Even If Conditionals:

Even and its Relationship to the Consequent*

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1. Introduction

As illustrated in 1 and 2, *even if* conditionals appear to entail their consequents. The latter appear INDEPENDENT of the corresponding antecedents in the sense that their truth is asserted regardless of the truth of their antecedents.[1] Let us call this phenomenon C (onsequent-) I (ndependence).

(1) Even if it rains, the game will continue.

(2) Even if the bridge were standing I would not cross.

(Benett 1982)

This phenomenon is visible regardless of the choice of moods. Test examples which illstrate the apparent entailment of consequents are given in 3 and 4, where a contradiction is felt.

(3) #Even if it rains, the game will continue, but (I think it won't rain, so) the game won't continue.

(4) #Even if the bridge were standing, I would not cross, but (I think the bridge isn't standing, so) I will cross.

One approach to the above phenomenon amounts to claiming that conditionals with *even* and those without *even* are subject to different truth-conditions.[2] A corollary of this assumption is that *even* alters truth-conditions in conditionals, even though it leaves them unchanged elsewhere. Assumptions along these basic lines pervade much of the research on *even if*.

In contrast, we will propose that all conditionals be given a simple and traditional material-implication-based analysis and that *even* be uniformly treated as imposing constraints on its context, not on truth-conditions per se.

Notice, crucially, that CI is not always observed:

(5)   My employer is so puritanical that he would fire me if I behaved in what he considered a libertine manner. Even if my wife smoked cigarettes, he would fire me (, but, since she wouldn't ever smoke, he won't fire me).

(6)   Even if you drink just a little, your boss will fire you (, but, since you surely won't drink (at all), he won't fire you).

Any approach which seeks to ensure the effect of CI in *even if* construc-tions by positing a distinct set of truth-conditions is devastatingly counter-exemplified by 5 and 6, where CI is absent despite the presence of *even*. The analysis proposed here will rise above these difficulties.

2. Framework: Relevance Theory

This study follows Relevance Theory, advocated by Sperber & Wilson 1986. An important perspective is that the information from the inputs of utterances and other cognitive perceptions is processed in connection with contextual assumptions through logical operations in the processing field, called central systems, which can be thought of as where a human being thinks, reasons and deduces. This theory also claims that such processes are subject to the Principle of Relevance, which expresses an aspect of human nature in which people can and indeed do process in-coming assumptions in such a way that they extract sufficient relevance. That is, they try to get more cognitive effect and use less effort.

In this framework, 'context' is not a vague theoretical concept at all; a context is some bunch of assumptions which the Speaker (S) and the Hearer (H) each have or get in their central systems. Thus, both the assumptions which constitute a context and those which are from ut-terances are semantic information in the same format. In order to draw out more relevance, such a context can be extended or changed under the Principle of Relevance using accessible assumptions in the memory or in-coming assumptions acquired through perceptions.

Our claim below is that such an elaboration of the initial context is stipulated by *even*. That is, we claim *even* works as a constraint on its

context and through this it contributes to the processing of the utterance in which it appears.[3]

3. *Even*: a constraint on its context

In this section we provide a unified account of *even*'s role in constraining context. To begin with, we take seriously the general idea that *even* does not contribute to the truth-conditions of the utterance in which it appears. That is, the truth-conditions of 7 and 8 are the same with or without *even*.

(7)   (Even) Harry got lost.

(8)   Mary will leave (even) if you stay.

Further, if 9 and 10, which are felt to be implied by the *even* forms in 7 and 8 respectively, are false, they do not affect the truth-values of the utterances in question.[4]

(9)   Somebody else got lost.

(10) In some case other than the one where you stay, Mary will leave.

Moreover, the negative operators in 11 and 12 cannot negate *even*s.

(11) It is not the case that (even) Harry got lost.

(12) It is not the case that Mary will leave (even) if you stay.

In 11 and 12, the negations negate, respectively, the information that Harry lost his way and the information that Mary will leave on condition that H will stay.[5] However, they do not negate impressions, i. e. 9 and 10. Thus, *even* is not a part of the truth-conditional content of the utterance.

Given the above conclusion, our claim is that the normal function of *even* is to restrict the context against which the utterance is processed. That is, *even* is a marker which requires a certain assumption in its context.

What is that assumption required by *even*, then? Considering 9 and 10, we can generalize the assumptions required in the relevant contexts. The assumption will be a conjunction: one conjunct will be the prop-

osition within *even*'s scope with an unbound variable replacing the focus of *even*; the other conjunct will assert the non-equality of the unbound variable and the focus of *even*. Given that *even*'s scope is its clause and its focus is the part *even* modifies, we get 13 and 14.

