Simplex Causatives and Sub-lexical Scope[1]

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Word Count: 8,598

Abstract

This thesis explores the possibility of sub-lexical scope in English, which provides insights into the representation of the lexical semantics of simplex causatives. Contrary to the traditional view, Martin (2018, 2020) argues for sub-lexical scope with eventive subjects, while maintaining its unavailability with agentive subjects. To examine Martin's theoretical predictions, I conducted a pilot experiment and its follow-up with 11 English native informants, the results of which indicates that mentioning the causing event is essential for licensing sub-lexical scope, whereas having an agentive subject foregrounds the issue of accountability (cf. Neeleman and Van de Koot 2012), thereby restricting the elasticity of a causal chain. Adapting Alexiadou et al's (2015) Voice hypothesis and VP decomposition, this thesis concludes that sub-lexical scope is allowed at the syntactic level but filtered out by interpretive factors.

***Keywords**: causatives, sub-lexical scope, Voice, event tokenisation*

1. Introduction

This thesis investigates the following two questions: (i) whether English simplex causatives permit modifiers to take scope over a sub-lexical component of their semantics, and (ii) if sub-lexical scope is possible, what mechanism is responsible for licensing it.

The 'sub-lexical scope' phenomenon that is dealt with in this thesis is exemplified by a so-called restitutive reading of the presuppositional adverbial *again* in (1):

[1] First and foremost, I would like to thank my supervisor, Dr Hans van de Koot, for his enduring academic support and warm encouragement throughout my dissertation project. Without his guidance, this thesis would not have been possible. I am also grateful to my informants who spared their time to participate in the two experiments. Their insightful comments have contributed significantly to the development of the discussion. My thanks should also go to Nonoka Sugawara, Kazune Sato, and Claudia Ciovica for introducing informants to me. Needless to say, the responsibility for any remaining errors and/or shortcomings is mine alone. Lastly, I would like to mention my mother Yuri Kanazawa and my grandmother Yoshiko Kanazawa. Their love and emotional support have always kept me motivated during my academic journey at UCL.

(1) John opened the window again.

a. Agent's action is repeated (repeated action reading)
again (cause (John, become (open (the window))))

b. Resultant state is restored (restitutive reading)
cause (John, become (again (open (the window))))

(Neeleman and Van de Koot, 2020:502)

As illustrated in (1a) and (1b), this sentence is ambiguous between two possible readings. Under the repeated action reading (or also called the repetitive reading), John's action of opening the window is repeated – it is presupposed that he had opened the window once previously, and he did so for the second time. By contrast, under the restitutive reading, which is of interest in our discussion, (1) is interpreted that the resultant state of the window's being open is restored by John's action, as in a situation, for example, where John and Mary enter a room, whose window was originally open then, and Mary closes it, and then John reopens it. Note that this reading presupposes neither a previous action of John opening the window nor a previous event of the window becoming open. In this sense, *again* can be seen as taking scope only over the resultant state, which is sub-lexical part of the lexical semantics of the verb *open*.[2]

Traditionally, it has been assumed that simplex causatives are not compatible with sub-lexical modification. Let us consider three types of modifiers: manner, locational, and temporal adverbials.

(2) Manner modifier

a. Bill awoke grumpily

b. John awoke Bill grumpily. (False if John was not grumpy.)

(Neeleman and Van de Koot, 2020:503, see also Higginbotham 2000, Pylkkänen 2008)

[2] Neeleman and Van de Koot (2020) argue against the existence of sub-lexical scope and propose that the restitutive reading of *again* can be captured as a consequence of a process of repairing conflict between two presuppositions generated by contrastive focus and *again*.

(3) Locational modifier

[CONTEXT: John steps out of his house in Whetstone, north London, and gets hit on the head by a falling roof tile. An ambulance transports him to UCLH, a hospital in central London, where he dies.]

a. A roof tile killed John in London.

b. #A roof tile killed John in UCLH.

(Neeleman and Van de Koot, 2020:504)

(4) Temporal modifier

a. John caused Bill to die on Sunday by stabbing him on Saturday.

b. *John killed Bill on Sunday by stabbing him on Saturday.

(Neeleman and Van de Koot, 2012:27, see also Fodor 1970)

In (2b), *grumpily* can only be associated with John's action, but not with Bill's awakening. This is not due to the property of this adverb, because in (2a) it does modify the latter. This suggests that simplex causative verbs prevent their sub-lexical material from being targeted by manner modification.

The contrast in felicity between (3a) and (3b) indicates that the same applies to locational modifiers: they must scope over the entire macro-event of causation. Since *in UCLH* only applies to the caused event 'Bill died', (3b) cannot truthfully describe the situation given in the context (3).

The unavailability of sub-lexical modification of simplex causatives is also demonstrated in (4). As shown in (4a), when complex causatives like *cause to die* are used, the causing event (John stabbing Bill) and the caused event (Bill's death) can be modified separately by *on Saturday* and *on Sunday* respectively. By contrast, simplex causatives like *kill* do not allow separate temporal modification of its subevents, as seen in (4b). Here again, the possible target of temporal modifiers is restricted to the macro-event denoted by the verb.

However, Martin (2018, 2020) claims that sub-lexical scope is possible with event-denoting subjects, pointing out that (5b) is accepted more readily by native speakers of English than (5a):

(5) a. Fred accidentally shot his dog on December 23! #*He* eventually killed it on December 25.[3]

b. Fred accidentally shot his dog on December 23! *This gunshot* eventually killed it on December 25.

(Martin, 2020: 147; emphasis added)

She attributes this agentive/eventive contrast to two different Voice heads that introduce the external argument to the VP, which affects how the event type denoted by the VP is 'fleshed out'.

While Martin (2018) suggests that agentive subjects can be interpreted either as intentional or non-intentional, her data only includes a comparison between eventive subjects and accidental agents. This naturally raises the question of whether speakers' judgements about sub-lexical scope really show the same pattern when the actions of the agent are construed as intentional. I thus conducted a pilot survey with 11 native English informants to examine the effects of subject type and the agent's intentionality on acceptability judgements of sub-lexical scope. The results indicate that speakers become more inclined to accept sub-lexical scope with agentive subjects if the result is construed as within the scope of the agent's intentions.

