

Implicative verbs and their presuppositions*

Perna Nadathur

March 4, 2015

Contents

1	Introduction: implicative verbs	2
2	The ingredients of an analysis	3
2.1	The role of presupposition	3
2.2	The components of an account	5
2.3	An overview of past accounts of <i>manage</i>	5
3	<i>Managing</i> and causal dependence	8
3.1	Required definitions	8
3.2	Discussion of the account	11
4	Extending the causal account	14
4.1	Catalysts, actual causes, and catalyst-external causal ancestors	14
4.2	One-way implicatives	17
5	A new proposal for implicative verbs	18
5.1	The proposal	18
5.2	Supporting evidence	21
5.3	Implicature and circumscription	23
5.4	Polarity-reversing implicatives	25
6	Conclusions and questions	27

*Thanks are due to Lauri Karttunen, Cleo Condoravdi, Itamar Francez, and Stanley Peters for helpful discussion of these ideas. Additional thanks go to three anonymous non-linguist informants, and to Ida Toivonen and Karoliina Lohiniva for their assistance with glossing and case. All errors are, as usual, mine.

1 Introduction: implicative verbs

Karttunen (1971) draws attention to a special class of English complement-taking verbs which come along with certain inferences regarding the status of their infinitival complements. Examples of these **implicative verbs** include *manage* and *dare*, in (1)-(2):

- (1) a. John **managed** to open the door.
b. \leadsto John opened the door.
- (2) a. Mary **dared** to open the door.
b. \leadsto Mary opened the door.

Implicatives may be distinguished from **factive verbs** like *know* and *regret* (Kiparsky and Kiparsky 1970), which also imply the truth of their complements, by the fact that the polarity of the inference reverses with negation in the matrix clause of an implicative statement (whereas factives preserve the truth of their complements under negation).

- (3) a. John didn't **manage** to open the door.
b. \leadsto John didn't open the door.
- (4) a. Mary didn't **dare** to open the door.
b. \leadsto Mary didn't open the door.

Reversal under negation suggests that the inferences in (1b)-(4b) are entailments of the implicative sentences, which is supported by the fact that any denial of the inferential content appears to be contradictory.

- (5) John **managed** to open the door, #but he did not open it.
- (6) Mary did not **dare** to open the door, #but she opened it.

Implicative verbs as a class appear to occur in a wide variety of languages outside of English, including French, Italian, Japanese and Korean. Finnish is particularly rich in implicatives, including both parallels of English *manage* (example 7) and *dare* as well as a wide variety of examples which have to do with more specific properties or attributes, such as time (see (8); Flint 1980).

- (7) a. Hän **onnistu-i** kuitenkin pakenema-an.
he-NOM succeed-PST.3sg however flee-3INF.ILL
'He succeeded in fleeing' (alt: 'He managed to flee')
b. \vdash He fled.
- (8) a. Hän **eht-i** ampu-a karhu-n.
he.NOM have.time-PST.3sg shoot-INF bear-GEN/ACC
'He had enough time to shoot the bear.'
b. \vdash He shot the bear.

These behave identically to *manage* and other English implicatives with respect to the relevant entailment patterns: negation in the upstairs clause entails the negation of the complement clause.

An interesting problem arises from the fact that the inferences described in examples (1)-(8) are entailments. Given an implicative *I*, and its complement *X*, we have the following relationship:

$I(X) \vdash X$. Logically, then, $\neg X$ implies the negation of $I(X)$. However, since it is also the case that $\neg I(X) \vdash \neg X$, we seem forced to the conclusion that the implicative assertion $I(X)$ is logically equivalent to the assertion of X . A brief comparison between the (a) and (b) sentences in each of (1)-(4) is enough to show that this conclusion cannot be correct. Thus, a central puzzle in accounting for implicative verbs is to explain what blocks the “intuitively unacceptable conclusion” that $I(X) \equiv X$ (Karttunen 1971).

In this paper, I propose an account of implicative verbs on which the above inferences and relationships are produced by the joint effects of a presupposition linked to the lexical content of the implicative verb and an assertion that remains essentially constant across the types and variety of implicatives. I invoke the model of causal relationships developed by Schulz (2011) as a contextual parameter linking not-at-issue information introduced by the implicative verb I to the accomplishment of its complement X . This account, and in particular its reliance on Schulz’s system for causal entailment, builds on a novel recent proposal for *manage* by Baglini and Francez (2015). The proposal presented here can be seen as a refinement and extension of the Baglini and Francez account, which is motivated largely by consideration of non-*manage* implicatives in Finnish as well as English. Much of the crucial data which highlights the backgrounding of foregrounding of various aspects of the inferential profile of an implicative comes from the Finnish implicative paradigm, which, while parallel to English implicatives in the abstract logical sense, is both more extensive and richer in terms of lexical content and diversity. The Finnish data are especially valuable in that many of the relevant verbs invoke a very specific lexical presupposition (e.g. *ehitiä* (=have.time) in example 8 involves a temporal requirement for its complement), and this specificity permits the probing of intuitions regarding various implicative-associated inferences in a way that more bleached English verbs such as *manage* and *bother* do not support. Ultimately, the proposal presented here is aimed at handling both Finnish and English implicatives, including those that inherently reverse polarity between the upstairs and downstairs clauses (e.g. *neglect to X* entails that X did not happen), as well as a subclass of one-way implicatives for which the inference from either the positive or negative implicative assertion to the valence of its complement is at best a strong implicature, rather than an entailment.

2 The ingredients of an analysis

2.1 The role of presupposition

Much of the attention given to the implicative problem has focused on English implicatives and, in particular, on *manage* (see, e.g. Coleman 1975, Karttunen and Peters 1979). It has generally been argued that the key difference between an implicative $I(X)$ and its complement X lies in the presuppositional content of I . That is, while $I(X)$ and X may be equivalent at the level of asserted content, I introduces a presupposition that an unqualified utterance of X does not require. In the case of *manage* this presupposition has variously been claimed to relate to notions of *difficulty*, *effort*, or *unlikelihood* with respect to achieving X . This diversity of presuppositions can be better understood by considering (9): while it seems relatively straightforward to conclude that (9a) involves a presupposition of effort, as in (9c), there is no obvious reason why it should not also (or instead) presuppose one or both of (9d)-(9e).

- (9) a. Solomon **managed** to build the temple.
- b. \vdash Solomon built the temple.

- c. *Solomon made an attempt to build the temple.*
- d. *Building a temple presented a difficulty (for Solomon).*¹
- e. *It was unlikely or unexpected that Solomon would build a temple.*

Since (9b) is felicitous in contexts which do not support either of the presuppositions in (9d) and (9e), it does not necessary imply $I(X)$. More generally, the “upwards” implication from X to $I(X)$, which would enforce logical equivalence between the two assertions, is blocked because X fails to satisfy the presuppositions of $I(X)$.

This route to addressing the equivalence problem appears promising when applied to implicatives other than *manage* as well. Implicatives do in general appear to introduce presuppositions similar to those in (9d) and (9e). Table 1 contains some additional examples from both Finnish and English which support this claim.

Table 1: More two-way implicatives

English	Finnish	Examples
dare	<i>uskaltaa</i>	<i>Hän uskals-i avat-a ove-n</i> he.NOM dare-PST.3sg open-INF door-GEN/ACC He dared to open the door
bother	<i>viitsiä</i>	<i>Hän e-i viitsi-nyt vastast-a</i> he.NOM neg-3sg bother-PP.sg answer-INF He didn’t bother to answer
condescend	-	He condescended to meet the petitioners
-	<i>iljetä</i>	<i>Hän e-i iljen-nyt katso-a</i> he.NOM neg-3sg bring.self*-PP.sg look-INF ‘He couldn’t bring himself to look’

The precise nature of presupposed content varies from case to case, but each verb in Table 1 seems to invoke a factor or attribute that might render the accomplishment of the downstairs event somehow difficult or otherwise unlikely.² For instance, English *dare* and Finnish *uskaltaa* presuppose a need for courage or fortitude in doing X (or, that an insufficient quantity of these attributes would render X unlikely). Similarly, *bother* and *viitsiä* presuppose something like inertia or laziness on the part of the subject – that is, that indifference/disinterest towards X or some aspect of X might block its accomplishment. Something similar occurs with *condescend*, although in this case the indifference is replaced by something stronger: disdain for X . Finally, *iljetä* presupposes that there is something shameful about doing X ,³ and this shame or aversion might present a difficulty in completing X .

¹It seems to me that there might well be another alternative presupposition, which is that the speaker assumes building a temple to be difficult in general, but not necessarily that it was difficult for Solomon in particular.

²To the extent that difficulty and unlikelihood are the right presuppositions for *manage*, the verbs in Table 1 can be seen as attribute-specific versions of *manage*.

³I am informed that this verb (*iljetä*) is difficult to translate into English: the sense of aversion or the notion that X is something that one would have to “bring oneself” to do is imported from the speaker’s perspective, and does not necessarily reflect the attitude of the subject towards the downstairs event (L. Karttunen, p.c.).

2.2 The components of an account

This gives us a starting point for setting out the ingredients of a satisfactory account of implicative verbs. For the moment, I restrict the discussion to two-way entailing implicatives of the polarity-preserving type – that is, to the class of *manage*, *dare*, *onnistua*, *ehtiä*, etc (“++ / – –” verbs in the shorthand from Karttunen 2012).⁴ I take it to be uncontroversial that implicatives lexically encode presuppositions about physical or mental attitudes or attributes (of the type discussed in the preceding section). The interesting and perhaps less obvious class feature of ++ / – – implicatives is that these presupposed necessary attributes are taken (in some way) to present potential obstacles for the accomplishment of the downstairs event. I employ the notion of “obstacle” in the sense of Karttunen (2014) as intuitively sensible, but reserve judgement for the time being on whether it belongs properly to the presupposed content of an implicative, or attaches in some other way. Given these assumptions, we have the following points to account for:

- (I) The implicative assertion $I(X)$ *conditions* accomplishment of X in some way on the validity of the lexical presuppositions of I . This is what blocks the “upwards” implication from X to $I(X)$.
- (II) The *conditioning* relationship involves both necessity and sufficiency. Since $I(X) \vdash X$ and $\neg I(X) \vdash \neg X$, the implicative assertion carries the inference that the required attribute for X introduced by I is sufficient as well as necessary for X .
- (III) Finally, an assertion of $I(X)$ or $\neg I(X)$ informs us uncontrovertibly that X or $\neg X$, respectively.

