी चाहती हैं कि कांग्रेस के इस मिशन की पूरे देश में एक लहर पैदा की जाए। Implicit = जिससे इस पार्टी की छवि महिलाओं के हक के लिए लड़ने वाली पार्टी के तौर पर हो। (2479626:837)

Goal is marked only at the Type Level and thus no directionality. In other words, the argument describing Goal can be either Arg1 or Arg2, nevertheless the Sense remains the same.

‘ताकि’, ‘जिससे’ and ‘इसलिये’ typical connectives carrying the sense Goal.

5.1.2 Type Cause

The type “Cause” is used when the connective indicates that the situations described in Arg1 and Arg2 are causally influenced and the two are not in a conditional relation. The directionality of causality is not specified at this level: when “Cause” is used in annotation, it means that the annotators could not uniquely specify its directionality. Directionality is specified at the level of subtype: “reason” and “result” specify which situation is the cause and which, the effect.

The rough formal semantics of “Cause” follows Giordano and Schwind (2004) in modelling causality with the binary operator $<$ such that $A < B$ models the causal law “A causes B”. Here A and B are drawn from the situations described in $||Arg1||$ and $||Arg2||$. Unless the connective and its arguments are embedded in a matrix that alters their truth value, the situations denoted by A and B and the causal relation between them are all taken to hold.

Subtype : “reason” : The type “reason” is used when the connective indicates that the situation described in Arg2 is the cause and the situation described in Arg1 is the effect ($||Arg2|| < ||Arg1||$), as shown in Example (61).

There is a lot of enthusiasm among the astronomical scientists by this discovery of American Space Agency NASA's Pitzer Telescope. Many mysteries can be resolved by the study of a new planet.

- (61) अमेरिकी अंतरिक्ष एजेंसी नासा के पिट्जर टेलीस्कोप की इस ताजा खोज से खगोल विज्ञानियों में काफी उत्साह है। क्योंकि नए ग्रह के अध्ययन से अंतरिक्ष की कुछ गूढ़ गुत्थियां सुलझ सकती हैं (2484408:356)

Subtype : “result” : The type “result” applies when the connective indicates that the situation in Arg2 is the effect brought about by the situation described in Arg1, ($||Arg1|| < ||Arg2||$), as shown in Example (62 and (63).

In the time of natural calamity, many frauds get active in the name of Relief funds. Many a times, the money given by sensitive people goes into the pockets of frauders. Therefore, give donation for the victims of Tsunami, but a little carefully.

- (62) प्राकृतिक आपदा आते ही राहत कोष के नाम पर ठग भी सक्रिय हो उठते हैं। संवेदनशील व भावुक लोगों द्वारा राहत कोष में दी गई राशि कई बार फरेबियों की जेब में चली जाती है। इसलिए सुनामी लहरों के कहर से पीड़ित लोगों के लिए दान तो दें, पर जरा संभलकर। (2484411:348)

On the other hand, fog has engulfed the capital Delhi. Due to this, not only seven trains were cancelled, plane flights were also interrupted.

- (63) दूसरी ओर, राजधानी दिल्ली को कोहरे ने अपनी आगोश में ले लिया। इसके चलते सात ट्रेन तो रद्द हुई ही, विमानों की उड़ानों में भी व्यवधान रहा। (2484407:511)

Test to differentiate between Cause and Goal : In Hindi ताकि is a connective which always denotes Goal. To differentiate between Cause and Goal, the connective in question can be replaced by ताकि. After this replacement, if semantics of the relation still remains same, then we can say that it is a Goal relation. A point to be noted here is that, while replacing the connective with ताकि we might need to change TAM/post positions of the verbs in the arguments or/and the selection of arguments as Arg1 and Arg2.

5.1.3 Type Pragmatic Cause

In type Pragmatic Cause, one of the arguments(Arg1) is the claim that is being supported by the other argument(Arg2).

- (64) यूपीए सरकार की आर्थिक नीतियों का खुलकर विरोध करने वाले वामदल पहली बार वित्त मंत्री पी. चिदंबरम से कुछ हद तक खुश नजर आए। क्योंकि आम बजट को काफी हद तक

न्यूनतम साझा कार्यक्रम (सीएमपी) के मुताबिक बताते हुए वामदलों ने इसे बेहतर बताया है।
(2484370:307)

5.1.4 Condition

The type “Condition” is used to describe all subtypes of conditional relations. In addition to causal influence, “Condition” allows some basic inferences about the semantic contribution of the arguments. Specifically, the situation in Arg2 is taken to be the condition and the situation described in Arg1 is taken to be the consequence, i.e., the situation that holds when the condition is true. Unlike “Cause”, however, the truth value of the arguments of a “Condition” relation cannot be determined independently of the connective.

For this reason, we introduce some branching-time logic operators into our rough description of the semantics of “Condition” subtypes: A, F, and G. A universally quantifies over all possible futures; therefore, $A\beta$ is true iff β is true in all possible futures. F and G are respectively existential and universal quantifiers over instants in a single future: $F\alpha$ is true iff α is true in some instant in a possible future, while $G\alpha$ is true iff α is true in every instant in a possible future.