To account for this pattern, I was initially tempted to hypothesise that separate mechanisms are responsible for licensing sub-lexical scope depending on the subject type, because only the agentive case shows sensitivity to intentions. However, my informants' responses raised another possibility that explicitly mentioning the causing event (in a *by*-phrase) can make sub-lexical scope reading more accessible in the agentive condition. I ran a follow-up experiment to examine this, and it was shown that mentioning the causing event indeed has an effect of stretching the causal chain which facilitates the sub-lexical scope reading, provided that the agent can be held accountable for the outcome of the event.

Based on the results of the two experiments, this thesis proposes that the sub-lexical scope phenomena can be captured by a unified mechanism, inspired by Alexiadou et al.'s (2015) Voice theory and event decomposition. It is also argued that the interpretive effect of foregrounding the accountability/intentionality makes sub-lexical scope less achievable in the

[3] In (5a), the reading such that Fred acted on December 25 to finish his dog off is irrelevant for the judgement. The interpretation being considered here is the one where the accidental shooting on December 23 is the only killing event performed by Fred. See Martin (2020) for more detail.

agentive condition.

This thesis is organised as follows: in Section 2, I review Martin's (2018, 2020) account on sub-lexical scope, and outline areas where further investigation is needed. Section 3.1 discusses the logic of the first experiment and formulates the two hypotheses to be examined. The experimental design is presented in Section 3.2 and the results are evaluated in Section 3.3. In Section 3.4, I sketch a further issue raised by informant responses and its implication to Martin's theory. Section 4 describes the second experiment and analyses the results considering the effect of accountability on stretching a causal chain by mentioning the causing event that is distant from the caused event. Section 5 compares and contrasts two theories of sub-lexical scope and proposes that a *single* Voice is responsible for introducing external arguments, and sub-lexical modification targets a constituent that corresponds to the result. Finally, Section 6 concludes this thesis.

2. Martin's account on sub-lexical scope

2.1 Two voice heads and event tokenisation

As noted in the previous section, Martin (2018, 2020) argues that sub-lexical modification is not possible when simplex causatives are used with agentive subjects, but such a constraint is relaxed with eventuality-denoting subjects. Consider (6a) and (6b), which are slightly adjusted from (5):

(6) [CONTEXT: Fred accidentally shot his dog Fido on December 23.]
   a. #Fred eventually killed Fido on December 25.
   b. The gunshot eventually killed Fido on December 25.

Martin attempts to capture the contrast between (6a) and (6b) by proposing that two distinct functional heads – Voice_{ag} and Voice_{c} – are responsible for introducing agentive subjects and eventive subjects respectively, and that the event variable denoted by the VP (such as *kill Fido*) is tokenised differently, depending on the voice head that introduces its external argument.

Following her account, agentive subjects are introduced by Voice_{ag}. In this case, the external argument *x* is interpreted as the agent of a single complex event that consists of both *x*'s actions and a change-of-state (CoS) of the theme's referent *y*. On the other hand, eventuality-denoting subjects are assumed to be introduced by another functional head, Voice_{c}. In this case, the external argument (e.g., *the gunshot*) is identified as the eventuality *v* that causes the VP-event (e.g., *kill Fido*), which culminates in the resultant state denoted by the verb (e.g., Fido's death).

Furthermore, Martin proposes that the VP-event *e* is 'tokenized by *change-of-state* of the theme referent' (p.150), which is caused by *v*. Thus, for example, the event type denoted by the VP *kill Fido* is identified as Fido's *dying* event. Consequently, (6b) is interpreted in the same way as (7), in which an unaccusative verb *die* expresses Fido's change of state:

(7) Fido *died* on December 25 from the gunshot on December 23.

Figure 1 summarises Martin's proposal and its predictions about sub-lexical scope. As illustrated in Fig.1a, in the agentive case, the agent's action and the theme's change-of-state must fall within the same temporal modifier's scope (see the circle in the top-right panel). Applying this analysis to (6a), the referent of the external argument *x*, namely Fred, is required to perform an action on December 25 that results in Fido's death. However, there is a contradiction because the context says that it was on December 23 rather than 25 that Fred's accidental shooting of his dog took place (and Fred did nothing to Fido on December 25: see footnote 2). Since there is no further eventuality introduced by the subject DP, it is impossible to identify Fred's previous action on December 23 in the causal chain, as can be seen in the top-left panel.

By contrast, when eventive subjects introduce another eventuality (*v*) to the causal chain, the VP-event (*e*) is fleshed out by the theme's change-of-state, which is caused by *v* (as shown in Fig.1b). This predicts that separate temporal modification of *v* and *e* is possible, provided that the former precedes the latter. Therefore, (6b) involves no contradiction unlike (6a).

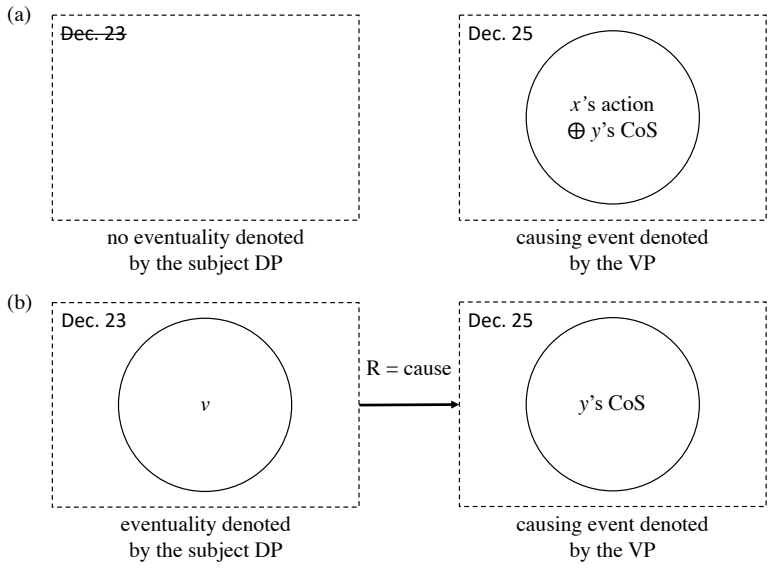


Figure 1: Causal chains denoted by lexical causative statements

(adapted from Martin, 2020:151)

2.2 Potential areas for further investigation

Given the proposal above, Martin (2020) suggests that sub-lexical modification 'never seems possible' with agentive subjects (p. 147). However, since she only compares eventive subjects with non-intentional agents, it is worth investigating the effect of intentionality in the agentive condition. Note that Martin's theory only distinguishes entity-denoting (agentive) and eventuality-denoting (eventive) subjects and predicts that the agent's intentions do not affect the availability of separate modification. That is, the way of VP-event tokenisation is determined solely by whether an additional eventuality is introduced to the causal chain. Thus, whenever simplex causatives are used agentively, VP-events are tokenised by a complex event as depicted in Fig.1a, regardless of the agent's intentions. If, contrary to this prediction, speakers become more inclined to accept sub-lexical scope when the actions of the agent are construed as intentional, a different mechanism should be proposed to account for the pattern.

