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NECESSARY VERSUS PROBABLE CAUSE

ABSTRACT. One finds in the systems of natural languages some explicit means of elaborating not only upon the directness of the causal relationship believed to exist between two events X and Y (i.e. some means of specifying just how inevitably event X gives or gave rise to event Y), but also some manner of indicating just who or what is understood to be the primary instigator of the caused event. The goal of the present paper is to explore these notions in detail and arrive at a formal, logic-based means of capturing them.

KEY WORDS: accessible worlds, agentivity, case, causation, clitic, conditional, counterfactual, French, modality, perception verbs. quantification, lexical semantics

1. INTRODUCTION

The notion of causation is one which has long fascinated logicians, linguists, and philosophers alike. From the point of view of interpretation, causation can be described as a relation between two events (more properly, states of affairs) such that the realization of the first has a determining influence in bringing about the realization of the second. The propositions expressed by the sentences in (1a, c), for example, all portray the actions of one individual, Veronica, as giving rise to the subsequent actions of another individual, her boyfriend.

(1) a. Veronica **made** her boyfriend kill her sister.
   b. Veronica **got** her boyfriend to kill her sister.
   c. Veronica **let** her boyfriend kill her sister.

While each of the examples in (1) expresses a causal relationship between two events, they differ in how they characterize certain aspects of this relationship. More specifically, they differ in how directly the first state of affairs is understood to have precipitated the second, as well as in the degree of responsibility they attribute to each of the participants involved in those events. With regard to the former distinction, the actions of Veronica in sentence (1a) are understood to have more directly determined the actions of her boyfriend than is the case in (1b). That is, we understand that whatever it is that Veronica did in (1a) left her boyfriend with little choice but to kill her sister. In (1b), however, we understand that he was, to a degree, free to choose a different course of action. One could say,

290   LISA A. REED

following Dorel (1980), Hyman and Zimmer (1976: 193), Kemmer and
Verhagen (1994: 132–134), and Talmy (1976: 106–107), among others,
that in (1a) Veronica's actions *directly caused* her boyfriend to kill her
sister, but in (1b) her actions only *indirectly* did so. As concerns the degree
of responsibility attributed to each of the individuals involved in the death
of Veronica's sister, it is clear that both the verb *make* and the verb *get*
portray Veronica as the guilty party. I.e., it is she who is the 'direct cause',
so to speak, of her sister's death; her boyfriend was simply a pawn acting
on her behalf. If one wished to instead attribute primary responsibility for
the death of Veronica's sister to her boyfriend, then clearly a verb like *let*
would have to be used, as was done in sentence (1c).

   The intent of the preceding paragraphs is to show that human beings use
natural language to express causal relations far beyond a neutral notion of
'event *X* causes or caused event *Y*'. That is, we have seen that one finds
in the systems of natural languages some explicit means of elaborating
not only upon the directness of the causal relationship believed to exist
between two events *X* and *Y* (i.e. some means of specifying just how
inevitably event *X* gives or gave rise to event *Y*), but also some manner
of indicating just who or what is understood to be the primary instigator
of the caused event. The goal of the present paper will be to explore these
notions in greater detail and to arrive at a formal, logic-based means of
capturing them. The discussion will proceed as follows. First, in Section 2
I lay out a range of data involving direct and indirect causation in French
periphrastic causative sentences. Some of these facts have been discussed
previously in the literature, but many of them have not. Section 2 reveals
that French is an ideal object of study for researchers interested in direct
and indirect causation since the contrast can be explicitly encoded with
every periphrastic causative verb in this language. In Section 3 we see that
the exact manner in which this is done has important implications for all
current analyses of causation. Finally, the paper concludes with Section 4
in which a novel, logic-based analysis of the direct/indirect contrast is
developed. This analysis differs from its predecessors in separating out
the respective influences of the directness of causation between two events
and the individual to whom the caused event is most directly attributed.
In this manner, we arrive at a more complete understanding of the French
data.

2. EXPRESSING DIRECT AND INDIRECT CAUSATION IN FRENCH

Let us begin by considering how the French language encodes the notions
of direct and indirect causation. For the moment, we will simply assume,

without discussion, the cognitive/functional characterizations of these contrasts developed in influential work by Hyman and Zimmer (1976), Kemmer and Verhagen (1994: 132–134), Shibatani (1973, 1976), and Talmy (1976), among others.[1] These have been given below in (2a, b). (As mentioned in the introduction, the theoretical import of (2a, b) will be the subject of Section 3, and certain modifications to these definitions will be the subject of Section 4.)

(2) a. **Direct causation:**
   A causative sentence in which the causee (the embedded subject in a periphrastic causative construction) is understood to be non-agentive.
   English example: *Veronica* **made** *her boyfriend kill her sister.*

b. **Indirect causation:**
   A causative sentence in which the causee is understood to be agentive.
   English example: *Veronica* **got** *her boyfriend to kill her sister.*

We will first consider how the direct/indirect contrast is encoded in periphrastic causative sentences involving the verb *faire* which translates variously into English as *make, get, have,* or *cause.* The facts involving *faire* will be examined first not only because they have received the greatest amount of attention in the literature, but also because they give rise to the clearest speaker intuitions. What our discussion will show in relation to this and, in fact, all of the other periphrastic causative verbs in this language, is that the syntactic status of the embedded subject determines for a particular causative sentence whether or not that sentence explicitly encodes the direct/indirect contrast. Specifically, we will see that what appears to be relevant in all instances is the case status of the embedded subject; that is, whether this nominal is treated as a case argument of the complex predicate comprised of the causative verb and the embedded verb, or is simply treated as a case object of the causative verb alone. In relation to *faire,* in particular, we will see that the contrast is only encoded when the embedded subject is treated, in terms of case, as being unambiguously the object of the verb *faire* alone, i.e. not as a case object of the verbal complex *faire* + embedded verb. (As we will see later, the facts involving the other causative verbs are slightly different.)

We will open our discussion with *faire* sentences in which the embedded subject is a non-pronominal expression, e.g. a noun phrase like *Marc.* It has long been known, as discussed, for example, in work by Comrie (1976) and Kayne (1975), that in the vast majority of dialects of modern French, a non-pronominal embedded subject of a *faire* causative *must* be treated as a case object of the verbal complex *faire* + embedded verb. I.e.,

292   LISA A. REED

the causee *cannot* be treated as a case object of *faire* alone, as is the case, for example, in the equivalent English causative sentences. Thus we find that for the great majority of French speakers, 'syntactically cohesive' (i.e., monoclausal) examples like (3a, b) are grammatical, but syntactically non-cohesive (biclausal) sentences like (4a, b) are not. (It bears mentioning, perhaps, that non-cohesive sentences like (4a, b) actually were acceptable in older forms of the French language and are, in fact, still attested in a few varieties of modern Canadian French, although we will not be discussing those dialects here.[2])

> (3) a. La montre en or de sa mère fit penser **Marc** au calendrier.
> 'His mother's gold watch made/got/caused Marc (to) think about the calendar.'
> b. Il aurait immédiatement fait rebrousser chemin à **Marc**.
> 'He would have immediately made/had/got Marc (to) turn back.'
> (4) a. *La montre en or de sa mère fit **Marc** penser au calendrier.
> 'His mother's gold watch made/got/caused Marc (to) think about the calendar.'
> b. *Il aurait immédiatement fait **Marc** rebrousser chemin.
> 'He would have immediately made/had/got Marc (to) turn back.'

The examples in (3a, b) demonstrate a second, equally well known fact concerning *faire*-infinitive sentences, namely, that the transitivity of the embedded predicate determines whether the embedded non-pronominal subject is treated as a direct object of the verbal complex or as an indirect object. Specifically, whenever the embedded verb does *not* take a direct object, as is the case with the embedded verb *penser au calendrier* 'to think about the calendar' in (3a), then the non-pronominal embedded subject *must* be treated as a direct object of the verbal unit *faire* V. However, when the embedded verb *does* take a direct object, as is the case for *rebrousser chemin* 'to retrace one's steps/to turn back' in (3b), then the embedded non-pronominal subject must be treated as an indirect object. It is important to note that there is no possible variation in the case treatment of a non-pronominal embedded subject in these types of sentences. That is, the embedded non-pronominal subject of an intransitive or an indirect transitive verb cannot be treated as an indirect object of the verbal complex, as the ungrammaticality of (5a) makes clear, nor can it be treated as a direct object if the causative sentence contains an embedded transitive verb, as the ungrammaticality of (5b) demonstrates.

> (5) a. *La montre en or de sa mère fit penser au calendrier à **Marc**.
> 'His mother's gold watch made/got/caused Marc (to) think about the calendar.'

　　　b. *Il aurait immédiatement fait rebrousser **Marc** chemin.
　　　　　'He would have immediately made/had/got Marc (to) turn back.'

In short, we see that in *faire* sentences containing a non-pronominal subject, complex verb formation is obligatory, with the exact case treatment of the causee being determined by the case hierarchy given below, adapted from Comrie (1976: 263).

　　(6) **Comrie's Case Hierarchy (adapted specifically to French)**:
　　　　A non-pronominal causee in a cohesive French causative sentence must be assigned the first available case in the following array:
　　　　Accusative > Dative > Instrumental (*par* 'by')

Turning to the interpretation of these sentences, the translations of the examples in (3a, b) above show that *faire*-infinitive sentences of this type are vague with respect to the direct/indirect contrast. In other words, one must rely on context to determine for a given sentence whether *faire* means *make, get, have*, or *cause*.

Considering next the case of *faire* sentences in which the causee appears in pronominal form, as one might expect, and as the examples in (7a, b) illustrate, the case treatment of the clitic pronoun may be identical to that of its full lexical noun phrase counterpart. Thus we see that (7a) is identical to (3a) with respect to its Accusative case feature, just as (7b) is parallel to (3b) in its Dative one. Not surprisingly perhaps, these examples are likewise vague with respect to the direct/indirect distinction, as the translations make clear.

　　(7) a. La montre en or de sa mère **le** fit penser au calendrier.
　　　　　'His mother's gold watch made/got/caused **him-Accusative** (to) think about the calendar.'
　　　b. Il **lui** aurait immédiatement fait rebrousser chemin.
　　　　　'He would have immediately made/had/got **him-Dative** (to) turn back.'

