Content in Embedded Sentences
A Typology by Context Shift[*]

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Abstract. In this overview, we look at embedded clauses that report somebody's attitude or speech. Semantic content in the embedded clause can in some such cases be interpreted from either of two perspectives: that of the speaker or that of the attitude holder/speaker being reported on. Other classes of content do not exhibit this ambiguity. Our overview shows which factors determine the interpretation of embedded linguistic and non-linguistic material and develop a partial explanation.

1 Introduction

Humans are able to assign meaning to complex sentences that they have never heard before. For this reason, semanticists assume generally that sentence interpretation is compositional (cf. Heim and Kratzer, 1998 among many others): the procedure interpreting sentences associates stored meanings to certain basic sentence parts and then applies general principles to combine the meanings of the parts to generate the sentence meaning. The compositionality of sentence meaning is one of the characteristic features of human language and perhaps a major contributor to our species's evolutionary success (Spelke, 2003). Compositionality is necessary for the interpretation of recursive structures because recursion leads to an infinite number of structures that can be generated.

In this paper we consider one way in which possibly all languages allow the recursive generation of an infinity of sentences: embedding of one sentence as a subordinate sentence within another.[1] How is the meaning of the embedded sentence joined into the meaning of the whole sentence? As we will see, the content of an embedded sentence is affected by and contributes in several different

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[1] Sentence embedding is generally thought to be a linguistic universal (Cristofaro, 2003 and others). Everett, 2005 claims that Pirahã lacks embedded sentences altogether, but our evidence at this point does not support this conclusion (Sauerland *et al.*, in preparation).

ways to the interpretation of the entire sentence. We propose one way to classify embedded content – namely, a classification based on the context shift behaviour of the embedded content. This classification can be applied not only to linguistic content, but also to non-linguistic content. We show, however, that non-linguistic content is distinguished from linguistic content by shiftability: While many types of linguistic content can shift when embedded, a shift of non-linguistic material is always impossible.

Context dependence underlies our classification of embedded content by context shift. There are many ways in which the content of an utterance may depend on the context in which it is made (Kaplan, 1978; Zimmermann, 1991). A prototypical context-dependent expression is the first person pronoun *I*, which always refers to the person who utters the expression. Hence the content of a sentence like (1) varies with the identity of the speaker.

(1)   I was born in Italy

Context-dependence is not restricted to pronouns, but is a pervasive phenomenon in natural language and *contextualist* philosophy even espouses the view that context-*in*dependent sentences don't exist (e.g. DeRose, 1999). For example, if we replace the pronoun in (1) with a proper name, as in (2), do we eliminate thereby the context-dependence of the sentence? Not quite, since there is still a temporal component in it that tells us that the described event is located in the past of the context of utterance.

(2)   Umberto Eco was born in Italy

Context-dependent expressions are usually interpreted with respect to the speaker's perspective (or the utterance context). For example, in (3-a), *here* refers to the location of the speaker, *tasty* means tasty to the speaker and *soooo* indicates a high degree from the speaker's perspective. However, there are linguistic devices that introduce additional perspectives, one prominent example being clausal complement taking predicates. If we embed (3-a) under a propositional attitude verb like *think*, as in (3-b), two different perspectives are available in the embedded clause: the perspective of the speaker (the utterance context) and the perspective of Jane (Jane's beliefs).

(3)   a.   The food here is soooo <yawn> tasty
        b.   Jane thinks that the food here is soooo <yawn> tasty

It turns out that not all context-dependent expressions behave alike in embedded clauses. For example, in (3-b), the temporal adverbial *here* still refers to the location of the speaker, not Jane's location, whereas *tasty* is now interpreted with respect to Jane (it's her taste, not the speaker's, that matters).

In the following we want to examine more closely, what kind of expressions tend to shift or tend not to shift under what circumstances. Section 2 sketches the linguistic and philosophical background of the discussion and introduces some basic terminological conventions. In Section 3 we examine the behavior of various types of context-dependent expressions in embedded contexts and identify some important patterns of variation.

2   Context Dependence and Shifting

It is an essential feature of human language (called 'displacement' by Hockett, 1960) that we are able to talk about things beyond the immediate here and now.