Also, while Martin only discusses separate modification by temporal modifiers, locational and manner modifiers should behave in the same way if her account is correct. The eventive condition is of interest here: if the VP-event is fleshed out by change-of-state of the theme's referent, it can also be a legitimate target of locational and manner modification. For example, if *kill Fido* is interpreted as Fido's *dying* event when the subject denotes an eventuality, then locational modifiers like *in a vet* and manner modifiers like *in an agonising manner* can be about where or how Fido dies, instead of about where/how it is slaughtered.

To conclude this section, Martin's (2018, 2020) theory gives rise to the following two research questions, which are investigated in the first experiment:

RQ1:

Is sub-lexical scope never possible with agentive subjects, regardless of the agent's intentions?

RQ2:

Do temporal, locational, and manner modifiers behave in the same way in terms of separate modification, depending on the subject type?

3. The first experiment

To address research questions 1 and 2, I carried out a pilot experiment using a questionnaire. This section reports the two hypotheses explored in this survey, its experimental design, and the results. The final subsection provides an overview of further questions arising from the informants' comments, which led to a follow-up experiment.

3.1 Hypothesis 1and 2

Given the discussion in Section 2.2, the first experiment investigated the two hypotheses below:

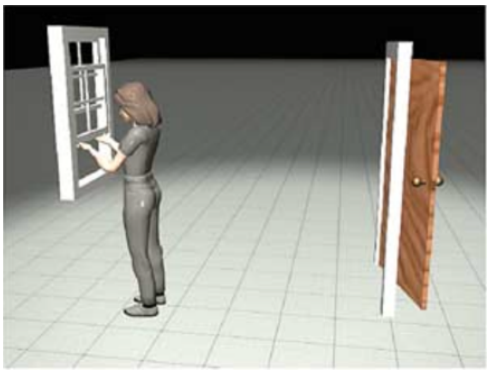
Hypothesis 1:

With agentive subjects, sentences that involve sub-lexical scope can be judged more acceptable if the result of the event denoted by the VP falls within the scope of the agent's intention in the mental model.

Hypothesis 2:

With eventive subjects, sub-lexical scope is possible – modifiers (regardless of their type) can take scope over the event introduced by the simplex causative verb to the exclusion of the event introduced by the eventive subjects.

While Martin (2018, 2020) doubts the possibility of sub-lexical scope with agentive subjects, there is a reason to suspect that speakers show sensitivity to the agent's intentions when interpreting sentences with simplex causatives. Consider a causal chain in which a woman called Sara opens a window, thereby a breeze comes into the room, and the door opens as a result, following Wolff (2003). He contends that such a situation cannot usually be described by a simplex causative as in (8a), while a multi-clausal expression like (8b) is appropriate:



(8) a. #Sara opened the door.

b. Sara caused the door to open.

(the picture and the example sentences are adapted from Wolff, 2003:2)

Wolff attributes the inaptness of (8a) to the fact that the wind is unlikely to be construed as an enabling condition that allows Sara to yield the result. However, he notes that (8a) could be more acceptable if it was indeed Sara's intention to open the door by using the force of the wind. This suggests that causal chains with intermediaries between the initial causer and the final causee are construed differently, depending on whether the interpreter constructs a mental model such that the resultant state specified by the lexical causative verb is included in the agent's intentions. Wolff's Experiment 3 confirms that the participants are more willing to describe situations with simplex causatives when the result is considered as intended (e.g., a girl throws a ball at a vase, and it breaks as a result) than when the same result is caused by an unintended act (e.g., a girl loses control of a bouncing ball, which bounces into a vase, and it breaks as a result).

Since the question is not addressed in Wolff (2003) whether the effect of intentionality can be extended to the availability of sub-lexical scope, and Martin's examples do not involve intentional agents, this experiment will examine if native English speakers' judgement about sub-lexical modification varies depending on the presence/absence of the agent's intentions (→ Hypothesis 1). Notice that if Martin's account is correct, the null hypothesis will be confirmed, as it predicts that entity-denoting subjects introduced by Voice_{ag} are incompatible with sub-lexical modification, regardless of its referent's intentionality.

Secondly, if, as Martin (2018, 2020) proposes, (i) agentive and eventive subjects are introduced by different functional heads, and (ii) the VP-event is interpreted as a change-of-state of the theme's referent in the latter case, then it would be predicted that modifiers can take sub-lexical scope when simplex causatives are used with an event-denoting subject (→ Hypothesis 2). In other words, adverbials can modify the eventuality (v) denoted by the subject DP and the VP-event (e) separately. Since locational/manner modifiers are not discussed by Martin, this experiment will investigate whether these modifiers behave in the same way as temporal modifiers in terms of separate modification, depending on the subject type.

3.2 Design of the experiment

To investigate Hypothesis 1 and 2, I conducted an acceptability judgement survey with 11 native speakers of English. The design of this experiment is a 3 × 2 × 3 × 2 with the independent variables (IVs) as follows:

(9) Verb type: *kill* vs. *flood* vs. *melt*
Subject type: agentive vs. eventive
Modifier type: temporal vs. locational vs. manner
Intentionality: intentional vs. unintentional

The causative verbs used in this experiment were *kill*, *flood*, and *melt*. They were selected because (i) they can take both agentive and eventive subjects, (ii) they are semantically compatible with situations in which there is a considerable time gap between the causing event and the caused event, and (iii) the actions denoted by these verbs can be either intentional or accidental.

