Decomposing relevance in conditionals

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Abstract

In many cases, the use of a conditional is felt to be inappropriate unless the antecedent is relevant to the consequent. A number of authors have recently considered this relevance effect, noting that it is difficult to defeat and concluding that it is part of the conventional meaning of conditionals rather than the pragmatics of their use. However, there are also systematic counter-examples to the relevance requirement, where a conditional is used precisely to convey the irrelevance of antecedent to consequent. I argue that both types of conditionals are better understood in terms of the interaction of a basic conditional meaning which does not encode any information about relevance, and a separate process of the establishment of coherence relations among successive clauses in discourse, regardless of whether conditionals are involved. This theory is supported by the distribution of discourse particles such as then and still in conditionals and other sentence and text types. I also show that this theory is consistent with previous experimental results that have been claimed to falsify an account of the relevance requirement based on coherence.

Keywords: Conditionals, relevance, discourse coherence, discourse particles, pragmatics.

1 Introduction

The use of a conditional sentence often suggests that the antecedent is relevant to the consequent. Consider (1):

(1) If Mary left the party early, Bill was unhappy.

A listener would readily infer that there is some connection between the antecedent “Mary left the party early” and the consequent “Bill was unhappy”. They do not, for example, merely happen both to be true. This connection does not determine a direction of causation: (1) is compatible with a situation where Mary’s early departure caused Bill to feel unhappy, or one where the only explanation for Mary’s departure is that she loathes being around an unhappy Bill. With the right background, it may also be compatible with a “common cause” scenario in which some third variable generates a correlation between the two events mentioned in (1). Whatever the causal story, this example generates a clear sense that the question of whether the antecedent is true is
relevant to the truth-value of the consequent. Following Skovgaard-Olsen, Singmann, and Klauer (2016), let’s call this the **relevance effect**.

While the relevance effect is widely known, most theoretical accounts of conditionals have not built a relevance requirement into the literal meaning of conditionals, and it is widely assumed to be a conversational implicature. However, authors who have made this claim have rarely attempted to justify it in any detail. Indeed, a number of authors have recently given strong theoretical and empirical arguments showing that the relevance effect does not behave like a conversational implicature (Douven, 2008, 2016; Krzyżanowska, 2019; Krzyżanowska & Douven, 2018; Skovgaard-Olsen, 2016; Skovgaard-Olsen et al., 2016). These authors have generally concluded, by process of elimination, that the relevance requirement is part of the conventionally encoded meaning of conditionals, either as an entailment or a conventional implicature. This position has been dubbed “inferentialism” (Douven, Elqayam, Singmann, & van Wijnbergen-Huitink, 2018). Inferentialism marks an important departure from all major philosophical, linguistic, and psychological theories of conditionals, including those based on the material conditional, possible-worlds semantics, domain restriction, mental models, suppositional reasoning, or probability logic.

This paper proposes an alternative non-conventionalist approach to the relevance effect, rooted not in conversational implicature but in **discourse coherence**. Drawing on a rich body of work on discourse coherence (Asher, 1993; Asher & Lascarides, 2003; Hobbs, 1979, 1990; Kehler, 2002; Knott & Dale, 1994, 1996), I suggest that the need to establish relevance between antecedent and consequent in examples like (1) is due to an obligatory process of inferring coherence relations among successive pieces of discourse. Coherence effects differ from conversational implicatures in numerous ways; arguments that motivate inferentialism by pointing to the failure of an implicature-based account thus do not count against a coherence theory. Additional support for the coherence account comes from the fact that the relevance requirement is systematically missing in certain conditionals, a fact which requires inferentialist theories to treat *if* as ambiguous between an interpretation that encodes relevance and one that does not. In contrast, the coherence-based theory is able to predict precisely where the relevance effect should occur based on parallels with the context-sensitivity of other multi-clause discourses and the effects of discourse particles such as *then* and *still* in conditional and non-conditional contexts.

The idea that coherence accounts for the relevance effect is consonant with the experimental data and theoretical analysis of Cruz, Over, Oaksford, and Baratgin (2016), who argue that the oddness of conditionals that fail the relevance requirement is due to the lack of a “common topic of discourse”. Subsequently, Krzyżanowska, Collins, and Hahn (2017) elaborated slightly on this idea within a coherence framework, but rejected their variant of Cruz et al.’s theory on the basis of an experiment. However, the positive proposal of this paper reveals several limitations in the theoretical analysis and experimental design of Krzyżanowska et al. (2017), and indeed section 7 shows that their results are compatible with the coherence-based theory of the relevance effect presented here.

The issue of whether relevance is semantically encoded in conditionals is crucial for understanding what conditionals mean and how they are used — topics of broad interest in psychology, linguistics, philosophy, computer science, and other fields. The viability of non-inferentialist theories of conditionals—including those based on mental models, supposition/the defective truth-
table, probability logic, the strict conditional, the material conditional, and the Stalnaker conditional—may also depend on it. In addition, the status of the relevance effect matters for several very general issues in the psychological and philosophical study of conditionals. For instance, a conventionally encoded relevance requirement could—depending on how it is spelled out in formal detail—problematic Strong Centering, a property of many popular theories of conditional semantics:

**Strong Centering:** If $A$ and $C$ are both true, then $If A then C$ is true.

The status of Strong Centering is an important issue in philosophical logic, and it also enjoys some experimental support (Cruz, Baratgin, Oaksford, & Over, 2015; Politzer & Baratgin, 2016). However, it is problematic if the relevance effect is part of the semantics of conditionals, since the mere truth of $A$ and $C$ does not suffice to guarantee relevance between them (Cruz et al., 2016; Krzyżanowska & Douven, 2018). In contrast, the coherence-based approach that I will propose below is compatible with Strong Centering: a failure of coherence establishment affects conversational felicity, but not truth.

The status of the relevance effect is also important because it bears directly on the question of whether the probability of a conditional is systematically equal to the corresponding conditional probability (Adams, 1975; Edgington, 1995; Lewis, 1976; Stalnaker, 1970).

**Stalnaker’s Thesis:** $P(If A then C) = P(C | A)$.

This equation has been supported in a large number of empirical studies (Douven & Verbrugge, 2010, 2013; Hadjichristidis et al., 2001; Fugard, Pfeifer, Mayerhofer, & Kleiter, 2010; Over & Evans, 2003). However, a semantic relevance requirement would generate systematic counterexamples to Stalnaker’s thesis, since irrelevance of $A$ to $C$ could lead to low probability of “If $A$ then $C$” even if the conditional probability $P(C | A)$ is high (Cruz et al., 2016; van Rooij & Schulz, 2019). In contrast, if the relevance effect is due to discourse pragmatics as argued here, we do not need to encode a conventional relevance requirement in the meaning of conditionals, and the equation between probabilities of conditionals and conditional probabilities may continue to hold in full generality. The status of the relevance effect is one of considerable significance for these and various other issues in the study of conditional semantics, pragmatics, and reasoning.

