Notes on Embedded Implicatures
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April 2006

1. Introduction: Chierchia 2004

Chierchia 2004 (henceforward, Ch04) argues that, contrary to the original Gricean model (Grice 1967), certain apparent implicatures may enter in to the determination of the truth conditions of an utterance. This happens, he proposes, in cases where an implicature is triggered in an embedded clause. In these cases, the implicature is calculated “locally”; and the result of the calculation, conjoined with the ordinary content of the clause, is used by the compositional semantic system in calculating the literal meaning of the embedding expression.

The idea of pragmatic “intrusion” into the process of semantic composition is not new. It has been propounded by various others since the 1970's (see, among others, Bach 1994, Carston 1988, Kempson 1986, Levinson 1983, Recanati 1989, Sperber and Wilson 1986/1995, Wilson 1975). Levinson 2000 is a more recent example of an extended argument for pragmatic intrusion. Chierchia’s view is distinguished from the views of those preceeding him in this: he argues that where implicature-like effects impact on truth conditional content, these effects are the result of grammatical rules which embody what have hitherto been taken to be purely inferential principles of interpretation. In effect, he does not argue for intrusion of pragmatics into the determination of truth conditions. Rather, his proposal is that some of what we have thought to be purely pragmatic is in fact part of grammar.¹

In his paper, Chierchia focusses on scalar implicatures. Standardly, these implicatures are thought to be a reflex of the Gricean Maxim of Quantity, and thus to be ultimately rooted in principles of rationality, as they apply to linguistic communication (see Grice 1989: 29-30). Chierchia argues rather that the rules which generate these purported implicatures are “provided by grammar” (p.59). The central consequence of the proposed system is characterized by Chierchia as follows:

¹. The position of Levinson 2000 is an intermediate one: he takes pragmatic intrusion to be a consequence of Generalized Conversational Implicatures, which in his view do not involve “full blown” pragmatic inferencing. However, to the extent that these implicatures are conversational, and governed by general interpretative heuristics, I take it that he would not consider them to be determined by grammar.
“the level at which [scalar] implicatures are added in (or removed) must not and cannot be freely set, but is simply the most local relevant environment” (p.64). This claim follows directly from the proposal that scalar inferences are determined by rules of grammar which recursively determine the content of clauses. Such rules do not allow for any “global” inference about the communicative intention of the speaker, or for flexibility in their application. Given that what is at issue is whether the relevant effects are due to pragmatics or to grammar, I will henceforth use the neutral term “implication” to refer to them.

The principal argument for Chierchia’s position comes from data which show, in his view, two things: First, that scalar implications arise in embedded contexts and second, that an account invoking only “global calculation” is inadequate to account for this. In this note, I will be examining in some detail the behavior of these so-called embedded implicatures. The data I present show that scalar implications display non-local behavior which is unexpected on the Chierchia view. I believe that these data tell against the “pragmatics as grammar” view, and in favor of a view that allows for a dynamic integration of compositional semantics and general pragmatic inference.

2. Embedding under believe
Chierchia’s central examples involve sentences in which a scalar item is included in a clause embedded under believe, as in:

(1) John believes that many of his students dislike him.3

Chierchia claims that a speaker of (1) attributes to John not merely the belief that many of his students dislike him, but the belief that many and not all of his students do. This claim is borne out by a continuation such as (2):

(2) ...He’d be mortified if he knew that in fact, they all do.

This continuation makes clear that the speaker intends the “not all” implication associated with many to be understood in the scope of the belief ascription, otherwise there would be no contrast between the belief attributed to John, and what is claimed to be the case.

2. Chierchia talks generally about implicatures, although his examples and the rules he develops pertain only to scalar implicatures. It is not clear to me how general Chierchia intends his conclusions to be.

3. This is a harmlessly modified version of Chierchia’s own example.
Here is a similar example with a different scalar item:

(3) John believes that the water in these springs is warm. He’ll get quite a surprise when he finds out that it’s really hot!

Chierchia argues that these readings demonstrate that the scalar implications must be calculated locally, that is, at the level of the embedded sentence. This would explain in a straightforward way how the implications become part of the belief attribution.