While the pronominal facts in (7a, b) are unsurprising, given the non-pronominal data discussed earlier, it has also long been known, cf., for example, Dorel (1980), Girault-Duvivier (1856), Harmer (1979), Hyman and Zimmer (1976), and many others, that when the embedded subject appears in pronominal form, it may appear in a case form distinct from that of its non-pronominal counterpart. The examples in (8a, c) and (9a, c) provide a few illustrations of these 'unexpected case' variants.[3] Thus, the Dative case feature of the embedded subject found in the sentences in (8a, c) contrasts with the Accusative form found in (3a) and (7a) above, and

the Accusative case feature in (9a, c) is distinct from the Dative case form given earlier in (3b) and (7b).

(8) a. La montre en or de sa mère... **lui** fit penser au calendrier.
'His mother's gold watch got **him-DAT** thinking about the calendar.'

Simenon, *La Fenêtre des Rouet*, p. 203

b. Il s'est porté un coup d'allure bénigne qui l'a pourtant suffisamment effrayé pour **lui** faire renoncer à son projet.
'He inflicted upon himself a wound which, though superficial, frightened him sufficiently enough so as to get **him-DAT** to cancel his plans.'

Robbe-Grillet, *Gommes*, p. 145

c. Catherine ne cherchait pas à analyser les causes qui **lui** faisaient répondre aux désirs de Zingel avec une docilité de zombie.
'Catherine didn't try to analyze what got **her-DAT** to satisfy Zingel's desires with the docility of a zombie.'

Guimard, *Rue du Havre*, p. 139

(9) a. Il l'aurait immédiatement fait rebrousser chemin.
'He would have immediately made **him-ACC** turn back.'

Proust, *Sodome et Gomorrhe*. I; Pléaide, II, p. 631

b. Je l'avais fait jurer qu'il viendrait.
'I had made **him-ACC** swear that he would come.'

Billy, *Madame*, p. 166

c. Nous pourrions les séquestrer quelques jours en les privant de nourriture et sous la menace du fusil **les** faire signer leur reddition.
'We could sequester them a few days while depriving them of food, and, by threatening to shoot them, make **them-ACC** surrender.'

Colin, *Les Jeux sauvages*, p. 77

The case form of the embedded subject is not the only interesting syntactic feature of these sentences, however, since Reed (1996) presents five pieces of evidence in support of the view that these sentences are also unambiguously biclausal in syntactic structure. To provide just one of these arguments, note first that in *laisser* 'to let' causative sentences, it is still possible in all dialects of Modern French to have both a monoclausal and a biclausal syntactic structure. The variable placement of the embedded subject, given in bold, demonstrates this well known fact.

(10) a. Je laisserai **Jean** fumer ces cigares.

b. Je laisserai fumer ces cigares à **Jean**.
'I'll let Jean smoke these cigars.'

Secondly, in relation to pairs like the preceding, if the embedded direct object appears in pronominal form, it can only cliticize to the embedded verb when no complex predicate has been formed. Thus, *ces cigares* 'these cigars' in (10a) can cliticize to the embedded verb, as shown in (11a), but it cannot do so in (10b), as the ungrammaticality of (11b) makes clear. (In monoclausal causative sentences like (10b), the direct object pronoun must appear on the matrix verb, as illustrated in (11c).)

(11) a. Je laisserai **Jean les** fumer.

b. *Je laisserai **les** fumer à **Jean**.

c. Je **les** laisserai fumer à **Jean**.

'I'll let Jean smoke them.'

Thus we see that one can test for the monoclausal/biclausal status of a particular causative sentence by attempting to separate the matrix and embedded verbs by a direct object pronoun, this being possible only in biclausal structures. When this test is applied to 'unexpected case' sentences like (8) and (9), one finds that they behave in a manner parallel to biclausal *laisser* 'to let' structures and in a manner unlike monoclausal sentences. While *faire* sentences involving non-pronominal noun phrases clearly disallow pronominalization to the embedded verb, as illustrated in (12b), this placement is allowed in 'unexpected case' sentences like (12c).

(12) a. Elle a fait mettre son pull à Jean.

'She made/had/got Jean (to) wear his sweater.'

b. *Elle a fait **le** mettre à **Jean**.

c. Elle **l'**a fait **le** mettre.

'She made him-ACC wear it-ACC.'

This paradigm, as well as the four others discussed in Reed (1996), provides compelling evidence in favor of the view that sentences like (8) and (9) are unambiguously biclausal in their syntactic structure, a point which will be important to bear in mind as the discussion proceeds.[4]

From the point of view of interpretation, it is equally important to note, following Hyman and Zimmer (1976) and others, that these types of sentences further distinguish themselves with respect to the direct/indirect contrast. As the translations of (8) and (9) make clear, 'unexpected' Accusative case variants unambiguously encode direct (*make*) causation, whereas 'unexpected' Dative Case variants encode only indirect (*get*) causation. Thus we can draw the following conclusions concerning the encoding of direct and indirect causation with the verb *faire*.[5]

296   LISA A. REED

(13) **Direct and indirect causation with faire 'to make/get/have /cause':**

Form of Embedded Subject	Specification of Causation
Monoclausal non-pronominal NP	vague (*to make/get/have/cause*)
Monoclausal case pronoun	vague (*to make/get/have/cause*)
Biclausal Accusative case pronoun	direct (*make*)
Biclausal Dative case pronoun	indirect (*get*)

Having considered the syntactic and semantic facts that obtain with *faire*, let us turn next to those involving *laisser* 'to let.' Like *faire*, *laisser* allows a monoclausal syntactic structure in which the transitivity of the embedded verb decisively determines the case treatment of a non-pronominal embedded subject. Thus, parallel to (3a, b) above, we find the embedded causee treated as a direct object when the embedded verb does not already have a direct object, as in (14a) below, and treated as an indirect object when the embedded verb does have such an object, as in (14b).

(14) a. Marc laisse brouter **ses moutons.**
         'Marc lets **his sheep-ACC** graze.'
     b. Je laisse conduire ma voiture **à mes enfants.**
         'I let **my kids-DAT** drive my car.'

As noted briefly above, *laisser* differs from *faire* in that it also allows a biclausal structure in sentences of this type. Thus we find, in addition to (14a, b) above, examples like (15a, b) below.

(15) a. Marc laisse **ses moutons** brouter.
         'Marc lets **his sheep-ACC** graze.'
     b. Je laisse **mes enfants** conduire ma voiture.
         'I let **my kids-ACC** drive my car.'

Interestingly, in sentences of this type, the possibility of having both a monoclausal and a biclausal syntactic structure seems to open up an interpretative possibility not found with *faire*. Specifically, Achard (1993a, b) was the first to notice that speakers use these two options to encode direct and indirect readings.[6] Monoclausal structures, in particular, unambiguously encode direct causation and biclausal sentences encode indirect causation. What this means, in relation to the examples in (14a, b) above, is that the cohesive structure encodes a low degree of agentivity on the part of the embedded subject; i.e., this individual is understood to have truly been 'under the thumb' of the matrix subject, whereas in non-cohesive examples like (15a, b), the causee is highly agentive. That is, in these examples the

matrix subject is understood to have decided that it was easier to just go along with the causee's will and desire to act.

To tease out this subtle distinction, Achard suggests that one add to the causative sentence a clause which specifies exactly who or what is the decisive force in determining whether the caused event takes place. As can be seen in (16a, b) below, monoclausal *laisser* structures clearly favor a clause encoding a low degree of agentivity for the embedded subject.

(16) a. Marc laisse brouter **ses moutons** parce que ça **lui** fait plaisir qu'ils broutent/??ça **leur** fait plaisir de brouter.
   'Marc lets his sheep graze because **he** likes for them to graze/?? because **they** like to graze.'

   b. Je laisse conduire ma voiture à **mes enfants** parce que ça **me** fait plaisir qu'ils la conduisent./?ça **leur** fait plaisir de la conduire.
   'I let my kids drive my car because **I** like for them to drive it./?**they** like to drive it.'

On the other hand, just the opposite is true of biclausal *laisser* structures, which are much more natural with a clause encoding a high degree of agentivity for the embedded subject, as in (17a, b).

(17) a. Marc laisse **ses moutons** brouter parce que ça **leur** fait plaisir de brouter./??ça **lui** fait plaisir qu'ils broutent.
   'Marc lets his sheep graze because **they** like to graze./??because **he** likes for them to graze.'

   b. Je laisse **mes enfants** conduire ma voiture parce que ça **leur** fait plaisir de la conduire/??ça **me** fait plaisir qu'ils la conduisent.
   'I let my kids drive my car because **they** like to drive it/??I like for them to drive it.'

In sum, *laisser* causatives containing non-pronominal embedded subjects differ both syntactically and semantically from their *faire* counterparts. While *laisser* allows both monoclausal and biclausal syntactic structures with non-pronominal subjects, and uses these structures to respectively encode direct and indirect causation; *faire* causatives, in the vast majority of French dialects, permit only a monoclausal syntactic structure with non-pronominal subjects and such sentences are vague with respect to the distinction.

Turning next to *laisser* sentences in which the embedded subject appears as a clitic pronoun, one finds, parallel to what was attested earlier for *faire*, that what matters for the encoding of direct and indirect causation is whether or not the case form of the clitic 'matches' the case that nominal element would have received if it had been a non-pronominal expression in a monoclausal structure. The examples in (18a, b) below contain a few of

298   LISA A. REED

these 'matching case' examples. That is, the pronouns in bold in (18a, b) below are parallel to their non-pronominal counterparts in (14a, b) above.

(18) a. Marc **les** laisse brouter.
     'Marc lets **them-ACC** graze.'
   b. Je **leur** laisse conduire ma voiture.
     'I let **them-DAT** drive my car.'

The examples in (19a, b), on the other hand, contain clitics referring to the causee whose case is distinct from that which they would bear if they were in a non-pronominal form in a cohesive structure.