## 2 Relevance as a conversational implicature?

The basic relevance effect was illustrated above: when we read a conditional such as (1) (‘If Mary left the party early, Bill was unhappy’) we automatically assume that the antecedent and consequent clauses are informationally related. Many authors writing on conditionals have noticed this fact and suggested that it is due to conversational implicature—though few have attempted to spell out the reasoning in detail. One exception is Quine (1965, §7), who argues that ‘if’ denotes

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1Note that Stalnaker’s thesis is about probability of truth. “Adams’ Thesis”, which states that the acceptability/assertibility of “If $A$ then $C$” is equal to $P(C | A)$, is empirically problematic (Douven & Verbrugge, 2010): many factors can influence acceptability and assertibility that are only tangentially related to truth.
the material conditional. However, Quine continues, someone who believes (1) simply because she believes its antecedent to be false ‘could save breath and at the same time convey more information’ by asserting the negation of the antecedent. Similarly, someone who believes (1) because she believes the consequent to be true would be better served by asserting its briefer, more informative consequent. This leaves only one obvious motivation for asserting the conditional: a belief that ‘there is some causal connection or general law’ whereby the antecedent’s truth would tend to lead to the consequent being true as well. Quine points out that, if such an account is able to explain the relevance inference without encoding it conventionally, we should resist the temptation to make it part of the meaning of conditionals, as modern inferentialists do.

In an extended defense of the material conditional analysis against an early form of inferentialism, Grice (1989a, written in 1967) echoes Quine’s pragmatic explanation of why the assertion of a conditional leads to the inference that the speaker does not merely believe the antecedent to be false, or the consequent true. By reasoning about the conversational maxims of Quantity and Quality (Grice, 1989b), we can infer from the assertion of a conditional that there is ‘non-truth-functional evidence’ for the truth of the conditional (Grice, 1989a, p.61-62).

The main problem for this account is that the relevance effect in conditionals does not behave like a conversational implicature, according to Grice’s own criteria. In particular, as Krzyżanowska (2019) points out, the relevance effect does not appear to be defeasible as conversational implicatures typically are. Consider the case of canceling a Quantity implicature. While the (a) example would typically be enriched to (b), there is no incoherence in the (c) sentence, which explicitly denies the ‘not all’ enrichment.

(2)  
  a. Many Americans own flags.
  b. Many, but not all, Americans own flags.
  c. Many Americans own flags—indeed, all of them do.

In contrast, an attempt to cancel the relevance effect explicitly generally leads to a sense of bizarreness, as in (3).

(3) If Mary left the party early, Bill was unhappy—though these things have nothing to do with each other.

Work by Skovgaard-Olsen, Collins, Krzyżanowska, Hahn, and Klauer (2019, Experiment 1) corroborates the intuition that conditionals differ from scalar implicatures: their participants rated the denial of relevance in a conditional as much more contradictory than the denial of a default scalar implicature, and indeed as contradictory as the denial of an uncontroversial entailment.

A related problem for an implicature-based story is the phenomenon of ‘missing-link conditionals’. The requirement of a connection between antecedent and consequent appears to be obligatory in indicative conditionals (Douven, 2017). In a context where such a connection is implausible or difficult to recover, the example is felt to be conversationally inappropriate.

(4) If Mary left the party early, Bill is Swedish.

Example (4) is quite difficult to make sense of, apparently because it is difficult for a listener or reader to supply a relevant connection between the timing of Mary’s departure and Bill’s nationality. Of course, it is possible to make sense of (4) with further contextual background—for example,
if we know that Mary has an irrational dislike of Swedes (and only Swedes), so that knowledge of her departure would allow us to infer Bill’s nationality. But the need to supply this background in order to make sense of (4) already sets it apart from classic conversational implicatures such as scalar implicatures. Specifically, in the original Gricean account as well as modern instantiations (Frank & Goodman, 2012; Chierchia, Fox, & Spector, 2012), the fact that an implicature is very implausible would normally lead to the suspension of the implicature, rather than a sense of bizarreness. This is clearly the case if we consider variants of example (2a) in which the ‘many’ ∼ ‘not all’ implicature is implausible or nonsensical.

(5) a. There are many black holes in the universe. (?? ‘There are not all black holes’)
   b. The hotel has many amenities. (?? ‘It does not have all amenities’)

In contrast, the fact that the antecedent and consequent of (4) are normally felt to be irrelevant to each other does not lead to the suspension of the relevance requirement, but rather to a generalized sense of inappropriateness. The need to supply special context to render (4) felicitous suggests that establishing relevance in conditionals is obligatory, rather than context-sensitive and defeasible. This suggests that the relevance effect is not a conversational implicature, as argued by Douven (2017), Krzyżanowska (2019) and others.²

A number of other arguments have been put forward in recent literature to problematize an implicature-based account. For example, Krzyżanowska and Douven (2018) provide experimental evidence that participants respond differently to failures of relevance in conditionals than to false implicatures. Krzyżanowska, Collins, and Hahn (2017) show that participants reject ‘If $p$, $q$’ conditionals when $p$ and $q$ are true but irrelevant to each other, while accepting ‘$p$ and $q$’; but this preference is reversed when $p$ and $q$ are inferentially relevant. The latter point is problematic if Quantity-based reasoning is involved in the generation of the relevance effect, since on such an account ‘$p$ and $q$’ should be preferred as the stronger option. Additional arguments against the implicature-based account are given by Douven (2008, 2015); Skovgaard-Olsen (2016); Skovgaard-Olsen et al. (2016, 2019).

## 3 Relevance as conventionally encoded?

There seems to be good reason to reject an initially attractive Gricean account of the relevance effect, then. What is the alternative? Inferentialist theories are motivated in large part by the failure of the implicature-based account, reasoning that the only alternative is for relevance to be a conventionally encoded part of the meaning of conditionals (Douven, 2008; Krzyżanowska & Douven, 2018; Skovgaard-Olsen, 2016, among others). As Douven et al. (2018, p.51) summarize the position,

inferentialism is the only semantics that makes the existence of an inferential connection between antecedent and consequent a requirement for the truth of a conditional.

²To be clear, there are good reasons to think that not all conversational implicatures are defeasible: Manner implicatures, for example, may turn out to be quite generally non-defeasible (Lauer, 2013). However, I do not see a way to analyze the relevance effect as a Manner implicature, and such an approach would not explain the effects of discourse particles as discussed below.
Inferentialism, in other words, builds the requirement of a connection into the meaning of the word “if,” thereby straightforwardly accounting for the felt oddness of [missing-link] conditionals.

This formulation is noncommittal about the status of the conventional relevance requirement as an entailment, a semantic presupposition, a conventional implicature, or some other type of conventional meaning. However, Skovgaard-Olsen et al. (2019) find stark differences between the relevance effect on the one hand and the behavior of presuppositions and conversational implicatures on the other. They suggest that the relevance effect most resembles the type of conventional implicature that Grice (1989b) identifies in the particle ‘therefore’. Skovgaard-Olsen (2016) also gives a theoretical analysis connecting the inferentialist approach to ‘if’ with ‘therefore’, ‘but’ and similar items that appear to carry conventionally encoded meaning that is not at issue but also not presuppositional.

While inferentialism does account straightforwardly for the robustness and apparent context-insensitivity of the relevance effect, it may do this job too well. For there are numerous examples of conditionals that are not associated with a relevance effect, like (6).