I created 18 short stories, each of which in principle[4] corresponds to a pair of test sentences, one with an agentive subject and the other with an eventive subject. Each test sentence contains either a temporal, locational, or manner modifier. Sample test materials are given in (10)-(12):

(10) [CONTEXT: For many years, Mary had wanted to kill John in revenge for his murder of her parents. John was very rich and had a big vault in which he kept his money and other valuable things. A couple of months ago, Mary discovered that the vault was regularly serviced by an engineer from the company that originally installed it. Mary, who is a master of disguise, finally saw her chance and paid John a visit impersonating a vault engineer. While in John's vault, she attached a booby trap to the vault door. A few weeks later, when John entered the vault, the booby trap was activated, and he died there.]

a. Mary killed John when he entered his vault.
[*kill*, agentive, temporal, intentional]

b. Mary's placing of the booby trap killed John when he entered his vault.
[*kill*, eventive, temporal, intentional]

(11) [CONTEXT: For reasons best known to himself, John, who works at the dam, wanted to provoke a sensational incident. He knows that opening the sluice on the dam can cause a damaging flood. So one day, he opened the sluice with the aim to flood a town…]

[4] For the [*kill*, intentional agent] condition, a single story is associated with two pairs of test sentences with either temporal or locational modifiers. In the [*flood*, locational, unintended agent] condition, there is a one-to-one correspondence between the scenario and the test sentence. See Appendix for all the test materials.

a. and indeed John did so way downstream in the Dordogne, exactly as he planned.[5]
(Intended reading[6]: *did so* = flood a town)
[*flood*, agentive, locational, intentional]

b. and indeed John's opening of the sluice did so way downstream in the Dordogne, exactly as planned.
(Intended reading: *did so* = flood a town)
[*flood*, eventive, locational, intentional]

(12) [CONTEXT: John is a skilled ice carver. Last year, he was planning to create a new piece of work during the Inuit ice carving competition. About a month before the competition, he asked Bill, his assistant, to put a big block of ice in the new, computer-controlled freezer, and program it to keep the ice at -25℃ until the morning of the contest. Unfortunately, Bill is not very computer savvy and unwittingly programmed the freezer to raise its temperature very gradually from -25℃ to -10℃ during the final three days before the contest. As a result, John's ice was in unusable condition on the morning of the contest.]

a. Bill melted John's ice very gradually.
[*melt*, agentive, -manner, unintentional]

b. Bill's programming of the freezer melted John's ice very gradually.
[*melt*, eventive, manner, unintentional]

In the agentive condition such as (10a), (11a), and (12a), the subject DP denotes an entity with a mental state, whereas in the eventive condition, the subject is an eventuality that describes the causing event that involves the agent's action (e.g., (10b), (11b), and (12b)).

In the intentional condition, there is an agent who acts intentionally to bring about the resultant state denoted by the VP. In other words, the result of the event denoted by the VP falls within

[5] In the [*flood*, locational] condition, *do so* substitution is used in the test sentences, because the locational modifier *in the Dordogne* in the VP *flood a town in the Dordogne* can naturally be read as modifying the DP *a town* instead of the causative verb *flood*. Consequently, the test sentences are presented as a continuation of the story.

[6] Where there is potential ambiguity in the test sentence, the intended reading is specified to ensure that the informants' judgement is based on the interpretation consistent with the purpose of the experiment. In certain cases, however, some informants pointed to difficulties in getting the intended reading, which is accounted for in Section 5.

the scope of the agent's intention in the mental model. For instance, in the *kill* story in (10), Mary intentionally attached a booby trap to John's vault door, so that it would be activated the next time John entered his vault, leading to his death. Likewise, in the *flood* story in (11), the context makes it clear that John intentionally opened the sluice on the dam to cause a flood.

In the unintentional condition, on the other hand, the stories tell that the resultant state denoted by the VP is an outcome of an accidental action by the agent. In the *melt* context in (12), for example, although John's ice ended up being melted, Bill had no intention to make this happen when he completed the freezer's setup (on the contrary, he wanted to keep it in top condition).

The interviews with the informants were conducted online via zoom or face-to-face, depending on their availability and preferences. They were asked to read each story at their own pace and rate the acceptability of the test sentences given the context provided by the story, on a scale of 1 to 5 as follows:

(13) 1. totally unacceptable
2. somewhat unacceptable
3. hard to make a clear judgement
4. somewhat acceptable
5. totally acceptable

The order of the 18 stories was randomised for each informant. For each agentive-eventive pair of the test sentences as in (10a, b), six out of the 11 participants were presented with the sentence with an agentive subject first (e.g., (10a) → (10b)), while the remaining five were presented with the one with an eventive subject first (e.g., (10b) → (10a)).

Considering that the nature of this experiment is a qualitative study with a small number of participants, not only the results of their acceptability judgements but also the reasons for their decisions were recorded. The next subsection reports the results of this experiment, based on the numerical data of the acceptability scores as well as comments from the informants.

3.3 Experimental results

In general, the intentional agent condition reached higher acceptability scores than the unintentional agent condition, as predicted by Hypothesis 1. The mean acceptability score for the [agentive, intentional] condition was 3.44, while the [agentive, unintentional] condition obtained a score of 2.47. In the eventive condition, by contrast, no considerable effect of intentionality was observed: the mean acceptability score for the [eventive, intentional]

condition was 4.59, and it was 4.26 for the [eventive, unintentional] condition. Figure 2 summarises the data:

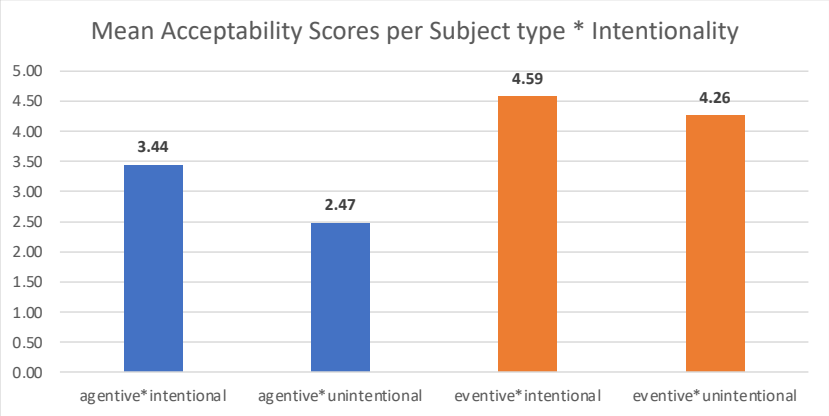


Figure 2: Mean Acceptability Scores per Subject type and Intentionality

However, unlike the other [agentive, intentional] sentences, the mean acceptability scores for the following two *kill* sentences, which are associated with the context given in (10), failed to reach 3:

(14) a. Mary killed John when he entered his vault.
[*kill*, agentive, temporal, intentional] (Mean Acceptability Score = 2.36)

b. Mary killed John in his vault.
[*kill*, agentive, locational, intentional] (Mean Acceptability Score = 2.37)

The informants who rated (14a) and (14b) commonly suggested that Mary should be physically in John's vault at the time of his death.

Similarly, several informants degraded *melt* sentences such as (15), pointing out that they sound as if the referent of the subject physically heated John's ice in his freezer:

(15) [CONTEXT: John and Susan are highly skilled ice carvers who compete in the annual Inuit ice carving competition. A couple of years ago John beat Susan by tampering with one of her carving knives and ever since she has been looking for a way to take revenge, preferably by somehow melting John's ice on the eve of the carving contest. However, until recently, John always kept his ice in an old-fashioned freezer located in a securely locked mobile unit. Then, about three months before this year's competition, John decided to replace his old freezer with a brand-new, top of the range, computer-controlled one. Susan, who is a computer expert, finally saw her chance. She hacked into the computer that controls John's

freezer and programmed the freezer to enter defrost mode on the eve of the annual contest. On the morning of the contest, John found his ice in unusable condition.]

Susan melted John's ice in his brand-new freezer, exactly as she planned.
[melt, agentive, locational, intentional] (Mean Acceptability Score = 3.82)

This means that these informants interpreted the agent's action to fall within the scope of the modifier, which is predicted by Martin's account of event-tokenisation with agentive subjects.

My informants' comments suggest that they were indeed sensitive to whether the result is included in the agent's plan. For instance, when judging the acceptability of (16) in the following scenario, six informants referred to the question of how much they thought John knew about the outcome of his action:

(16) [CONTEXT: For reasons best known to himself, John, who works at the dam, wanted to flood a town that is four hours downstream. One day, he opened the sluice on the dam at 2 pm. As a result, the town was flooded four hours later.]

John flooded the town around 6 pm, exactly as planned.
[*flood*, agentive, temporal, intentional] (Mean Acceptability Score = 3.73)

Four of them said that it is natural to assume from the context that John knew that the town would be flooded four hours after he opened the sluice (and so rated (16) as 4 or 5), whereas another two thought it was too much to say 'exactly as planned' given that the context (16) does not guarantee that John really knew that the town in question was four hours downstream.

Regarding Hypothesis 2, the eventive condition got substantially higher scores than the agentive condition, which is also compatible with Martin's account:

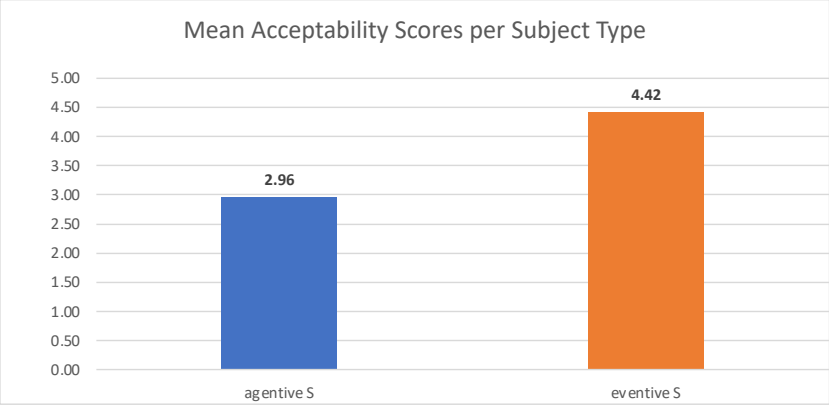


Figure 3: Mean Acceptability Scores per Subject Type (agentive/eventive)

On the other hand, modifier type does not seem to affect their acceptability judgement:

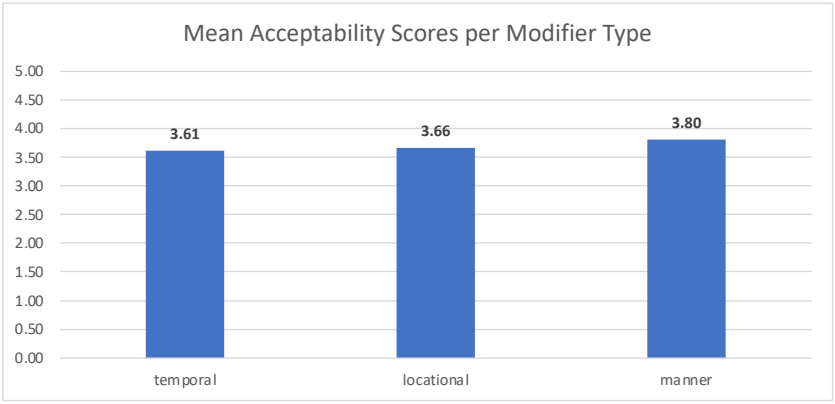


Figure 4: Mean Acceptability Scores per Modifier Type (temporal/locational/manner)

In the eventive condition, the acceptability scores of the following two *kill* sentences were clearly lower than the rest:

(17) [CONTEXT: One Monday, the sheriff asked the gunsmith to inspect his six-shooter. On that day, the gunsmith had had a lot of work and by the time the sheriff brought in the gun, he was getting very tired and made a mistake repairing the gun. Consequently, the gunsmith returned the gun to the sheriff in a faulty state. The next day, on Tuesday, the sheriff had a gunfight with the outlaw Mary Jane. Although he had never lost a gunfight before, this time his gun jammed at the critical moment, and he was gunned down.][7]

The gunsmith's faulty repair killed the sheriff on Tuesday.
[kill, eventive, temporal, unintentional] (Mean Acceptability Score = 3.82)

(18) [CONTEXT: One day, two gang members, John and Bill, had a fight with each other in the street. Bill, who used to be an amateur boxing champion, got so mad during the fight that he lost all self-control and knocked John unconscious with all his strength. John was taken to the hospital immediately, but two days later, he died there because of a brain injury sustained in the street fight.]