Subtype : hypothetical : The semantics for “hypothetical” is $\|Arg2\| < AF\|Arg1\|$: if Arg2 holds true, Arg1 is caused to hold at some instant in all possible futures. However, Arg1 can be true in the future independently of Arg2. The condition (Arg2) is evaluated in the present and the future. An example tagged as “hypothetical” is given in (65). The verbs in Arg1 and Arg2 are usually in present or future tense.

If your total income is 5 lakh rupees and you donate 50 thousand rupees to the Prime-Minister Relief fund then for Income tax related calculation your income is assumed to be 4 lakh 50 thousand.

- (65) यदि आपकी कुल आय 5 लाख रुपए है और आप 50 हजार रुपए प्रधानमंत्री राष्ट्रीय सहायता कोष में दान करते हैं तो आयकर संबंधी गणना के लिए आपकी कुल आय 4 लाख 50 हजार मानी जाएगी। (2484411:868)

Subtype : general : The tag “general” applies if the connective indicates that every time that $\|Arg2\|$ holds true, $\|Arg1\|$ is also caused to be true. Typically, “general” describes either a generic truth about the world or a statement that describes a regular outcome every time the condition holds true. Its semantics is then $AG(\|Arg2\| < \|Arg1\|)$: in all possible futures, it is always the case that $\|Arg2\|$ causes $\|Arg1\|$. The verbs in Arg1 and Arg2 are typically in present and future tenses.

It can be assumed from the optional explanation that gas is accumulated fast. Bose said that if this is true then there lies deep meaning inherited in the context of planetary system.

- (66) वैकल्पिक स्पष्टीकरण से माना जा सकता है कि गैस शीघ्र संचित हो जाती है। बॅस ने कहा कि अगर यह सच है तो इसमें ग्रहीय प्रणाली के संदर्भ में ‘गूढ़ निहितार्थ’ है। (2484408:1704)

For more clarity, following is an English example.

- (67) That explains why the number of these wines is expanding so rapidly. But consumers who buy at this level are also more knowledgeable than they were a few years ago. “They won’t buy if the quality is not there,” said Cedric Martin of Martin Wine Cellar in New Orleans. (Contingency:Condition:General)

Subtype : unreal (counter factual)

The tag “unreal” applies when the situation described in arg1 either does not hold or is unlikely to hold. The semantics for “unreal present” is a special case of the semantics for hypothetical. Besides asserting the condition between the two arguments, we also assert that $\neg||Arg2||$ (meaning $||Arg||$ does not hold or is not expected to hold).

Unlike in PDTB, where we distinguish between Unreal past and Unreal present, we have a single category called “unreal” here. This is because we found it difficult to distinguish such difference in Hindi and also, the tense information could be computed using other mechanisms.

In response to a question he agreed that if Jallalitha’s government would have taken steps like removing the cases of government employees, taking back cases against political opposers before the elections, then it would have profited for sure.

- (68) एक सवाल के जवाब में उन्होंने माना कि यदि जयललिता सरकार ने सरकारी कर्मचारियों से मामले हटाने, राजनीतिक विरोधियों के खिलाफ मुकदमे वापस लेने जैसे कदम चुनाव के पहले उठाए होते तो इससे निश्चित तौर पर फायदा होता (2489465:962)

In Example (68), the TAM of the verb in the clause (चुनाव के पहले उठाए होते) says that the action of doing the work earlier has not occurred.

Subtype : factual

The tag “factual” applies when the connective indicates that Arg2 is a situation that has either been presented as a fact in the prior discourse or is believed by somebody other than the speaker/writer. “Factual” is actually a special case of the subtype “hypothetical”. Besides asserting the condition between the two arguments, it also asserts that $||Arg2||$ holds true or is believed by someone to hold true. (If $||Arg2||$ indeed holds true, then $||Arg1||$ is caused to be true.)

Unlike the subtype Unreal which is easy to determine through syntax itself, the fact that the condition in a Factual relation is true, is evident in the context in most of the cases.

5.2 Class Comparison

The class tag “COMPARISON” applies when the connective indicates that a discourse relation is established between Arg1 and Arg2 in order to highlight the prominent differences between the two situations. Semantically, the truth of both arguments is independent of the connective or the established relation. “COMPARISON” has two types to further specify its semantics. In some cases, Arg1 and Arg2 share a predicate or a property and the difference is highlighted with respect to the values assigned to this property. This interpretation is tagged with the type “Contrast”. There are also cases in which the highlighted differences are related to expectations raised by one argument which are then denied by the other. This interpretation is tagged with the type “Concession”.

5.2.1 Contrast

“Contrast” applies when the connective indicates that Arg1 and Arg2 share a predicate or property and a difference is highlighted with respect to the values assigned to the shared property. In “Contrast”, neither argument describes a situation that is asserted on the basis of the other one. In this sense, there is no directionality in the interpretation of the arguments. This is an

important difference between the interpretation of “Contrast” and “Concession”.