(19) a. Cela, peu à peu, **lui** laissait espérer dans la clémence du sort.
     'That, bit by bit, led **him-DAT** to hope for the mercy of fate.'
                Carco, cited in Sandfeld, t. III, p. 175
   b. Il avisa Émilia de le laisser conduire l'intrigue.
     'He advised Emilia to let **him-ACC** orchestrate the intrigue.'
             É. Bourges, *Crépuscule des dieux*, III

Interestingly, it has remained unnoticed until now that the two types of clitics (i.e., those whose case 'matches' that of the full noun phrase in a monoclausal structure and those whose case does not) not only unambiguously encode the direct/indirect contrast, but even more surprisingly do so in an opposing fashion. Cohesive Accusative case clitics like (18a) above encode direct causation, as indicated by the judgments in (20a), while non-cohesive Accusative case clitics like (19b) encode indirect causation, as indicated by the facts in (20b).

(20) a. Marc **les** laisse brouter parce que ça **lui** fait plaisir qu'ils broutent.
     /??ça **leur** fait plaisir de brouter.
     'Marc lets them-ACC graze because **he** likes it when they graze.
     /??**they** like to graze.'
   b. Marc **les** laisse brouter l'herbe parce que ça **leur** fait plaisir de la brouter./??ça **lui** fait plaisir qu'ils la broutent.
     'Marc lets them-ACC eat the grass because **they** like to eat it./??**he** likes for them to eat it.'

In a like manner, cohesive Dative clitics like (18b) encode indirect causation, as demonstrated by the judgments in (21a), while non-cohesive Dative clitics like (19a) express direct causation, as the facts in (21b) make clear.

(21) a. Je **leur** laisse conduire ma voiture parce que ça **leur** fait plaisir de la conduire./??ça **me** fait plaisir qu'ils la conduisent.
     'I let them-DAT drive my car because **they** like to drive it./??**I** like for them to drive it.'

    b. Marc **leur** laisse téléphoner à leurs parents parce que ça **lui** fait plaisir qu'ils leur téléphonent./??ça **leur** fait plaisir de leur téléphoner.

    'Marc lets them-DAT call up their parents because **he** likes for them to call them./??**they** like to call them.'

Thus, the full range of facts involving *laisser* can be succinctly summarized as in (22), a table to be contrasted with that of *faire* given earlier in (13).

(22) **Direct and indirect causation with *laisser* 'to let':**

Form of Embedded Subject	Specification of Causation
Monoclausal non-pronominal NP	direct (causee does Y only because matrix subject will allow it)
Biclausal non-pronominal NP	indirect (causee does Y because causee instigates Y; matrix subject just goes along with it)
Monoclausal Accusative case pronoun	direct (causee does Y only because matrix subject will allow it)
Monoclausal Dative case pronoun	indirect (causee does Y because causee instigates Y; matrix subject just goes along with it)
Biclausal Accusative case pronoun	indirect (causee does Y because causee instigates Y; matrix subject just goes along with it)
Biclausal Dative case pronoun	direct (causee does Y only because matrix subject will allow it)

What a comparison of the two tables reveals is that there is always a systematic link between the syntactic structure of a French periphrastic causative sentence and its semantic interpretation. Specifically, the semantic encoding of a direct or indirect reading must make reference to the monoclausal versus biclausal status of the causative sentence. In other words, in order for it to be possible for the semantic system to encode a direct or an indirect reading, the syntactic system must make a choice available to the speaker – the speaker must be able to either choose to use a biclausal structure in which the causee is treated as a case object of the causative verb alone, or to use a monoclausal structure in which this argument is treated as an object of the complex predicate. Once these two options are available, then the manner in which a specific reading (i.e. direct or indirect) is linked to a specific structure (i.e. monoclausal or biclausal) seems to be arbitrarily determined. We say it is arbitrarily deter-

mined because biclausal Accusative case pronouns in *faire* sentences have
been shown to encode direct causation whereas biclausal Accusative case
pronouns in *laisser* structures encode indirect causation. Thus biclausality
in and of itself cannot be said to encode a direct or indirect reading. Sim-
ilarly, Dative pronouns in monoclausal *laisser* sentences encode indirect
causation, but Dative pronouns in biclausal *laisser* structures encode direct
causation. Therefore one cannot claim that a specific case form is always
used to encode a particular reading. In short, the range of French facts
examined thus far supports the view that the linguistic system must open
up two possible syntactic structures for a given causative sentence before
a direct or indirect reading can be explicitly encoded. Furthermore, once
these two options are available, then one option seems to be conventionally
selected to encode a particular reading.

To conclude the empirical portion of this paper, we need only consider
the behavior of a final type of French periphrastic 'causative' verb that
has been discussed in the literature – the class of perception verbs which
includes *voir* 'to see', *regarder* 'to watch', *entendre* 'to hear', *sentir* 'to
feel', and *écouter* 'to listen.' Prima facie, the appellation 'causative verb'
in this case seems rather strange since there is no sense in which the matrix
subject in examples like (23a, b) determines the actions of the embedded
subject. That is, the matrix subject in these sentences is not the 'causer',
but rather a perceptual witness (or experiencer) of the event denoted by the
embedded clause.

> (23) a. J'ai vu se recroqueviller **les racines**.
>   'I saw **the roots** curling up.'
>   b. J'ai vu tirer **les soldats**.
>   'I saw **the soldiers** shooting.'

However, it has long been known in the syntactic literature on causa-
tion that French perception verbs behave in a manner parallel to the other
causative verbs. For example, the sentences in (23a, b) above show that per-
ception verbs also allow complex predicate formation. That is, the matrix
verb and the embedded one form a unit with respect to case. Other syntactic
facts, such as clitic placement, the rarity of morphology and negation asso-
ciated with the embedded verb, and so on have been cited as further support
for this view. But what has only recently been noted, specifically in Achard
(1993a), is that there are also semantic parallels between perception and
the more obviously causative verbs. In particular, Achard has shown that
perception verbs also use syntactic structure to encode the degree of agen-
tivity associated with the embedded subject. In this case, however, we are
not concerned with the degree of agentivity this argument has in relation to
the matrix subject, but rather the degree of agentivity he or she has in rela-

tion to some third party, generally left vague. The contrast between (23a, b) above and (24a, b) below brings out this semantic effect quite nicely.

(24) a. J'ai vu **les racines** se recroqueviller.
   'I saw **the roots** curling up.'
   b. J'ai vu **les soldats** tirer.
   'I saw **the soldiers** shoot.'

Example (23a) would be appropriate to describe a situation in which the sun is drying up the roots, causing them to curl up. Example (24a), on the other hand, would be appropriate in a quite different context, such as a horror film in which the roots are twisting around the throat of a helpless victim. Similarly, example (23b) could be uttered in a context in which the matrix subject observes the soldiers firing, on command, at a target at the range. On the other hand, (24b) would be used if they were firing on their own at a fleeing dissident. In other words, pairs like (23) and (24) show that monoclausal *voir* 'to see' structures encode direct causation – the roots and the soldiers in (23) are being acted upon by outside forces – whereas biclausal sentences encode indirect causation – the roots and the soldiers in (24) are highly agentive and acting 'on their own'. The contrast between (25a, b) below further supports this view. Sentence (25a) is perfectly natural since one can imagine seals choosing to float upside down, but (25b) is odd since boats do not normally have any freedom of choice when it comes to floating.

(25) a. J'ai vu **les phoques** flotter la queue en l'air.
   'I saw the seals floating around with their tails up in the air.'
   b. #J'ai vu **le bateau** flotter.
   'I saw the boat floating around.'

As one would expect, if one resorts to a monoclausal structure, as in (26a, b) below, the readings change. Sentence (26a) is appropriate since the seals, being dead, are clearly non-agentive. And (26b) gives rise to an equally non-agentive reading on the part of the boat.

(26) a. J'ai vu flotter **les phoques**: ils étaient tous morts.
   'I saw the seals floating: they were all dead.'
   b. J'ai vu flotter **le bateau**: il est à nouveau en état de naviger.
   'I saw the boat floating: it's seaworthy once again.'

Thus Achard has made the important observation that perception verbs behave semantically, not just syntactically, in a manner parallel to other causative verbs, in particular, *laisser*. In sentences containing non-pronominal embedded subjects, cohesive structures encode direct causation and non-cohesive structures, indirect causation. What I would now like to show,

302 LISA A. REED

for the first time, is that this semantic parallel between *laisser* and perception verbs is further supported by an examination of sentences in which the embedded subject appears in pronominal form. Let us consider first examples in which the pronoun corresponding to the embedded subject bears a case feature which matches that its non-pronominal counterpart would receive in a monoclausal structure. The sentences in (28a, b), for example, are the cliticized variants of (27a, b).[7]

(27) a. J'ai vu se recroqueviller **les racines**.
    'I saw **the roots-ACC** curling up.'
  b. J'ai vu faire des bêtises **à Jean**.
    'I saw **Jean-DAT** doing stupid things.'
                       Example (27b) is due to Kayne (1975: 232)

(28) a. Je **les** ai vues se recroqueviller.
    'I saw **them-ACC** curling up.'
  b. Je **lui** ai vu faire des bêtises.
    'I saw **him-DAT** doing stupid things.'

The Accusative case clitic in (28a), like its counterpart in cohesive *laisser* sentences, encodes direct causation; i.e., the roots are understood to have been subject to the influence of outside forces, such as the heat of the sun. On the other hand, the Dative clitic in (28b), like its cohesive *laisser* counterpart, encodes an indirect reading. The individual to which this pronoun refers is understood to have been acting of his own volition, i.e. he is not understood to have been under the influence of some third party.

Let us consider next sentences in which the embedded subject appears as a clitic whose case form does *not* match that of its non-pronominal counterpart in a monoclausal sentence. Sentences like (29), for example, are parallel to *laisser* sentences like (20b) above in that the biclausal Accusative clitic encodes an indirect reading. That is, in each of these examples, native speakers understand that the embedded subject is acting of his or her own free will.[8]

(29) a. On **le** vit briser ses meubles.
    'We saw **him-ACC** destroying his furniture.'
                       Sand, *Lélia*, VIII

(29) b. En **la-ACC** voyant faire l'aumône...
    'Upon seeing **her-ACC** give alms...'
                       É. Augier, *Effrontés*, II, 6

To summarize, we have examined the facts involving perception verbs like *voir* 'to see' and established that they match those involving *laisser* 'to let.' The table in (30) provides a summary of this discussion.