(6) If Mary leaves now, Bill will still be unhappy.

The message of (6) is precisely the opposite of what inferentialist theories would lead us to expect: it conveys that the consequent will be true regardless of the status of the antecedent, i.e., that antecedent and consequent are irrelevant to each other.

The addition of still in (6) is helpful in generating the irrelevance reading of conditionals, and I will explain why in section 4 below. In any case, irrelevance readings can arise without such additional material, as we see in (7): neither conditional can be associated with a relevance effect, on pain of contradiction.

(7) a. Q: If Mary leaves now, will Bill be unhappy?

b. A: If Mary leaves now, Bill will be unhappy. If she doesn’t leave, he’ll be unhappy. It makes no difference.

The inferentialist account of ‘if’ would predict that both conditionals in (7b) should conflict with the continuation ‘It makes no difference.’ However, A’s response is perfectly acceptable in this context, and conveys precisely that Mary’s departure is irrelevant to Bill’s unhappiness.

How can we account for the fact that the use of a conditional sometimes conveys that the antecedent and consequent are relevant to one another, and sometimes that they are irrelevant to one another? The usual response seems to be that the relevance effect holds for ‘normal’ uses of conditionals, and that examples like (6) and (7) can be treated as somehow non-standard. However, the notion of a ‘normal’ use does not have a theoretical interpretation in natural language semantics. If we dismiss a particular use of an item as ‘abnormal’, this amounts to postulating an ambiguity. Douven (2008, p.31) embraces this consequence explicitly:

As has been frequently observed in the literature, the word “if” is put to a great many uses ... Some might still hope for a unified theory of conditionals that correctly predicts all possible judgements about any conditional any competent user of the language
might ever make. Note, though, that it is by no means a priori that such a theory can be had. ... It seems more realistic to suppose that the right approach to conditionals is of a more modest and piecemeal variety. In this spirit, I offer the evidential support theory of conditionals as a theory of ordinary or normal uses of conditionals. “Normality” is here to be taken in the entirely unproblematic statistical sense of the word ...

Similar diagnoses of conditionals that fail to display the relevance effect are given by, e.g., Douven (2017) and Skovgaard-Olsen (2016).

A natural worry is that this type of analysis deprives the inferentialist approach to conditionals of explanatory value: the theory seems now to be that ‘if’ encodes a relevance requirement, except when it doesn’t. This objection would be softened if inferentialists were to provide guidance about which reading should be selected in which contexts. However, no one has attempted to do so, beyond the very general claim that the relevance-enforcing reading is somehow ‘normal’ or ‘default’. It would clearly be more satisfactory to have a theory of conditionals that provides a unified interpretation for ‘if’ in both relevance-supporting and relevance-denying readings, and an account of which contexts support which readings. In other words, the theoretical situation would be greatly improved if we had a theory that explains why the statistics seem to favor the relevance requirement—and treats less frequent uses not as anomalies to be ignored, but as important clues to the nature of the relevance effect. The coherence-based account presented below attempts to do precisely this.

4 Relevance as a coherence effect

I propose that the relevance effect can be decomposed into two components: a basic semantics for conditionals that does not encode a relevance requirement, and an obligatory pragmatic process of establishing coherence relations among adjacent clauses in discourse (Asher, 1993; Asher & Lascarides, 2003; Hobbs, 1979, 1990; Kehler, 2002; Knott & Dale, 1994, 1996). This allows for the frequent need to establish relevance between antecedent and consequent, and also for the less frequent use of conditionals to indicate irrelevance. As we will see, neither use is a special feature of conditionals: both are instances of a general interpretive process whereby we infer coherence relations among successive pieces of discourse, and are attested in a variety of other multi-clause texts.

4.1 Result and Explanation

To begin, consider the text in (8).

(8) Mary left the party early. Bill was unhappy.

This text would not normally be interpreted as a string of unconnected utterances, but rather as involving some kind of informational relationship between the sentences. One natural interpretation is to infer a cause-effect relationship: Mary left early, and as a result Bill was unhappy. This is an instance of the Result relation of Kehler (2002):
**Result:** Infer $P$ from an assertion of $S_1$ and $Q$ from an assertion of $S_2$, where normally
$P \rightsquigarrow Q$.  
(Kehler, 2002, p.20)

The ‘$\rightsquigarrow$’ in this definition is glossed by Kehler as ‘could plausibly follow from’; it is meant to
be weaker than the conditional. In what follows I will largely rely on the theoretical framework
of Kehler (2002), which is adapted from that of Hobbs (1979, 1990). This is primarily for sim-
plicity of presentation: the main points are compatible with other major accounts of coherence
establishment in the literature.

The Result relation is not explicitly marked in (8), and has to be inferred. It can be marked
explicitly by various particles and adverbials:

(9) Mary left the party early. **So*/As a result, Bill was unhappy.

Result relations do not only occur in multi-sentence utterances, but also in multi-speaker discourses
and within single sentences. For example:

(10) a. Speaker A: Mary left the party early.
    Speaker B: (So) Bill was unhappy (then).
 b. Mary left the party early, (and) so Bill was unhappy.

Most crucially for us, the Result relation also occurs naturally in conditionals and other subordi-
nating contexts that involve suppositional reasoning.

(11) a. Assuming that Mary left the party early, Bill was unhappy (as a result).
 b. Supposing that Mary left the party early, Bill was unhappy (because of her departure).
 c. If Mary left the party early, Bill was unhappy (as a result).

The other Cause-Effect relation discussed by Kehler (2002) is Explanation, which is simply
Result with the order of clauses reversed.

**Explanation:** Infer $P$ from an assertion of $S_1$ and $Q$ from an assertion of $S_2$, where
normally $Q \rightsquigarrow P$.  
(Kehler, 2002, p.21)

An Explanation relation is also possible in the bare juxtaposition of sentences in (8), which can be
read as suggesting that Mary left early because Bill was unhappy. This reading comes out clearly
in examples where a Result relation is implausible, such as (12).

(12) Mary left the party early. The host was drunk and abusive.

Explanation relations also occur in multi-speaker discourses and various inter-sentential contexts,
for instance:

(13) a. Speaker A: Mary left the party early.
 Speaker B: The host was drunk and abusive.
 b. Mary left the party early, because the host was drunk and abusive.

Like Result, Explanation relations are also possible in conditionals: both examples in (14) indicate
that we can infer the existence of the cause described in the consequent from the effect that is
considered suppositionally in the antecedent.

(14) a. Supposing/Assuming that Mary left the party early, the host was drunk and abusive.
 b. If Mary left the party early, the host was drunk and abusive.
4.2 Inferential particles

So far we have seen two very general coherence-establishing strategies—Result and Explanation—both of which occur in conditionals among other multi-clause discourses. These are two straightforward ways for two pieces of information to be in a relevance relation: $A$ and $C$ are relevant to each other whenever $A$ typically allows one to infer $C$, or $C$ typically allows one to infer $A$. These relations can be inferred, or can be provided explicitly by a marker that picks out one of these relations: *as a result* singles out a Result relation, while *because* singles out Explanation. Some particles are more general, indicating an inferential relationship between clauses without constraining what kind of inference. Two notable examples are *then* and *so*, both of which are compatible with inferential connections even when there is no causal relationship in either direction, but both are correlated via a third variable.