Following conditions must hold for a Contrast relation to hold.

- a) The two arguments are compared along some common dimension or topic
- b) The comparison must highlight at least 2 differences.

For example, in,

(69) John is tall while Bill is short

One point of difference is ‘John’ vs. ‘Bill’ and the other point of difference is ‘tall’ vs. ‘short’. Here the common topic is ‘John’s height’.

Accordingly, the following would NOT be a contrast relation:

(70) John is intelligent but he is boring.

Even though they might share a common topic of ‘Johns qualities’, since there is only one point of difference.

- c) There should be no inference of any concessive relation. That is, contrasts should be considered ONLY IF there is no concession relation.

Two subtypes of “Contrast” are defined: “juxtaposition” and “opposition”.

Subtype : “juxtaposition” : The subtype “juxtaposition” applies when the connective indicates that the values assigned to some shared property are taken to be alternatives (e.g., John paid \$5 but Mary paid \$10.) More than one shared predicate or property may be juxtaposed. When the intended juxtaposition is not clear, the higher level tag “Contrast” is annotated.

Special Investigation Group (SIT), investigating the Shankar Raman murder case, has sent a summon to Junior Shankaracharya Vijyendra Saraswati for presenting himself before the court on Sunday afternoon 2:00 PM. On the other hand, A local court sent the manager of Kanchi Math, Sunderesa Ayyar, who was arrested yesterday, to court custody of 14 days.

(71) शंकररमन हत्याकांड की जांच कर रहे विशेष जांच दल (सिट) ने कनिष्ठ शंकराचार्य विजयेन्द्र सरस्वती को रविवार दोपहर 2.00 बजे उसके समक्ष पेश होने के लिए समन भेजा है। उधर, कल रात गिरफ्तार किए गए कांची मठ के मैनेजर सुंदरेसा अय्यर को आज एक लोकल कोर्ट ने 14 दिन की न्यायिक हिरासत में भेज दिया। (2479532:312)

Subtype : “opposition” : The subtype “opposition” applies when the connective indicates that the values assigned to some shared property are the extremes of a gradable scale, e.g., tall-short, accept-reject etc. Note that the notion of gradable scale used in distinguishing “opposition” from “juxtaposition” strongly depends on the context where the sentence is uttered. For example, consider the pair black- white. These two concepts are usually taken to be antonyms. Therefore, it seems that whenever Arg1 assigns ‘black’ and Arg2 assigns ‘white’ to a shared property (e.g. Mary is black whereas John is white), the discourse connective has to be labelled as ‘opposition’. However, in many contexts ‘black’ and ‘white’ are just two of the colors that may be assigned to the shared property (e.g., take the sentence Mary bought a black hat whereas John bought a white one uttered in a shop that sells red, yellow and blue hats as well). In such cases, they are not antonyms, and the connective is labelled as “juxtaposition”.

For now, Chief-minister Narendra Modi is silent on this topic. On the other hand, Opposition's minister Amarsingh Chowdhary has said that looking at the attitude of the regional ministers, Modi's departure is decided.

- (72) मुख्यमंत्री नरेंद्र मोदी ने फिलहाल इस मामले पर चुप्पी साध रखी है। वहीं विपक्ष के नेता अमरसिंह चौधरी ने कहा है कि विधायकों के तेवरों को देखते हुए मोदी का जाना तय है (2484410:988)

5.2.2 Type Pragmatic Contrast

The tag “Pragmatic Contrast” applies when the connective indicates a contrast between one of the arguments and an inference that can be drawn from the other. Contrast is not between the situations described in Arg1 and Arg2.

- (73) बच्चे क्रिकेट खेलने के लिए समुद्र तट पर जा पहुंचे। मछुआरे समुद्र में जाने की तैयारी करने लगे। इस बीच विभिन्न चैनलों पर सुनामी के समाचार दिखाए जा रहे थे। Implicit = लेकिन अगले एक घंटे में जो कुछ हुआ उस पर विश्वास करना कठिन है

In example (73), the contrast is between Arg2 and the inference drawn from Arg1. In other words, “it is easy to believe the happenings” (inference drawn from Arg1), but “it is difficult to believe what is going to happen next” (Arg2).

5.2.3 Type Concession

The type “Concession” applies when the connective indicates that one of the arguments describes a situation A which causes C, while the other asserts (or implies) $\neg C$. Alternatively, one argument denotes a fact that triggers a set of potential consequences, while the other denies one or more of them. Formally: $A < C \wedge B \rightarrow \neg C$, where A and B are drawn from $||Arg1||$ and $||Arg2||$. ($\neg C$ may be the same as B, where $B \rightarrow B$ is always true.) Two “Concession” subtypes are defined in terms of the argument creating an expectation and the one denying it.

Subtype: “expectation”

When Arg2 creates an expectation that Arg1 denies ($A = ||Arg2||$ and $B = ||Arg1||$), it is tagged as “expectation”, as shown in Example (74).

Later, Bipasha, being angered, returned without taking part in the Festival. It is worth noting that it was Bipasha who was supposed to light the candle in the programme and after that had to take part in the whole program.