(30) **Direct and indirect causation with *voir* 'to see':**

Form of Embedded Subject	Specification of Causation
Monoclausal non-pronominal NP	direct (causee does *Y* under the influence of an outside force)
	Partial gap in the paradigm: Dative marked NPs are largely unattested
Biclausal non-pronominal NP	indirect (causee does not do *Y* under the influence of an outside force)
Monoclausal Accusative case pronoun	direct (causee does *Y* under the influence of an outside force)
Monoclausal Dative case pronoun	indirect (causee does not do *Y* under the influence of an outside force)
Biclausal Accusative case pronoun	indirect (causee does not do *Y* under the influence of an outside force)
Biclausal Dative case pronoun	Gap in paradigm

Having explored a wide range of empirical facts related to direct and indirect causation in the French language, let us turn next to an exploration of the theoretical implications of these data.

3. EARLIER APPROACHES TO THE DIRECT/INDIRECT CONTRAST

Causation has been analyzed from a wide variety of perspectives, including cognitive, functional, and logical ones. The vast literature on this topic prohibits a thorough review of the work done in this area. However, in this section I would like to show, in the briefest of terms possible, how the novel French data uncovered in Section 2 pose problems for all current accounts of the phenomenon. In this manner the stage is set for the development of a novel analysis of direct and indirect causation in logical terms, the subject of Section 4.

3.1. *Cognitive and Functionalist Approaches*

The vast majority of research and insights on direct and indirect causation has come from linguists working within cognitive or functional traditions. For this reason, we begin our discussion here. Functional grammarians like Givón (1984, 1990) share with cognitive linguists, such as Lakoff (1987, 1990) and Langacker (1987, 1991), the working hypothesis that knowledge of grammar is not qualitatively different from other aspects of human cognition. That is, these frameworks assume that natural language

grammars are abstract extensions of the same sorts of cognitive mechanisms human beings use in other areas in order to increase their rate of survival in a complex and changing world. Under this view, which is distinct from that of 'autonomists' like Noam Chomsky, linguistics is not a field devoted to the elaboration of principles and parameters independent of mechanisms studied in biology, anthropology, and, most especially. psychology. but rather it is as an interdisciplinary endeavor the goal of which is to explore how all of these factors interact to produce natural language grammars. While the ultimate objective of cognitivists and functionalists is to relate or even reduce the study of natural language to the study of other non-linguistic mechanisms of the mind/brain, it bears mentioning that this correlation is generally viewed as a long-term goal. As Givón (1984: 11) emphasizes, the structure and function of natural language has been so little studied from this perspective that in many cases it is premature to demonstrate how natural language coding devices reduce to abstract extensions of other mental abilities. Our brief overview of these approaches as they apply to French causative sentences will reflect this fact since it will not explicitly be shown how these structures iconically correlate with other areas of human cognition, perception, and neurology. Instead, we will discuss, in broad terms, how cognitivists and functionalists have taken 'the first step' towards this goal, i.e., how they have begun constructing an inventory of the mechanisms natural languages use to convey or encode cognitive information related to causation.

Virtually every analysis of causation in cognitive and functionalist terms takes as its point of departure some version of Givón's (1984: 20, 96–97) notion of a 'prototypical transitive event' – what Lakoff (1987) calls a 'cognitive model'. (See, for example, the analyses of Achard (1993a, b), Givón (1980, 1990: chapter 13) and Kemmer and Verhagen (1994).) A 'prototypical transitive event' is the simplest conceptual/structural means of conveying information about a state of affairs involving two individuals in the world. Periphrastic causative sentences, we will see, are viewed as metaphoric extensions of these simpler units. According to Givón (1984: 20), human beings perceive transitive modes of reality as involving the following factors: (a) an agentive participant, who exerts physical energy on a second, highly individuated entity (b) a physical contact between these two participants (c) an absorption on the part of the second entity of the energy expended by the first and (d) a complete and direct change of state in the second entity which is viewed as the result of the absorption of the expended energy and which is also understood to be the effect of the physical contact between those two individuals. The sentences in (31a, d) provide a few examples of prototypical transitive events. In (31a), the noun

phrases *Shawn* and *the nail* refer to two highly individuated entities involved in a transitive event. *Shawn* is the agent, the individual who exerts energy via physical contact on the patient, *the nail*, which undergoes a complete and direct change of state as a result of this contact. Examples (31b, d) express similar situations of this type.

(31) a. Shawn hammered the nail.
  b. Cindy drew a diagram.
  c. Bill bleached his hair.
  d. They killed him.

Givón suggests that human languages use a number of linguistic coding strategies in order to convey this (and other sorts of) cognitive information. These coding strategies may include any combination of word order specifications, morphological markers (like case), and intonational features. For example, English (and French) neutrally express the cognitive information involved in prototypical transitive events like those expressed in (31a, d) by using the word order Subject Verb Object (SVO), the case marking strategy Nominative for agent, Accusative for patient, and uttering the sentence in a flat intonation. Other languages, such as Japanese, arbitrarily select different word order, morphological, and intonational coding devices to do the same. These strategies are not, of course, assumed to form part of a Universal Grammar in these frameworks, as Chomsky would have it. but rather they are assumed either to form part of other cognitive abilities or to be learned by the speaker on the basis of exposure to natural language data.

As Givón (1984, 1990) has also argued at length, these coding strategies are readjusted within the language in order to perform different discourse functions. For example, while the SVO word order is used in English to neutrally (i.e. affirmatively) express cognitive information related to transitive events, a different word order strategy is used in order to perform different discourse functions, such as to ask questions, as illustrated in (32a). Yet another word order (and case marking strategy) is used in order to alter topical information, as illustrated by the passive sentence in (32b).

(32) a. Did they kill him?
  b. He was killed (by a bus).

While all transitive events crucially involve two participants, in some cases transitive verbs express events obligatorily involving three, or even more, participants. For example, the action expressed by the verb *put* obligatorily involves at least three participants, as indicated in (33a). However, verbs like *send* and *hit* only optionally involve this number of individuals, as made clear in (33b, d).

306   LISA A. REED

(33) a. They put the cartons in a closet. (vs. *They put the cartons.)
     b. Cherri sent a message (to Shawn).
     c. Cindy sent a message (for Cherri).
     d. Shawn hit the nail (with a hammer).

Givón notes that examples like the preceding indicate that human beings
cognitively perceive and encode transitive semantic roles beyond agent and
patient. In (33a), there is a locative noun phrase; in (33b), a recipient; in
(33c), a beneficiary; and, in (33d), an instrumental, a list which is by no
means exhaustive. As one would expect, these separate semantic roles can
also be explicitly encoded via word order, morphological, and intonational
strategies. In French, for example, both recipients and beneficiaries are
coded via Dative case, as illustrated in (34a, b).

(34) a. Elles (**lui**) ont fait quelque chose de méchant.
        'They did something nasty (**to him-DAT**).'
     b. Véronique (**lui**) a fait un gateau.
        'Veronica made a cake (**for her-DAT**).'

As alluded to earlier, Givón suggests that complex sentences are metaphor-
ical extensions of these simpler cognitive models. In relation to causative
sentences, for example, Kemmer and Verhagen (1994) have proposed that
sentences like (35a, b) are modeled after the simple structures given in
(34a, b).

(35) a. Ils ont fait pleurer Mathieu.
        'They made/caused/got Matthew (to) cry.'
     b. Je fais lire ce livre à tous mes étudiants.
        'I make/have/get all of my students (to) read this book.'

That is, they suggest that in (35a) the causee *Mathieu* is analyzed as a
patient, parallel to the noun phrases meaning *something nasty* in (34a)
and *a cake* in (34b). As such, the causee in (35a) will be explicitly coded
with Accusative case when it appears in pronominal form. On the other
hand, in (35b), the causee is analyzed as a recipient and, as such, is coded
with Dative case. According to Kemmer and Verhagen (1994) there is a
further result of these case markings, namely, that Accusative causees are
understood to be more affected by the actions of the matrix subject, more
topical, and have a lower degree of autonomy, whereas Dative causees are
less affected, less topical, and more autonomous. This, they suggest, is due
to the fact that Dative case is generally linked to animacy. As these authors
point out, this analysis extends nicely to *faire* infinitive examples in which
one finds both the causee and another argument treated as direct objects,
as in (36) below.

(36) Il l'aurait immédiatement fait rebrousser chemin.
    'He would have immediately made **him-ACC** turn back.'

Proust, *Sodome et Gomorrhe*, I; Pléaide, II, p. 631

Under this approach, one would expect such examples to encode a direct reading since the Accusative case feature of the causee indicates that it is being viewed as a patient, not a recipient. As a consequence, this individual is understood to be more affected by the actions of the matrix subject, more topical, with a lower degree of autonomy.

The fact that 'unexpected' Accusative case sentences have been shown in Reed (1996) to also involve biclausal syntactic structures is a further expectation of this analysis. To see why, we must first consider Givón's (1980, 1990: Ch. 13) suggestion that the degree of semantic integration of two events expressed by a matrix and embedded clause in a complex sentence is reflected in the degree of syntactic integration of those clauses. Specifically, he has argued at length that languages encode cognitive 'closeness' (cognitive features such as co-temporality, co-spatiality, and causation) via word order, case marking, and other coding devices. For example, he suggests that the 'predicate raised' (i.e. monoclausal) structures in (35a, b) above and (37a, b) are a linguistic reflection of a perceived close temporal, spatial, and causal relationship that exists between the events expressed by the matrix and embedded clauses. The non-subject (i.e. non-nominative) Case feature of the embedded causee in these sentences is a further reflection of this semantic binding, as is the lack of clausal subordinators (like the complementizer *that*) and the absence of embedded verbal morphology.

(37) a. He **made appear** upon the scene two dancing images.
    b. He finally **let go** of me.

Taken from Givón (1980: 356–357)

As evidence for this view, Givón points out that more coercive causative verbs, like *force*, never exhibit the strong 'binding' feature of predicate raising, as demonstrated below in (38a, b).

(38) a. He will force **me** to go.
    b. *He will force to go **me**.