I take the view that the central problem in accounting for implicative verbs is the problem of determining the correct “division of labour” between assertion and presupposition (or other more contextually-driven inferences) that will produce the outcomes and relationships sketched here.

2.3 An overview of past accounts of *manage*

As noted earlier, the majority of past work on English implicatives⁵ has focused on *manage*. With the exception of Baglini and Francez (2015), this work has generally taken the view that the asserted content of $manage(X)$ is, trivially, X , and that all other information is carried by lexical presuppositions of the sort described above. The “trivial assertion” view appears to take its justification from Karttunen’s original discussion, which argues that the illocutionary force of $manage(X)$ is shared by X ; stating “all that takes place when John *manages to do* something is that he does it [...] *managing to do* is inseparable in time and space from *doing*; it is the same event” (pp.349–350).⁶

⁴Section 4.2 expands the discussion to one-way implicatives, and section 5.4 brings in polarity-reversing (+ – / – +) types.

⁵Remarkably, except for Flint (1980), there appear to be few to no systematic studies of Finnish implicatives.

⁶It is perhaps not difficult to see why this might suggest that $manage(X) \equiv X$ at the asserted level, but I believe Karttunen’s intention in the 1971 paper to be more closely aligned with the account I propose in section 5. This belief is motivated by the fact that he goes on to say that an “affirmative assertion [of an implicative] states, according to the speaker’s supposition, that a sufficient condition for the truth of the complement is fulfilled,” and that a “negative assertion claims that a necessary condition for the truth of the complement is not fulfilled [...]” (p.352). Thus, the assertion of X (or $\neg X$) is achieved as a logical conclusion of the assertion, but is not literally contained in it.

Regardless of its origins, this view is adopted by Karttunen and Peters (1979), who claim that *manage* is truth-conditionally vacuous, but presupposes⁷ that its complement requires effort from the subject:

- (10) a. John **managed** to sit through a Chinese opera.
- b. *Assertion*: John sat through a Chinese opera.
- c. *Presupposition*: Sitting through a Chinese opera requires some effort for John

This analysis is reiterated by Bhatt (1999), who reprises Karttunen and Peters’s evidence from the projective properties of the inferences in (10b) and (10c):

- (11) a. I just discovered that John **managed** to sit through a Chinese opera.
- b. I just discovered that John sat through a Chinese opera.
- c. I just discovered that sitting through a Chinese opera requires some effort for John.

(11a) entails (11b) but not (11c), which shows that the inferential content of (10a) represented in (10b) projects through *discover* in (11a), but the (10c) inference does not. This supports the view that the first inference is entailed (or asserted), but the second is presupposed (since the speaker of (11a) is not committed to (11c)). If we agree that (10b) and (10c) fully capture the implications of (10a), then there is nothing more to be said about the division of inferential labour with respect to *manage*.

As argued by (Coleman 1975), however, it is not clear that (10b) and (10c) do fully capture (10a). In particular, it is not clear that the downstairs assertion and a presupposition of effort capture the implications of *manage* in all cases. Coleman points out that the apparently presuppositional content of *manage* behaves somewhat unusually: *manage*-sentences frequently fail to presuppose an input of effort on their subject’s part, as in examples (12) and (13) (see also Bhatt 1999, on “*able to* without ability”):

- (12) Harry **managed** to insult Ursula without even trying.
- (13) Our neighbors **managed** to schedule their one wild party of the year the night before my German exam.

In each of these effortless cases the presupposition of effort is replaced by a weaker (but related) presupposition of general difficulty/unlikelihood. Coleman argues that (12) is infelicitous with the continuation “and anyone could have,” which would suggest that insulting Ursula is a completely trivial accomplishment. Similarly, (13) does not require malicious neighbors, or even some external difficulty in scheduling the party before the exam; rather, it suggests that the concurrence of the two events was unlikely or unexpected. Crucially, then, while *manage* does not always presuppose effort, à la Karttunen and Peters, Coleman claims that where this presupposition “vanishes”, a

⁷In Karttunen and Peters, this is treated as conventional implicature rather than presupposition (although, since one of the goals of that paper is to unify the two, this is perhaps not a significant deviation). I do not undertake here to meaningfully investigate which of the two classifications is correct, but take the pre-theoretical view that the not-at-issue content of implicatives seems less closely to align with current theories of the behavior of conventional implicature (e.g. Potts 2005) than with the admittedly heterogeneous behavior of presuppositions (see Tonhauser et al. 2013). An investigation of which classification is correct is certainly an important aspect of an investigation of implicative verbs, but I intend to leave this for future work.

conceptually related inference appears. Her account of this peculiar behavior involves a strength-based ordering of presuppositions: if the context does not support a stronger presupposition, we move down the list (from effort to difficulty to general unlikelihood). Thus, a *manage*-sentence could only be infelicitous in a context which failed to support even an unlikelihood presupposition (see Coleman p.82).⁸

While this provides a theoretically interesting means of reconciling the complex behavior of *manage* with an account along the lines of Karttunen and Peters (1979), and although her strength-ordering has found support both from Fillmore’s 1975 “frame extension” and Dalrymple et al’s 1998 “strongest meaning hypothesis,” two immediate lines of objection arise. First, Baglini and Francez (2015) argue that Coleman’s “weaker” presuppositions seem to sometimes be cancelable when the stronger ones are not, which contradicts her claim that they form an entailment chain. They provide naturally-occurring examples (14) and (15)⁹ as evidence of this, arguing that (14) explicitly denies any difficulty in crossing the river, but nevertheless presumes an effort to do so, and that (15) denies any sense of unexpectedness, but again leaves intention/effort untouched.

- (14) Clad in civilian clothes and having passports, they easily **managed** to get back over the Volga.
- (15) Now it’s becoming obvious that Fork will **manage** to kill someone important.

Another issue for the trivial-assertion approach involves the interaction of *manage*-sentences with adverbial modifiers. For example, Karttunen (1971) notes the following contrast between an *because*-clause attached to *manage*(*X*) and the same clause attached to *X*:

- (16) a. John **managed** to buy the ring because it was cheap.
- b. John bought the ring because it was cheap.

Unlike in the earlier cases, here the implicative sentence does not appear to entail the non-implicative; this is due to the presence of the *because*-clause, which adds something different to (16a) than it does to (16b). While both *because*-clauses are essentially causal, the one in (16a) is interpreted as explanatory, and the one in (16b) is interpreted as providing motivational context (roughly, albeit awkwardly, paraphrasable as “John bought the ring *for* being cheap”). Karttunen argues that *because*-clauses are generally ambiguous between these two interpretations, but the “motivational” interpretation is for some reason blocked in (16a). On a trivial-assertion approach to *manage*, the only route to explaining this contrast seems to be to claim that the presence of a presupposition somehow blocks a non-explanatory interpretation – this seems stipulative at best.

It is worth remarking that the difference between (16a) and (16b) is a particularly striking distinction between an implicative assertion and the assertion of its complement, because in other respects adverbial modifiers seem to “transfer” between the two assertions:

- (17) a. Since last year, John hasn’t **managed** to write to Mary.
- b. Since last year, John hasn’t written to Mary.
- (18) a. At the door, John **managed** to apologize.

⁸Coleman also cites evidence of ordered presuppositions with the English implicatives *happen* and the polarity reversing *fail*; thus, strength-ordered presuppositions are intended, on her account, to be seen as a class-feature of implicatives.

⁹See Baglini and Francez for source data.

- b. At the door, John apologized.

These observations (and a number of related observations regarding adverbial modifiers, not discussed here) are due to Karttunen (1971), and seem in keeping with the claim that ultimately *managing to do* something and *doing* it represent the same event. What (16) suggests is that *manage(X)* and *X* somehow foreground different aspects of the occurrence of that event, in a way that is accessible by causal modifiers but not (necessarily) by other types of modification.

3 *Managing* and causal dependence

Data points such as (14)-(16) lead Baglini and Francez (2015) to the conclusion that the inferential profile of *manage* has yet to be properly understood. Ultimately, they argue against the claim that the asserted content of a statement *manage(X)* is trivially *X*, instead proposing that the use of *manage* invokes a contextually-determined set of causal relationships for the accomplishment of *X*. The causal framework used to flesh this out (due to Schulz 2011) provides, on their account, significant insight into both Coleman’s “vanishing” presupposition problem as well as the behavior of adverbial modifiers noted by Karttunen. This section provides an overview of the Baglini and Francez (2015) proposal, including the causal model on which it relies, and discusses the ramifications of the account.

Baglini and Francez state their proposal as follows (p.6):

- (19) A sentence of the semantic form *manage(X)*:
 - a. presupposes the familiarity of a “catalyst,” a *causally necessary but insufficient* situation for the truth of *X*
 - b. asserts that the catalyst *actually caused X*

At least at first glance, this appears to permit an analogy between the mysterious presuppositional content of *manage* (cf. Coleman) and the more attribute-specific presuppositional content of the Finnish and English implicatives in section 2.1 (*dare/uskaltaa*, *bother/viitsiä*, etc), insofar as one could take the notion of a “catalyst” in the latter cases to relate to the particular attribute invoked by usage of the implicative: *manage*, as relatively bleached, simply refers to a generic catalyst.

3.1 Required definitions

The real weight of the proposal lies in the formalizations Baglini and Francez provide for the notions of *causal necessity*, *causal sufficiency* and *actual cause*. These rely on Schulz’s 2011 framework for causal entailment. Schulz represents causal relationships with a *dynamics*, or a formal representation of causal relationships between a set of propositions. Baglini and Francez incorporate a dynamics into their proposal as a contextually-developed and manipulable feature of the background or common ground of a discourse: a dynamics keeps track of what is known, assumed, or communicated about causal links between those propositions that have been made salient or contextually relevant.