Chierchia observes that embedded implicatures may be cancelled in various circumstances. For example, cancellation is induced where the strengthened reading is inconsistent with other contextual information. So consider:

(4) Anne: Everyone wants their students to like them.

Bill: No, not really. Take John. He thinks that most of his students dislike him, and he thinks that the rest hate him, and it doesn’t bother him in the least.

Let’s assume that <dislike, hate> constitutes a Horn scale. Given this, Chierchia’s system predicts that the strongest reading generatable for the embedded clause most of his students dislike him, is paraphrasable as:

(5) Most of his students dislike but don’t hate him; and not all of his students dislike him.

If the speaker were attributing this thought to John, then the continuation (and he thinks that the rest hate him) would be incoherent. Chierchia’s system then allows for “retreat” to a weaker interpretation of the embedded clause, in effect employing only the scalar implication generated by dislike:

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4. Crucial to Chierchia’s argument is the claim that the standard algorithm for calculating scalar implicatures globally, which is based on the work of Horn (1972, 1989) and Gazdar (1979), does not produce adequately strong readings. Chierchia points out, for example, that application of this algorithm allows us to derive for (1) only the reading: “John does not know that not all of his students dislike him,” which is weaker than the intuitively correct interpretation. However, observing that the Horn/Gazdar algorithm does not give correct results is not the same as demonstrating that there is no implementation of the basic Gricean view which will do so.

5. Chierchia argues further that embedded implicatures are subject to what he calls the Strength Condition, which he formulates as follows: “The strong value of a constituent cannot become weaker than the plain value.” (p.62). More formally, this condition can be formulated as follows: Let \( \alpha \) be a subtree with constituent \( \beta \). If the value of \( \alpha \) computed with the strengthened value of \( \beta \) is entailed by the value of \( \alpha \) computed with the plain value of \( \beta \), then compute value of \( \alpha \) with plain value of \( \beta \).

This condition results in the suspension of scalar implications in the scope of a downward entailing operator.
6. Most of his students dislike but don’t hate him. The point to note here, for my purposes, is that Chierchia’s system allows for an embedded implicature to be cancelled; but it does not allow for “drift”. To repeat the claim quoted above: “the level at which implicatures are added in (or removed) must not and cannot be freely set.”

Let’s turn now to the first complication involving scalar items embedded under believe. The issue can be illustrated independently of scalar implications. Suppose I say:

(7) John believes that some of his lunatic friends are going to be elected to office.

Now, who is attributing lunacy to the relevant friends? In fact, there are two ways to take the utterance. One might take it as implying that John thinks that the friends in question are lunatics. But there is another way to take it, where John believes merely that some of his friends will be elected to office, and it is my evaluation that they are lunatic. (Very likely, I offer this evaluation to indicate that I don’t share John’s belief.) Notice that the problem cannot be resolved simply by appeal to syntactic scope. Even on the second, problematic, interpretation, the belief attributed to John may be a general one, that is, a belief that some friends or other of his are going to be elected. If we were to try to solve the problem by assuming that the subject of the embedded clause takes scope over the belief operator, then, under standard assumptions, we would expect the quantifier to have a specific reading: there are some friends of John’s such that he believes those friends are going to be elected.

Let’s now see how this issue applies to the question of embedded implicatures. The background to our example: Arthur is a pianist, who believes that every performance he has ever given has been superb. Belinda and Charles are fellow pianists, who think that Arthur’s performances are merely adequate. Against this background, consider an utterance by Belinda of the following:

(8) Arthur believes that we are jealous of his adequate performances.

Now, in Chierchia’s system, the “default” interpretation for this utterance would incorporate the strengthened interpretation of the embedded clause, giving:

(8a) Arthur believes that we are jealous of his adequate-but-not-superb performances.

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6. The problem is a version of the familiar Ortcutt problem (Quine 1956).
The *but not superb* addendum is, by hypothesis, the result of a rule generating scalar implications at the level of the embedded clause.\(^7\)

Now, given the background information about Arthur’s beliefs, Belinda could not intend to attribute to Arthur the belief that his performances are adequate but not superb. As Charles shares this background information, he would not take the utterance this way. In other words, the scalar implication which is licensed by default by *adequate* cannot be incorporated into the ordinary content of the embedded clause, under pain of inconsistency.