This, Givón argues, is due to the fact that verbs like *force* express a situation in which the causee strongly resists the influence of the matrix subject. In other words, the causee is seeking to not have the two events linked in the manner desired by the matrix subject. Given this resistance, the possibility arises that the causal link may have been broken. The biclausal structure is intended to reflect this 'weaker' semantic binding. Returning

now to French causative sentences like (36) above, the fact that such sentences have been shown to be biclausal is now expected since they too express 'power struggles' in which the causee could possibly succeed in resisting the will of the matrix subject.

Achard (1993a, b) advances a final piece of evidence in support of this approach in his account of certain facts involving *laisser* 'to let' and perception verbs. He uses a modified version of Givón's analysis to explain why monoclausal *laisser* 'to let' (and *voir* 'to see') structures like (39a) below are used to describe situations in which the causee is completely under the influence of another individual whereas biclausal structures like (39b) describe situations in which the causee is more autonomous. Specifically, the syntactically integrated structure of the former reflects a situation in which the causee is truly a manipulated object, whereas the unintegrated structure of the latter reflects the relative autonomy of this individual.

(39) a. Marc laisse brouter **ses moutons** parce que ça **lui** fait plaisir qu'ils broutent.
    'Marc lets his sheep graze because **he** likes for them to graze.'
  b. Marc laisse **ses moutons** brouter parce que ça **leur** fait plaisir de brouter.
    'Marc lets his sheep graze because **they** like to graze.'

While these analyses provide a very intriguing account of the data discussed thus far, an examination of the full range of facts introduced in Section 2 indicates that this type of approach is not without problems, at least in its current form. Researchers in cognitive and functional frameworks have suggested that a monoclausal causative sentence encodes a situation in which the embedded subject is seen as more non-agentive than he or she is in a biclausal structure. This is said to be the linguistic reflection of the fact that this individual is treated more as a manipulated object in the former type of sentence than in the latter. While this is true of the causative sentences these authors examined, a perusal of the tables in (13), (22), and (30) reveals that this correlation does not always obtain. For example, we noted earlier in relation to sentences like (3a, b) that monoclausal examples with *faire* are actually vague with respect to the direct/indirect contrast. They do not unambiguously encode direct causation as this approach suggests. To provide a second example, these analyses would also lead one to expect all monoclausal *laisser* examples to encode direct causation, as (39a) above does. However, in examples in which the causee is a Dative pronoun, such as (21a), just the opposite is true and a thorough examination of the tables in Section 2 reveals additional unexpected phenomena of this sort.

The cognitive/functional approach also suggests that specific case features correlate in predictable ways with particular readings. Namely, Accusative case is said to encode a low degree of agentivity on the part of the causee and Dative case, a high degree of agentivity. While this is true of the data these authors examined, a thorough examination of the tables in (13), (22) and (30) reveals that this too is not always the case. If, for example, one has a *faire* causative in which the causee appears in the form of an 'expected' case pronoun, then both case forms encode direct and indirect readings. To provide a second example, in non-cohesive *laisser* and perception verb sentences involving pronominal causees, Accusative case quite surprisingly encodes indirect causation and Dative case, direct causation. In short, while current assumptions within the cognitive and functional perspective account for a wide range of causative data, they face problems in a non-negligible number of cases. This, we will see later, is quite likely due to the fact that such analyses currently make crucial reference to just two factors – the syntactic status of a given causative sentence (i.e. its monoclausal or biclausal status) and the case treatment of the causee. The full range of data presented in Section 2 will later be shown to indicate that something more is at work. In particular, in Section 4 I suggest that the lexical semantics of each causative verb must be considered in formulating any analysis of the direct/indirect contrast. Before we turn to this issue, however, I would like to show that current logic-based accounts of causation also fall short of accommodating the full range of data introduced in Section 2.

### 3.2. *Logical Accounts of Direct and Indirect Causation*

Dowty (1972) and Lewis (1973a) were the first to (independently) develop logic-based analyses of causation. Their analyses, which differ slightly from one another for the technical reasons discussed at length in McCawley (1976), are both based on Hume's (1912) insight that causative sentences are really 'hidden' modal sentences. That is, Hume suggested that causative sentences not only express what the world actually *is* like, but also what it *would* be like if a very specific set of circumstances were different. To capture this idea formally, Dowty and Lewis have made use of the material implication. In particular, Dowty has associated neutral causative sentences like (40a) with the Logical Forms in (40b, c).

(40) a. John's smoking caused him to get cancer.
    b. [John smoked. $\wedge$ John got that cancer.]$_i$ $\wedge$
       [John didn't get that cancer. $\square$ $\rightarrow$ John didn't smoke.]$_{S_i}$
    c. $[\phi \wedge \Psi]_i \wedge [\neg\Psi\square \rightarrow \neg\phi]_{S_i}$

310   LISA A. REED

The Logical Forms in (40b, c) state that if a speaker utters *John's smoking
caused him to get cancer*, then that speaker is asserting two things. First,
he or she is asserting that it is, in reality, true that John both smoked and he
got cancer. (This is the meaning of the first conjunct $[\phi \wedge \Psi]_t$.) Secondly,
that speaker is asserting that in some set of worlds that are pretty much like
this one, except for the fact that John did not get that particular cancer, John
also did not smoke. (This is the meaning of the second conjunct $[\neg\Psi\Box \rightarrow
\neg\phi]_{S_t}$.) Under this approach, therefore, one can truthfully utter *Event X
causes Event Y* if and only if X and Y occurred in the real world and in
some set of similar worlds in which Y fails to obtain, so does X.

In order to interpret these Logical Forms, a number of definitions must
be incorporated into the logic-based semantic system of a natural language.
These definitions, which will be developed in a step-by-step fashion in
(41)–(44), are due to Lewis (1973b:13–14), who was himself inspired by
earlier work by Stalnaker (1968) and Stalnaker and Thomason (1970). We
will begin with the set of definitions in (41).

(41) Let $ be an assignment to each possible world i of a set $\$_i$ of sets
of possible worlds. Then $ is called a (centered) system of spheres,
and the members of $\$_i$ are called spheres around i (designated S_i),
if and only if, for each world i, the following conditions hold:

a. $\$_i$ is centered on i.
b. $\$_i$ is nested.
c. $\$_i$ is closed under unions.
d. $\$_i$ is closed under (non empty) intersections.
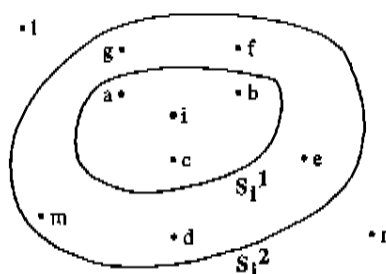
The function of these definitions is to set up some means by which we may
consider what the real world would be like if certain factors were different.
These alternative states of affairs are called accessible worlds, which are
worlds that resemble ours with respect to any number of factors (often
left vague), but which differ from ours with respect to other, very specific
ones. The assignment function which sets up this means of comparison is
symbolized by the $\$_i$ and it organizes the accessible worlds in a particular

way, described by each of the clauses in (41). The initial clause in (41a) ensures that the real world, symbolized i, will be the world we consider to be most similar to itself. The clause in (41b) ensures that if we have two accessible possible worlds j and k which are different from each other in the exact degree to which they are similar to the real world, then it will be possible to determine once and for all which of the two worlds, j or k, is the one most similar to i. This world will be assigned to a sphere of accessible worlds closer to the sphere containing the real world. The clauses in (c) and (d) ensure that we make a difference between worlds which are comparable to ours and worlds which are not. In particular, the clause in (c) ensures that if we have two possible worlds j and k, only one of which is to any degree comparable to the real world, then only that similar world will be assigned to an accessibility sphere around the real world i. The inaccessible world will not be in any sphere around i. The clause in (d) has a very similar effect. It ensures that if there is a world j that is a member of a number of accessibility spheres around i, and if there is also a different world k that is in no way similar to the real world i, then only j will be assigned to the appropriate spheres of worlds accessible from i. The sum total effect of these definitions will be to organize worlds similar to ours in the fashion illustrated in the graph below (41). We see the real world i in the center of a system of spheres of worlds: each sphere contains equally similar worlds; spheres containing worlds most comparable to ours are found closest to i. Worlds to no degree comparable to ours are outside the spheres.

The definitions given in truth table form in (42) are also needed to interpret the variably strict conditional operator found in the Logical Form of causative sentences like (40a). In particular, Lewis (1973b) has proposed that every conditional operator, be it of the variably or constantly strict variety, must be associated with the same standard truth table given in (42). Thus (42), under this approach, will apply to each of the conditional sentences in (43).

(42) **Standard truth table for the material implication**

ϕ	Ψ	ϕ conditional operator Ψ
t	t	t
t	f	f
f	t	t
f	f	t

(43) a. If she had fewer than 25 students in the course, then she definitely gave essay tests.

312   LISA A. REED

   b. If she has fewer than 25 students in the course, then she will
     definitely give essay tests.
   c. If she had fewer than 25 students in the course, then she would
     certainly have given essay tests.

In order to differentiate between the various types of conditional sentences
in (43), Lewis (1973b: Ch. 1) has put forth the definitions given in (44)
which specify exactly worlds must be considered in evaluating the truth of
$[\phi \rightarrow \Psi]$.

  (44) a. **Strict indicative conditionals (symbolized →):**
      Worlds at which we evaluate the truth of $[\phi \rightarrow \Psi]$: the real
      world only.
     b. **Strict modal conditionals (symbolized $\Box[\phi \rightarrow \Psi]$):**
      Worlds at which we evaluate the truth of $[\phi \rightarrow \Psi]$: every ac-
      cessible world.
     c. **Variably strict (a.k.a. counterfactual) conditionals (symbol-
      ized $[\phi\Box \rightarrow \Psi]$):**
      Worlds at which we evaluate the truth of $[\phi \rightarrow \Psi]$:
      every world in some sphere of accessible worlds.