- (20) A **dynamics** *D* over a set of proposition symbols *P* is a tuple $\langle B, F \rangle$, where:
 - a. $B \subseteq P$ is the set of distinguished *background variables*

- b. The function F (rooted in B)¹⁰ maps elements X from $I = P - B$ to tuples $\langle Z_X, f_X \rangle$, where:
 - i. Z_X is an n -tuple of propositions from P
 - ii. $f_X : \{0, 1\}^{|Z_X|} \rightarrow \{0, 1\}$ is a two-valued function from n -tuples on $\{0, 1\}$ to $\{0, 1\}$.

In (20), B is the set of propositions that are taken to be causally independent of all other relevant facts in P (and the discourse context). Its complement within P , $I = P - B$ (the *inner* variables) are therefore those propositions whose truth or falsity depends on the truth or falsity of other variables in P . Finally, for a proposition $X \in I$, Z_X gives the set of propositions on whom X has causal dependence, and f_X is the function that determines the truth value of X based on a two-valued truth assignment for Z_X .

For Schulz (and Baglini and Francez), a *situation* is represented by an assignment of the three values $\{u, 0, 1\}$ to the variables in P , where u can be thought of as encoding that a variable is undetermined by what has so far been said or assumed. A world, by contrast, has no undetermined (relevant) propositions: it is a situation which uses only the values $\{0, 1\}$. Given a situation, then, we can use the relationships encoded in D to causally update (i.e. draw conclusions about the values of) any undecided proposition symbols. These updates proceed via an operator \mathcal{T}_D :

- (21) Let D be a dynamics and s a situation for the set P . The (updated) situation $\mathcal{T}_D(s)$ is defined, for all $p \in P$, by:
- a. If $p \in B$, $\mathcal{T}_D(s)(p) = s(p)$.
 - b. If $p \in I$, with $Z_p = \langle p_1, \dots, p_n \rangle$, then:
 - i. If $s(p) = u$ and $f_p(s(p_1), \dots, s(p_n))$ is defined, then $\mathcal{T}_D(s)(p) = f_p(s(p_1), \dots, s(p_n))$.
 - ii. If $s(p) \neq u$ or $f_p(s(p_1), \dots, s(p_n))$ is not defined,¹¹ then $\mathcal{T}_D(s)(p) = s(p)$.

The operator \mathcal{T}_D can be applied iteratively to calculate the causal consequences of the determined propositions in a situation; Schulz shows¹² that this process must result in a fixed point after finitely many steps. It can therefore be used to define a notion of causal entailment:

- (22) A set Σ of literals **causally entails** a proposition $p \in P$ in a dynamics D if p is true on the least fixed point s_Σ^* of \mathcal{T}_D on s_Σ , where s_Σ is the situation which validates everything in Σ and assigns u to all other proposition symbols in P :

$$\Sigma \models_D p \text{ iff } s_\Sigma^*(p) = 1$$

Once we have a notion of causal entailment, it is relatively straightforward to define the relationships of causal necessity and sufficiency between two proposition symbols:

- (23) Given a dynamics D and two propositions $X, Y \in P$:
- a. X is **causally necessary** for Y iff $\neg X \models_D \neg Y$.

¹⁰While not central to the discussion here, the notion of *rootedness* is an important aspect of Schulz's framework: informally, F is rooted in B if "walking backwards" through the causal dependencies always terminates in an element of B . More formally, if we let R_F be the relation $\{\langle X, Y \rangle \mid X, Y \in P \text{ and } Y \in Z_X\}$, and let R_F^T be the transitive closure of R_F , then F is rooted in B if (P, R_F^T) is a poset and B is the set of minimal elements (p.244).

¹¹For instance, if some of p_1, \dots, p_n are undetermined in s .

¹²The proofs are given in an appendix to Schulz (2011), which is not included in the published version of the paper, but is available on the author's webpage.

b. X is **causally sufficient** for Y iff $X \models_D Y$.

Baglini and Francez, however, wish to extend the notions of necessity and sufficiency to relations between a situation s (implicitly, the catalyst) and a proposition X (the *manage*-complement). This can be done straightforwardly for sufficiency, as given in (24):

(24) A situation s is **causally sufficient** for the truth of a proposition X when s^* , the least fixed point of s with respect to \mathcal{T}_D has $s^*(X) = 1$.

Formalizing causal necessity is somewhat more complicated. Intuitively, for a situation s to be causally necessary for the truth of a proposition X , we would like the following to hold. First, s should not be causally sufficient for $\neg X$. Second, if we consider just those propositions determined by the situation s which are causal ancestors of X , no non-equivalent situation should be able to develop into one where X holds. Third, again considering just the causal ancestors of X , changing the value of any one of these propositions that is determined in s should result in the causal entailment of $\neg X$ (any situation that contradicts s should be causally sufficient for $\neg X$).¹³

(25) Given a dynamics $D = \langle B, F \rangle$, let R_F be the relation $\{\langle X, Y \rangle \mid X, Y \in P \text{ and } Y \in Z_X\}$. Let R_F^T be the transitive closure of R_F .¹⁴ Additionally, let P_X be the closure of the set of variables in Z_X under R_F^T . Given a situation s , let Σ_s represent the set of literals to which s assigns the value 1; and let $\Sigma_s|_{P_X}$ be the subset of Σ_s which contains only those variables (or their negations) which are in P_X . Then, s is **causally necessary** for the truth of X if the following hold:

- a. $s \not\models_D \neg X$
- b. No set Σ with $\Sigma|_{P_X} \neq \Sigma_s|_{P_X}$ has the property $\Sigma \models_D X$
- c. If Y_1, \dots, Y_n are literals in $\Sigma_s|_{P_X}$, Y is any set comprising one or more of Y_1, \dots, Y_n , and \bar{Y} is the set containing the pointwise negation of Y , then $(\Sigma_s|_{P_X} - Y \cup \bar{Y}) \models_D \neg X$

Finally, Baglini and Francez define the notion of an *actual cause* relative to a world:

(26) A situation s **actually causes** a variable X in a world w if $s(X) = u$, $w(X) = 1$, and w respects D .¹⁵

These definitions complete the scheme outlined in (19). Given a sentence of the form *manage*(X), a catalyst is a situation s that is causally necessary but causally insufficient for the truth of X ; moreover, it is presupposed (by the speaker) that s is familiar as a catalyst for X , on the basis of the contextually-developed dynamics. In particular, the catalyst situation is presupposed to hold in the discourse context: consequently, the open or at-issue question handled by the assertion is that of whether the catalyst *actually caused* X in the world of evaluation.

¹³This definition of causal necessity is not fully equivalent to that offered by Baglini and Francez (2015); I believe the only significant difference, however, is that their definition does not restrict itself to consideration of just those propositions which are causal ancestors of X . Their definition is stated as: “a catalyst s is causally necessary for the truth of a variable p . . . when no s' that differs from s in the value of determined variables and in which p is not true causally entails p .” (p.9). This formulation is (evidently) significantly more elegant than that offered in (25); I provide that version only in the interests of transparency.

¹⁴See Schulz’s definition of rootedness.

¹⁵That is, w agrees with the least fixed point of \mathcal{T}_D applied to s on all variables determined in $s_{\mathcal{T}_D}^*$.

A positive assertion of $manage(X)$ answers this question in the affirmative: the catalyst s actually caused X . By definition (26), this necessitates that the world of evaluation assign the value 1 to X ; consequently, we arrive at the entailment relation $manage(X) \vdash X$. On the other hand, a negative assertion answers the open question in the negative: s did not actually cause X in the world w of evaluation. Since s is presupposed to hold in context, and a world w determines all propositions, this necessitates that the value assigned to X in w is 0, and we get the negative entailment $\neg manage(X) \vdash \neg X$.

3.2 Discussion of the account

Baglini and Francez (2015) emphasize the fact that the presupposition of a familiar, and, in particular, a causal catalyst captures the empirical observations made by Coleman and Karttunen, and, in addition, handles the cases where Coleman’s hierarchy seems to break down. Broadly speaking, the nature of a dynamics D as a contextually-developed variable allows a relevant catalyst to invoke variously the notions of effort, difficulty, or unlikelihood, based on shared context.

As an example, consider again (10a), reproduced here:

(10a) John **managed** to sit through a Chinese opera.

Suppose we know the following: John dislikes opera and Chinese opera in particular. His girlfriend, however, really enjoys it, and has bought them tickets to go. John never says no to her, so he’ll go if she asks him to: suppose also that she has asked him to. In this scenario, the following variables might form a familiar catalyst: the purchase of the tickets and John’s girlfriend asking him to go (which, given our dynamics, means he will). These variables form a necessary situation since John would never go to the opera in their absence, but they are insufficient to ensure that he sits through it: this remains unknown, and might depend on factors such as the length of the opera, whether he has a glass of whisky beforehand, etc. From the catalyst, however, we are directly able to infer that he will make the attempt. Crucially, for Baglini and Francez, this results from presupposing the catalyst. In this scenario, we also get the inference that sitting through the opera will be difficult for John – this is because his dislike for Chinese opera is included in the dynamics as a background variable. We might also get an inference to unlikelihood in a similar fashion (it was unlikely that John would go, given his dislike).

The particularities of these inferences come along with the more general relationship of $manage$ to a dynamics and a causal catalyst. If the dynamics is constructed differently in a different discourse context, we get a slightly different set of inferences, which are not necessarily stacked *a la* Coleman. For instance, suppose John knows nothing about Chinese opera, so he neither likes nor dislikes it. It might still be unlikely, then, that he’d go on his own, but we know he’ll try it out because his girlfriend asked him to go. The presupposition of trying or effort is thus preserved, but we lose an inference that sitting through the opera is necessarily difficult for John (although it might still be the case that the speaker thinks that sitting through a Chinese opera is generally a nontrivial task). Observe that, in this altered scenario, it seems felicitous to utter (27):

(27) John easily **managed** to sit through a Chinese opera.

In this way, the context dependence of the implicative presupposition can be attributed to the context-dependence of the causal schema that is invoked and to the context-dependent division of variables into those that are part of the catalyst and those that are not.