(4) a. It is raining [here] [now]
     b. It is raining [in Naples] [now]   place shift
     c. It was raining [here] [six weeks ago]   time shift
     d. It was raining [in Naples] [six weeks ago]
     e. It could be raining [here] [now]   world shift

In (4-a) the context of evaluation is simply the context of utterance: An utterance of (4-a) is true if and only if it is raining at the time and place of that utterance. However, the contexts of utterance and evaluation need not coincide. The examples in (4-b)–(4-e) contain expressions that effectively change the context of evaluation: in (4-b) spatially, in (4-c) temporally, in (4-d) both spatially and temporally, and in (4-e) modally.

   We have implicitly distinguished between a context of utterance and a context of evaluation. The assumption that natural language expressions are doubly context dependent goes back to Kaplan, 1978. The standard picture is as follows: The context of utterance determines the content of the utterance and cannot be changed (*shifted*) by linguistic means, whereas the context of evaluation determines the truth of an utterance and can be changed by linguistic means like adverbials or tense and aspect marking (as in (4-b)–(4-e)). In the following, we will call an expression *shifted* if it is not interpreted relative to the utterance context but relative to some other context.

   One way to motivate the distinction between the two kinds of contexts is to look at expressions that are semantically similar, but differ in being evaluated with respect to different contexts. For example, the first person pronoun *I* is evaluated with respect to the context of utterance and cannot be shifted by temporal adverbials like *twenty minutes ago*. By contrast, the definite description *the speaker* is evaluated with respect to the context of evaluation and hence is affected by temporal adverbials. That's why (5-a) is perfectly informative (saying that the person who is speaking now is not identical to the person who was speaking twenty minutes ago), whereas (5-b) and (5-c) seem contradictory when understood literally.

(5) a. Twenty minutes ago, I was not the speaker
     b. Twenty minutes ago, the speaker was not the speaker
     c. Twenty minutes ago, I was not me

   In the past decade, the assumption that the utterance context cannot be shifted has been questioned on empirical grounds. It has been noted that in some languages, first person pronouns can be shifted, i.e. refer not to the speaker but to the matrix subject of the embedding clause, as illustrated in the Amharic example in (6) from Schlenker, 2003.

(6)   ǰon   ǰəgna nəññ   yɨl-all
        John hero   be.PF-1sO 3s.say-AUX3M
        'John says that I'm a hero.' / 'John says that he's a hero.'

We have already observed that something similar is going on in examples like
(3-b) with other kinds of expressions. In the next section we will look at examples
of this type more systematically.

3   Typology of Context Shift

There are various factors that affect shifting in some way, among them the type of
embedding (e.g. direct vs. indirect speech), the type of embedding predicate (e.g.
'say' vs. 'believe'), the type of embedded element (e.g. pronoun vs. definites) and
the interaction with other elements in the same clause (e.g. it has been suggested
that there is a preference for elements in the same clause to "shift together", cf.
Anand and Nevins, 2004).

    We concentrate on two factors, the type of embedding and the type of em-
bedded element. The main types of embedding in English are illustrated in (7).
Direct Discourse (DD, quotation) is a faithful reproduction of some utterance
or thought, as in (7-a). Standard Indirect Discourse (SID) is a description of the
content of some utterance or thought, as in (7-b). Finally, Free Indirect Discourse
(FID) is a special narrative style to convey what a character says or thinks, as
in (7-c), where the parenthetical *John thought* is optional.

(7)   a.   John said "I will go to Boston soon."
        b.   John said that he would go to Boston soon.
        c.   He would go to Boston soon [John thought]

The second factor is the type of embedded element. We will cover descriptions
(e.g. *the man with the hat*), directional expressions (e.g. *across the street* or *come*
vs. *go*), personal pronouns (e.g. *I, you*), evidentials, epistemic modals, (e.g. *must,
might*), taste predicates (e.g. *is tasty, is beautiful*), expressives (e.g. *the damn
dog, that jerk*), honorifics and politeness strategies (e.g. German *Du* vs. *Sie*) and
qualities of voice (e.g. angry, excited, sad, tired).

    Concentrating on Standard Indirect Discourse (SID), we will argue for the
following four-way classification of shift of semantic content:

(8)   *always shifted*:   main predicate, epistemic modals, taste predicates
        inter-language variation: pronouns, evidentials
        intra-language variation: descriptions, directionals
        never shifted: expressives, politeness

3.1   Group 1: Always Shifted

This group includes the main predicate of a sentence when there is no adverbial
quantifier taking scope over the predicate (Percus, 2000). Percus describes this
as obligatory binding of the highest open world variable in a sentence by the
world-variable binder of the embedded clause.