The cook would have used a knife as the murder weapon, and would have hidden it in the pantry; the butler would have use a cane, and would have hidden it in the garden shed. Neither the weapon’s location nor its identity is a cause of the other, but in this context either can be used to infer the other.

(15)  
   a. A: The weapon was a knife.  
        B: So/Then it was found in the pantry.  
   b. The weapon was a knife, and so it was found in the pantry.  
   c. The weapon was found in the pantry. So, it was a knife.

In these examples, *so* and *then* function to indicate that the information in the second clause can be inferred from the first, without commenting on what the precise shape of the causal relationship is. One oddity worth pointing out is that the combination *and then* does not appear to have an inferential reading: it appears to be compatible only with the temporal meaning of *then*. For instance, (16) lacks a causal interpretation: it can only be read as indicating that the host became abusive after Mary’s departure. (17) is strange because the temporal meaning makes little sense given the content.

(16)  
   Mary left the party early, and then the host was drunk and abusive.

(17)  
   The weapon was a knife, and then it was found in the pantry.

In other contexts, though, both *so* and *then* appear to function quite generally as markers of inferential relations, including but not limited to cause-effect and effect-cause relationships.

This may shed light on the vexed question of conditional *then*. While *if*... *then* has often been treated as a kind of discontinuous operator that is synonymous with bare *if*, many have noted that this analysis is both linguistically implausible and non-explanatory. For example, Grice (1989a, p.62) argues that *if* $p$ *then* $q$ “is little different from ‘if $p$, in that case $q$’, a linguistic form which has a much closer connection with argument than would attach to the linguistic form in which the word ‘then’ does not appear.” The notion of ‘argument’ that Grice has in mind here may well be what I called ‘inferential relation’ above: from $p$ we can infer $q$, and so there is an argument from $p$ to $q$.

On the influential analysis of Iatridou (1993), the inference from $p$ to $q$ is part of the meaning of *if*, but the particle *then* adds a presupposition that $q$ cannot be inferred from $\neg p$. In other
words, Iatridou’s theory associates with *then* the information that we cannot infer the consequent no matter what, ensuring that the information in the antecedent is relevant to our ability to infer the consequent.

Combining elements of Grice’s and Iatridou’s analyses within a discourse-theoretic framework, Biezma (2014) argues convincingly that ‘*then* is a discourse marker that ... establishes an anaphoric relation between the information gained from the previous discourse move and information gained from the subsequent move’. As one instance of this discourse function, *then* in conditionals functions to enforce a ‘causal explanatory’ relation between antecedent and consequent. It plays a similar role in other types of sentences and texts, as we have seen: see Biezma’s paper for much more linguistic detail and analysis.

While Biezma does not connect her analysis to coherence theory, the account pursued here is highly compatible with hers. In coherence terms, a ‘causal explanatory relation’ will generally involve the coherence relations Result or Explanation.

\begin{itemize}
  \item If Mary left the party early, *then* Bill was unhappy (as a result).
  \item If Mary left the party early, *then* the host was drunk and abusive (we can infer).
\end{itemize}

Additionally, this line of analysis predicts that conditionals with *then* should be incompatible with contexts where there is no inferential relationship between antecedent and consequent. Consider the following pair due to Davis (1983):

\begin{itemize}
  \item If you open the refrigerator, it will not explode.
  \item If you open the refrigerator, *then* it will not explode.
\end{itemize}

Given our normal assumptions about refrigerator behavior, (19a) is naturally read as an irrelevance conditional: the refrigerator will not explode tout court, including in the case where you open it. However, example (19b) with *then* seems to exclude this interpretation. As Davis notes, it conveys the surprising claim that opening the refrigerator will somehow prevent it from exploding, with the disturbing implication that an unopened refrigerator will explode. This pattern is explained if we suppose that the conditional is in itself compatible with both relevance (Result/Explanation) and irrelevance readings, but the use of *then* points to a relevance interpretation due to its requirement of an inferential connection between antecedent and consequent. A similar explanation extends to Davis’ distinction between ‘strong’ conditionals that involve inference and are normally marked with *then*, and ‘weak’ conditionals that are not marked with *then* and can be true and felicitous despite irrelevance of antecedent and consequent.

### 4.3 Irrelevance conditionals and Violated Expectation

The discussion of conditionals with and without *then* brings irrelevance readings back to the forefront. Recall that our main criticism of inferentialism above was that the theory is unable to give an explanatory account of the variable use of conditionals to indicate either relevance or irrelevance between clauses. The decomposition of relevance effects into conditional semantics and coherence relations, on the other hand, is perfectly suited to do this: irrelevance between clauses is associated with another type of coherence relations, with their own special linguistic markers.
The relevant coherence relations here are Violated Expectation and its reverse-order counterpart Denial of Preventer.

**Violated Expectation**: Infer $P$ from an assertion of $S_1$ and $Q$ from an assertion of $S_2$, where normally $P \sim \neg Q$.  

(Kehler, 2002, p.21)

**Denial of Preventer**: Infer $P$ from an assertion of $S_1$ and $Q$ from an assertion of $S_2$, where normally $Q \sim \neg P$.  

(Kehler, 2002, p.21)

Violated Expectation is available in a variety of contexts, though it is often more natural with support by particles such as *but, yet, nevertheless, anyway, however, or still*. For instance, (20) can be read in this way, but the intended reading is more prominent in (21).

(20) Mary left the party in a huff. The host was gracious to her as she departed.

(21) a. Mary left the party in a huff. **Still/Yet/However**, the host was gracious to her as she departed.
   b. Mary left the party in a huff. The host was **still** gracious to her as she departed.
   c. Mary left the party in a huff. The host was gracious to her as she departed **anyway**.

With multi-clause sentences with *and*, a similar pattern emerges: the Violated Expectation reading is possible with a bare conjunction, but much more salient with support from an appropriate particle as in (23).

(22) Mary left the party in a huff, and the host was gracious to her as she departed.

(23) a. Mary left the party in a huff, and **still/yet** the host was gracious to her as she departed.
   b. Mary left the party in a huff, and the host was **still** gracious to her as she departed.
   c. Mary left the party in a huff, and the host was gracious to her as she departed **anyway**.

Violated Expectation can also be marked by substituting *but* for *and*. While *and* places few constraints on appropriate coherence relations, the choice of *but* restricts the coherence relation to one of a handful of relations—one of which is Violated Expectation.

(24) Mary left the party in a huff, but the host was gracious to her as she departed.

Precisely the same pattern occurs in conditionals. It is difficult to construe the conditional in (27) as indicating a Violated Expectation relation. The most obvious reading involves Result, which is surprising given that the content does not readily support this reading in light of our knowledge about typical human behaviors.

(25) If Mary left the party in a huff, the host was gracious to her as she departed.

However, with support from appropriate linguistic marking a Violated Expectation reading emerges.