Another important aspect of the Baglini and Francez proposal is their claim that the assertion of *manage* is nontrivial. Since the catalyst situation is necessary but insufficient, presupposing that it holds is not enough to permit a conclusion about whether or not X takes place. To revisit the opera scenario, once we know that the tickets have been bought and that John will go to the opera, the open question seems to be whether these things will be *enough* to guarantee he makes it through – this seems to be what the notion of an *actual cause* is getting at.

Let us consider how this is cashed out. Taken together with the presupposition that the catalyst s holds, the definition (26) of an actual cause informs us of the valence of X in the evaluation world w – in a sense, then, it is because the assertion directly tells us that $w(X)$ is 1 (or 0) that we can draw a conclusion regarding the actual cause relationship. To put it another way, although there is something intuitively correct about invoking the question of whether the catalyst was sufficient to cause X , the notion of an actual cause in proposal (19) seems hard to differentiate from a view on which X is simply asserted by $manage(X)$. In particular, we are not precisely coming to a conclusion about the valence of X based on our knowledge of its causal ancestors, but rather it is the valence of X (contained in the assertion of $manage(X)$) that allows us to draw certain conclusions about its causal history.

It is true, however, that something additional to the assertion/denial of X is taking place in this schema. Assuming that X is an inner variable in D (which seems to follow from the requirement of the existence of catalyst for X), then its valence is determined by a set Z_X of proposition symbols. Since f_X is defined as a two-valued function, X is fully determined by the values assigned to the variables in Z_X . Thus, given that a causally necessary but insufficient situation s for X is presupposed to hold, a positive assertion of $manage(X)$, in telling us that $w(X) = 1$, also tells us that some s -undetermined variables were set in the “right way” so as to determine $X = 1$. That is, there exists a non-empty set of proposition symbols that, taken together with those symbols determined by s , form a necessary as well as sufficient set to ensure X . What $manage(X)$ says, then, is that some causal factor (or factors) outside of the familiar catalyst permitted X to hold in w . In the original opera scenario, for example, this additional factor might be that the opera turned out to be quite short, so it did not try John’s patience too much to sit through the whole thing. Thus, it is the setting of some (background)¹⁶ variable in a way conducive to X that allows the relation of actual cause to go through; conversely, if this background variable is set in the wrong way, the catalyst cannot cause X to happen – crucially, *actually causing* is blocked by the w -determination of the non-catalyst causal ancestors of X .

Baglini and Francez’s framework essentially points out (in a way that seems intuitively correct) that use of an implicative verb suggests that X is not a background variable in a given discourse context but rather depends on a more or less complex causal background. This discussion shows that (19) requires that X depend on at least two other variables, one of which cannot be included in the catalyst situation. This complexity of causes makes it difficult to assess the validity of the notion of an actual cause: if the catalyst is presupposed to hold, is it right to think of it as actually causing X , or rather of the catalyst-external variable(s) as the crucial causes relative to w ?

We might get closer to pinning these questions down by considering Baglini and Francez’s discussion of *because*-clauses. They point out that the relationship of implicatives to a dynamics

¹⁶We can add that this variable is a background variable without loss of generalization: an s -external variable Y that, taken with the determined variables in s forms a necessary and sufficient situation must not be fully causally dependent on s in order for s to remain causally insufficient for X . Consequently, Y must have some causal ancestor which is not in s , and since F is rooted in B , we can trace this back to a background variable.

explains the contrast in (16), reproduced here.

- (16) a. John **managed** to buy the ring because it was cheap.
b. John bought the ring because it was cheap.

In both cases, the *because*-clause targets asserted content rather than presupposed or implied content. On the proposal being considered here, the *because*-clause in (16a) takes an explanatory interpretation because the assertion of a *manage*-sentence is essentially about explicating a causal chain: the explanation for *X*'s occurrence is that the relevant catalyst actually caused it (and the *because*-clause is taken to offer some additional information as to how.) In (16b), as per Karttunen's original claim, either explanatory or motivational interpretation is available, but the motivational reading seems preferred in contexts where a causal explication of *X* has not been made salient (by use of an implicative or any other means).

This explanation is not fully satisfactory. It seems to me that what is added to the assertion of an implicative by a *because*-clause is actually information about the relevant non-catalyst variables. That is, the *because*-clause in (16a) does not seem so much to tell us how the catalyst managed to actually cause *X* as that the enabling factor in *X*'s occurrence was the cost of the ring. Thus, the *because*-clause specifies which causal factor was really in question regarding the purchase of the ring: another way of thinking about this is that the use of *manage* seems to suggest that some critical factors for *X* are in question in *w* (a positive assertion tells us that these were settled in the enabling way), and the *because*-clause gives us some additional information about these factors that is not imparted by *manage* itself. It is not clear, however, that the notion of an *actual cause* as stated in (19) correctly captures whether the assertion of *manage*(*X*) is more focused on those catalytic variables that are known in the discourse context or on the setting of those that are critically in question: describing the assertion as "*s* actually caused *X* in *w*" suggests the former, but we have seen that it forces a set of essential conclusions about the latter that seem to me to be closer to our intuitions about what an assertion of *manage*(*X*) is doing.

Finally, there is a special set of cases where a positive or negative assertion of *manage*(*X*) seems felicitous even though it is impossible to specify a causally necessary catalyst for *X*. Broadly speaking, these are cases where *X* is causally dependent on a disjunction of other variables.¹⁷ Consider the following:

- (28) John **managed** to get to school on Friday.¹⁸

Suppose we are in the following situation. John has (at most) four ways of getting to school: the public bus, biking, walking, or if his mother drives. Any one of these routes will get him there. There was a big snowstorm on Thursday night and it is very cold on Friday morning, so biking and walking are both out of the question. It is not clear, however, whether the public bus will be running, or if John's mother will be able to drive, due to the dangerous conditions. In such a situation, it seems felicitous to assert (28) (or its negation) in order to communicate that one of the in-question modes of transit worked out (or that neither did). However, what could the catalyst be in such a scenario? The only possibility for a variable that belongs in a causally necessary but insufficient situation is that John tries to go to school; however, what does it mean for him to try

¹⁷It is not clear how Schulz's framework treats disjunctive causes, or if it can do so in all possible configurations, but I do not investigate this issue here.

¹⁸This example is based closely on one suggested by Stanley Peters, p.c.

to go to school outside of embarking on one of the possible methods of transportation? If we know that the bus, too, is not running, then it might be the case that John’s asking his mother to drive him is causally necessary (but insufficient, since she may say no) – but the crucial point here is that (28) or its negation seems completely felicitous when we don’t yet know the status of the bus!

This, and examples like it, seem to support the view of *manage* as focusing not on the relationship between a catalyst and X , but rather on the existence of a causally necessary and sufficient situation that was either met or not met (that is, on the catalyst-external variables that fill in the causal sufficiency relationship along with those in s). I take the view that this uncertainty can be attributed to the fact that *manage* is semantically bleached as an implicative (in comparison to English *dare*, and the majority of the Finnish examples so far provided).

This discussion has served a few purposes. We have seen that Baglini and Francez’s move to invoke a causal schema in implicative assertions allows us to capture the unusual presuppositional facts surrounding *manage* and other implicatives, and also seems to shed some light on adverbial modification. In addition, we have seen the strength of the view that *manage*(X) does not trivially assert X , but rather involves us in some sort of causal calculation regarding what was in question for the accomplishment of X and the way in which these factors were resolved. More generally, we have seen that it is not clear from *manage* itself precisely which direction this calculation should go in, and in particular whether it involves those contextual factors that have already been resolved or those that are mutually understood as in question.

4 Extending the causal account

One of the goals of the present paper is to provide a first attempt at an account of implicative verbs that takes, along with Baglini and Francez (2015) the view that the assertion of an implicative verb is not only nontrivial, but is also intimately associated with a contextually-built understanding of causal relationships. Baglini and Francez’s proposal evidently captures a number of relevant and interesting facts that previous approaches have dealt with unsatisfactorily, but it is limited by the fact that it is an account of English *manage*, rather than of implicative verbs in general. This limitation seems to be the cause of some confusion, due to the bleached nature of *manage* as compared to other implicatives. Here, I attempt to set out the issues associated with extending an account of *manage* to other implicative verbs, as well as the ways in which considering a broader range of implicatives may shed light on the important causal relationships involved. I first discuss the problem of catalysts and actual causes and then move on to the issues introduced by the existence of one-way implicatives (such as *able to* or Finnish *jaksaa*(=have.strength)).

4.1 Catalysts, actual causes, and catalyst-external causal ancestors

The discussion in section 3.1.2 noted several consequences of the Baglini and Francez proposal. I set these out again here, for clarity.

- (29) Given an assertion *manage*(X) (or \neg *manage*(X), with catalyst s_X :
- a. Z_X contains at least one variable that is undetermined in the least fixed point s_X^* (via \mathcal{T}_D) of s_X .
 - b. If Y_X is the set of such variables, then the positive assertion informs us that Y_X is determined in w in such a way that, in conjunction with s_X , we have both a necessary and sufficient situation for X .

- c. The negative assertion informs us that Y_X is set in a way that blocks X

In particular, then, a negative assertion seems to suggest that some factor external to the “familiar catalyst” was actually crucial in blocking the accomplishment of X . Although this is arguably acceptable for *manage*, it seems to break down when we consider proposal (19) as a schema for arbitrary implicatives.

- (30) a. He **dared** to kill the cat.
 b. He didn’t **dare** to kill the cat.
- (31) a. Hän **henno-i** tappa-a kissa-n
 he.NOM have.the.heart-PST.3sg kill-INF cat-GEN/ACC
 ‘He had the heart to kill the cat’ (understood: He killed the cat.)
 b. Hän e-i **henno-nut** tappa-a kissa-a
 he.NOM neg-3sg have.the.heart-PP.sg kill-INF cat-PART
 ‘He did not have the heart to kill the cat’ (understood: He did not kill the cat.)