Epistemic modals express the necessity or possibility of the embedded proposition in view of what is known (typically by the speaker). Embedded epistemic modals always receive a shifted interpretation (cf. Stephenson, 2008, Hacquard, 2006), i.e. they behave just like main verbs.

(9)   a.   It must be raining
       b.   John thinks it must be raining
       c.   Mary thinks that John thinks it must be raining
       d.   [Every boy]$_i$ thinks he$_i$ must be stupid

Predicates of personal taste are interpreted relative to a judge, in root contexts typically the speaker (autocentric perspective). Embedded taste predicates typically receive a shifted interpretation.

(10)   a.   The chili is tasty
       b.   John says/thinks that the chili is tasty
       c.   Mary says that John thinks that the chili is tasty
       d.   Every boy thinks that the chili is tasty

In addition, the highest sentence adverbial belongs to this category, as Percus, 2000 shows. See also Keshet, 2008 for recent extensions and modifications of Percus's analysis.

3.2   Group 2: Inter-language Variation

The items in this group are fixed in their shiftability in some languages, but possibly not in others or they are fixed too, but in the opposite direction.

Pronouns. First and second person pronouns in English are never shifted in standard indirect discourse. For example, the embedded occurence of *I* in (11-a) cannot refer to the matrix subject, but only to the author of the whole sentence. By contrast, in languages like Amharic, both an English-type (unshifted) and a shifted interpretation of the first person pronoun is possible, as in (11-b) from Schlenker, 2003.

(11)   a.   John says that I'm a hero
       b.   ǰon   ǰəgna nəññ   yɨl-all
            John hero be.PF-1SO 3S.say-AUX3M
            'John says that I'm a hero.' / 'John says that he's a hero.'

Similarly, in so-called Role Shift (RS) constructions in Sign Languages (cf. Lillo-Martin, 1995) personal pronouns are often shifted. An example from Catalan Sign Language (LSC) is given in (12) (from Quer, 2005). The first person pronoun 'IX-1' does not refer to the person who utters the sentence, but to Joan, whose belief is reported in the embedded clause.

(12)   ——————————————TOPIC   ————————————————————RS-i
       IXa MADRID‗m MOMENT JOAN‗i THINK IX-1‗i STUDY FINISH
       HERE‗b
       'When he was in Madrid, Joan thought he would finish his study here'

Note that RS in LSC differs from direct discourse in English in that not all context-dependent expressions are obligatorily shifted. Although the spatial adverbial 'HERE' in (12) can receive a shifted interpretation, it is by default interpreted with respect to the utterance context. The fact that 'IX-1' and 'HERE' in (12) can be interpreted with respect to different contexts is evidence against strong versions of the *Shift Together Constraint* of Anand and Nevins, 2004.

As far as we know there are no languages where embedded indexicals must be shifted; either they cannot be shifted or they can be shifted but remain ambiguous. Logophoric pronouns are analyzed by Schlenker, 2008 as obligatorily shifted indexicals, but they cannot usually occur out of embedded clauses.

Evidentials are linguistic markers that indicate the speaker's type of source of information, e.g. whether she witnessed the reported state of affairs herself (direct evidentials), only heard about it (reportative evidentials) or inferred it from other information (inferential evidentials). Evidentials are typically hard to embed, especially in in complement clauses, but there are languages that do allow evidentials in embedded positions.

For example, in Tibetan evidentials can be embedded under verbs of speaking and thinking and always receive shifted interpretations, just like epistemic modals in English (cf. Garrett, 2001). Example (13-a) illustrates an unembedded use of the indirect evidential *red*, where it receives a speaker-oriented interpretation. If this evidential marker occurs in complement clauses of *bsam* 'think', as in (13-b), only a shifted interpretation is available, according to which the person in possession of the indirect evidence is the matrix subject, not the speaker.

(13)   a.   yang.chen dge.rgan red
           Yangchen teacher   [ind cop]
           'Yangchen is a teacher.'
           (Speaker's source: hearsay/inference)
       b.   bkra.shis kho dge.rgan red   bsam-gi-'dug
           Tashi   he teacher   [ind cop] think-[dir imp]
           'Tashi$_i$ thinks he$_j$ is a teacher.'
           (Tashi's source: hearsay/inference)

However, evidentials do not behave alike in all languages. Whereas embedded evidentials in Tibetan require a shifted interpretation, evidentials in Bulgarian are typically not shifted (cf. Sauerland and Schenner, 2007).