(26) a. If Mary left the party in a huff, the host was **still** gracious to her as she departed.
   b. If Mary left the party in a huff, the host was gracious to her as she departed **anyway**.
   c. **Even if** Mary left the party in a huff, the host was gracious to her as she departed.
Note here that *even if* conditionals are naturally used to mark Violated Expectation relations. This makes sense in light of theories of *even if* such as those of Lycan (2001) and Bennett (2003), which compositionally derive the fact that *Even if A, C* often conveys that *If A, C* and *If not-A, C* are both true.³

Denial of Preventer relations exhibit a similar pattern, tending to be less prominent unless marked explicitly. With the noncommittal connective *and* the reading does not emerge readily, but it does with *even though* and *despite*, which (as Kehler (2002, p.21) notes) can be use to mark Denial of Preventer.

(27) The host was gracious to Mary as she departed, and she left the party in a huff.

(28) a. The host was gracious to Mary as she departed, even though she left the party in a huff.
   b. The host was gracious to Mary as she departed, despite her leaving the party in a huff.

Once again, this pattern also holds in conditionals: the bare conditional in (29) naturally favors an Explanation relation despite the oddness of this interpretation given world knowledge. However, the corresponding *even if* conditional unambiguously favors a Denial of Preventer reading.

(29) The host was gracious to Mary as she departed if she left the party in a huff.

(30) The host was gracious to Mary as she departed *even if* she left the party in a huff.

I will suggest below that the the apparent default status of Result/Explanation relations in conditionals is attributable to the dispreference for Violated Expectation and Denial of Preventer readings when there is no supporting linguistic marking, across all of these constructions. This, in turn, explains the ‘normal’ status of conditionals that support the relevance effect.

Conditionals whose coherence relation is Violated Expectation or Denial of Preventer are generally interpreted as irrelevance conditionals. For instance, our initial example of an irrelevance conditional in (6) involved a Violated Expectation relation marked by *still*.

(31) If Mary leaves now, Bill will still be unhappy.

Why do we infer from (32) that Bill will also be unhappy if Mary does not leave—and so that Bill will be unhappy no matter what, rendering antecedent and consequent irrelevant to each other? According to Kehler’s definition, a Violated Expectation relation here indicates that there is a default expectation that once can infer from the antecedent to the negation of the consequent. In this case, Violated Expectation is appropriate to the extent that we would normally expect Mary’s departure not to be associated with Bill’s unhappiness in a situation like the one described. However, this condition is still compatible with it being the case that Bill will *not* be unhappy if Mary does *not* leave.

³In these accounts, *even* has the same meaning that it does in *Even SUE left*. Roughly, the latter conveys that *Sue left* is not only true, but quite unlikely/surprising relative to true focus alternatives such as *Bill left, Sally left*, etc. Similarly, a conditional of the form *Even if A, C* typically conveys that *If A, C* is not only true, but quite unlikely/surprising relative to the true alternative *If not-A, C*. This implies that *C* holds unconditionally. The relative unlikelihood/surprisingness implication of *Even if A, C* is of course highly compatible with the Violated Expectation implication that one would normally infer from *A* to ¬*C*.
In other words, Kehler’s definition does not exclude a situation where we expect both \( P \rightarrow \neg Q \) and \( \neg P \rightarrow \neg Q \), i.e., \( \neg Q \) unconditionally. But this kind of scenario does not appear to be compatible with the use of *still* and *anyway*, and possibly not with Violated Expectation relations in general.

(32) a. If you drink this wine, you will still die.
   b. If you drink this wine, you will die anyway.

Here Kehler’s condition for Violated Expectation is satisfied: normally, drinking wine is associated with not dying \( (P \rightarrow \neg Q) \). However, (32) is a distinctly odd way to convey that the wine is poisoned. This seems to be due to the fact that we also expect to remain alive if we do not drink the wine \( (\neg P \rightarrow \neg Q) \). In other words, it seems that the Violated Expectation relation is not appropriate when we expect the consequent to be false no matter what.

We can account for these observations in either of two ways. We can either strengthen the definition of Violated Expectation, or we can add additional content to the meaning of the particles *still* and *anyway*. If we choose the former route, the necessary modification to account for (32) seems to be:

**Violated Expectation (modified):** Infer \( P \) from an assertion of \( S_1 \) and \( Q \) from an assertion of \( S_2 \), where normally \( P \rightarrow \neg Q \) and \( \neg P \rightarrow Q \).

**Denial of Preventer (modified):** Infer \( P \) from an assertion of \( S_1 \) and \( Q \) from an assertion of \( S_2 \), where normally \( Q \rightarrow \neg P \) and \( \neg Q \rightarrow P \).

These changes are also motivated by examples not involving conditionals. The examples in (33) are appropriate only under the unusual background assumption that the wine was somehow expected to *save* Bill from death, and not under the more ordinary assumption that both drinking the wine and not drinking it should be associated with not dying.

(33) a. Bill drank a glass of wine. He still died.
   b. Bill drank a glass of wine, and he died anyway.

Assuming that *still* functions here merely to mark Violated Expectation, the odd background required to make sense of (33) follows directly from the modified definition. The example is only appropriate when drinking a glass of wine is normally associated with not dying, and also not drinking a glass of wine is associated with dying. The latter inference is what generates the unexpected background implication that drinking the wine is expected to save Bill, rather than merely being irrelevant.

With this independently motivated modification, we can now explain why conditionals whose coherence relation is Violated Expectation or Denial of Preventer are interpreted as irrelevance conditionals. Since *still* marks Violated Expectation, (34) is only appropriate when both (35a) and (35b) are in the context as default assumptions.

(34) If Mary leaves now, Bill will still be unhappy.

(35) a. If Mary leaves now, Bill will not be unhappy.
   b. If Mary does not leave now, Bill will be unhappy.
Since (34) contradicts the (35a), this assumption is discarded. However, (35b) is consistent with the assertion and remains. The resulting context contains the information in assertion (34) and assumption (35b). The net effect is a context that supports the following:

(36) If Mary leaves now, Bill will be unhappy; and if Mary does not leave now, Bill will be unhappy.

In other words, Bill will be unhappy no matter what: the antecedent and consequent of (34) are irrelevant to each other.

4.4 Interim summary

In light of the observations in this section regarding discourse particles and coherence relations in various types of texts, there is good reason to think that coherence establishment can account for the relevance effect where it occurs, and its non-occurrence in irrelevance conditionals. This conclusion is compatible with every non-inferentialist theory of conditionals that I am aware of. Furthermore, it undermines the major arguments for the inferentialist treatment of relevance as a conventional component of conditional meaning: relevance and irrelevance inferences in conditionals can be explained by independent factors, with no need to postulate conventionalized relevance inferences or an ambiguity in conditionals.

The next sections address a number of further questions that arise in accounting for the range of arguments that have been produced in favor of inferentialism. These include the status of missing-link conditionals, the ‘normal’ status of relevance conditionals, and how the theory accounts for previous experimental work that has been taken to problematize a coherence-based theory of the relevance effect.