Assuming that the notion of a catalyst is intended to capture the lexical presuppositions of an implicative verb (e.g. trying or difficulty for *manage*), the causally necessary but insufficient catalyst presupposed to hold for (30) should include a variable invoking the requisite courage, and the catalyst for (31) should include a variable invoking the fortitude of heart required for killing the cat. In particular, these catalysts should be presupposed to hold regardless of the valence of the assertion: that is, the requisite courage/fortitude should be presupposed to be present in each of (30a)-(31b). However, the negative assertions (30b) and (31b) in fact seem to suggest precisely the opposite: the necessary ingredient (courage, fortitude) was absent or at least not present in sufficient quantity.

With respect to the earlier discussion, then, what this suggests is that a statement of the form $I(X)$, where I is an implicative verb, in some manner focuses our attention not on those causal ancestors for X that we know to be correctly aligned (per se), but rather on the fact that some causal prerequisite for X is “in question” in the context. In this respect, *manage* is an unusual implicative in that it fails to specify the nature of this undetermined variable: consider, for contrast, the following attribute-specific implicatives.

- (32) a. John **bothered** to respond to my email.
 b. John didn’t **bother** to respond to my email.
 c. *suggests/presumes that the undetermined variable with respect to John’s answering the email was his apathy (towards doing so)*
- (33) a. Hän **eht-i** ampu-a karhu-n
 he.NOM have.time-PST.3sg shoot-INF bear-GEN/ACC
 ‘He had the time to shoot the bear.’ (understood: He shot the bear)
 b. Hän e-i **eh-ti-nyt** ampu-a karhu-a
 he.NOM neg-3sg have.time-PP.sg shoot-INF bear-PART
 ‘He didn’t have the time to shoot the bear.’ (understood: He did not shoot the bear)
 c. *suggest/presumes that the undetermined variable with respect to shooting the bear was sufficient time (for doing so)*

- (34) a. Hän **maltto-i** odotta-a
 he.NOM have.patience-PST.3sg wait-INF
 ‘He had the patience to wait.’ (understood: He waited)
- b. Hän e-i **maltta-nut** odotta-a
 he.NOM neg-3sg have.patience-PP.sg wait-INF
 ‘He did not have the patience to wait.’ (understood: He didn’t wait)
- c. *suggests/presumes that the undetermined variable with respect to his waiting was his having sufficient patience (to do so)*

In each of these cases, the attribute invoked by the lexical presupposition (as discussed earlier) if the implicative verb (apathy, time, patience) seems to be specified as crucially in question for the accomplishment of the implicative complement X . This is not, of course, incompatible with Baglini and Francez’s presupposition of a necessary but insufficient catalyst that holds in both the positive and negative cases: indeed, for a single attribute/variable to be the crucial deciding factor, it seems only reasonable that any other prerequisites (ability, desire, etc) must be presumed to be in place – but the focus of the presumption seems subtly different than that advocated by proposal (19). In particular, the ultimate cause or obstacle for X is the “in-question” attribute, not the stable catalyst, and it seems that the notion of an actual cause is more reasonably attributed to this variable than to the catalyst as defined by Baglini and Francez. Moreover, on this view, we might understand the behavior of *manage* in the following way: by failing to specify the nature of the variable in question, *manage*(X) simply communicates that some variable (or variables) *was* in doubt – a positive assertion indicates that this was resolved in a manner conducive to X , and a negative assertion indicates that it was not.

This seems to align well with the discussion of *because*-clauses in the previous section. Where a *because*-clause on a *manage*-sentence seems to help pin down the nature of the in-question factor (e.g. the cost of the ring in example 16a), a *because*-clause in an example like (32) seems to further specify the means by which the already-specified crucial factor was resolved:

- (35) a. John (only) **bothered** to respond to my email because it was about money.
 b. John didn’t **bother** to respond to my email because it was long.

Here, in the first case the *because*-clause explains what caused the apathy problem to be resolved in a positive direction (the subject matter of the email might, for instance, be taken to represent a causal ancestor of the apathy variable), while in the latter the *because*-clause indicates why the apathy problem was resolved in a negative direction. In either case, the clause focuses on the factor that might have blocked X , just as in the *manage* case. In general, then, use of an implicative verb seems to focus our attention on the presence of an unresolved/in question causal ancestor for X , rather than on those ancestors that are taken to be positively-resolved. In order to extend a Baglini and Francez-style proposal to verbs such as *bother*, *ehitiä*(=have.time), *malttaa*(=have.patience), and *henno-a*(=have.the.heart), it seems important to capture this specificity and focus. Simultaneously, this extension should capture that *manage/onnistua*(=succeed) are special, unusually-nonspecific cases, and should derive any unusual properties of these particular implicatives from this fact. As noted, this does not argue against Baglini and Francez’s claim that a causally necessary but insufficient situation for X is presupposed by $I(X)$ (although it does, along with example (28), call into question whether the predetermined variables need form a necessary situation), but is

rather meant to demonstrate that something additional is needed for the account to extend beyond *manage*.

4.2 One-way implicatives

Further complications for proposal (19) arise when we take into account the existence of one-way (polarity-preserving) implicatives. Consider the following:

- (36) a. John **was able** to solve the problem.
 b. \nVdash John solved the problem.
- (37) a. John **was not able** to solve the problem.
 b. \vdash John did not solve the problem.
- (38) a. Hän **jakso-i** noust-a.
 he.NOM have.strength-PST.3sg rise-INF
 ‘He had sufficient strength to rise.’
 b. \nVdash He rose.
- (39) a. Hän e-i **jaksa-nut** noust-a.
 he.NOM neg-3sg have.strength-PP.sg rise-INF
 ‘He did not have sufficient strength to rise.’
 b. \vdash He rose.

In these cases, the negative entailment (in examples (37) and (39)) persists, supporting a view on which the crucial factor invoked by an implicative verb is taken to be a sufficient variable in context for X , but the positive entailment disappears. For instance, in (40) it is completely coherent both to assert that John was able to solve the problem but that (for some other reason) he did not do it:

- (40) John **was able** to solve the problem, but he didn’t want to do it.

It is worth noting, of course, that the positive inferences about X from (36a) and (38a) – i.e. that John did solve the problem, or that the protagonist did rise – seem in many cases to be conveyed as a strong implicature from the use of the implicative verb, but examples like (40) crucially show that these inferences are cancelable.

The framework given in (19) doesn’t seem to provide room to account for the existence and behaviour of one-way implicatives (on the assumption that a unified account of implicative verbs is both possible and desirable). The problem can be seen arising from the division of labour between presupposition and assertion proffered in (19).

Suppose we maintain the existence and satisfaction of a necessary and insufficient catalyst for X as the presupposition introduced by an implicative verb I (setting aside the discussion in section 4.1 for the moment). Then the negative assertion (that the catalyst did not actually cause X) will continue to produce the desired negative entailment. However, a positive assertion of actual cause will (unsurprisingly) continue to produce the positive entailment, which we do not want for cases like *be able* and *jaksa*(=have.strength). Evidently, we need an assertion that is weaker than *actual cause* in the positive case: what could this be? Essentially, we need to remove anything that entails that $X = 1$, so the best we can do is to assert that the (necessary and insufficient) catalyst

holds, which leaves X undetermined. This is extremely peculiar, though: the positive assertion is now no longer the logical negation of the negative assertion (which must retain the notion of *actual cause* in order to produce the entailment that $X = 0$), in addition to being functionally vacuous (since I already presupposes the catalyst). In addition to this issue, there is no obvious reason why the asserted content in a one-way case should be substantively different from that in a two-way case: rather, it seems desirable to produce the difference in entailments from a difference in background assumptions produced by the two types of implicatives. That is to say, just as we seem to “calculate” the entailment of X from a positive assertion of *manage*(X), rather than having it simply handed to us, this calculation should simply fail to go through in the case of a one-way implicative, which seems to be a result that should follow from the pragmatic background introduced by the implicative in question.

This suggests that the necessary modification will have to be tied to the presuppositions of an implicative verb. However, the only possible modification we could make to the presupposition as given in (19) is to remove the assumption that the catalyst is necessary (there is no obvious way to weaken insufficiency). If we presume a catalyst that is neither necessary or sufficient, the negative assertion (of not actually causing) still goes through, in a sense – it follows from the existence, as before, of some catalyst-external causal ancestor for X that was not set in a way conducive to X (note, then, that this external ancestor must be necessary in context).

What happens to the positive assertion in this case? It turns out that modifying the presupposition (in this admittedly unlikely way) does not help us avoid the earlier issue. We still can’t produce the desired result with an assertion of actual cause, since this will continue to force the value of X to be 1. So we are back at square one: the division of labour between presupposition and assertion in (19) enforces conditions that are too strong to allow for one-way implicatives.

5 A new proposal for implicative verbs

We would like an account of polarity-preserving implicatives to preserve the causal nature of the presupposition (as suggested by Baglini and Francez), but to focus on some causal prerequisite that is *in question* for the accomplishment of the implicative-complement, rather than a necessary but insufficient factor that is assumed to hold. In addition to this, we would like to preserve the intuition that the conclusion of X or $\neg X$ from an assertion of $I(X)$ or $\neg I(X)$, respectively, is drawn on the basis of some (simple) inferential process, rather than handed to us directly by the assertion. This is in the spirit of Baglini and Francez’s notion of an *actual cause*. Moreover, there should be some difference in the background (pragmatic) assumptions between one-way and two-way implicatives that prevents this calculation from handing us the positive entailment for one-way implicatives, crucially without forcing non-equivalence between $I(X)$ and $\neg I(X)$, or requiring us to stipulate that one-way and two-way implicatives make different sorts of assertions.

5.1 The proposal

The following claims provide the backbone for a new proposal:

- (41) a. **Claim 1:** Implicative verbs (both one-way and two-way) presuppose the existence of a causal ancestor Y for their complement X that is *open* or *in question* in the discourse context.
- b. **Claim 2:** For both types of implicative, Y is taken to be causally necessary for X .