To determine the truth of a strict indicative conditional like the one in
(43a), one considers only the real world; in evaluating the truth of a strict
modal conditional like (43b), on the other hand, every accessible world
must be considered. Finally, in the case of variably strict conditional or
counterfactual sentences like (43c), only one sphere of accessible worlds
needs to be considered.[9]

   In sum, the current logical analysis of causation has associated these
sentences with the Logical Form $[\phi \rightarrow \Psi]$, $\wedge$ $[\neg\Psi\Box \rightarrow \neg\phi]_{S}$, . Before
exploring how this analysis fares with respect to the data introduced in
Section 2, we must first point out and rectify a shortcoming of it. The
current analysis of causation makes use of the variably strict material im-
plication ($\Box \rightarrow$). As such it suffers from two problems discussed at length
in subsequent work on other types of conditionals, specifically, in work by
Grice (1967, 1989), Kratzer (1986) and Lewis (1975).[10]

   The first problem, originally pointed out in Lewis (1975) and later
discussed in Kratzer (1986), relates to the problem of vacuous truth in
conditional sentences. In particular, the truth conditions associated with
the material implication, given above in (42), state that any conditional
sentence will be vacuously true if the antecedent clause is false. While this
does not seem overly problematic in the case of conditional sentences like
(43) above, it does seem to give quite unsatisfactory results when applied
to other sentences of apparently the same form. Consider, for example, the

sentence in (45a), drawn from Kratzer (1986), which is associated with the Logical Form in (45b).

(45) a. Most of the time, if a man buys a horse, he pays for it cash.
    b. For most cases, [It is a case of a man buying a horse. →
      It is a case of that man paying cash for it.]

Under the classical analysis of conditionals, the preceding sentence would be true if the following state of affairs obtains. (a) There are 1 000 000 cases that exist. (b) Only 2000 of these 1 000 000 cases involve men buying horses. (c) None of the 2000 horse-buying cases involve cash payment; e.g., all of the horses were paid for by check. Given that the antecedent clause of (45b) is false since most cases do not involve horse-buying at all, the entire conditional sentence containing it will be true, clearly an undesirable result.

To illustrate the same problem using a causative sentence, consider the example in (46a), which, by Dowty's analysis, would be associated with the Logical Form in (46b):

(46) a. I made John eat his oatmeal.
    b. [I did X (e.g. screamed). $\land$ John ate his oatmeal.]$_i$ $\land$
      [John didn't eat his oatmeal. $\Box$ → I didn't do X.]$_{s_i}$

This sentence will, under the classical approach, be true under the following conditions: (a) In the real world, I screamed and John ate his oatmeal. (b) In every world in some sphere of accessible worlds, John ate his oatmeal (the antecedent clause is false), even though I didn't scream (the consequent is true). This again is a quite undesirable result.

As Grice (1967, 1989), Lewis (1973b: 24–26) and many other authors have made clear, it is possible to develop a pragmatic account of this particular problem, although some have expressed dissatisfaction with this type of solution. In particular, these authors have suggested that the problem of vacuous truth can be resolved by assuming that a conditional sentence can only be felicitously uttered if the antecedent is entertainable; i.e., if one assumes that the antecedent is possibly true in at least one world in the sphere of worlds under consideration. The nature of this constraint would be pragmatic since it would reduce to the fact that it is pointless (and therefore uncooperative) to assert conditional sentences whose antecedent one knows to always be false.

An appeal to discourse principles cannot, however, so easily resolve the second problem, aptly referred to as 'Grice's Paradox' as it was first pointed out by H. Paul Grice (1967: Lecture IV, 1989: 78–85). To set up the paradox, first consider the following situation: (a) Two individuals, Yog and Zog love to play chess with each other. (b) Whenever they play, they

314　　　　　　　　　　　LISA A. REED

adopt two special rules: there are no draws and Yog must take white 9 times out of 10. (c) Up until last night, Yog and Zog had played 100 games. the outcome of which follows: Whenever Yog had white, he won 80 games out of 90 and whenever he had black, he lost 10 out of 10. (d) Yog and Zog played a game last night, but it is not yet known which color Yog had or what the outcome of the game was. Given this situation, it is clear that a speaker may truthfully utter either (47a) or (47b). That is, given the outcome of the previous 100 games, the speaker may truthfully say that if Yog had white, then there is an 8/9 probability that he won; similarly, this speaker may say that if Yog lost, then there is a 1/2 probability that he had black.

(47) a. If Yog had white, there is an 8/9 probability that he won.
　　　b. If Yog lost, there is a 1/2 probability that he had black.

The paradox resides in the meaning of the pairs of words *white* and *black*, *win* and *lose*. Given that these pairs are antonyms, (47a) and (47b) are logically equivalent sentences, yet. paradoxically, they are associated with two different probabilities. In particular, if it turns out that Yog did have white and he also won (the antecedent and consequent of (47a) are both true), then it must also be the case, given the meaning of *white* and *win*, that he didn't lose and he didn't have black. In other words, if the antecedent and consequent clauses of (47a) are both true, then antecedent and consequent clauses of (47b) must both necessarily be false. Similarly, if it turns out that Yog actually lost and he had black (the antecedent and consequent of (47b) are true), then necessarily, he could not have had white and he could not have won (i.e., the antecedent and consequent clauses of (47a) will necessarily be false). In sum, the meaning of the words in these conditional sentences is such that (47a) has the Logical Form in (48a) and (47b) has the Logical Form in (48b). Importantly, these two Logical Forms have long been known to be logically equivalent.

(48) a. $\phi \rightarrow \Psi \equiv$
　　　b. $\neg\Psi \rightarrow \neg\phi$

And herein lies the paradox: how can it be the case that two logically equivalent sentences have different probabilities? That is, how can both (49a) and (49b) be true at the same time?

(49) a. 8/9 probability that $[\phi \rightarrow \Psi]$
　　　b. 1/2 probability that $[\neg\Psi \rightarrow \neg\phi]$

Lewis (1975) and Kratzer (1986) have found an alternative Logical Form for conditional sentences which resolves this problem. as well as the first one. In particular, suppose that the antecedent clause of natural language

if...then sentences does not correspond to the antecedent clause of the logician's material implication, as had been previously assumed, but instead, the function of this clause is to restrict the domain of quantification for the evaluation of the truth of the *then* clause.[11] In other words, let us suppose that the *if* clause determines exactly what types of worlds are accessible for evaluating the truth of the *then* clause. Under this approach, a sentence like (50a) will now have the Logical Form in (50b), whereas as sentence like (51a) will have the LF in (51b).

(50) a. If Yog had white, there is an 8/9 probability that he won.
   b. For 8/9 cases of games such that Yog had white in that game, Yog won.
(51) a. If Yog lost, there is a 1/2 probability that he had black.
   b. For 1/2 cases of games such that Yog lost that game, Yog had black.

It is clear that in evaluating the truth of these two sentences, one must consider very different sets of accessible worlds. In the first sentence, one only considers worlds in which Yog had white in the chess game, whereas in the second, only worlds in which Yog lost the chess game. In particular, (50a) will be true if and only if it is the case that in each of the accessible worlds in which Yog has white, he wins 8 out of every 9 times. In contrast, (51a) will be true if and only if it is the case that in every world in which Yog loses, 1 time out of 2, he has black. In sum, proposing that *if* clauses have the semantic effect of restricting the domain of accessible worlds needed to evaluate the truth of the *then* clause does have the desirable effect of resolving Grice's paradox since under this approach sentences like (50a) and (51a) will no longer be logically equivalent and, therefore, it is unproblematic that two such sentences should be associated with different probabilities.

But does this approach also take care of our first problem involving vacuous truth? To see that it does, reconsider the causative example originally given in (46a) above, repeated below, for convenience, as (52a). Under this approach to conditional sentences, this example will now be associated with the LF in (52b):

(52) a. I made John eat his oatmeal.
   b. [I did X (e.g. screamed). $\land$ John ate his oatmeal.]$_i$ $\land$
      [For all cases such that that case involves John not eating eat his oatmeal, I didn't do X.]$_{s_i}$

Recall from the preceding discussion that the classical analysis of causation involving the material implication problematically allowed sentences like (52a) to be true if the following two conditions held: (a) In the real

316   LISA A. REED

world, I happened to scream and John ate his oatmeal: (b) In every world
accessible from the real one, John ate his oatmeal, although I didn't scream.
Under the revised LF in (52b), the sentence *I made John eat his oatmeal*
would be assigned the truth value of 0 (falsity) in this situation since worlds
in which he did eat his oatmeal are no longer accessible worlds and there
is a ban on vacuous quantification in natural language.

Thus we see that subsequent research on conditional sentences indi-
cates that causative sentences are best analyzed as in (52b). Given this
background, we can now consider how the current logic-based approach to
causation fares with respect to the data introduced in Section 2. The point
here can be made very briefly: current logic-based analyses of causation
are not formulated in such a way as to account for English contrasts like
those given below in (53a, c), nor for their French counterparts discussed
in Section 2. That is, the current analysis of causation was intended only to
apply to *neutral* causal relations, without making distinctions with respect
to the direct and indirect causes. The current analysis would therefore as-
sociate all of the sentences given below in (53a, c) with the LF in (53d),
thus failing to capture subtle semantic distinctions between them.[12]

(53) a. Mary **made/got** her children (to) eat their oatmeal.
     b. Mary lets her kids drive the family car whenever she feels like
        it./ whenever they feel like it.
     c. Mary **saw** the roots twisting under the force of the sun's heat./
        around the throat of their helpless victim.
(53) d. $[\phi \wedge \Psi]_i \wedge [[\forall c \text{ such that } c \text{ involves } \neg\Psi] c \text{ involves } \neg\phi]_{S_i}$

In the next and final section of this paper we see how the current logic-
based account of causation can be modified to account for these contrasts.

4. A LOGIC-BASED ACCOUNT OF THE DIRECT/INDIRECT CONTRAST

In order to account for the meaning differences known as direct and indi-
rect causation, two refinements must be made to the current logical theory
of causation. The intuitive import of these modifications is to separate and
formally define what this author maintains to be two very different types of
forces involved in a given causal relationship. These are (a) how directly or
inevitably one event triggers another one (i.e., if event X takes place, does
this virtually always give rise to event Y or does it just sometimes do so?)
and (b) the degree to which a particular individual involved in the caused
event is deemed to be its instigator (i.e. is it the causee who actually set the
train of events in motion or is it someone else?).