5 Why are missing-link conditionals odd?

As noted above, one of the major arguments for inferentialism is the oddness of missing-link conditionals, which shows convincingly that the relevance effect is not due to Gricean pragmatics. After all, most types of conversational implicature can be suspended when the context does not support them, but a failure of relevance cannot be rescued in this way: instead we feel a sense of inappropriateness.

(37) ?? If Paris is the capital of France, Montreal is not in Chile.

(38) If Mary is here, Bill is too. ?? But these things have nothing to do with each other.

However, this argument does not undercut a coherence-based theory, since coherence establishment is an obligatory part of constructing an interpretation for a text. The literature on discourse coherence contains discussion of many examples with a similar flavor, where a text is felt to be infelicitous because it is difficult to infer a plausible coherence relation among clauses. For instance:

(39) John broke his leg. I like plums. (Knott & Dale, 1994)
This text is strikingly odd, but there is no hope of pinning its oddness on a conventional inference associated with some connective or other linguistic item: it is simply the juxtaposition of two sentences. The same holds of various other ways of connecting the sentence, including if.

(40)  
a. John broke his leg, and I like plums.  
b. John broke his leg, but I like plums.  
c. John broke his leg. Similarly, I like plums.  
d. If John broke his leg, I like plums.

All of these oddities can be explained in the same way: we have a limited repertoire of coherence relations available when interpreting texts, and each places requirements on the relation between these two sentences that are implausible given typical background assumptions.

On the coherence theory, the contrast between the felicitous conditional (40a) (= (1)) and the missing-link conditional (40b) (= (4))—which we used above to motivate the puzzle around the relevance effect—is explained in the same way as the contrast in (42).

(41)  
a. If Mary left the party early, Bill was unhappy.  
b. If Mary left the party early, Bill is Swedish.

(42)  
a. Mary left the party early. Bill was unhappy.  
b. Mary left the party early. Bill is Swedish.

It is natural to read both (41a) and (42a) as suggesting that Bill was unhappy as a result of Mary’s departure—a Result relation—or else that Mary left because Bill was unhappy—an Explanation relation. Neither of these possibilities is explicitly signaled by linguistic means; instead, we infer a plausible coherence relation between clauses as part of the process of rationalizing why a speaker would choose to juxtapose these two clauses in constructing a text.

By contrast, (41b) and (42b) are strange because we are unable to infer a plausible coherence relation. An Explanation relation is implausible given the content of the clauses, and a Result relation is practically impossible—Mary’s departure could hardly affect Bill’s nationality. However, the coherence of (9) improves dramatically if we supply the background information that Mary has an irrational dislike of Swedes, making it plausible that Bill is Swedish does in fact stand in an Explanation relation to Mary left the party early. Strikingly, the addition of this background is sufficient to render felicitous both the conditional (41b) and the juxtaposition of sentences in (42b). This suggests that the phenomenon of missing-link conditionals is reducible to a more general phenomenon of missing-link texts.

6 The default status of the relevance effect

Why are ‘normal’ conditionals associated with the relevance effect, while irrelevance conditionals are felt as ‘abnormal’? As Douven (2008) notes in the passage quoted in §3, the sense of normality invoked here is statistical: the claim is that a majority of conditionals in actual use enforce a relevance requirement, and that the inferentialist theory explains this.
We should be hesitant to adopt such a statistical claim without evidence from analysis of linguistic corpora. Still, the claim may be true. If it is, the inferentialist theory does not in fact account for it. Instead, this theory treats if as ambiguous between a reading that enforces relevance and one that does not, and gives no account of how or why one reading is chosen. The latter component is what would be needed to explain the purported statistical prevalence of relevance-enforcing readings.

In contrast, the coherence theory actually goes some way toward explaining why there should be a preference for coherence relations that enforce relevance (Result and Explanation), especially in conditionals that are not explicitly marked as Violated Expectation/Denial of Preventer. As we saw in section 4.3, several different linguistic contexts seem to disfavor Violated Expectation/Denial of Preventer relations except when there is explicit marking to this effect. Strikingly, there was in several examples a tendency to read conjunctions, conditionals, and bare juxtapositions of sentences as involving a Result or Explanation relation even when such a relation was implausible in light of the content. Here is one more set of examples to solidify the point:

    b. John called Bill a nice guy, and Bill punched him.
    c. After John called Bill a nice guy, Bill punched him.
    e. Bill punched John if John called him a nice guy.

All of these texts are naturally read as indicating that Bill punched John because John called him a nice guy. This is striking, because this causal relationship is inconsistent with our normal assumptions about typical human behavior. There seems to be a general default for inferring such causal relations rather than Violated Explanation/Denial of Preventer, even when there is no incoherence in the latter, and world knowledge supports them more strongly than Result or Expectation relations. The missing interpretations do, of course, come out when explicitly marked:

(44) a. Even though John called Bill a nice guy, Bill punched him.
    b. If John called Bill a nice guy, Bill still punched him.

A general preference for Result and Explanation relations over Violated Expectation and Denial of Preventer goes some way toward accounting for the preference for relevance readings of conditionals, then: Result and Explanation are incompatible with irrelevance readings. This style of explanation does not, however, account for why this preference would exist. Instead, it simply shows that the problem may be reducible to a larger unsolved problem. While a detailed investigation of this preference is beyond the scope of this paper, it is plausibly related to the content of the coherence relations themselves. As long as our expectations are reasonably well-attuned to the statistics of the real world, there should be more expectation-verifying than expectation-falsifying events to talk about. It may also be that the preference for relevance readings, absent explicit marking to the contrary, is particularly strong in conditionals because relevance is typically needed to rationalize why a speaker would have chosen to subordinate the material in the consequent to the information contained in the antecedent, as opposed to using an informationally symmetric device such as and or juxtaposition. But these are merely speculations at this point, and further empirical
and theoretical investigation is needed in order to verify that the posited preference is indeed real and that it extends to a variety of conditional and non-conditional contexts.

7 Previous experimental work on coherence and relevance

As mentioned in the introduction, the coherence-based account of the relevance effect was anticipated by Cruz et al. (2016), who suggested that missing-link conditionals are odd because of the lack of a “common topic of discourse”. The analysis in section 5 was an effort to spell out this idea, tying it into existing work on coherence establishment in greater detail. In the account proposed here, the problem in missing-link conditionals is not merely that the antecedent and consequent are about a different “topic” in some generalized sense. Instead, the establishment of discourse coherence relations relies on a certain inventory of available relations among clauses, a few of which were discussed in detail above. A sentence or text may be felt to be infelicitous if it is not possible to relate the information in the clauses using one of the available relations. In addition, certain linguistic devices—notably particles and connectives—have a semantics that is compatible with only a subset of coherence relations. As a result, a text may be incoherent because the only plausible coherence relations are excluded by the semantics of the particles or connective used, even though the same text would have been coherent with different connectives or particles. We saw a variety of examples along these lines above.

Krzyżanowska et al. (2017) followed up on the account of Cruz et al., comparing conditionals to two-person conversational exchanges in a task designed to dissociate relevance from presence or absence of a common topic. In the conversational exchange condition, they asked participants to judge, on a 7-point Likert scale, to what extent it would make sense to respond to an assertion of a context sentence with a certain response in three conditions: Positive relevance/Same topic; Irrelevant/Same Topic; Irrelevant/Different Topic. These three conditions were instantiated in ten contexts. Sample stimuli in one such context for the conversational exchange condition are given in (45).