(14)   a.   Maria kaza če Todor ima červena kosa.
           Maria said that Todor has-DIR red hair
       b.   Maria kaza če Todor ima-l červena kosa.
           Maria said that Todor has-REP red hair

In sum, both personal pronouns and evidentials show inter-language variation: In some languages they may or even must be shifted, in other languages they cannot be shifted at all.

3.3   Group 3: Free Intra-language Variation

Some items are generally ambigous and are ambiguous in the same way across languages. Namely, definite descriptions and directional adverbials belong to this category.

Definite descriptions in embedded contexts can systematically receive both an embedded (*de dicto*) and an unembedded (*de re*) reading. This observation goes back to Quine, 1956. For example consider (15) in a scenario where John thinks I met person 1 yesterday, but I actually met person 2. (15) has an interpretation that requires person 1 to be a spy, but also one that requires that person 2 be a spy.

(15)   John thinks that the man I met yesterday is a spy

Directional adverbials behave similarly. Consider *across the street*. In (16), John could think that the president could live across the street from me or from John.

(16)   John thinks that the president lives across the street

As far as we know there are no known cases of expressions that show free intra-language variation in one language, but not in another. Indexical pronouns come close, but as far as we know their shiftability is always constrained in some way or other as Anand, 2006 and Malamoud, 2006 show.

3.4   Group 4: Never Shifted

Finally, there are aspects of content that can never be shifted. In this category, we find politeness marking on pronouns, expressives, non-voluntary aspects of speech such as accent, and gestural content.

A clear case that is never shifted are formal pronouns of address in German (and presumably in other languages that have similar pronouns too). In German, the second person singular can only be used to address people someone is friends with, otherwise the third person plural pronoun *Sie* is used.[2]

This component of the meaning of the pronoun never shifts in German: use of a polite pronoun in indirect discourse could always indicate the speaker's attitude towards the addressee and never that of the subject of the embedding clause. For example, (17-a) and (17-b) both allow only a speaker oriented interpretation of *Du* and *Sie*.

(17)   a.   John sagte, dass Sie   nach Italien fahren
              John said   that you.formal to   Italy   travel
              'John said that you are going to Italy.'
        b.   John sagte, dass du   nach Italien fährst
              John said   that you.informal to   Italy   travel

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[2] Sauerland, 2003 shows that it is not necessary to analyze this form as a separate politeness form homophonous with the third person singular, but as a real occurrence of the third person plural form.

Expressives (Cursing) behave similar. Embedded expressives cannot be shifted as illustrated by (18), though there may be a few exceptions discussed by Potts, 2007 and Schlenker, 2007.

(18)   Sue believes that that bastard Kresge should be fired.
        # I think he's a good guy.   Potts, 2007

Non-voluntary aspects of speech like the speaker's accent are not usually considered part of meaning following Grice, 1957. While we do not disagree with this concept of meaning, it is nevertheless instructive to note that non-voluntary aspects are never shifted. Only if they are willfully imitated can they be shifted – for example, the partial quotation 'beea' in (19) can be an indication of John's accent.

(19)   John said he would like a 'beea', meaning a 'beer'.

Gestural elements combined with speech also seem to belong to the category of non-shiftable items even though they are voluntary. Consider the example in (20), where we imagine two gestures indicating the height of a person. For example, the speaker may hold his hand out flat in the air at the height stated with the fingers straightened as if measuring a person's height. (20) can be used even if John does not know Mary's height or believes her to be of a height other than 150cm. But, if I, the speaker, know that Mary is 200cm while John believes that she is only 150cm, it would be odd to use the height-indicating gesture.[3]

(20)   John hopes that he [gesture indicating height = 200cm] is going to dance
        with Mary [gesture indicating height = 150cm].

Furthermore, gesture can be used in embedded sentences seemingly inconsistent with the verbal content as in (21). The only reading of (21) is that John's internet girlfriend is actually 150cm tall, but John has been led to believe that she is 200cm tall.

(21)   John hopes that he is going to dance with the 200cm tall woman [gesture
        indicating height = 150cm] he met on the internet.