The clauses in (54a, b) are intended to specify the first factor, namely, the degree to which an event X either necessarily or probably gives rise to another event Y.

(54) a. **Event ϕ is a necessary cause of event Ψ =**
   Universal quantification over accessible worlds
   [[For $\forall c$ such that c involves $\neg\Psi$] that c involves $\neg\phi]_{S_i}$

b. **Event ϕ is a probable cause of event Ψ =**
   Existential quantification over accessible worlds
   [[$\exists c$ such that c involves $\neg\Psi$] c involves $\neg\phi]_{S_i}$

According to (54a), an event ϕ stands in a *direct* causal relationship to event Ψ (put differently, event ϕ is a *necessary* cause of event Ψ) if and only if it is the case that in some set of worlds which function pretty much like this one, *every time* event Ψ fails to occur, so too must event ϕ. In the case of verbs meaning *make* or *let*, the two events corresponding to ϕ and Ψ are expressed by the matrix and embedded clauses respectively. In the case of a perception verb, however, the causing event ϕ remains vague. Indirect causation between events, on the other hand, is characterized in (54b) as a situation in which two events are more loosely causally linked. That is, we have a situation of *indirect* causation (or we say that an event is only a *probable* cause of another event) if we allow for the possibility that the caused event fails to take place, even though the causing event still did. In short, (54a, b) formally define direct causation between events as involving universal quantification over a sphere of accessible worlds and indirect causation between events as existential quantification over such a sphere.

My second modification, as alluded to above, is intended to capture the lexical semantics of various causative verbs. This, we noted earlier, differs from verb to verb with respect to which of the two individuals involved in two events ϕ and Ψ is understood to be the primary instigator (or direct cause) of Ψ. Intuitively, what we would like to capture is this. A verb which means *make* or *get* differs from a verb meaning *let* or *see* in that when one is made or gotten to do something, one is not directly responsible for one's actions. Someone else is determining them from the outside. If, on the other hand, a second party simply allows one to do something or simply sees one doing something, then clearly, that individual is not primarily responsible for one's actions. A concrete example might serve to make this clearer. If I, as a mother, were not around to *make* or to *get* my kids to eat their oatmeal on a given morning, then quite likely, they would not eat it. This is because in the case of these verbs, *I* am the direct cause of the event of eating the oatmeal. If, on the other hand, I were not around one day to *let* or to *see* my kids drive the family car, then it is quite likely they would

318   LISA A. REED

go ahead and drive it anyway. This is because with these verbs it is *they* who are the direct cause of the realization of the event of driving the car.

To capture these intuitions formally, I would like propose that the Logical Form (LF) of the verb *faire* 'to make/get' contains the clause in (55a), while the LF's of verbs like *laisser* 'to let' and *voir* 'to see' contain the clause in (55b).

(55) a. **Subject of causing event is the direct cause:** *faire* **'to get/ make'**

$[\Psi = 0]$ at some S in $\$_i$ where $\$_i$ picks out accessible worlds in which the thematic subject of ϕ does *not* exist.

b. **Subject of caused event is the direct cause:** *laisser* **'to let' & perception verbs:**

$[\Psi = 1]$ at some S in $\$_i$ where $\$_i$ picks out accessible worlds in which the thematic subject of ϕ does *not* exist.

These clauses specify whether the caused event is required to be true or false in some sphere of accessible worlds in which the agent of the causing event does not exist. If the caused event would not take place under such circumstances, then the agent of the causing event is being portrayed as the direct cause of the event. I.e., he or she is understood to have made or gotten the embedded subject to act as he or she did in the real world. If, on the other hand, the event denoted by the embedded clause would have taken place anyway, without this individual's influence, then, clearly, that individual simply let or saw the caused event take place in the real world.

These then are the proposals. Let us now verify that this approach can account for the data discussed in Section 2. We begin with the examples in (56) and (57), all which involve a causative sentence containing a biclausal Accusative case pronoun.

(56) Je l'ai fait manger sa soupe.
     '**I made** him-**ACC** eat his soup.'

(57) a. Marie **les** a laissés conduire sa voiture.
        'Marie **finally relented and let** them-**ACC** drive her car.'
     b. Marie **les** a vus conduire sa voiture.
        'Marie **saw** them-**ACC go driving off** in her car.'

As noted in Section 2, the syntactic configuration of these three examples is identical: all three involve a biclausal syntactic structure in which the pronoun referring to the causee is treated as a case object of the causative verb alone. As was also noted in that section and as is summarized in the tables in (13), (22), and (30), this identical syntactic configuration, paradoxically enough, to gives rise to opposite direct and indirect readings, in

the traditional sense of these terms (cf. (2a, b)). That is, this syntactic configuration in (56) gives rise to a 'direct' reading (the causee is understood to have a low degree of agentivity), whereas in (57a, b) this structure gives rise to an 'indirect' reading (the causee is understood to have a high degree of agentivity). How does the present analysis account for these facts? Consider first the full Logical Forms associated with these sentences, given in (58b) and (59b).

(58) **Non-cohesive Accusative case with *faire* 'to make' = 'direct' causation**

    a. **I made** him eat his soup.

    b. $[\phi \wedge \Psi]_i \wedge [[\forall c \text{ such that } c \text{ involves } \neg\Psi] c \text{ involves } \neg\phi]_{S_i}$ where $\$_i$ picks out accessible worlds in which the agent of ϕ *exists* $\wedge$ $[\Psi = 0]_{S_i}$ where $\$_i$ picks out accessible worlds in which the agent of ϕ does *not* exist.

(59) **Non-cohesive Accusative case with *laisser* 'to let X do as X wishes' and *voir* 'to see X do as X wishes' = 'indirect' causation**

    a. Marie finally relented and **let** them drive her car.
    Marie **saw** them go driving off in her car.

    b. $[\phi \wedge \Psi]_i \wedge [[\forall c \text{ such that } c \text{ involves } \neg\Psi] c \text{ involves } \neg\phi]_{S_i}$ where $\$_i$ picks out accessible worlds in which the agent of ϕ *exists* $\wedge$ $[\Psi = 1]_{S_i}$ where $\$_i$ picks out accessible worlds in which the agent of ϕ does *not* exist.

The first conjuncts of the LF's in (58b) and (59b) are identical and are drawn from the traditional logical analysis of causation. These clauses simply require that the causing and caused events actually took place in the real world. The second conjuncts of these LF's are also identical. These conjuncts capture the fact that the two events are *inevitably* linked in every world in some sphere of worlds like this one in which the matrix subject exists. That is, these conjuncts express a *direct* causal relationship between the two events. The third conjuncts of (58b) and (59b) are the ones which differ and which interact with the second conjunct to give rise to the paradoxical agentivity readings. First, in the case of the verb *faire* 'to get/make,' the third conjunct says that the subject of the causing event is the primary cause of the embedded event's taking place. Without him or her, this event would probably not have taken place at all. In contrast, the third conjunct of the verbs meaning *let* and *see* does not attribute this primary responsibility to this argument, and by inference, we conclude that this must be attributed to the agent of the caused verb. How then does this

account for the apparent paradox concerning the degree of agentivity of the causee? Recall that direct causation between events entails that the two events are causally linked in every accessible world in a sphere around the real world and that the lexical meaning of *faire* 'to get/make' says that the matrix subject is THE primary cause of the embedded event's taking place. Given this, we infer that the two events are so inevitably linked because the matrix subject is extremely powerful. That is, he or she will not allow for any other possible outcome. The embedded subject cannot act in any way but in accordance with the influence of the matrix subject; hence, the non-agentive reading for the embedded subject in sentences like (58b). On the other hand, since verbs like *laisser* 'to let' and *voir* 'to see' attribute primary responsibility for the embedded event's occurrence to the embedded subject, the inevitably of the two event's being causally linked will, in these cases, be attributed to the strong influence of the embedded subject. Hence, the highly agentive reading associated with the embedded subject in the syntactically parallel sentences involving these verbs. Thus we see that a direct causal relationship between events, coupled with the differing lexical semantics of the various causative verbs gives rise to opposite agentivity readings in the case of *faire* and *laisser/voir*. This type of causal relationship results in a 'direct' reading (in the traditional sense) for the former case and an 'indirect' reading in the latter.

Let us consider next biclausal examples in which the causee appears as a Dative case pronoun, i.e. sentences like (60a) and (61a), which are associated with the LF's in (60b) and (61b).

(60) **Non-cohesive Dative case with *faire* 'to get' = 'indirect' causation**

    a. Je **lui** ai fait téléphoner à ses parents.
       'I **got** him-**DAT** to call up his parents.'
    b. $[\phi \wedge \Psi]_i \wedge [[\exists c$ such that c involves $\neg\Psi] c$ involves $\neg\phi]_{S_i}$ where $\$_i$ picks out accessible worlds in which the agent of ϕ *exists* $\wedge$ $[\Psi = 0]_{S_i}$ where $\$_i$ picks out accessible worlds in which the agent of ϕ does *not* exist.

(61) **Non-cohesive Dative case with *laisser* 'X lets Y do Z whenever X chooses to' = 'direct' causation**

    a. Je **lui** laisserai téléphoner à sa mère quand ça **me** chante.
       'I'll **let** her-**DAT** call up her mother **whenever I feel like it.**'
    b. $[\phi \wedge \Psi]_i \wedge [[\exists c$ such that c involves $\neg\Psi] c$ involves $\neg\phi]_{S_i}$ where $\$_i$ picks out accessible worlds in which the agent of ϕ *exists* $\wedge$

$[\Psi = 1]_{S_i}$ where S_i picks out accessible worlds in which the agent of ϕ does *not* exist.