- c. **Claim 3:** The difference between one-way and two-way verbs is whether Y is taken to be sufficient for X ; two-way implicatives background it as sufficient, while one-way implicatives do not.
- d. **Claim 4:** Necessity (and sufficiency, where applicable) of Y for X is backgrounded; the at-issue content of an implicative assertion simply tells us how Y was resolved.

Claims 1 and 4 seem to follow from the discussion in section 4.1, which shows that attribute-specific implicatives seem to claim either that the relevant attribute was present or was not present in context (as a result of which X either happened or did not), and are supported by the evidence from *because*-clauses, which provide information about the in-question causal ancestors of X , rather than those that are backgrounded as being met. Claim 2 follows from the observation that both one- and two-way implicatives support the negative entailment: if Y is not present, X does not occur, which defines a relationship of causal necessity between Y and X (in context). Finally, Claim 3 follows from the difference in entailment relations between one- and two-way implicatives. If one-way implicatives do not support the positive entailment, it cannot be the case that Y is sufficient to ensure X ; at the same time, if Y is the open factor and Y allows the conclusion of X in context, the relationship of causal sufficiency must hold between Y and X in the two-way cases.

On this basis, I propose the following account:

- (42) A statement of the form $I(X)$:
- a. presupposes the existence of a causal ancestor Y of X , where Y is causally necessary for X *in context*
 - b. asserts that Y was met in the situation at hand ($\neg I(X)$ asserts that Y was not met)
 - c. if I is a two-way implicative, we have a second, *circumscriptive* presupposition: that all non- Y causal conditions for X were met in context.

Crucially, then, the presupposition that Y exists does not presuppose that it holds (or that it is causally necessary *in general*/outside of the particular discourse context), but instead serves to highlight, as desired, that a causally necessary condition for X is in question. I avoid building the intuition that Y is open or unresolved in context into the presupposition, since the asserted content in fact specifies how Y was resolved; the sense that Y was in question, I suggest, is derived as a strong implicature from the use of the implicative verb (as competing with a simple assertion of X).¹⁹

Before proposal (42) can get off the ground, we need to formalize what it means for a variable Y to be causally necessary for X in context: so far, we have only defined causal necessity between two propositions in a dynamics and between a situation and a proposition. Extending these notions to causal necessity between propositions in a context is relatively straightforward:

¹⁹Notice that there is something decidedly odd about using an implicative construction when the relevant attribute invoked isn't in question in context. Suppose John is a well-known concert pianist who never disappoints, and Rhapsody in Blue is known to be his speciality. All of the arrangements had been made months in advance for him to perform at Carnegie Hall last night (including the permission), and the weather conditions, instruments, etc, were all in place. In this scenario, there is something infelicitous about using (1) to describe the event:

- (1) ?Last night, John was able to play Rhapsody in Blue at Carnegie Hall.

- (43) Given a situation s in a dynamics D , a variable Y is **causally necessary** for X **in context** iff the situation s_Y produced by adding $Y = 1$ to the set of determinations in s is causally necessary for X .

How are the desired entailments derived? The presupposition shared by both types of implicative tells us that Z_X contains at least one variable W which is either Y or dependent on it, such that, in context, $Y = 0$ ensures that $X = 0$. It does not tell us what else may (or may not) be in Z_X , so D may be underdetermined. The assertion sets Y to either 1 or 0. In the negative case, $Y = 0$ allows us to conclude $X = 0$. For one-way implicatives, this is as far as we can go. The positive assertion tells us that $Y = 1$, but lacking further information, we cannot conclude anything about X , as desired.

On the other hand, in the two-way case we have an additional presupposition that bears a striking resemblance to Baglini and Francez’s notion of a catalyst. Practically speaking, it gives us the sufficiency of Y for X in context, but it does this by circumscribing Y ; that is, by presupposing that any other necessary causal conditions for X were resolved in the positive way. Thus we are left with only Y as a determinant for X ; consequently, the assertion that $Y = 1$ allows us to conclude that $X = 1$, and again we derive the required entailment by the joint effects of presupposition and assertion, rather than from the assertion directly.

On this proposal, implicative verbs vary as to the nature of Y : Y relates to the lexical presuppositions carried by the verb at hand. In addition to this variation, implicatives can also vary in the degree to which they are specific about Y . While a verb such as Finnish *ehittää* (=have.time) is extremely specific, English *be able* (Finnish *pystyä*) is already somewhat less certain about the nature of the ability,²⁰ and *manage* and *onnistua* (=succeed) are fully bleached.

- (44) a. Hän e-i **pysty-nyt** tappel_{ema}-an
 he.NOM neg-3sg able-PP.sg fight-INF
 b. He **was** not **able** to fight.
 c. ⊢ He did not fight.

It is this lack of specificity that gives *manage* its peculiar character: I suggest that its classification as a two-way implicative is an unavoidable result of this. In particular, the use of *manage* simply presupposes that X is not a background variable – i.e. it depends on some variable or variables, which are suggested to be in question by the use of an implicative. The negative assertion tells us that at least one necessary condition was not met, as usual, resulting in $X = 0$; the positive assertion, however, is forced to set any unmet necessary conditions to 1, simply by virtue of the fact that *manage* was unspecific about them.

This view preserves many of the intuitions and benefits of the Baglini and Francez account. Specifically, we maintain the sense of a causal relationship between the lexical presuppositions of an implicative and its complement; moreover, we still predict the “varying” presuppositions of *manage* as a result of reliance on a contextually-built dynamics D for causal entailment. We also predict the behavior of *because*-clauses, although we gain the sense in which they seem to help us pin down what the crucial factor in permitting (or blocking) X was from the focus on an open, rather than a satisfied, causal prerequisite. Finally, we gain the ability to handle examples such as (28), reproduced here.

²⁰Note that example (44) is, lacking context, ambiguous between at least a sheer physical-ability reading and an opportunity reading.

(28) John **managed** to get to school.

Recall that we backgrounded this with a disjunctive set of possible causes: any of biking, walking, taking the bus, or being driven by his mother are sufficient variables to get John to school. No situation in this dynamics which is causally necessary can be insufficient, which was a problem for (19); this is resolved here. We don't need to know how John got to school; *manage* informs us that some necessary and sufficient set of conditions for X was met – in the context where the snowstorm blocks biking and walking, we conclude that either the bus was running or John's mother drove him, and the disjunction of these two routes is precisely the necessary and sufficient situation provided by context.

5.2 Supporting evidence

For the most part, the arguments I have made for proposal (42) have involved theoretical considerations – or intuitions about the appropriate theoretical classification of various portions of the information provided by an implicative assertion (e.g. that causal relationships are part of the background, that the conclusion X or $\neg X$ is derived rather than directly asserted, or that I focuses on an “open” rather than a “settled” variable). While the supporting evidence I provide in this section also relies on judgements based on intuition, it provides a more practical/empirical basis for some of the claims in (41) as well as the proposal in (42).

I cannot see any principled basis on which to test proposal (19) against (42) with respect to the asserted content of an implicative statement. In the two-way cases, both proposals successfully produce the entailment to X or $\neg X$, and consequently a question such as “did some necessary situation cause X ?” (cf. (19)) or “was a necessary condition for X met?” (cf. (42)) is logically bound to receive an affirmative answer, and will not be particularly enlightening. We might use the one-way implicatives as an adjudicator, but this seems empirically unnecessary, since (19) is first of all not an attempt to account for one-way implicatives and, secondly, we have already seen that it cannot do so as it stands.

This leaves presuppositional content. Both accounts share a form of the necessity presupposition (although their focal points are different), so it seems like the most sensible test of (42) must be over the additional, circumscriptive presupposition attributed to two-way implicatives. In particular, if the presupposition that no other necessary variable/situation but the highlighted factor was in question (in context) is correct, we should expect infelicity to arise from any attempt to use a two-way implicative in a situation where the context/dynamics is set up to obviously contain other necessary but open variables for X .

This prediction seems, broadly, to be upheld in English. Consider the following context for an assertion of *bother*(X):

- (45) a. Mary's friend Bill is generally apathetic about parties. However, he is known to be a bit of networker and he'll often convince himself to come to a party if he thinks there will be someone there who is worth his time and effort to make a connection with. Mary planned a party for some of her friends and neighbors, and invited the newly-elected members of city council, including the chair. When she and Bill talked about it last week, he said he wasn't sure it was worth his time to meet the councillors, but he was thinking about it. When she told him the date of the party, however, he said he might be away on a business trip and that time and so he might not be able to come in either

case. They didn't get a chance to talk again before the party, so she doesn't know what he decided about the councillors or whether he was on a trip. In the end, he didn't show up at the party, and Mary says:

- b. ?“Bill didn't **bother** to come to my party.”

There is some variation in judgement here (which may be due to the intermediacy of *bother* on a scale of implicative-specificity). However, where (45b) is felt to be acceptable, my informants for the most part felt it was felicitous as something of a “meta”-comment on Bill's general attitude towards parties (or possibly on his failure to let Mary know about his plans), rather than as a description of what happened in the situation in (45a). In general, however, since Bill might simply have been out of town and hence unable to come, it seems marked to use *bother* here. Notice, moreover, that it is much more incontrovertibly infelicitous/objectionable for Mary to use (46) to describe the situation:

- (46) #“Bill didn't **bother** to come to my party because he decided the city councillors weren't worth his time.”

Possibly due to the increased specificity of the relevant implicative verbs, the parallel judgements of felicity/infelicity seem to be sharper from my informants in the Finnish contexts in (47) and (48).

- (47) a. A hunter in the forest lost count of the number of times he had fired his gun and was not sure if he had used all the bullets or not. He decided to check the gun after eating something, and put it down to get some food from his bag. While he had both hands in the bag, he caught sight of a bear coming towards him. We are wondering if he shot it.
 b. #Hän **eht-i** ampu-a karhu-n
 he.NOM have.time-PST.3sg shoot-INF bear-GEN/ACC
 ‘He had enough time to shoot the bear.’