- (74) बाद में गुस्से के चलते बिपाशा महोत्सव में बिना भाग लिए वापस लौट गई। गौरतलब है कि बिपाशा को ही यहां कार्यक्रम में दीप प्रज्ज्वलित करना था और उसके बाद पूरे प्रोग्राम में शिरकत करनी थी। (2474838:596)

Subtype : “contra-expectation”

When Arg1 creates an expectation that Arg2 denies ($A = ||Arg1||$ and $B = ||Arg2||$), it is tagged as “contra-expectation”, as shown in Example (75).

Indian Weather Department knew about the Tsunami in time and it also got to know about the earthquake tremor. But instead of taking precautionary measures, the weather department misled the people while falsifying the news of earthquake in Southern India.

- (75) भारतीय मौसम विभाग को सुनामी की खबर समय रहते लग गई थी और दक्षिण भारत में भूकंप के झटके का भी पता चल गया था। पर एहतियाती कदम उठाने की जगह मौसम विभाग ने दक्षिण भारत में भूकंप की सूचना को झुठलाते हुए लोगों को गुमराह किया। (2484404:316)

5.2.4 Type Pragmatic Concession

The tag “Pragmatic Contrast” applies when the connective indicates a concession between one of the arguments and an inference that can be drawn from the other. Concession is not between the situations described in Arg1 and Arg2, that is, either an expectation is raised by a situation that is inferred from one of the argument and the other one denies it, or in other case, an expectation is raised by situation directly from one of the arguments and the situation inferred from another argument denies it.

- (76) मौसम विभाग आंकड़े डाउनलोड करता रहा और सुनामी लहरें लोगों को लीलने लगीं। (2484404:2175)

In example (76), the inference derived from Arg1 raises an expectation that since the geological department is still downloading data, thus people are not being killed by Tsunami. But this expectation is denied by Arg2.

5.2.5 Type Similarity:

Unlike the type Contrast, in case of Similarity,

- Two abstract objects are being compared but they do not contrast in the sense that the values assigned to the predicate are similar.
- Predicates in arg1 and arg2 are synonymous or similar.

- (77) सुभाष ने लालू की इस बात के लिए आलोचना की की चुनाव चिन्ह उनके आवास पर भेजा गया। इसी तरह पटना के राजद सांसद रामकृपाल यादव पर आरोप लगाया की वे भी पार्टी के दानापुर, बिक्रम और पालीगंज के अधिकृत प्रत्याशीयोंके खिलाफ काम कर रहे हैं।

5.3 Class Expansion

The class “EXPANSION” covers those relations which expand the discourse and move its narrative or exposition forward.

5.3.1 Type Instantiation

The tag “Instantiation” is used when the connective indicates that Arg1 evokes a set and Arg2 describes one of its instances in further detail. It may be a set of events, a set of reasons, or a generic set of events, behaviors, attitudes, etc. Typical connectives often tagged as “Instantiation” are :

Remember, you cannot claim reduction on a donation amount greater than 10 percent of your total income. If your income is 5 lakh, then whatever amount may donate; under the Income Tax regulation Article 80G you will not get tax reduction on an amount greater than 50 thousand.

- (78) ध्यान रहे, आप अपनी कुल आमदनी के 10 फीसदी से अधिक की दान राशि पर कर छूट का दावा नहीं कर सकते। जैसे कि यदि आपकी आय 5 लाख है तो आप चाहे जो रकम दान कर दें, आयकर अधिनियम की धारा 80जी के अंतर्गत आपको 50 हजार से अधिक राशि पर कर राहत प्राप्त नहीं होगी। (2484411:1129)

The rough semantics for “Instantiation” involves :

- (1) both arguments holding – ie, $\|Arg1\| \vee \|Arg2\|$ – and
- (2) following (Forbes-Riley et al., 2006), a relation holding between $\|Arg1\|$ and $\|Arg2\|$ of the form exemplify.

5.3.2 Type Exception

The type “Exception” applies when the connective indicates that Arg2 specifies an exception to the generalization specified by Arg1, as in Example (79). In other words, Arg1 is false because Arg2 is true, but if Arg2 were false, Arg1 would be true.

The cold-wind has affected the whole of northern India, but it's greatest effect has been seen today in the Pilani District of Rajasthan.

- (79) शीतलहर ने यूं तो समूचे उत्तर भारत को प्रभावित किया लेकिन इसका सबसे अधिक असर आज राजस्थान के पिलानी जिले में देखा गया। (2484407:1106)

5.3.3 Type Restatement

A connective is marked as “Restatement” when it indicates that the semantics of Arg2 restates the semantics of Arg1. It is inferred that the situations described in Arg1 and Arg2 hold true at the same time. The subtypes “Specification”, “Generalization”, and “Equivalence” further specify the ways in which Arg2 restates Arg1: $\|Arg1\| \rightarrow \|Arg2\|$ in the case of generalization, $\|Arg1\| \leftarrow \|Arg2\|$ in the case of specification, and $\|Arg1\| \leftrightarrow \|Arg2\|$ in the case of equivalence, where indicates logical implication.