Chierchia’s system, as noted, allows for this: if a strengthened interpretation results in inconsistency, then the system can reject it in favor of an ordinary interpretation (or a strengthened but weaker one). However, as noted above, in such a case the scalar implication is simply suspended altogether. Crucially, there is no mechanism to allow it to re-emerge somewhere else in the interpretation.

Yet this is precisely what happens in this case. For Belinda’s utterance of (8) conveys her opinion that Arthur’s performances are adequate-but-not-superb. In other words, her use of the scalar term *does* generate a scalar implication, but not at the level of the embedded clause.

This case, involving belief statements, might reasonably be taken to involve complexities which are orthogonal to the question of local vs. global calculation of implicatures. I include it for completeness. The cases we will consider in the remainder of the paper are much more straightforward. But in all of them, the observation will be essentially the same: that a scalar implication generated by an embedded scalar item can emerge as a commitment of the speaker, rather than as part of the content of the embedded clause.

### 3. Embedding under factives

#### 3.1. see, hear, know

Consider:

(9) The guide saw that many of the children were swimming in the lake.

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7. Chierchia does not discuss any cases involving pre-nominal modification; but I presume that his system would generate this implication.
Note that in (9)-(10), *see* and *hear* are used in their full lexical sense, not in their reduced evidential sense, as in “I hear that you’ve been promoted.” In this latter sense, the verbs are not factive.

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(10) The teacher could hear some of the children splashing in the pool.

(11) a. The guide knew that many of the children were swimming in the lake.

     b. Bill knew that the water in the springs was warm.

In each of these cases, the strengthened interpretation of the embedded clause is plausibly taken as the intended content of the embedding predicate. That is, (9) most naturally conveys that the guide saw that many but not all of the children were swimming in the lake; if the speaker knew that the guide saw that all of the children were swimming, then the use of this sentence to describe the situation would be misleading.

It is also the case that the speaker of (9) would herself be committed to the claim that many but not all of the children were swimming. On the assumption that the scalar implication is part of the content of the embedded clause, this seems a natural consequence of the factivity of the embedding verb. By virtue of this property, the sentences entail the content of the embedded clause. A speaker is committed to the entailments of her claims. So, by this view, the speaker of (9)a. should be committed to whatever proposition comes under the scope of *see*.

According to this account, then, the presence of a global effect of an embedded scalar item is a consequence of its local effect. Let’s call this the “local leads to global” account. Happily, this account gives rise to a robust prediction: that the scalar implication can appear as a commitment of the speaker only if it is understood as part of the content of the embedded clause. If we can find examples where the speaker appears committed to the scalar implication, but where this implication is not understood as part of the content of the embedded clause, then this account is undermined. While I have found it hard to find or to construct examples with *know* where this is clearly the case, other more complex factives provide relevant evidence, as we will see in the following sections.

3.2. Change of state factives: *realize, discover, notice*

We begin with these examples:

(12) The guide realized/discovered/noticed that some of the children had brought snacks.

(13) The visitor realized/discovered/noticed that the weather was warm.
In both cases, the expected scalar implicature is understood as a commitment of the speaker: from an utterance of (12), a hearer naturally infers that some but not all of the children had brought snacks. This strengthened content can also be understood as the content of the realization/discovery. For example, (12) could be continued:

... so she encouraged them to share their treats with the others.

This would be appropriate only if the guide’s realization included the observation that not all of the children had brought snacks.

But now, let’s consider some slightly more complex examples.

(14) The guide realized that some of the children had left the group.

(15) The visitor realized that the day had turned warm.

It seems incorrect to take (14) as a report that the guide realized that some but not all of the children had left the group. What we take the guide to have realized is the “positive” fact that some of the children had left the group. The “negative” fact – that not all of the children had left – is not part of her realization, but is rather part of her subsequent knowledge. The effect is presumably due to an interaction between the (presuppositional) change of state predicate in the embedded clause and the presuppositional main clause predicate. The result is an implication (presupposition?) that the guide believed, prior to her realization, that all of the children were with the group. It cannot, then, be part of her realization that some of the children have not left the group, because to realize \( p \), one must go from not knowing (believing) \( p \), to knowing it.