[7] This scenario replicates the famous example by Katz (1970), who concludes that this scenario can be described by periphrastic causatives like (i) but not by simplex causatives like (ii):

(i) The gunsmith caused the sheriff to die.
(ii) # The gunsmith killed the sheriff.

In this experiment, the agentive counterpart for this scenario received low acceptability score of 1.27, which is consistent with Katz's argument. As for the eventive condition (17), see also Neeleman and Van de Koot (2012), who points out that 'there is reluctance in most native speakers to construe the gunsmith's faulty repair as the immediate cause of that event' (p.27), even though his faulty repair resulted in the death of the sheriff.

Bill's terrible blows killed John in the hospital.
[kill, eventive, locational, unintentional] (Mean Acceptability Score = 2.46)

For (16), three informants pointed out that the gunsmith's faulty repair was merely a contributing factor but not the direct cause of the sheriff's death. Two informants also explicitly commented that it was Mary Jane who is more directly responsible for the outcome of this event. For (17), six informants said that this sentence sounds as if Bill hit John in the hospital. Another two informants suggested that this sentence could be better without the locational modifier (i.e., *Bill's terrible blows killed him.*)[8].

Considering that the overall results presented in Figure 2 could be affected by the peculiarity of *kill* sentences (16) and (17), I constructed another graph based on the *flood* and *melt* data only:

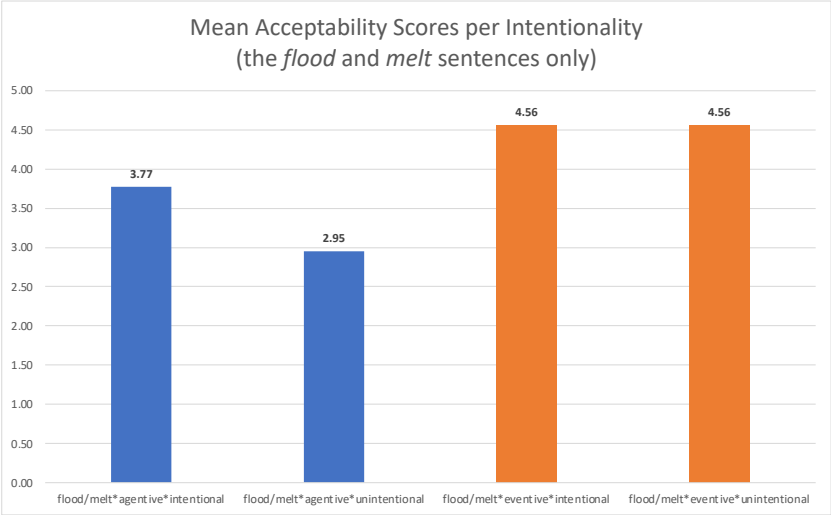


Figure 5: Mean Acceptability Scores per Intentionality (on the basis of the 'flood' and 'melt' data)

As can be seen above, the results still suggest that only the agentive condition shows sensitivity to the agent's intentions.

[8] I thus suspect that the lower acceptability scores for (16) and (17) can be attributed to independent factors that have something to do with the contexts: in both scenarios, the causing event does not deterministically result in the result, namely the death of the theme's referent, and this must be the primary reason behind the infelicity of these sentences. In (16), faulty gun repairs do not stereotypically lead to someone's death, and the context involves another individual with a mental state than the gunsmith (i.e., Mary Jane), who is more closely related to the sheriff's death in that he would not have died without her presence. Similarly, people do not typically die because of being knocked down unconscious by someone. Moreover, Bill's terrible blows in (17) will never be construed as an event that deterministically brings about John's death *in the hospital*, because John could have died in a different place, or in fact, he could have woken up after being unconscious.

3.4 Further questions raised by unsolicited informant responses

One of the informants suggested that if the way Mary killed John is specified (i.e., if a phrase such as *by placing a booby trap* is added to (14a) and (14b), repeated below as (19a) and (19b)), these sentences become much more acceptable:

(19) a. Mary killed John when he entered his vault.
b. Mary killed John in his vault.

This indicates that: (i) the default interpretation of simplex causatives with agentive subjects is the one that keeps the causal chain minimal, and (ii) if a causing event is mentioned that is distant from the caused event, then an interpretation of a stretched causal chain can be attained.

If mentioning the causing event in a *by*-phrase facilitates the sub-lexical scope reading, it becomes unclear on Martin's theory how to account for the data. Following her account, the [agentive, +*by*-phrase] condition should still be worse than the eventive condition, given that the subject is agentive. The following figure illustrates that Martin's event-tokenisation predicts contradiction about the timing of Mary's action: if the VP-event 'kill John' is tokenised by a complex event composed of Mary's action (of attaching a booby trap to John's vault door) and John's change-of-state (from being alive to dead), as depicted in Figure 6, then Mary's action should be interpreted as occurring at the time specified by the temporal modifier; but the context tells that the causing event mentioned in a *by*-phrase took place a few weeks earlier:

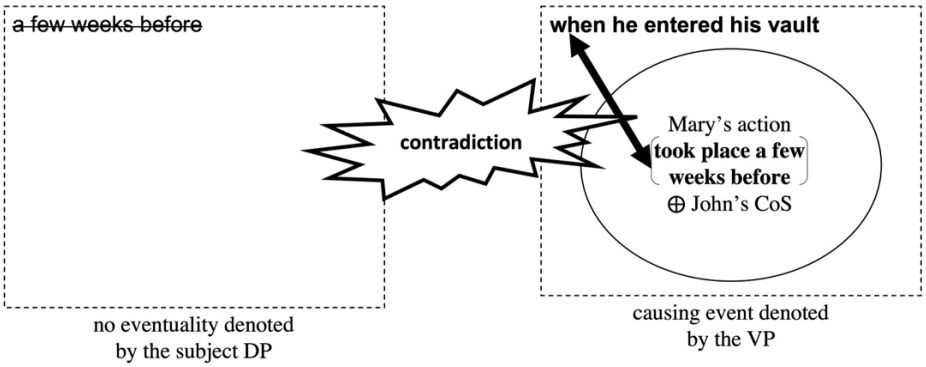


Figure 6: Event-tokenisation of 'Mary killed John when he entered his vault by attaching a booby trap to the vault door', based on Martin's (2020) account

Thus, Section 4 discusses the second (follow-up) experiment that was carried out to test the effect of adding a *by*-phrase in the agentive condition.