(45) [Patrick plans to take his girlfriend, Sophie, for short holidays. He is discussing different ideas with Matt. They have been to the Alps plenty of times, so now Patrick considers a hiking trip in the Pyrenees.]
Patrick: “Sophie likes the Alps.”
   a. Matt: “She will enjoy hiking in the Pyrenees.” (Positive relevance-Same topic)
   b. Matt: “Mountaineering can be dangerous.” (Irrelevant-Same topic)
   c. Matt: “More and more people in Western Europe care about animal welfare.” (Irrelevant-Different topic)

Krzyżanowska et al. (2017) also asked participants to give “makes sense” ratings for matched conditionals in the same three conditions, using ten minimally modified contexts; examples are given in (46).

(46) [Same context, but no assertion from Patrick.]
a. Matt: “If Sophie likes the Alps, then she will enjoy hiking in the Pyrenees.” (Positive relevance-Same topic)
b. Matt: “If Sophie likes the Alps, then mountaineering can be dangerous.” (Irrelevant-Same topic)
c. Matt: “If Sophie likes the Alps, then more and more people in Western Europe care about animal welfare.” (Irrelevant-Different topic)

Krzyżanowska et al. (2017) reasoned that, if the relevance effect was due to the lack of a common topic of discourse as Cruz et al. (2016) had suggested, then the conditionals in (46) should be affected in the same way as the dialogues in (45): both are odd only to the extent that there is a failure of common topichood. In contrast, if conditionals carry an additional relevance requirement, then there should be a contrast between the relevant and irrelevant conditionals in (46a)-(46b) that is absent in the exchanges in (45a)-(45b). This is indeed what they found. While there was a general preference for exchanges like (45a) over (45b), the latter were still largely judged to make sense. In contrast, participants overwhelmingly found that (46a) made sense and (46b) did not. This indicates that relevance makes a much larger difference in conditionals like (46) than in dialogues like (45), even when the clauses are constructed so that the same broad topic of conversation is maintained.

Krzyżanowska et al. (2017) interpreted this finding as evidence for inferentialism and against the coherence-based account suggested by Cruz et al. (2016). However, this argument fails due to linguistic characteristics of the stimuli that Krzyżanowska et al. (2017) use, and also because coherence establishment is much more fine-grained than mere “common topichood”, and it is constrained by semantic characteristics of the material used.

On the first point, all conditional items in the experiment use the particle then, which was discussed in section 4.2. As we saw there, the use of then restricts the relation between antecedent and consequent to one of inferrability, or a “causal explanatory relation” in the closely related account of Biezma (2014). In terms of coherence theory, this means that the available coherence relations are effectively restricted to Result and Explanation. It is then no surprise that participants rated conditionals like (46a) as making more sense than conditionals like (46b). In (46a), the consequent she will enjoy hiking in the Alps can plausibly be inferred from the antecedent Sophie likes the Alps. In the Irrelevant-Same topic items like (46b), the consequent mountaineering can be dangerous cannot be so inferred, by design. The fact that there is no similar contrast in the conversational exchange condition can be explained by noting that the materials are mismatched: Matt’s response does not use then or an analogous particle that would restrict the relation between Patrick’s utterance and Matt’s to one that involves inference.

If we modify the materials to remove this subtle confound, so that the conditions are linguistically matched, the contrast that Krzyżanowska et al. (2017) observe clearly disappears: (47a) and (47b) contrast sharply, the former being highly sensible and the latter making little sense. This is perfectly analogous to the conditional examples in (46). In both cases, the problem is that “mountaineering can be dangerous” is explicitly marked as being inferrable from “Sophie likes the Alps”, but there is no plausible way to treat the former as an inference from the latter.

(47) Patrick: “Sophie likes the Alps.”
a. Matt: “Then she will enjoy hiking in the Pyrenees.” (Positive relevance-Same topic)
b. Matt: “Then mountaineering can be dangerous.” (Irrelevant-Same topic)

We thus have every reason to expect that an experiment that uses the same particle then in both conditions will fail to find evidence for a special treatment of conditionals in terms of a special preference for relevance. As far as these materials are concerned, the requirement of relevance could be attributed to the inferential requirement of then, rather than to the conditionals.

That said, it is likely that a modified experiment would continue to find a contrast—perhaps weaker—if then were simply removed everywhere. In this case, the relevant comparison would be between the original conversational exchange condition and the modified conditional stimuli in (48).

(48) a. Matt: “If Sophie likes the Alps, she will enjoy hiking in the Pyrenees.” (Positive relevance-Same topic)
b. Matt: “If Sophie likes the Alps, mountaineering can be dangerous.” (Irrelevant-Same topic)
c. Matt: “If Sophie likes the Alps, more and more people in Western Europe care about animal welfare.” (Irrelevant-Different topic)

I suspect that this modified experiment would find similar qualitative patterns to the original experiment of Krzyżanowska et al. (2017). If this is correct, how can it be explained? As we have seen repeatedly, the meanings of connectives and particles play an important role in constraining available coherence relations. For example, our discussion above focused on four coherence relations that are commonly associated with conditionals: Result and its converse Explanation, and Violated Explanation and its converse Denial of Preventer. Notably, all of these relations involve a prior expectation—either that one clause can be inferred from the other, or that the negation of one clause can be inferred from the other. While there are numerous further coherence relations that do not involve inference at all, it is not clear which, if any, are compatible with conditionals.

In contrast, an unmarked conversational exchange like those used in the experiment of Krzyżanowska et al. (2017) is compatible with a wide variety of coherence relations, for instance Exemplification.

**Exemplification:** Infer \( p(a_1,a_2,...) \) from an assertion of \( S_1 \) and \( p(b_1,b_2,...) \) from an assertion of \( S_2 \), where \( b_i \) is a member of subset of \( a_i \) for some \( i \). (Kehler, 2002, p.17)

(49)-(50) give examples of Exemplification in a conversational exchange and a monologue.

(49) Patrick: “Many children love video games.”
    Matt: “My son really likes Plants vs. Zombies.”

(50) Matt: “Many children love video games. My son really likes Plants vs. Zombies.”

In general, conversational exchanges like (49)—and the relevant condition in the experiment of Krzyżanowska et al. (2017)—join monologues like (50) in being among the most flexible linguistic contexts for inferring coherence relations. In addition to particles, choice of connective can constrain the availability of coherence relations. Even and—which is compatible with a wide variety of coherence relations—places some constraints: it is difficult to read (52) as involving an Exemplification relation.
(51) ?? Many children love video games, and my son really likes *Plants vs. Zombies*.

The natural reading of (52), to my ear, is that the second clause adds an additional piece of information that bears some structural resemblance to the first (specifically, a Parallel relation, discussed further below). It is quite odd against the background knowledge that *Plants vs. Zombies* is itself a video game, and this oddness disappears when we replace the latter with something that is not a video game (so that a Parallel relation is available, see below).

(52) Many children love video games, and my son really likes *Star Wars*.