In this context, which explicitly suspends a necessary condition for shooting the bear that is not time (i.e. whether the hunter had any more bullets in his gun), the use of the two-way implicative *ehä* is felt to be infelicitous. One informant explained this judgement by saying she could not use *ehä* here, because “if he didn't have any bullets, he could not have shot the bear,” and explained that the same problem applied to using *ehä* in a negative assertion (with the intention of claiming that the hunter did not shoot the bear). Similar judgements arise in the following case:

- (48) a. Two versions of a survey were prepared for a policy consultant to take door to door. One version had unusually detailed questions about sexual preferences which were not on the other. The policy consultant was only given one version, but we are not sure which one. We are wondering whether he asked the personal questions.
 b. #Hän **kehtas-i** kysy-ä niin henkilökohtais-i-a asio-i-ta.
 he.NOM unashamed-PST.3sg ask-INF such personal-PL-PART thing-PL-PART.
 ‘He was unashamed to ask something so personal.’

Again, the use of two-way implicative *kehdata*(=be.unashamed) was felt to be inappropriate here, since there was a contextually open reason why the consultant might have been unable to ask the personal questions which is completely independent of any shame or trepidation he might feel:

he might simply have had a survey which didn't include the awkward questions. This suggests that the notion of a circumscriptive/sufficiency presupposition is accurate for the two-way implicative cases: their use conditions are not met in contexts where some factor other than the implicative-invoked one is in question.

Crucially, no such infelicity arises in the one-way cases, and this seems to be a sharp difference between the two types of polarity-preserving implicatives. Indeed, it is possible to assert (without emphasis on the implicative verb) something that contradicts the conclusion to X , but attributes this to a different open causal factor:

- (49) Hän **jakso-i** tappelema-an, mutta päätt-i sitä
 he.NOM have.strength-PST.3sg fight-INF, but decide-PST.3sg he.PART
 vastaan.
 against.ILL
 'He had the strength to fight, but he chose not to.'

Of course, since we don't get the entailment to X from a positive assertion of a one-way implicative, this result is expected.

5.3 Implicature and circumscription

An important question regarding the formulation of (42) is the following: why is the additional presupposition required for two-way implicatives framed as circumscriptive rather than simply as presupposing the sufficiency of Y for X ? The motivation for this is the observation, noted briefly earlier, that one-way implicatives under many circumstances strongly implicate their complements in the non-entailed direction.

- (50) a. John **was able** to solve the problem.
 b. \leadsto John solved the problem.
- (51) a. Hän **mahtu-i** kulke-ma-an ove-sta
 he.NOM fit-PST.3sg go-INF-ILL door-ELA
 'He was small enough to fit through the door.'
 b. \leadsto He went through the door.²¹

Karttunen (2012) remarks on these implicatures, and draws a parallel between them and the strengthening inference of *conditional perfection* (Geis and Zwicky 1971), in which a conditional statement is interpreted as biconditional. The analogy seems to follow from the fact that, in both constructions, a listener infers from the fact that only one condition for a conclusion was mentioned that this is the only relevant condition in the context at hand. In the case of conditional perfection, this gives us necessity in addition to the asserted sufficiency (*if Y then X* stipulates the sufficiency of Y for X), and in the case of implicative verbs, it gives us sufficiency in addition to the presupposed necessity. To put it another way, both implicatures are licensed by taking the fact that a speaker only bothered to mention one condition as evidence that this condition is the only condition that matters.

²¹With respect to this implication, of my informants said that he felt that the protagonist must have gone through the door, because there was no obvious other way to get the information that he had fit.

In both cases, this is essentially circumscriptive reasoning, and can be formalized by an operation along the lines of *predicate circumscription* (cf. McCarthy 1980, 1986) or *exhaustive interpretation* (cf. Groenendijk and Stokhof 1984, van Rooij and Schulz 2004). For a one-way implicative I , we draw the conclusion X from $I(X)$ on the basis of the inference from the use of I to the idea that only the (lexically) I -invoked precondition was in question in the given context. The idea, then, is that normality assumptions/circumscription have become lexicalized in the case of certain implicatives, to the point that their use is infelicitous in the absence of a context licensing these assumptions. This produces the two-way entailments for these verbs (again, with *manage*, *onnistua*(=succeed), and a few others as special cases where the positive entailment is derived as a consequence of semantic bleaching).

Thus, if we take the sufficiency presupposition in the two-way cases to be circumscriptive, we have a natural continuity between one- and two-way implicative verbs. Circumscription can easily be licensed as an implicature in contexts where there is no reason to suppose that anything other than the invoked condition is in question, but the inference is blocked when the context makes other open prerequisites for X salient:

- (52) a. A professional fighter had had a long day of competition, and was starting to feel a bit tired. After his penultimate match, he had to take a long break, and his fans were wondering if he had the strength to fight his last match. The fighter’s main concern was whether he would re-aggravate an old injury to his knee by continuing to fight. He was trying to figure out what to do and eventually decided that, while he felt strong enough to go ahead, it wasn’t worth risking the injury. After he declared that he was retiring from the match, a reporter asked his coach whether he’d just become too tired or had quit for some other reason. The coach replied:
- b. “Hän **jakso-i** tappelema-an.”
 he.NOM have.strength-PST.3sg fight-INF
 ‘He had sufficient strength to fight.’
- c. ↗ He fought (the match).

This begs the following question: what puts an implicative on one side of the presupposition/implicature divide (with respect to sufficiency) as opposed to the other? I do not offer an answer to this question here, but there are at least two routes that seem worth exploring. One possibility is that the split is an epiphenomenon of some deeper conceptual/categorical difference between the type of condition invoked by one-way implicatives vs two-ways. A first pass at such an explication might be the notion that one-way implicatives seem often to be about external attributes (ability, strength, temperature²²), while two-way verbs are about internal attributes (shame, apathy, daring). This rough hypothesis does not seem likely to be sustainable in the face of Finnish verbs such as *ehä*(=have.time, two-way), but additional investigation is required before a definitive claim can be made either way. A second possibility is suggested by the classification scheme offered by Flint (1980) for Finnish verbs of possibility and sufficiency (including many

²²The relevant verb here is Finnish *tarjeta*(=be.warm):

- (1) Hän e-i **tarjen-nut** men-nä ulos.
 he.NOM neg-3sg warm-PP.sg go-INF outside
 ‘He was not warm enough to go outside.’

implicatives), in which she provides a ranking of the strength of seemingly analogous verbs along the dimension of cause they invoke. On this view, the presupposition/implicature division is not so much a categorical one as a continuum, and this may be supported by experimental evidence from White (2015) on “soft implicative entailments”, especially with respect to implicatives like *remember* (Finnish equivalent *muistaa*) and *forget* (Finnish *unohtaa*), which suggests that some of the implicative “entailments” are more cancelable than expected. The degree of malleability involved, and which verbs are subject to it, however, is left as a matter for future investigation.

5.4 Polarity-reversing implicatives

I have so far omitted a discussion of polarity-reversing implicatives, but these exist as well, and come in both two-way and one-way types. In the two-way case, $I(X)$ entails the negation of X , and $\neg I(X)$ entails X .

- (53) a. John **failed** to open the door.
 b. \vdash John did not open the door.
- (54) a. John didn’t **fail** to open the door.
 b. \vdash John opened the door.
- (55) a. Hän **laiminlö-i** korjat-a virhee-n.
 he.NOM neglect-PST.3sg repair-INF error-GEN/ACC
 ‘He neglected to correct the error.’
 b. \vdash He did not correct the error.
- (56) a. Hän e-i **laiminlyö-nyt** korjat-a virhe-ttä.
 he.NOM neg-3sg neglect-PP.sg repair-INF error-PART
 ‘He did not neglect to repair the error.’
 b. \vdash He repaired the error.

In general, the English implicatives have tended to be less specific than the Finnish cases, but it is worth noting here that the polarity-reversing types in Finnish seem to have a lower degree of specificity than their polarity-preserving counterparts (they also appear to be far less prevalent). For the moment, why this should be the case is an open matter for speculation.

As far as extending proposal (42) to handle examples like (53)-(56), we can do this fairly easily in one of two ways, either of which involves a minor change to the presuppositional content from the polarity-preserving case. The first possibility is to describe the invoked ancestor Y as causally necessary in context for $\neg X$; this derives the negative entailments in (54) and (56) immediately, and the positive entailments in (53) and (55) secondarily as a result of circumscribing Y as the only factor in question for $\neg X$. Alternatively, we can describe the negation of the invoked ancestor as causally necessary in context for X : in this case we get the positive entailments directly, and the negative entailments as a result of the circumscriptive presupposition. Either of these changes is relatively straightforward, and it is not necessarily clear from the data in (53)-(56) which is to be preferred.

The more interesting cases, and the ones which may (eventually) shed light on which route to take, involve 1-way polarity reversing implicatives, which, at least in English, appear to come in two types: $-+$ (*hesitate/epäröidä*) or $+ -$ (*too shy*), in Karttunen’s (2012) notation.

- (57) a. Hän **epärö-i** otta-a osa-a kilpailu-n
 he.NOM hesitate-PST.3sg take-INF part-PART race-ILL
 b. He **hesitated** to take part in the race.
 c. \nVdash He didn't take part in the race.
- (58) a. Hän e-i **epäröi-nyt** otta-a osa-a kilpailu-n
 he.NOM neg-3sg hesitate-PP.sg take-INF part-PART race-ILL
 b. He did not **hesitate** to take part in the race.
 c. \vdash He took part in the race.
- (59) a. John **was too shy** to speak up in class.
 b. \vdash John did not speak up in class.
- (60) a. John **was not too shy** to speak up in class.
 b. \nVdash John spoke up in class.

I am informed that Finnish only uses the implicative construction for the $-+$ or *hesitate*-type of one-way reversing implicatives, and employs a causative construction for verbs with the opposite entailment pattern. This might suggest that the *hesitate*-type are the more basic sort, which, in turn, would privilege the view that polarity-reversing implicatives presuppose Y as causally necessary for $\neg X$.

However, there is also good reason to suspect that the $+-$ types may be more basic with respect to implicativity. Notice that these types seem to conform to the implicature pattern noted with polarity-preserving ($--$) one-way verbs:

- (61) a. John **was not too embarrassed** to ask for help.
 b. \rightsquigarrow John asked for help.