Note that in cases like these it is almost impossible to force a scalar implication into the content of a change-of-attitude verb, even where this implication would result in a more reasonable interpretation for the sentence. Consider a teacher at the end of the school day who realizes that some of the children have not been picked up by their parents. One could describe this situation by saying:

(16) The teacher realized that some but not all of the children had gone home.

But it would be odd, at best, to use the following sentence:

9. In fact, there seems to be a complex interaction between the presupposition of realize, the presupposition of leave, the partitive, and perhaps also the scalar expression. I am far from understanding this interaction.
The teacher realized that some of the children had gone home.
This can only convey the “positive” realization that some of the children had gone, not the “negative” one that some had not. To get the latter, one needs to add an explicit only before some. So, here we have examples where scalar implicatures cannot be treated as local content.

Nonetheless, an utterance of (14) above, in any of its versions, or of (17), would normally commit the speaker to the claim that some but not all of the children had left the group (or gone home).

So, is there a scalar implication in this case, or not? Yes, there is: our understanding of what the speaker takes to be the case is affected by her choice of scalar item. Crucially, though, this implication is not understood as part of the propositional content with respect to which the subject has undergone a change of attitude. In other words, in this case the scalar item has a global effect, without a local one. 10

First consequence: this provides us with an example of the sort needed to undermine the “local leads to global” proposal considered in the previous section. Second consequence: this poses a general problem for the Chierchia treatment of scalar implicatures. Chierchia makes the (helpfully) strong claim that a scalar item, if it triggers an implication at all, must trigger it locally; and local implications must become part of the ordinary content of the clause in which they occur. Scalar implications may be suppressed; but there is no mechanism whereby they can be suppressed in their local environment but show up globally.

3.3. Emotive factives: be surprised that, be glad that, be annoyed that
When we turn to the case of emotive factives, we must introduce some additional complexities of Chierchia’s account. According to this account, ordinary scalar implicatures are suspended in NPI-
licensing environments, due to their “scale reversal” properties. (See fn.5.) Emotive factives turn out to create such environments:

(18) He was surprised/glad/annoyed that any students showed up to the talk.

(19) He was surprised/glad/annoyed that she had ever loved him.

Chierchia claims further that the interaction between scalar items and NPI-licensors (generally, DE operators) may give rise to “indirect implicatures”. So consider:

(20) Bob doubts that most students will show up.

In a non-DE environment, *most* is generally strengthened to *most and not all*. But strengthening the complement of *doubt* in this way leads to a contradictory result:

(21) a. Bob doubts that most but not all of the students will show up =

   b. Bob doubts that most of the students will show up and he doubts that not all of the students will show up.

   c. Bob doubts that most of the students will show up and he believes that all of the students will show up.

So Chierchia concludes that strengthened interpretations are not calculated in this way under DE operators. However, sentence (20) gives rise to a different implication, namely:

(22) ¬(Bob doubts that some students will show up) =

        Bob thinks that some students will show up.

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11. From a brief review of some of the major papers on NPI licensing (e.g. Linebarger 1987, von Fintel 1999), it seems to be accepted that adversatives (*be amazed, be sorry, regret*) license NPIs, but “positives” like *be happy, be glad* do not. Using Google, I searched the web for examples of *any* and *ever* under predicates of both types. While I found many more examples with adversatives, I found several natural-sounding cases of NPIs under both *happy* (“I was happy that I ever got to have such a great fake relationship in the first place.”) and *pleased* (“I drank a load of plum wine and was very pleased that it was ever thought of.”), although I found no such examples with *glad*.

   The status of these predicates with respect to NPI licensing is in fact orthogonal to my point here. If the predicates are NPI licensors, then the arguments below show that the treatment for NPI-licensing contexts proposed by Chierchia does not make correct predictions with respect to them. If they are not NPI-licensing, then they fall under the scope of the discussion in section 3.2.