Subtype : generalization : “Generalization” applies when the connective indicates that Arg2 summarizes Arg1, or in some cases expresses a conclusion based on Arg1. An example of “generalization” is given in (80).

Central Home Minister Shivraj Patil told on Monday that the country requires 35,000 crore rupees to get back from the damage caused by major natural calamities in last one year, including the Tsunami that came on 26th December 2004. Patil said that a big sum is required to confront the damage caused by the natural calamities that have affected India in last one year.

- (80) केंद्रीय गृह मंत्री शिवराज पाटिल ने सोमवार को बताया कि पिछले 26 दिसंबर 2004 को आई सुनामी समेत पिछले एक साल में आई कई प्रमुख प्राकृतिक आपदाओं के नुकसान से उबरने के लिए देश को 35,000 करोड़ रुपये की जरूरत है। इस प्रकार पाटिल ने कहा कि पिछले एक साल में भारत में आई प्राकृतिक आपदाओं से हुई क्षति का मुकाबला करने के लिए काफी बड़ी रकम की जरूरत है। (2479624:337)

Subtype : equivalence : “Equivalence” applies when the connective indicates that Arg1 and Arg2 describe the same situation from different perspectives. In Example (81), the two arguments highlight two different aspects of the same situation.

Your computer can get a really mysterious disease, for which a website will be responsible. It means, you will get in trouble because of a 'Diseased Website'.

- (81) आपके कंप्यूटर को एक रहस्यमयी बीमारी लग सकती है, जिसके लिए वेबसाइट जिम्मेदार होगी। यानी 'बीमार वेबसाइट' के चलते आप परेशानी में पड़ जाएंगे (2479528:331)

Subtype : specification : "Specification" applies when Arg2 describes the situation described in Arg1 in more detail.

On Tuesday, the daily routine of the capital was disturbed due to extreme typhoon winds. There was electric shortage at many places and the vehicles came to a standstill due to winds with speed of nearly 80 kilometres per hour.

- (82) राजधानी में मंगलवार देर रात भीषण आंधी-तूफान से जनजीवन अस्त-व्यस्त हो गया। उदाहरण के लिए करीब 80 किलोमीटर प्रति घंटे रफ्तार की हवाओं के चलते कई जगह बिजली गुल हो गई और वाहन जहां के तहां खड़े हो गए। कई स्थानों पर पेड़ गिर गए और जगह-जगह होर्डिंग व घरों, दुकानों के टीन उड़ गए। (2479529:251)

Due to snowfall in the entire state, especially Northern Kashmir, there are cold winds blowing. Snow bed of width from 6 inch to 2 feet could be seen at many places in the whole of Kupwara District.

- (83) पूरे राज्य, खासकर उत्तरी कश्मीर में हुई जबरदस्त बर्फबारी से शीत लहर ने जोर पकड़ लिया। खासकर पूरे कुपवाड़ा जिले में जगह-जगह बर्फ की छह इंच से लेकर दो फीट मोटी पर्त तक देखी गई। (2484407:890)

5.3.4 Type Alternative

The type "Alternative" applies when the connective indicates that its two arguments denote alternative situations. It has three subtypes: "conjunctive", "disjunctive" and "chosen alternative".

Subtype : conjunctive : The "conjunctive" subtype is used when the connective indicates that both alternatives hold or are possible ($||Arg1|| \wedge ||Arg2||$).

- (84) यदि घुसपैठ में इजाफा होता है या स्थिति बिगड़ती है, तो बेशक इस फैसले की समीक्षा की जाएगी (2605262:527)

Subtype : disjunctive : The "disjunctive" subtype is used when two situations are evoked in the discourse but only one of them holds. The semantics of "disjunctive" is $||Arg1|| \vee ||Arg2||$, where

$$A \vee B \equiv ((A \vee B) \wedge (A \rightarrow \neg B) \wedge (B \rightarrow \neg A)).$$

The UPA government with Congress in lead has yet to decide whether to keep Vohra for continuing the talk process or to get someone else for his position.

- (85) कांग्रेस नेतृत्व वाली यूपीए सरकार को अभी तय करना बाकी है कि वार्ता प्रक्रिया जारी रखने के लिए वोहरा को पद पर बनाए रखा जाए या फिर उनके स्थान पर किसी और को लाया जाए (2477219:1295)

Subtype : chosen alternative : The "chosen alternative" subtype is used when the connective indicates that two alternatives are evoked in the discourse but only one is taken, as with the connective न कि shown in Example (86).

He has come here for consultation, not for listening to the insults.

(86) वे यहां विचार-विमर्श के लिए आए हैं, न कि खरीखोटी सुनने। (2496836:960)

5.3.5 Type Conjunction

The Type “Conjunction” is used when the connective indicates that the situation described in Arg2 provides additional, discourse new, information that is related to the situation described in Arg1, but is not related to Arg1 in any of the ways described for other types of “EXPANSION”. (That is, the rough semantics of “Conjunction” is simply $\|Arg1\| \vee \|Arg2\|$.)