4. The second experiment

To analyse the third research question given below, I ran a follow-up survey with the 11 informants who participated in the first experiment:

RQ3:

Is it enough to mention a causing event that is distant from the caused event to facilitate sub-lexical scope with agentive subjects?

As explored in detail in the following subsections, this second experiment indicates that mention of a causing event does have an effect of stretching causal chains, but only under the condition that the agent can be held accountable for the resultant state denoted by the verb.

4.1 Hypothesis 3

If the sub-lexical scope reading is licensed simply by a reference to the causing event – whether in an eventive subject or in an event-denoting adjunct like a *by*-phrase, then sentences with an agentive subject and a *by*-phrase are expected to behave *exactly* like ones with an eventive subject. Reflecting the results of the first experiment, this means that those sentences should achieve higher acceptability scores, and the effect of intentionality would become smaller.

However, considering for example that speakers make a choice between (20a) and (20b) to describe the identical scenario given in (10), it will be safe to assume that each of these sentences highlights different aspects of the scene, and thus having an agent and a *by*-phrase is not equivalent to having an eventive subject:

(20) a. Mary killed John in his vault, by attaching a booby trap to the vault door.
b. Mary's placing of the booby trap killed John in his vault.

Neeleman and Van de Koot (2012) argue that when using causative predicates, speakers must distinguish a crucial contributing factor (henceforth CCF) that is essential in a causal chain from other factors that fall in what they call the ceteris paribus category (i.e., factors that are considered as non-essential), and the external argument identifies the CCF. Compare (21a) and (21b), given in two different contexts:

(21) [CONTEXT 1: Several burglars tried to break an incredibly hard window using a hammer and only John, the most muscular of them, succeeded.]

[CONTEXT 2: John was alone, and he tried to break an incredibly hard window. He first used a brick but failed, then tried a piece of timber in vain, and finally succeeded by using a hammer.]

a. John broke the window.
b. The hammer broke the window.

(cf. Neeleman and Van de Koot (2012))

The first situation can be described appropriately by (21a) but not by (21b), while the reverse applies to the second situation. In the former, since every burglar used the same tool, the choice of instrument is not significant, but John is the one who 'crucially contributed' to breaking the window. In the latter, the hammer (but not the other items) is indispensable for the result. Following this analysis, it is Mary that is presented as the CCF in (20a), whereas in (20b), Mary's action (of attaching a booby trap) is considered essential for John's death in his vault.

Following Neeleman and Van de Koot's account, sentences with an agentive subject are associated with the effect of accountability, defined as follows:

(22) *Accountability*
The referent of a DP specified as [+*m*][9] is held accountable for the action expressed by the verb if and only if it is the CCF argument of that verb.

(Neeleman and Van de Koot, 2012:31)

That is, while sentences with an eventive subject like (20b) are judged as feasible provided that the event encoded by the subject is interpreted as the CCF for the resultant state, the referent of agentive subjects, such as Mary in (20a), must be construed as accountable for the result. Here, note that intentionality implies accountability, but not vice versa: if someone acts intentionally to bring about a certain outcome, it is not possible to deny their responsibility. Contrarywise, someone can still be held accountable for their non-intentional actions, as one can be charged with accidental manslaughter in a court of law. In our experimental materials, John in the accidental flooding scenario can still be held accountable for the result, and Bill, who melted John's ice by his incorrect programming, may get the blame for it.[10]

---

[9] The [±m] feature originates from Reinhart's (2002) 'Theta System' and Neeleman and Van de Koot (2012) assume that all DPs that refer to entities with a mental state carry the [+m] feature.

[10] In the first experiment, three informants explicitly mentioned John's responsibility for the accidental flooding, and seven suggested that it is somewhat true to say that Bill melted John's ice, although not on purpose.

Based on the discussion above, I formulated the following hypothesis for this experiment:

Hypothesis 3:

The key factor to achieving sub-lexical scope is mentioning a causing event that is distant from the result. More specifically:

(i) When simplex causatives are used agentively, the causal chain is interpreted as minimal as possible by default, if no causing event is mentioned.

(ii) However, when a causing event is explicitly mentioned, then a longer causal chain can be accommodated, provided the agent can be interpreted as accountable for the result.

The first part of this hypothesis predicts that adding a *by*-phrase will increase the overall acceptability of the sentences in the agentive condition, by relaxing the tendency to minimise the causal chain, as specified in Hypothesis 3-(i).[11] On the other hand, Hypothesis 3-(ii) predicts that the [agentive, +*by*-phrase] condition will show improved results but not quite identical to the eventive condition, because only the former is associated with the effect of accountability (and also of intentionality). More precisely, it is predicted that the [agentive, intentional] cases will achieve higher acceptability scores, as the agent can be held accountable for their intentional actions, whereas the unintentional cases may vary, depending on whether the result can be construed as within the scope of the agent's accountability.

4.2 Design of the experiment

For all the 18 sentences with an agentive subject used in the first experiment, a version with a *by*-phrase was created, as exemplified in (23a′-c′)[12]:

(23) a. John flooded the town around 6 pm, exactly as planned.
[*flood*, temporal, intentional, –*by*-phrase]

a′. John flooded the town around 6 pm, exactly as he planned, by opening the sluice at 2 pm.
[*flood*, temporal, intentional, +*by*-phrase]

b. Mary killed John in his vault.
[*kill*, locational, intentional, –*by*-phrase]

[11] The reason for this, I propose, is the limited scope of intentions, which is discussed in Section 5.1.