12. Cf.: *He thinks that most of the students will show up* is interpreted as *He thinks that most but not all of the students will show up* = *He thinks that most of the students will show up and he thinks that no all of the students will show up.*
This implication is the indirect implicature.\textsuperscript{13}

Now consider:

(23)a. Bob was surprised that many of the children wanted to swim.

b. The visitor was surprised/glad/annoyed that the weather was warm.

What are the predictions of Chierchia’s account for these cases? Let’s focus on (23)a. First, Chierchia’s system predicts that \textit{many of the children} is not strengthened to \textit{many but not all}. This prediction is certainly borne out. It is in no way part of what Bob is surprised about that not all of the children wanted to swim. Similarly, in example (23)b., it is not part of what the visitor is surprised/glad/annoyed about that the weather was not hot.

Chierchia’s system further predicts that (23)a. will have the indirect implicature:

(24) Bob was not surprised that some of the children wanted to swim.\textsuperscript{14}

Chierchia notes further that indirect implicatures tend to be less robust than direct ones. There is perhaps a weak implication from an utterance of (23)a. that (24) holds; although I find it easy to take the sentence as indicating that Bob expected that none of the children would want to swim.

But now we come to the observation which is problematic for Chierchia’s system: the speaker of (23)a. herself appears committed to the claim that some \textit{but not all} of the children wanted to swim. This involves the direct implicature of \textit{some}, which, according to Chierchia, isn’t supposed to emerge at all in this environment. Similarly, utterance of any of the versions of (23)b. would appear to commit the speaker to the claim that the weather was warm \textit{but not hot}.

The point is just the same as in the examples we considered in the previous section. We see an embedded scalar item giving rise to an implication (perhaps an implicature) which is understood as a commitment of the speaker, but which does not enter into the local content of the clause in which the trigger appears. The problem is perhaps more severe in this case as, according to Chierchia’s proposal, the “direct implicature” should not arise at all, as the rule for generating strengthened interpretations involving DE operators simply does not produce it. (See Chierchia’s rule of Strong Application (final version), Ch04 p.64.) Nor can the problem be avoided by suggesting that this

\textsuperscript{13} This is calculated in Chierchia’s system by considering the set of alternatives generated by applying doubt pointwise to the set of alternatives to some students will show up.

\textsuperscript{14} Actually, it is not entirely clear what the prediction is, as the entailment facts with emotive predicates are unclear. See references in fn.10 for discussion.
context, although NPI licensing, is not strictly DE, because then the case simply reduces to the case of
the ordinary factives, where according to Chierchia’s account, we should expect the global effect
of the scalar item only if there is also a local effect.

4. Conclusions
Chierchia’s observations add to the evidence that defeasible, inferential content can be part of “what
is said”, of the truth conditional content of an utterance. The data presented here, however, appear
to undermine the claim that inferential content has a completely regular impact on truth conditions
of the sort which can be captured by a rule of grammar.

My conclusion is that we should allow for a much more flexible model of how inference and
liter content interact. Psycholinguistic evidence already indicates that certain kinds of generalized
inferences, which would include scalar inferences, are generated as soon as the “trigger” is
encountered. (See, for example, Grodner and Sedivy (in press)). But data of the sort given here show
that how those inferences contribute to the overall content conveyed may depend on broader
considerations. I suspect that what we see is something which can be characterized as “calculate
locally, reason globally”. This is an idea which I hope to flesh out in further work.

5. Appendix: Implications associated with or
It has been noted, most recently by Klinedinst (2005), that sentences in which an or coordination
occurs in the scope of a plural QP show a distributivity effect. Consider, for example:

\[(25) \quad \text{Every guest sang or danced.}\]

An utterance of this sentence would normally convey (a) that each guest sang or danced and (b) that
both singing and dancing took place, i.e. that at least one guest sang and at least one guest danced.
As Klinedinst formulates it, the additional implication is that it is not the case that every guest sang,
and it is not the case that every guest danced. In conjunction with the first implication, this entails
that at least one guest sang but did not dance, and at least one guest danced but did not sing.