(13) (7) $\Rightarrow$ Focus: the subject / Scope: the entire clause
$\Rightarrow$ x got lost $\wedge$ x$\neq$ Harry

(14) (8) $\Rightarrow$ Focus: the antecedent
Scope: the entire clause (i. e. the conditional itself)
$\Rightarrow$ If x, Mary will leave $\wedge$ x $\neq$ you stay

Therefore, 'x got lost $\wedge$ x$\neq$ Harry' and 'If x, Mary will leave $\wedge$ x$\neq$ you stay' are the contextual information required by *even*. Since, generally, information which has an unassigned variable does not yield sufficient relevance, because it is not a proposition, the variable undergoes possible value-assignment (PVA). This assignment is performed under the Principle of Relevance by identifying 'x' as some preceding assumption in the context or, if there is not a good candidate already, by retrieving some piece of knowledge from memory and constructing some usual condition under which the original consequent holds true.

To surmarize, in interpreting an *even if* conditional (*even* + 'p $\rightarrow$ q'), H processes its propositional form ('p $\rightarrow$ q') against a context which includes 'x $\rightarrow$ q $\wedge$ x$\neq$ p' due to the effect of *even*.

4. CI and logical operations

Now, let us put our ideas together. We have decomposed *even if* conditionals into two elements; the general meaning of conditionals and the normal operation of *even* on the interpretation proces. And, since CI does not characterize a material implication, CI is consequently not essential to *even if* conditionals, which contain material implications. Thus, an independent case must be just a consequence of logical interactions of a material implication with other assumptions in a context. Some sample logical deductions which give rise to the effect of CI are seen below.

(15) $p \rightarrow q$, $\text{-}p \rightarrow q$ / q
(16) q, $p \rightarrow q$ / q

15 expresses that when we have two material implications whose antecedents are contradictory and whose consequents are the same, we can deduce the information corresponding to the consequents.

16 corresponds to the case where the assumption corresponding to the consequent of the material implication is already given or is summoned from memory as a piece of knowledge of the world. Since the consequent is true for such an independent reason, it is true. 17 can be thought of as an example of this.

(17) Even if that finger were bent, Syracuse would be in central
       New York.   (Bennett 1982)

Although 16 explains some cases of independent consequents, we will not pursue this line any further, because this kind of reasoning has nothing to do with the *even if* conditionals per se.

These are not the only logical operations that give rise to CI-effects. Indeed, not all cases of CI arise from tautologies of propositional logic: supporting knowledge about particular relations or individuals mentioned in a conditional may give rise to equally valid CI-inducing entailments.

5.   The application of the theory to the examples

Now we can apply our theory to the examples in sec. 1. Since 2 is analyzed practically in the same way, we just reconsider 1 as an 'independent' case, which is repeated with analysis in 18.

(18) Even if it rains, the game will continue.
       $\Rightarrow$ propositional form: $p \rightarrow q$
             constraint imposed by *even*: $x \rightarrow q \wedge x \neq p \Rightarrow$ PVA:
             $\text{-}p \rightarrow q$ (19)
       $\Rightarrow$ $p \rightarrow q$, $\text{-}p \rightarrow q$ / q

(19) If it does not rain, the game will continue.

An *even if* conditional consists of '$p \rightarrow q$' and *even*. In processing, *even* requires '$x \rightarrow q \wedge x \neq p$' as a constraint on the context. In assigning a

value to 'x', as in this example no particular assumption serves as the value already given, some knowledge is retrieved from H's memory. Here, it is '-p' that stands in for 'x' which is easy enough to retrieve. That is, the knowledge which we aquire through our lives tells us that games continue on condition that it does not rain. Thus, this '-p → q', which is expressed as 19, makes a small enough demand on processing energy to satisfy the Principle of Relevance. The pattern here satisfies 15 and, thus, we can deduce 'q'. Therefore, this example allows us to predict CI, and in fact we get it.

Next consider 'dependent' examples. We begin with example 5, whose essential part is repeated as 20, assuming the same preceding context as in 5.

(20) Even if my wife smoked cigarettes, he would fire me.
  $\Rightarrow$ propositional form: $p \to q$
     constraint imposed by *even*: $x \to q \land x \neq p \Rightarrow$ PVA: $r \to q$ (21)
  $\Rightarrow$ $p \to q$, $r \to q$

The propositional form is, again, '$p \to q$', and *even*'s requirement is just as in 18. The result of PVA, however, is different from that in 18. In this case, through preceding contextual assumptions, the expected result will be something like 21 and not 22.

(21) If I smoked cigarettes, he would fire me.[6]

(22) If my wife didn't smoke cigarettes, he would fire me.