In NCMP, the progress of the promises in the areas of politics, society and economy will be discussed. Along with this, there will be thinking and consultation on the matter related to stopping terrorism and illegal immigration.

(87) एनसीएमपी में राजनीतिक, सामाजिक और आर्थिक क्षेत्र में किए गए वादों की प्रगति की समीक्षा की जाएगी। साथ में सांप्रदायिक, आतंकवाद, उग्रवाद और घुसपैठ को रोकने से संबंधित मसौदे पर विचार-विमर्श किया जाएगा। (2484369:1012)

Nothing has been done for small farmers in the budget. There is no new project for small business and cut-offs in the custom duty would have a direct effect on the domestic businesses.

(88) बजट में छोटे किसानों के लिए कुछ नहीं किया गया है। और लघु उद्योग के लिए नई योजना नहीं है और कस्टम ड्यूटी में कटौती का सीधा असर घरेलू उद्योग पर पड़ेगा (2484370:1643)

A test for conjunction could be to reverse the order of the arguments and see if the meaning of the relation remains same. This test could help to differentiate between causally or temporally related arguments from conjunctions. (However may not help necessarily to differentiate from other types) Apart from this, events related through conjunction are unrelated so, we can say that connectives conjoining event through the relation Conjunction do not have any semantics, they just perform the task of structurally attaching the two arguments.

5.4 Class Temporal

The tag “TEMPORAL” is used when the connective indicates that the situations described in the arguments are related temporally. The class level tag “TEMPORAL” does not specify if the situations are temporally ordered or overlapping. Two types are defined for “TEMPORAL”: “Asynchronous” (i.e., temporally ordered) and “Synchronous” (i.e., temporally overlapping).

5.4.1 Type Asynchronous

The tag “Asynchronous” is used when the connective indicates that the situations described in the two arguments are temporally ordered. Two subtypes are defined which specify whether it is Arg1 or Arg2 that describes an earlier event.

Subtype : precedence : It is used when the connective indicates that the situation in Arg1 precedes the situation described in Arg2, as before does in Example (89).

The opposition is constantly sending it's messages to Delhi. Before this, leaders opposing Modi had a meeting with Lalkrishna Advani.

- (89) *विरोधी खेमा दिल्ली तक लगातार अपना संदेश पहुंचा रहा है। इसके पहले मोदी विरोधी नेताओं ने लालकृष्ण आडवाणी से मुलाकात की थी।* (2484410:2683)

Subtype : succession : Subtype “succession” is used when the connective indicates that the situation described in Arg1 follows the situation described in Arg2, as xxx does in Example (90).

The weather department denied the occurrence of any earthquake tremor. The children went to the sea-shore to play cricket. The fishermen started preparing to go for the sea.

- (90) *मौसम विभाग द्वारा भूकंप के झटके को नकार दिया गया। जिसके बाद बच्चे क्रिकेट खेलने के लिए समुद्र तट पर जा पहुंचे। मछुआरे समुद्र में जाने की तैयारी करने लगे।* (2484404:1691)

5.4.2 Type Synchronous

The tag “Synchronous” applies when the connective indicates that the situations described in Arg1 and Arg2 overlap. The type “Synchronous” does not specify the form of overlap, i.e., whether the two situations started and ended at the same time, whether one was temporally embedded in the other, or whether the two crossed.

From 6:29 to 7:00 digital statistics were downloaded from the representative centres, which took nearly half an hour. During this, news related to the devastation of earthquake and the sea waves were being broadcasted on many channels in television.

- (91) *6.29 से 7.00 बजे तक ‘प्रतिनिधि केंद्रों से डिजिटल आंकड़े डाउनलोड किए गए, जिसमें लगभग आधा घंटा लग गया।’ इस बीच टेलीविजन के विभिन्न चैनलों पर भूकंप और समुद्री लहरों के कहर के बारे में समाचार प्रसारित होने लगे थे।* (2484404:940)

6 Issues

6.1 Differentiation between Connectives and AltLexes

We encountered so many expressions in Hindi which fell on the boundary of being connectives or AltLexes. Connectives (e.g. *क्योंकि*, *और*) are by definition frozen. So they do not inflect and they constitute a closed class. On the contrary, AltLexes are productive expressions. In Hindi, expressions like *इसके बावजूद*, *इससे पहले*, *इसके अलावा* are productive in the sense that the pronominal part (*इस*) can be replaced by other expressions such as *उस*. But, unlike other purely productive AltLexes like *‘इसका सबसे बड़ा कारण है’* they are quite often used in the same form and its major part is frozen (postposition). We decided to consider these forms as connectives. This is because these postpositions (*‘-के अलावा’*, *‘-से पहले’*, *‘के बावजूद’*) act as subordinators and they are taken as connectives in that case. Apart from this, they also connect nouns at syntactic level. In other words, they act as connectives at syntactic level. As, the underlying assumption in DLTAG is the parallelism between the structures of discourse and syntax, we took these to be an evidence of the same and took them as connectives.