4   Towards an Analysis

Existing analyses to the shiftability of semantic content under embedding have, for the most part, not considered the full array of data that we have laid out above. The data are summarized in the following table:

(22)   *always shifted*:   main predicates, epistemic modals, taste predicates
        inter-language variation: pronouns, evidentials
        intra-language variation: descriptions, directionals
        never shifted: expressives, politeness, involuntary content, gesture

It will be useful to investigate to what extent this table has cross-linguistic validity. Our investigation to this point has been merely cursory.

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[3] There is a use of the gesture embedded under a verb of speech which does shift. But this case is parallel to the partial quotation in (19).

Nevertheless we attempt to provide some explanations for the date in the above table. It seems clear that some explanation must be found, since otherwise we would expect more variation. A clear case that can be explained is that of involuntary content. Since involuntary content is produced by the speaker of an utterance without his control, it is necessary that any information the involuntary content carries must be attributed to the speaker. Now first consider the other unshiftable cases.

For the case of expressives, two possible lines of explanation come to mind: on the one hand, their behavior may be related to the fact that expressives also seem to have involuntary uses. For example, I may say 'Shit!' without conscious intent as some unfortunate event happens. If used in this way, 'Shit!' may not be shifted for the same reason that other involuntary content cannot be shifted. However, why this would carry over to voluntary uses of expressives remains unclear – possibly the involuntary uses affect the shiftability of the voluntary. A second explanation has been suggested in Sauerland, 2007: Expressives usually express extreme degrees of some emotion. If expressives were to shift, the resultant meaning would be one where the extreme degree of some emotion is attributed to third persons. This could be perceived as so unlikely or unpolite that hearers usually – perhaps via a kind of habit – do not consider that option.

For politeness the explanation might be different: Polite expression is often related to register choice. If we assume that register choice is similar to the choice of a grammar, it seems reasonable to assume that the register is chosen once per utterance. Christian Huber (p.c.) pointed out to one of us that in the Upper Kinnaur area in India different languages are used depending on the social relationship between the speakers – high caste speakers use one language, low caste speakers a different language, and in inter-caste interaction only one language is used even if both speakers are proficient in the other language as well. In the Kinnaur culture, register choice involves code-switching between two grammars. If we are right, all register amounts to a kind of code-switching though the grammars involved are usually much more similar than in Kinnaur.[4] We speculate based on our personal experience that code-switching is most natural at sentence boundaries, though intra-sentential code-switching does of course exist (cf. Belazi et al., 1994). Politeness understood as register/language choice should then similarly only occur at sentence boundaries.

That leaves only the case of gesture unaccounted for. Though further investigation is necessary, we think it might be amenable to an analysis similar to one of those we gave for expressives above given that gesture occurs involuntarily, and perhaps is involuntary more frequently than voluntary.

The difference between content with complete freedom (descriptions and directions) on the one hand and items that must be shifted (main predicate, epistemic modals, taste predicates) has been successfully analyzed already in recent work by Percus, 2000 and Keshet, 2008. The idea of this work is that independent constraints on world variable indexation predict the differences. That leaves an

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[4] Yang, 2002 emphasizes the view of several grammars being active in parallel even in monolinguals. This is clearly compatible with our proposal here.

account of the two cases of interlanguage variation (pronouns and evidentials) left to be given. As we mentioned, both cases are subject to some constraint and are completely free in no language that we know of. A detailed study of the general constraints on the shiftability of pronouns and evidentials is beyond the scope of this paper. See though Anand, 2006 for a recent attempt.

5   Conclusion

In this paper, we provided an overview of content in embedded clauses. We restricted our overview to cases of complement clauses embedded under attitude and speech verbs, like (22). In these cases, we looked at what perspective is taken for the interpretation of semantic content that occurs in an embedded clause: that of the speaker or that of the subject of the embedding verb. Both readings are usually imaginable, and they are clearly distinct: We can give paraphrases for any contentful material where it is interpreted relative to the speaker and also where it is interpreted relative to the subject of the embedding verb.

(23)   Jane thinks that the food here is soooo <yawn> tasty (repeated from (3-b))

   As we observed, though, many imaginable interpretations are not actually available – natural language is restricted as far as the potential ambiguity of embedded material is concerned. We have seen that there are four categories of content under embedding as classified by their shiftability, and we have suggested an explanation of the shiftability of some of the classes in the last section.

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