Klinedinst argues for an account of the distributive implication as a local implicature, utilizes
a version of Chierchia’s account. He then argues that the well-known free-choice implication which
arises when or is embedded under an existential modal (and in a variety of other environments) can be given a parallel analysis.\textsuperscript{15}

In this appendix, I examine the behavior of these implications with respect to embedding. I found that the data are quite complex, and it is not easy to determine exactly what is going on. As it is easier to determine intended interpretations of actual uses of the relevant sentence types, I searched for examples on the Web, using Google searches.\textsuperscript{16} It turns out to be quite hard to find such examples that do not involve additional complications (e.g. additional operators), so in some cases I have had to resort to constructed examples.

My tentative conclusion is that the distributive implication (DI) and the free-choice implication (FCI) do not behave in quite the same way. The former seems to show behavior similar to the scalar implications considered above: it is often interpreted under the scope of an embedding verb; but there are instances where it has a global effect without a local one. The free-choice implication, on the other hand, is not really separable from the (other) truth-conditional content, and so has robustly local effects.

What follows is a collection of examples, organized by embedding verb, with some discussion. Examples are preceded by D or FC, to indicate whether the example illustrates the distributive implication or the free-choice implication. It is my hope that the examples and accompanying discussion will be useful in the ongoing research on the interpretation of or.

1. believe

(1) D John believes that every guest sang or danced.
Here, the distributive implication (DI) indeed seems to fall under the scope of believe, i.e. what John believes is that every guest sang or danced, and that some guest did each. This is borne out by the possibility of the continuation: ...but in fact, they all danced. The DI seems similarly embedded in the following, attested, example:

\textsuperscript{15} Danny Fox also has recent work in a similar vein. However, I have not yet had an opportunity to read it.

\textsuperscript{16} The inspiration for using Google to find data comes from David Beaver’s “Bellybutton Lint” paper (Beaver, forthcoming).
(2) D In her delusions she believed that almost everyone around her was evil or potentially harmful to her.\textsuperscript{17}

Turning now to a (constructed) FC case:

(3) FC The babysitter thought that the children were allowed to / could watch TV or movies whenever they wanted to.

The most natural interpretation attributes to the babysitter the thought that the children were allowed to watch TV and were allowed to watch movies (whenever they wanted to). So, in the terms being used here, the FC implication is embedded under think, i.e. the content of the thought is that both are allowed. It is, though, a little difficult to think about this example in these terms, because it is not possible to separate out the “literal content” from the purportedly implicated, free-choice content. A non-free-choice reading can be forced, as in the following:

(4) The babysitter thought that the children were allowed to watch TV or movies, but she wasn’t sure which.

but I find it hard to understand (3) as having the same meaning as the first clause of (4) plus an additional implication that at least one world of each kind is permitted.

2. \textit{see, hear, know}

(5) D Looking around, he saw that everything was smashed or partially burned.\textsuperscript{18}

(6) D He just knew that everyone was either angry or sad.\textsuperscript{19}

In the above, the DI is both local and global. Sentence (5) indicates that everything in fact was smashed or burned, with some things smashed and some things burned. This, presumably, is what the subject saw, so in this sense the implication has a local effect. The same holds, mutatis mutandis, for sentence (6).

\footnotesize
\begin{itemize}
\item \textsuperscript{17} http://www.worldandi.com/newhome/public/2004/February/mtpublprint.asp
\item \textsuperscript{18} http://www.wittyworld.com/countries/bosnia.html
\item \textsuperscript{19} http://www.linsdomain.com/otherworld/pages/Otherworld-11.htm
\end{itemize}
(7) FC The babysitter knew / saw that the children were allowed to watch TV or movies whenever they wanted to.

As with (3), the natural interpretation is that the babysitter knew/saw that the children were allowed to do both things. Additionally, this conjunctive permission claim is understood as a commitment of the speaker.

3. *realize, discover, notice*

(8) D My friend, Alan, once told me that they were taking the word "gullible" out of the dictionary. I believed him until I realized that everyone was either looking at me askance or laughing.²⁰

(9) D When we looked in our suitcases before the winter, we realized that everyone had outgrown or worn out last year's clothes.

(10)D After about the first of six end-to-end marathons, I discovered that everyone was either walking or limping.²¹

(11)D I soon discovered that everyone had skunk advice or a skunk tale.²²

In all of the examples above, the DI has both global and local effect. For example, what the writer discovers in the situation described in (11) is that some people have advice about skunks, and some have tales about skunks with everyone falling into one class or the other.