6.2 Ambiguous Subordinators

As we discussed earlier, subordinators like *‘-कर’* are quite ambiguous and they have same syntactic form for all the different senses that they can have. We annotated a few instances of *‘-कर’* (examples of the same is shown in section 8). We realized that it was quite subtle to

differentiate between the instances which are discourse connectives from the ones that are not. Apart from this, it could take multiple senses which are difficult to identify. We believe that a lot more annotation and study are needed to fully understand their behaviour.

Appendices

A Explicit Connectives

List of Explicit Connectives with relative frequencies	
और	Temporal.Asynchronous.Succession - 1 Expansion.Exception - 1 Expansion.Conjunction - 87 Expansion.Alternative.Conjunctive - 1 Contingency.Pragmatic cause - 1 Contingency.Cause.Result - 2 Contingency.Cause.Reason - 1 Comparison.Contrast.Opposition - 1 Comparison.Contrast.Juxtaposition - 2
लेकिन	Expansion.Exception - 1 Comparison.Pragmatic contrast - 15 Comparison.Pragmatic concession - 6 Comparison.Contrast.Opposition - 13 Comparison.Contrast.Juxtaposition - 3 Comparison.Concession.Contra-expectation - 21 Comparison.Concession - 1
अगर .. तो	Contingency.Pragmatic condition - 1 Contingency.Condition.Unreal - 1 Contingency.Condition.Hypothetical - 4 Contingency.Condition.General - 4 Contingency.Condition.Factual - 1
बहरहाल	Comparison.Pragmatic contrast - 3 Comparison.Pragmatic concession - 2 Comparison.Contrast.Juxtaposition - 1 Comparison.Concession.Contra-expectation - 1 Comparison.Concession - 1
गौरतलब है कि	Temporal.Asynchronous.Precedence - 1 Expansion.Restatement.Specification - 2 Contingency.Cause.Result - 1 Contingency.Cause.Reason - 1
हालांकी	Comparison.Pragmatic contrast - 4 Comparison.Pragmatic concession - 4 Comparison.Contrast.Juxtaposition - 1 Comparison.Concession.Contra-expectation - 3
पर	Comparison.Pragmatic concession - 2 Comparison.Contrast.Opposition - 2 Comparison.Contrast.Juxtaposition - 1 Comparison.Concession.Contra-expectation - 3
बल्कि	Expansion.Alternative.Chosen alternative - 1 Comparison.Contrast.Opposition - 2 Comparison.Contrast.Juxtaposition - 3 Comparison.Concession.Contra-expectation - 1
या	Expansion.Alternative.Disjunctive - 3 Expansion.Alternative.Conjunctive - 1

	Expansion.Alternative.Chosen alternative - 5
यदि .. तो	Contingency.Condition.Hypothetical - 2 Contingency.Condition.General - 8 Contingency.Condition.Factual - 2
जब .. तो	Temporal.Synchrony - 3 Contingency.Condition.General - 1 Contingency.Cause.Result - 2
यानी	Expansion.Restatement.Specification - 1 Expansion.Restatement.Generalization - 2 Contingency.Cause.Result - 1
उधर	Comparison.Pragmatic contrast - 2 Comparison.Contrast.Opposition - 1 Comparison.Contrast.Juxtaposition - 20
जबकि	Comparison.Pragmatic contrast - 5 Comparison.Contrast.Opposition - 4 Comparison.Contrast.Juxtaposition - 17
तो	Contingency.Condition.Factual - 2 Contingency.Cause.Result - 5 Comparison.Contrast.Juxtaposition - 3
अलबत्ता	Comparison.Pragmatic contrast - 1 Comparison.Pragmatic concession - 1 Comparison.Contrast.Juxtaposition - 1
के बाद	Temporal.Asynchronous.Succession - 12 Temporal.Asynchronous.Precedence - 4
आगे	Temporal.Asynchronous.Succession - 2 Expansion.Conjunction - 3
या फिर	Expansion.Alternative.Disjunctive - 1 Expansion.Alternative.Chosen alternative - 1
जब .. तब	Temporal.Synchrony - 4 Contingency.Cause.Result - 1
दराअसल	Expansion.Restatement.Generalization - 1 Contingency.Cause.Reason - 2
तब .. जब	Temporal.Synchrony - 1 Contingency.Cause.Reason - 1
दूसरी ओर	Comparison.Pragmatic contrast - 1 Comparison.Contrast.Juxtaposition - 10
वहीं	Comparison.Contrast.Opposition - 2 Comparison.Contrast.Juxtaposition - 6
तथा	Expansion.Conjunction - 2 Comparison.Contrast.Juxtaposition - 3
इस बीच	Temporal.Synchrony - 8 Comparison.Contrast.Juxtaposition - 1
इसके अलावा	Expansion.Conjunction - 14 Comparison.Contrast.Juxtaposition - 1
मगर	Comparison.Pragmatic contrast - 1 Comparison.Concession.Contra-expectation - 1
तो .. लेकिन	Comparison.Pragmatic contrast - 1 Comparison.Concession.Contra-expectation - 1
इस दौरान	Temporal.Synchrony - 5
तब	Temporal.Synchrony - 3