The key questions, then, are the following: does the choice to employ a conditional constrain available coherence relations in an analogous way? If so, do the particular materials in the crucial Irrelevant-Same topic condition of Krzyżanowska et al. (2017) invite a coherence relation that is compatible with an unmarked conversational exchange, but incompatible with the use of a conditional? It seems clear that conditionals do indeed exclude some relations: for instance, an Exemplification relation is plainly unavailable in a conditional variant of (50).

(53) If many children love video games, my son really likes *Plants vs. Zombies*.

To discern whether this possibility introduced an uncontrolled confound in the experiment of Krzyżanowska et al. (2017), consider another stimulus from the critical Irrelevant-Same topic condition.

(54) [Laura and Kate discuss local politics. They are particularly worried about the city’s government not investing in public transport.]
    Kate: “Public transport is inefficient.”
    Laura: “There are hardly any bicycle lanes.”

The exchange in (54) is perfectly sensible, and it is most naturally read as an instance of Kehler’s Parallel relation (Kehler, 2002, p.16).

**Parallel:** Infer \( p(a_1, a_2, \ldots) \) from an assertion of \( S_1 \) and \( p(b_1, b_2, \ldots) \) from an assertion of \( S_2 \), where for some property vector \( q_i \), \( q_i(a_i) \) and \( q_i(b_i) \) for all \( i \).

In (54), the parallel properties are *being inefficient* and *hardly existing*, both of which are instances of the property \( p \) of being a negative transport-related political issue. The parallel arguments are \( a_1 = Public \ transport \) and \( b_1 = bicycle \ lanes \), which share the common property \( q_1 \) of being crucial to efficient transport.

Participants in the experiment of Krzyżanowska et al. (2017) judged (54) to make more sense than the conditional variant in (55).

(55) [Same context, but Kate has not said anything.]
    Laura: “If public transport is inefficient, there are hardly any bicycle lanes.”

This can be explained if conditionals are incompatible with the Parallel relation, and Parallel is the only relation that makes sense in this context. A conclusive demonstration of the latter point is not possible here, since no one has produced an agreed-upon exhaustive list of coherence relations. However, a careful search of the relations that Kehler (2002, pp.15-21) identifies reveals no other
plausible candidates. It remains to shown that conditionals do no support a Parallel relation. This point seems plausible already by considering (55): the obvious parallelism between Kate’s and Laura’s complaints does not suffice to render (55) felicitous. For another example, consider the felicitous instances of Parallel in (56) and (57), and their strikingly odd conditional counterpart in (58).

(57) Barack adores Stanley Kubrick, and Joe likes Francis Ford Coppola.
(58) If Barack adores Stanley Kubrick, Joe likes Francis Ford Coppola.

Here $a_1 = \text{Barack}$, $b_1 = \text{Joe}$, and the common property $q_1$ is something like *politician in the most recent Democratic administration*; $a_2$ is Kubrick, $b_2$ is Coppola, and $q_2$ is *being a famous director*; and the relation that binds them together is $p = \text{have positive feelings toward}$. However, there is a sharp contrast between (56) and (58): something about the meaning of the conditional renders a Parallel relation odd in (58), even though it is clearly compatible with the conjunction in (56). The most natural (though still fairly odd) interpretation of (58) involves a Result relation, where knowledge of Barack’s feelings toward Kubrick somehow allows us to infer Joe’s feelings about Coppola.

Most of the critical materials in the experiment of Krzyżanowska et al. (2017) yield to a similar analysis, though not all of them instantiate the Parallel relation. Some, such as (46b), are instances of Kehler’s Contrast relation, which also appears to be incompatible with conditionals.\(^4\)

Why are conditionals incompatible with certain relevance relations that are available in conjunctions, monologues, and dialogues? One clue is that other subordinating devices with similar meaning to *if* also display the same restrictions. Judging by the following examples, the Parallel relation is also excluded in sentences with subordinating adverbials headed by *supposing, provided, and on the assumption that*.

(59) a. ?? Provided Barack adores Stanley Kubrick, Joe likes Francis Ford Coppola.
    b. ?? On the assumption that Barack adores Stanley Kubrick, Joe likes Francis Ford Coppola.
    c. ?? Supposing Barack adores Stanley Kubrick, Joe likes Francis Ford Coppola.

The shared meaning component between these items and *if* involves the discourse attitude of *supposition*. The examples in (58) and (59) that exclude Parallel are all contexts in which the consequent is subordinated to the assumption that the antecedent is true. In contrast, dialogues, monologues, and conjunction typically treat adjacent clauses as independent pieces of information.

\(^4\)Contrast relates to Parallel as Violated Explanation does to Result:

**Contrast:** Infer $p(a_1,a_2,...)$ from an assertion of $S_1$ and $\neg p(b_1,b_2,...)$ from an assertion of $S_2$, where for some property vector $\tilde{q}$, $q_i(a_i)$ and $q_i(b_i)$ for all $i$. (Kehler, 2002, p.16)

In (46b) $p$ is something like *being a reason to invite Sophie to a trip in the mountains*; $a_1$ is Sophie’s liking for the Alps, which is such a reason; and $b_1$ is the danger of mountaineering, which is not such a reason. This accounts for the most natural interpretation of the dialogue in (46b), which reads as a back-and-forth about the quality of the suggestion to plan a trip around Sophie’s enjoyment of mountain activities.
neither subordinated to the other. It is the latter situation which appears to be required for a Parallel relation to be possible.

This discussion only scratches the surface of the rich interaction between coherence relations and coordinating/subordinating devices, and it remains to be seen what further restrictions are associated with conditional meaning. However, it is clear that conditionals impose restrictions on available coherence relations that severely problematize the anti-coherentist argument of Krzyżanowska et al. (2017). The fact that a dialogue like (45b) can be given a coherent interpretation is no guarantee that a matched conditional can be interpreted coherently. Furthermore, it appears that the coherence of the particular experimental stimuli that Krzyżanowska et al. (2017) employ relies on coherence relations—Parallel and Contrast—that are excluded in conditionals quite generally. Given this, the contrast that they observe is not evidence against a coherence-based theory of the relevance effect.

8 Conclusion

The frequent—but, crucially, not universal—requirement of relevance between a conditional’s antecedent and its consequent cannot be explained by Gricean pragmatics. However, we cannot conclude from this observation that it is a conventional aspect of the meaning of conditionals. An overlooked third possibility, discourse coherence, turns out to provide a unified explanation of where the relevance requirement occurs and where it does not, with support from the distribution of various connectives and discourse particles. The crucial observation is that similar relevance and irrelevance inferences arise in non-conditional sentences, with similar options for support from connectives and discourse particles. Missing-link conditionals are a special case of the broader phenomenon of incoherent texts: they are conditionals in which it is not possible to supply a plausible coherence relation.

This decomposition of the relevance effect into conditional semantics and discourse coherence overturns the major arguments for inferentialism. It is, however, compatible with a variety of theories of conditionals that do not encode any information about relevance. This conclusion also removes some important objections to empirically well-motivated features of conditionals—such as Strong Centering and Stalnaker’s Thesis—that are incompatible with inferentialism.

References