On the other hand, the *hesitate*-type seem almost to default towards a more factive-type implicature in their non-entailed direction, although we can (crucially with additional context) push the inference in either a factive or implicative direction:

- (62) a. John **hesitated** to ask for help.
 b. *Factive*: \rightsquigarrow John asked for help (after some time).
 c. *Implicative*: \rightsquigarrow John didn't ask for help (because his hesitation meant he lost the opportunity).
- (63) a. Hän **ujostel-i** näyttä-ä kuva-{a/n} minu-lle.
 he.NOM shy-PST.3sg show-INF picture-{PART/GEN} me-ILL
 'He was shy to show me the picture.'²³
 b. *Factive*: \rightsquigarrow He showed me the picture (reluctantly).
 c. *Implicative*: \rightsquigarrow He did not show me the picture (because of his shyness).

These differences open up a number of questions, including but not limited to the relationship between implicatives and causatives, and the sharpness of the distinction between factive and

²³There appears to be a correlation of the case difference with the "preferred" implication: the partitive seems to privilege the factive implicature, while the genitive/accusative marker seems to privilege the implicative implicature.

implicative verbs (see also Karttunen 2014), but I do not propose to investigate these issues in the current paper. Whichever alternative ends up being preferred, the point to be made here is that the proposal in (42) can be extended to treat polarity-reversing implicatives with a relatively minor (and arguably natural) adjustment to the presupposed content, and this at least for the moment, seems to speak in favour of the proposal. I leave the other issues surrounding polarity-reversing implicatives for future work.

6 Conclusions and questions

Based on the novel proposal for *manage* put forward by Baglini and Francez (2015), this paper has proposed a general account of implicative verbs which produces the interesting entailment patterns first noted by Karttunen (1971), but without enforcing an undesirable functional equivalence between an assertion of $I(X)$ and an assertion of X . In particular, this account draws on Baglini and Francez’s use of Schulz’s (2011) framework for causal entailment to propose that implicative verbs in general presuppose the existence of a causally necessary condition for their complements (which is more or less specified by the lexical content of the verb in question), and asserts whether or not this condition was met in a given context. To capture the bidirectional entailments of two-way implicatives, I proposed that these verbs come along with a second, circumscriptive presupposition to the effect that the only condition in question for the satisfaction of the complement is the condition invoked by the implicative verb. This proposal has the benefit of providing a natural connection between one-way and two-way implicatives since, in many circumstances, context can license an inference to circumscription over the condition invoked by a one-way implicative as well. This proposal gains support from the Finnish paradigm of implicative verbs, which includes both less-specific implicatives along the lines of English *manage* and *bother*, but also includes a wealth of attribute-specific implicatives which permitted empirical investigation of the status of the proposal presuppositions.

In addition to providing a framework for polarity-preserving implicatives, I have argued that the central proposal here can easily be extended to cover polarity-reversing implicatives. This discussion raised a number of interesting questions for further investigation, crucially surrounding the existence of two types of one-way polarity reversing implicatives. Implicative verbs of the *hesitate*-type seem to straddle a relationship to other implicatives and to so-called factive verbs, in that in their non-entailing (positive) direction, they can easily contextually be pushed to implicate either the negation or the assertion of their complements. This opens the question of whether these verbs are properly members of an implicative paradigm, or whether the divide between implicatives and factives is as sharp as has been previously supposed.

A related question, also raised by polarity-reversing implicatives, is that of the granularity required in a causal framework. In particular, English has a fairly robust paradigm of one-way implicatives that include the words *too* or *enough* (e.g. *have enough strength to*, *have enough time to*, *be too shy to*, *be too ashamed to*). These suggest that, in invoking a condition for X , implicatives may also invoke some notion of the degree to which a certain attribute or condition is a permitting or an inhibiting factor: for instance, John might show the picture despite being shy, but he won’t show it if he is *too* shy (that is, if his level of shyness exceeds some contextually-relevant amount).

(64) John **was (too) shy** to show his picture.

Generally speaking, implicative verbs (and in particular the one-way verbs) often seem to be about attributes or resources that must either meet a certain mark or not exceed it: there does not seem to be a way to capture this feature of the constructions in the causal framework as provided by Schulz, and it seems worth investigating what modifications might allow this sort of nuance. A broader investigation would also ideally address the issue of whether these nuances are properly addressed in a general account of implicatives, or whether they should be (compositionally) added by the presence of *too* and *enough*.

Another avenue for investigation involves modification by adverbs such as *barely*, which seem to induce a notion of likelihood over the route by which *X* was accomplished:

- (65) John **barely** managed to get to school.

In (65), in addition to the entailment that John did eventually get to school, we get the strong sense that, whatever route he used to get there, it either almost failed or was in general an unlikely or unusual route to have taken. Within the framework of a dynamics, this suggests that we need a notion of likelihood over causal routes from one variable to another, and this issue seems worth investigating in further detail.

Finally, the entailments and implicatures associated with the implicative paradigm are closely related to the issue of *actuality entailments* from ability modals in the perfective aspect. In particular, it was noted by Bhatt (1999) that the ability modal/one-way implicative *be able* generates the inference to the satisfaction of its complement very strongly in certain uses in the past tense:

- (66) Last year at the World’s Strongest Man competition, John **was able** to lift a fridge.
 ~> John lifted a fridge (last year at the competition).

This remains cancelable in English, but in languages which mark a distinction between perfective and imperfective aspect (such as French), seems to strengthen to an entailment. The following examples are due to Hacquard (2009) (who also shows that the actuality entailment pattern arises with root modals in general in the perfective, including necessity modals).

- (67) Jane **a pu** soulever cette table, #mais elle ne l’a pas soulevée.
 Jane PST.PFV can lift this table, #but she NEG it PAS lift
 intended: ‘Jane was able to lift this table, but she didn’t lift it.’
- (68) Jane **pouvait** soulever cette table, mais elle ne l’a pas soulevée.
 Jane can.PST.IMPF lift this table, but she NEG it PAS lift
 ‘Jane was able to lift this table, but she didn’t lift it.’

This observation seems related to the effect that the distinction between genitive/accusative and partitive case has on the implicatures associated with the Finnish example (63); in general it seems intriguing and important that case and aspect (and potentially tense as well) can change the observed entailment patterns associated with complement-taking verbs. While the literature contains a wide variety of accounts for actuality entailments on ability modals (Bhatt 1999, Mari and Martin 2007, Hacquard 2009, Homer 2009, Piñón 2009) an account that makes good on their relationship to implicative verbs seems to be lacking, and this is particularly rich ground for further investigation along the lines opened up by Baglini and Francez and further developed here.

References

- Baglini, Rebekah and Francez, Itamar. 2015. The implications of managing. *Journal of Semantics* To appear.
- Bhatt, Rajesh. 1999. Ability modals and their actuality entailments. In *Proceedings of West Coast Conference on Formal Linguistics*, volume 17, Stanford: CSLI.
- Coleman, Linda. 1975. The case of the vanishing presupposition. In *Proceedings of the first Annual Meeting of the Berkeley Linguistics Society*.
- Dalrymple, Mary, Kanazawa, Makoto, Kim, Yookyung, McHombo, Sam and Peters, Stanley. 1998. Reciprocal expressions and the concept of reciprocity. *Linguistics and Philosophy* 21, 159–210.
- Fillmore, Charles. 1975. An alternative to checklist theories of meaning. In *Proceedings of the First Annual Meeting of the Berkeley Linguistics Society*, pages 123–131.
- Flint, Aili. 1980. *Semantic structure in the Finnish lexicon: verbs of possibility and sufficiency*. Ph. D.thesis, Columbia University.
- Geis, Michael and Zwicky, Arnold. 1971. On invited inferences. *Linguistic Inquiry* 2, 561–566.
- Groenendijk, Jeroen and Stokhof, Martin. 1984. *Studies on the semantics of questions and the pragmatics of answers*. Ph. D.thesis, University of Amsterdam.
- Hacquard, Valentin. 2009. On the interaction of aspect and modal auxiliaries. *Linguistics and Philosophy* 32, 279–312.
- Homer, Vincent. 2009. French modals and perfective. In *Proceedings of the West Coast Conference on Formal Linguistics*.
- Karttunen, Lauri. 1971. Implicative verbs. *Language* 47, 340–358.
- Karttunen, Lauri. 2012. Simple and phrasal implicatives. In *Proceedings of *SEM: The first joint conference on lexical and computational semantics*, pages 124–131.
- Karttunen, Lauri. 2014. Three ways of not being lucky. Slides from SALT 24, New York University.
- Karttunen, Lauri and Peters, Stanley. 1979. Conventional implicature. In Oh and Dinnen (eds.), *Syntax and Semantics*, pages 1–56, New York: Academic Press.
- Kiparsky, Paul and Kiparsky, Carol. 1970. Fact. In Bierwisch and Heidolph (eds.), *Progress in linguistics*, The Hague: Mouton.
- Mari, A. and Martin, F. 2007. Tense, abilities, and actuality entailments. In *Proceedings of the Amsterdam Colloquium*.
- McCarthy, J. 1980. Circumscription – a form of non-monotonic reasoning. *Artificial Intelligence* 13, 27–39.
- McCarthy, J. 1986. Applications of circumscription to formalizing common sense knowledge. *Artificial Intelligence* 28, 89–116.

- Piñón, Christopher. 2009. Another look at the actuality entailments of certain modals. Presentation, *Genericity: Interpretation and Uses*, paris.
- Potts, Christopher. 2005. *The logic of conventional implicatures*. Oxford: Oxford University Press.
- van Rooij, Robert and Schulz, Katrin. 2004. Exhaustive interpretation of complex sentences. *Journal of Logic, Language, and Information* 13, 491–519.
- Schulz, Katrin. 2011. If you'd wiggled A, then B would've changed. *Synthese* 179, 239–251.
- Tonhauser, Judith, Beaver, David, Roberts, Craige and Simons, Mandy. 2013. Toward a taxonomy of projective content. *Language* 89, 66–109.
- White, Aaron Steven. 2015. Soft implicative entailments. Presentation, LSA Annual Meeting, Portland OR.