²⁰ http://lotusmoppet.livejournal.com/

²¹ http://www.badwaterbenjones.com/hitec/97bj.html

(12)FC  Bob realized that he could dodge the question, or fib.23

(13)FC  Having been in Newhouse at one time, I realized that he could rearrange the statement or take the statement out of context.24

(14)FC  He then discovered that he could splash or pore [sic] the paint directly on to the canvas using the brush to splash paint across the canvas to create patterns.25

(15)FC  Quickly, he discovered that he could rewind or fast-forward the message by small movements along the button with his thumb.26

In each case, the subject realizes/discovers that he has two options.

4.  **Emotive factives: be surprised, be glad, be annoyed**

(16)D  I was surprised that everyone had one-room or two-room apartments.27
The sentence conveys that some people have one-room apartments, and some have two-room apartments. However, this distribution is not part of what the writer expresses surprise about: the surprise is that everyone has a small apartment, i.e. that everyone falls into the union of the predicates. Note that whereas (17)a. is a reasonable continuation, (17)b. is not.

(17)  a.  I expected everyone to live in large houses.
    b.  ?I expected everyone to live in one-room apartments.

So, the DI is behaving like the scalar implications discussed above: when embedded under an emotive factive, it does not become part of the embedded content, but does become part of the global content conveyed. The same effect is seen in examples (18)-(20):

(18)D This morning I checked around and was surprised to find that almost everyone thinks it was a draw or that Kerry won.  
(Surprise is that everyone falls in union, not that people are distributed among the two views, or that there is someone with each of those opinions.)

(19)D He was glad that everyone was gone or asleep.  
(Glad that everyone is in the union, not that there are some who are gone and some who are asleep.)

(20)D For a while I was annoyed that practically everything was Buffy or Buffy actors, but there've been some blasted awesome sets on there lately.  
(Similarly here: what subject is glad/annoyed about is that everyone/everything falls in the union.)

Now we turn to parallel examples with free choice implications:

(21)FC Ogle was surprised that people were previously allowed to play games or download music on library computers.

30. Original source not retrievable.

-16-
This gives rise to an implication that both activities were previously allowed. Moreover, the subject, Ogle, is said to be surprised (independently) at both things. So, in the terms being used here (although, again, it is not clear to me that these terms are appropriate in this case), the FC implication is in some sense under the scope of the embedding verb.

The following (constructed) example is similar:

(22)FC I was surprised that we are allowed to have wine or beer at department functions.

- Conveys that we are allowed to have wine and we are allowed to have beer.
- Conveys surprise of the subject at permissibility of each.\(^{32}\)

So, in these examples, the FC implication is not behaving in the same way as the scalar and distributive implications.

The next example (also constructed) is less clear:

(23)FC I’m glad that on this diet I’m allowed to eat some candy or a small desert every now and then.

Again, there’s a clear global effect: this tells us that the speaker is allowed to eat some candy now and then and is allowed to eat a small desert now and then. However, I don’t read this as the speaker saying that she is glad, independently, about each. The most natural reading is that she is glad of the occasional indulgence. So, in this case, the FCI is parallel to the DI.

5. Brief summary

I think the principal conclusion to be drawn from these data is that the interaction between non-truth conditional implications and embedding verbs are complex. I tentatively conclude further that the

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32. With the right intonation, I can force a different reading of (22). Consider:

I was surprised that we are allowed to have wine OR beer at dept functions. In my old dept, only wine was allowed. Beer was considered vulgar.

- Reading: Surprised that [wine is permitted and beer is permitted], but NOT [[surprised that wine is permitted] and [surprised that beer is permitted]]. However, this reading too conveys that both are permitted.
behavior of the FC implication with respect to embedding, particularly in the case of emotive factives, suggests that it is not of quite the same sort as the scalar and distributive implications.

References
Beaver, David (forthcoming): ‘Have you noticed that your bellybutton lint colour is related to the colour of your clothing?’. In Ede Zimmerman (ed.), *Presupposition: Papers in Honor of Hans Kamp*.