इसी दिन	Temporal.Synchrony - 1
जैसे ही	Temporal.Synchrony - 1
जब	Temporal.Synchrony - 1
तब .. जब	Temporal.Synchrony - 1
इसके बाद	Temporal.Asynchronous.Succession - 9
बाद में	Temporal.Asynchronous.Succession - 5
इसके बाद से	Temporal.Asynchronous.Succession - 1
इस घटना के बाद से	Temporal.Asynchronous.Succession - 1
और तभी	Temporal.Asynchronous.Succession - 1
और उसके बाद	Temporal.Asynchronous.Succession - 1
इसके थोड़ी देर बाद	Temporal.Asynchronous.Succession - 1
इसी के बाद	Temporal.Asynchronous.Succession - 1
पहले .. और बाद में	Temporal.Asynchronous.Succession - 1
जैसे ही .. तो	Temporal.Asynchronous.Succession - 1
इससे पहले	Temporal.Asynchronous.Precedence - 4
इसके पूर्व	Temporal.Asynchronous.Precedence - 1
इसके पहले	Temporal.Asynchronous.Precedence - 1
पहले	Temporal.Asynchronous.Precedence - 1
इससे पूर्व	Temporal.Asynchronous.Precedence - 1
इससे पहले भी	Temporal.Asynchronous.Precedence - 1
इसके तहत	Expansion.Restatement.Specification - 2
खासकर	Expansion.Restatement.Specification - 2
इसतरह	Expansion.Restatement.Generalization - 1
खासतौर पर	Expansion.Instantiation - 1
मसलन	Expansion.Instantiation - 1
साथ ही	Expansion.Conjunction - 11
इसके साथ ही	Expansion.Conjunction - 6
व	Expansion.Conjunction - 2
न तो .. और न ही	Expansion.Conjunction - 2
इसी तरह से	Expansion.Conjunction - 1
उल्लेखनीय है कि	Expansion.Conjunction - 1
उस पर	Expansion.Conjunction - 1
दूध	Expansion.Conjunction - 1
इनके अलावा	Expansion.Conjunction - 1
इस बारे में	Expansion.Conjunction - 1
या तो .. या	Expansion.Alternative.Disjunctive - 1
इसके लिये	Contingency.Pragmatic cause - 1
ताकि	Contingency.Goal - 6
इसलिये	Contingency.Cause.Result - 15
इससे	Contingency.Cause.Result - 8
इस पर	Contingency.Cause.Result - 5
लिहाजा	Contingency.Cause.Result - 4
इसके चलते	Contingency.Cause.Result - 2
इसी लिये	Contingency.Cause.Result - 2
जिसके चलते	Contingency.Cause.Result - 2
जिससे	Contingency.Cause.Result - 2
इसकेलिये	Contingency.Cause.Result - 1
इसी के चलते	Contingency.Cause.Result - 1
फलतः	Contingency.Cause.Result - 1

इसपर	Contingency.Cause.Result - 1
इसके मद्देनजर	Contingency.Cause.Result - 1
जिससे कि	Contingency.Cause.Result - 1
ऐसे में	Contingency.Cause.Result - 1
आखिरकार	Contingency.Cause.Result - 1
अंततः	Contingency.Cause.Result - 1
इस लिये	Contingency.Cause.Result - 1
इस प्रकार	Contingency.Cause.Result - 1
के लिये	Contingency.Cause.Reason - 6
क्योंकि	Contingency.Cause.Reason - 6
की वजह से	Contingency.Cause.Reason - 2
के कारण	Contingency.Cause.Reason - 2
इसलिये .. क्योंकि	Contingency.Cause.Reason - 1
से	Contingency.Cause.Reason - 1
केलिये	Contingency.Cause.Reason - 1
चूंकी	Contingency.Cause.Reason - 1
फिर भी	Comparison.Pragmatic contrast - 1
एक ओर .. और दूसरी ओर	Comparison.Pragmatic contrast - 1
भले ही .. लेकिन	Comparison.Pragmatic contrast - 1
वैसे	Comparison.Pragmatic contrast - 1
बेसक लेकिन	Comparison.Pragmatic concession - 1
भले पर	Comparison.Contrast.Opposition - 1
भले ही .. पर	Comparison.Contrast.Opposition - 1
दूसरी तरफ	Comparison.Contrast.Juxtaposition - 2
वहीं दूसरी ओर	Comparison.Contrast.Juxtaposition - 1
इसी प्रकार	Comparison.Contrast.Juxtaposition - 1
जहां .. वहीं	Comparison.Contrast.Juxtaposition - 1
इधर	Comparison.Contrast.Juxtaposition - 1
के बावजूद	Comparison.Concession.Expectation - 1
हालांकि .. लेकिन	Comparison.Concession.Contra-expectation - 4
लेकिन	Comparison.Concession.Contra-expectation - 1
बावजूद इसके	Comparison.Concession.Contra-expectation - 1