The information in 22 would be difficult to retrieve from H's memory, because it is such a rare experience in life. Thus, the assumption in 22 is much less accessible than that in 21, so it is too energy-consuming to satisfy the Principle of Relevance. As a result, as H fails to get '-p → q', he can not use 15. In fact, there is no logically valid inference that could derive the information corresponding to the consequent.

The example in 6 can be explained along the same lines.

(23) Even if you drink just a little, your boss will fire you.
  $\Rightarrow$ propositional form: $p \to q$

constraint imposed by *even*: $x \rightarrow q \wedge x \neq p \Rightarrow$ PVA:
$r \rightarrow q$ (24)
$\Rightarrow \quad p \rightarrow q, \ r \rightarrow q$

(24) If you drink a lot, your boss will fire you.

Notice that the two types differentiated according to whether they have CI or not are not constant: They just happen to be as they are and have nothing to do with distinctions, say, between the predicates. Therefore, we can expect, and indeed have an example with a dependent consequent using the same predicate as is adopted in 1, which shows CI.

(25) If it doesn't rain, the game will continue; even if it rains lightly, the game will continue; but if it rains heavily, the game will be cancelled.[7])

6. Consequence of the theory

As considered above, CI is caused through the interaction of the propositional form of the utterance with other information in the context, so that it is simply a consequence of human logical operations. If this approach is correct, a usual conditional without *even* may often show CI, depending on assumptions in the central systems. One case of this is where '-p $\rightarrow$ q' is retrievable. Consider:

(26) Brigitte Bardot is strikingly beautiful, but if she were an ugly witch, I would love her.

26 is supposed to be able to have a concessive reading. In this reading, the first conjunct ('Brigitte Bardot is strikingly beautiful') activates an assumption 'If she is beautiful, I will love her.' and the latter conjunct ('if she were an ugly witch, I would love her') has a concessive relationship with the former assumption. Furthermore, if H regards 'She is beautiful.' and 'She is ugly.' as contradictory, the assumption that S will love her is derived.

The above interpretation, however, is not forced, because of the lack of *even,* and so 26 may alternatively be interpreted as a usual conditional. In this case, the utterance also causes a conversational implicature such as 27 suggested by the use of the subjunctive mood. That is, the

assumptions expressed as the consequent and the antecedent of the implicature are regarded as true in the actual world.

(27) Since she is not an ugly witch, I will not love her.

Notice that in the concessive case of CI, the implicature in 27 can not be obtained. This is because, if it could be, the derived assumption that S will love her contradicts the consequent of 27.

7. Conclusion

Given our theory, it is not the case that in *even if* conditionals, *even* contributes to the truth-conditions while in usual utterances it does not. And neither the scope nor the focus varies according to the context. Nor are there two truth-conditions sensitive to whether the utterance has CI or not. (If so, the theory would have to include a system to make a context to choose the reading.) In our theory, the context can be affected, and the phenomenon in question is just a consequence of the interaction between the meaning of a usual conditional and the normal function of *even,* so that CI may occur as a byproduct. That is, CI is not essential to this construction. This perspective accepts the dependent examples as well. Moreover, the phenomenon can be explained under the assumption that *even* always performs the same function with the same scope and focus.

NOTES

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1) It may not be appropriate to use such an intuitive term as 'independent', for no relationship between the antecedents and the consequents of conditionals is assumed in the perspective we take in which conditionals in general

are analyzed as material implications.

We, however, use this term mainly for two reasons: 1) We can grasp the phenomenon in question easily. 2) We aim to show that the intuition can be ascribed to the interactions in the human cognition assumed in Relevance Theory: As is shown below, the consequents are independent if the information corresponding to them is derived through logical operations.

2) That is, the truth-tables for usual conditionals and *even if* conditionals would be as follows:

p	q	If p, q.	q even if p.
t	t	t	t
t	f	f	f
f	t	t	t
f	f	t	f

This approach is practically the same as the one that treats *even if* as an idiom. Since these truth-conditions are the same as that of 'q ', this approach cannot deal with the case where and *even if* conditional co-exists with ' -q '.

3) As for this point of view, see Blakemore 1987.

4) In this case, however, the utterances will be judged inappropriate. Note that if our approach is correct, this notion can be analyzed as describing the case where H fails to recover contexts which are relevant enough.

5) Here we neglect the cases of meta-linguistic negation. See Kay 1990.

6) The antecedent may be 'I behaved in a libertine manner'. The point is that the value is not ' -p '.

7) The lack of CI in 25 may seem paradoxical in comparison to 1. However, the introduction of scalarness with *lightly* brings with it a crucial difference in the interpretation process which we do not have space to describe.

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