As was the case with the paradigm discussed, these examples have been shown to have identical syntactic structures, yet they give rise to opposite agentivity readings. Let us consider how the semantic analysis just put forth also resolves this apparent paradox. Once again, the first conjuncts of these LF's are identical and they simply require that both the causing and caused events take place in the real world. The second conjuncts (which are also identical) express an *indirect* causal relationship between the causing and caused events; i.e., in these examples, the events denoted by the matrix and embedded clauses need not be inevitably linked in every accessible world in a sphere around this one in which the matrix subject exists. They need only be linked in *one* other world like this one, thereby allowing for the possibility that there is some world like this one in which one of the events occurs without the other. The second conjunct interacts with the third one (which distinguishes the meaning of the verb *faire* 'to get/make' from that of the other causative verbs) to give rise to the differing agentivity readings generally known as 'direct' and 'indirect' causation. In the case of a verb like *faire* 'to get/make', the third conjunct says that the matrix subject is THE primary cause of the embedded event's taking place. Given that, we assume that the two events may fail to be linked because the matrix subject is not all that powerful. That is, he or she could have failed to get the embedded subject to act in the desired manner. Hence, the highly agentive reading for the embedded subject in these types of *faire* sentences. In contrast, the third conjunct of the verb *laisser* 'to let' specifies that the matrix subject is not the primary cause of the embedded event's taking place, from which we infer that the embedded subject is. Now the lack of a strong causal link between the two events will be attributed to the lack of a strong influence on the part of the embedded subject. Hence, the non-agentive reading associated with the embedded subject in this type of *laisser* sentence. Thus we see that an indirect causal relationship between events, coupled with the differing lexical semantics of the various causative verbs again gives rise to opposite agentivity readings in the case of *faire* as opposed to *laisser*. In particular, an indirect causal relationship between events results in an 'indirect' reading (in the traditional sense) for the verb *faire* and a 'direct' reading for *laisser*. And we conclude by noting that these LF's can, of course, be extended to the remaining paradigms in the tables in Section 2. That is, any *faire* sentence in which the causee is understood to be non-agentive will be associated with an LF parallel to (58b) and any *faire* sentence in which this argument is understood to be agentive will be associated with an LF like (60b). In a similar vein, any

in the text. Thus we see a second, unexplained syntactic gap in the Dative paradigm of perception verbs. (Cf. the preceding footnote.)

(i) *Je leur ai vus téléphoner à leur mère.
'I saw them-DAT calling up their mother (under someone else's direction).'

[9] But see Kratzer (1986) for evidence that even indicative conditionals involve quantification over worlds other than the real one.

[10] I would like to thank Alexis Dimitriadis and Sabine Iatridou for drawing my attention to these issues.

[11] Since this is not germane to the issues under discussion, I am assuming here that bare *if* conditionals are equivalent to *if...then* conditionals. But see Iatridou (1994) for evidence that *if...then* conditionals introduce a semantic presupposition not found in their bare *if* counterparts.

[12] As Ellen Prince (p.c.) has pointed out to me, the present analysis of causation suffers from a second defect, relating to the scope of negation. Consider in this respect the sentence in (ia) below, which speakers associate not with the expected interpretation in (ib). but with that given in (ic):

(i) a. Marie didn't make/see him eat his soup.
   b. Expected interpretation: $\neg[\phi \land \Psi]_i$
      I.e., In the real world, either Marie didn't do X/see him eat his soup or he didn't eat the soup (or both).
   c. Actual interpretation: $[\neg\phi] \land [\Psi \lor \neg\Psi]_i$
      I.e., In the real world, Marie did not do X/see him eat his soup and he may or may not have eaten the soup.

The preceding examples show that if one negates causative sentences involving *make* and *see* one finds, unproblematically, that the truth of both the matrix and embedded clauses in the real world is affected, indicating that these are aspects of asserted meaning. But what is strange is that negation only changes the truth value of one of the conjuncts in the clause $[\phi \land \Psi]_i$ in the LF's of these sentences from true to false. In particular, only the truth value of ϕ (the matrix clause) is changed from truth to falsity; the truth of the embedded clause is not switched -- it becomes indeterminate. Yet the classical analysis of negation would lead one to expect that negation could take scope over the conjunction. One finds similar, although not identical, facts with the verb *let*. (The actual interpretation for this verb is not the expected (ic), but rather $[\neg\phi \land \neg\Psi]$.) I will not address this problem further here since it is not specific to the analysis of causation per se, but rather, to the proper analysis of negation in complex sentences of which causatives are just one type. In particular, the same type of problem has been noted in relation to the so called 'Neg-raising' and non-Neg-raising sentences given below in (ii) and (iii) respectively.

(ii) a. I don't think/suppose/imagine that he has come.
    b. I think/suppose/imagine that he has not come.

versus

(iii) a. I don't regret/claim that he has come. ≠
     b. I regret/claim that he has not come.

For a fuller discussion of this issue, the reader is referred to Horn (1989:308–330).

REFERENCES

Achard, Michel: 1993a. *Complementation in French: A Cognitive Perspective*. Ph.D. dissertation, University of California, San Diego.

Achard, Michel: 1993b, Causative structures in French: Word order following *faire, laisser*, and *forcer*, in *Proceedings of the Nineteenth Annual Meeting of the Berkeley Linguistics Society*, Berkeley: University of California, Berkeley. pp. 1–12.

Comrie, Bernard: 1976, The syntax of causative constructions: Cross-language similarities and divergences, in Masayoshi Shibatani (ed.), *Syntax and Semantics*, Vol. 6. New York: Academic Press, pp. 261–312.

Dorel, Martine: 1980, The two verbs *Faire* in French expressions of causation, in Frank II. Nuessel, Jr. (ed.), *Contemporary Studies in Romance Languages*, Bloomington: Indiana University Linguistics Club, pp. 27 47.

Dowty, David: 1972, On the syntax and semantics of the atomic predicate CAUSE, in *Papers from the Eighth Regional Meeting, Chicago Linguistic Society*, Chicago: University of Chicago, pp. 62–74.

Girault-Duvivier, Charles Pierre: 1856. *Grammaire des grammaires. ou analyse raisonnée des meilleurs traités sur la langue française*, Paris: Cotelle.

Givón, Talmy: 1980, The binding hierarchy and the typology of complements. *Studies in Language* 4: 333–377.

Givón, Talmy: 1984, *Syntax: A functional-typological introduction*, Volume 1, Amsterdam/Philadelphia: John Benjamins Publishing Company.

Givón, Talmy: 1990, *Syntax: A functional-typological introduction*, Volume 2, Amsterdam/Philadelphia: John Benjamins Publishing Company.

Grice, H. Paul: 1967, *William James Lectures*, revised and published as Grice (1989).

Grice, H. Paul: 1989, *Studies in the Way of Words*, Cambridge: Harvard University Press.

Harmer, Lewis Charles: 1979, *Uncertainties in French Grammar*, Cambridge: Cambridge University Press.

Hatcher, Anna: 1944, Je le vois sourire; Je le vois qui sourit; Je le vois souriant, Part One, *Modern Language Quarterly* 5: 275–301.

Horn, Laurence: 1989, *A Natural History of Negation*, Chicago: The University of Chicago Press.

Hume, David: 1912, *An Enquiry Concerning Human Understanding and Selections from a Treatise of Human Nature*, Section VII, Chicago: Open Court Publishing Company.

Hyman, Larry and Zimmer, Karl: 1976, Embedded topic in French, in Charles N. Li (ed.), *Subject and Topic*, New York: Academic Press, pp. 191–211.

Iatridou, Sabine: 1994, On the contribution of conditional *Then*, *Natural Language Semantics* 2: 171–199.

Kayne, Richard: 1975, *French Syntax: The Transformational Cycle*, Cambridge: The MIT Press.

Kemmer, Suzanne and Verhagen, Arie: 1994, The grammar of causatives and the conceptual structure of events, *Cognitive Linguistics* 5: 115–156.

Kratzer, Angelika: 1986, Conditionals, in A. M. Farley, P. Farley, and K.-E. McCullough (eds.), *Papers from the Parasession on Pragmatics and Grammatical Theory*, Chicago Linguistics Society. pp. 1–15.

Lakoff, George: 1987, *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*, Chicago: University of Chicago Press.

Lakoff, George: 1990, The invariance hypothesis: Is abstract reason based on image-schemas? *Cognitive Linguistics* 1: 39–74.

326   LISA A. REED

Langacker, Ronald: 1987, *Foundations of Cognitive Grammar*, Vol. 1: *Theoretical Prereq-uisites*, Stanford: Stanford University Press.

Langacker, Ronald: 1991, *Foundations of Cognitive Grammar*, Vol. 2: *Descriptive Appli-cation*, Stanford: Stanford University Press.

Lewis, David: 1973a, Causation, *Journal of Philosophy* **LXX**: 556–572.

Lewis, David: 1973b. *Counterfactuals*, Cambridge: Harvard University Press.

Lewis, David: 1975, Adverbs of quantification, in Edward Keenan (ed.), *Formal Semantics of Natural Language*, Cambridge: Cambridge University Press, pp. 3 15.

McCawley, James: 1976, Remarks on what can cause what, in Masayoshi Shibatani (ed.), *Syntax and Semantics*, Vol. 6, New York: Academic Press, pp. 117–129.

Reed, Lisa: 1992, Remarks on word order in causative constructions, *Linguistic Inquiry* **23**: 164-172.

Reed, Lisa: 1996, On the unincorporated character of the French cohesive infinitive construction, in Claudia Parodi, Carlos Quicoli, Mario Saltarelli, and María Luisa Zubizarreta (eds.), *Aspects of Romance Linguistics*, Washington, D.C.: Georgetown University Press, pp. 357–372.

Shibatani, Masayoshi: 1973, *A Linguistic Study of Causative Constructions*, Ph.D. dis-sertation, University of California, Berkeley. Distributed by the Indiana University Linguistics Club, Bloomington, Indiana.

Shibatani, Masayoshi: 1976, The grammar of causative constructions: A conspectus, in Masayoshi Shibatani (ed.), *Syntax and Semantics*, Vol. 6. New York: Academic Press, pp. 1-40.

Stalnaker, Robert: 1968, A theory of conditionals, in Nicholas Rescher (ed.), *Studies in Logical Theory, American Philosophical Quarterly Monograph 2*, Oxford: Basil Blackwell Publishers, pp. 98-112.

Stalnaker, Robert and Thomason, Richmond: 1970, A semantic analysis of conditional logic, *Theoria* **XXXVI**: 23–42.

Talmy, Leonard: 1976, Semantic causative types, in Masayoshi Shibatani (ed.), *Syntax and Semantics*, Vol. 6, New York: Academic Press, pp. 43–116.

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