[12] See Appendix for all the materials.

b′. Mary killed John in his vault, by attaching a booby trap to the vault door.
[*kill*, locational, intentional, +*by*-phrase]

c. Bill melted John's ice very gradually.
[*melt*, manner, unintentional, –*by*-phrase]

c′. Bill melted John's ice very gradually, by programming the freezer to raise its temperature.
[*melt*, manner, unintentional, +*by*-phrase]

The stories associated with each test sentence remain unchanged from the ones used in the original experiment.

At the stage of the decision to do this follow-up survey, eight participants had already completed the first experiment. Thus, eight personalised questionnaires were created, in which each informant's responses to the previous survey were preserved, and 18 additional test sentences of the [+*by*-phrase] condition were inserted after the corresponding stories. The eight informants were asked to assess the acceptability of these 18 sentences with a *by*-phrase, using the same 5-point scale as in the first experiment. Their responses were collected either by email or in person, depending on their availability. They were also asked to provide reasons if they wanted to change any of their previous answers on reconsideration, and one of them made two marginal changes for the [*flood*, eventive, temporal, intentional] sentence from 5 to 4, and for the [*kill*, eventive, manner, intentional] sentence from 4 to 3. As for the remaining three participants, a questionnaire that includes all the three conditions ([agentive, –*by*-phrase], [agentive, +*by*-phrase], [eventive]) was used. In other words, the two experiments were conducted simultaneously for them.

4.3 Experimental results

As predicted by Hypothesis 3, [agentive, +*by*-phrase] sentences generally achieved higher acceptability scores than ones without a *by*-phrase, although the mean score did not reach the same level as the eventive condition. The mean acceptability scores for each condition were: [agentive, –*by*-phrase]: 2.96 vs. [agentive, +by-phrase]: 4.09 vs. [eventive]: 4.42.

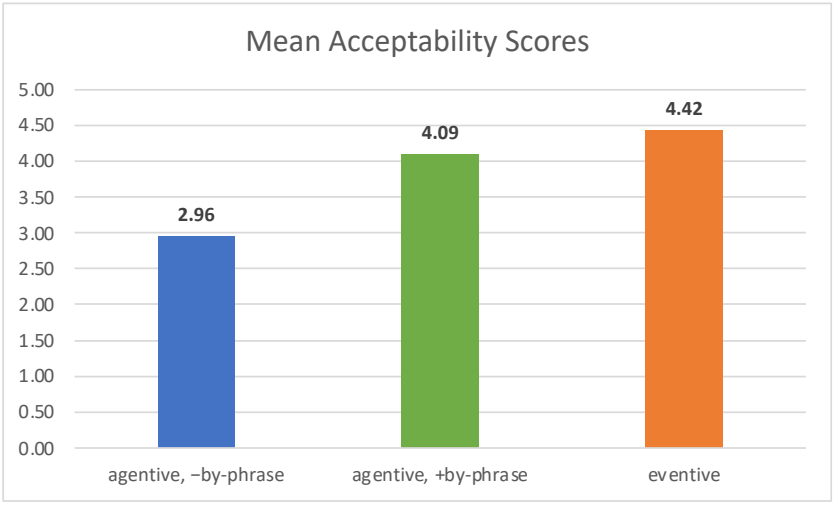


Figure 7: Mean Acceptability Scores per Three Conditions

In particular, the acceptability scores for the [*kill*, intentional] sentences (19a, b) increased more than 2 points when the causing event was mentioned, as given in (24a, b):

(24) a. Mary killed John when he entered his vault, by attaching a booby trap to the vault door.
(Mean Acceptability Score: 2.36 without the *by*-phrase → 4.38)

b. Mary killed John in his vault, by attaching a booby trap to the vault door.
(Mean Acceptability Score: 2.73 without the *by*-phrase → 4.80)

Without the *by*-phrase, seven out of 11 informants considered (19a) to be unacceptable, rating the sentence as either 1 or 2. In stark contrast, all except 1 of them accepted (24a), giving a score of 4 or 5. Similarly, while (19b) was judged totally/somewhat unacceptable by seven informants, all of them rated (24b) as good. This suggests that all the informants judged the test sentences (24a) and (24b) to fit the context which involves a remote murder with a booby-trap when the causing event was clarified.[13]

In addition, the [*melt*, locational, intentional] sentence (25) reached close to the 'totally acceptable' level by adding a *by*-phrase:

[13] In fact, (24b) outscored the eventive counterparts, indicating that this is the best of the three sentences that describe the story:

Mary's placing of the booby trap killed John in his vault. (Mean Acceptability Score: 4.45)

(25) Susan melted John's ice in his brand-new freezer, exactly as she planned, by hacking into the computer that controls it and programming it to enter defrost mode on the eve of the annual contest.
(Mean Acceptability Score: 3.82 without the *by*-phrase → 4.90)

As reported in Section 3.3, a subset of the informants stated that in the absence of a *by*-phrase, it is understood that Susan was inside John's freezer when she (physically) melted his ice. Here again, the improved acceptability of (25) shows that a stretched causal chain interpretation was attained by specifying the causing event.

However, adding a *by*-phrase did not improve the acceptability of the [*kill*, unintentional] sentences (26a, b), which correspond to the scenarios in which the causing event does not deterministically lead to the result:

(26) a. The gunsmith killed the sheriff on Tuesday, by incorrectly repairing his gun on Monday.
(Mean Acceptability Score: 1.27 without the *by*-phrase → 2.10)
b. Bill killed John in the hospital, by knocking him unconscious with all his strength.
(Mean Acceptability Score: 1.09 without the *by*-phrase → 1.30)

In neither case, the agent can realistically be considered accountable for the result, because faulty gun repairs and knocking someone unconscious do not typically result in death (see also footnote 6). The low acceptability scores for (26a, b) are consistent with the prediction that the effect of adding a *by*-phrase will be obtained only when the result is considered in the scope of the agent's accountability.

Also, the [*flood*, manner, unintentional] sentence (27) did not improve so much[14]:

(27) [CONTEXT: John works at the dam. One day, he had a very tiresome day and unwittingly opened the sluice on the dam. As a result, a massive wave engulfed a town downstream with catastrophic force.]

---

[14] The temporal and locational counterparts were judged better in the [+*by*-phrase] condition:

(i) John flooded the town around 6 pm, by opening the sluice at 2 pm.
Temporal: –*by*-phrase (2.82) → +*by*-phrase (4.10)

(ii) and indeed John did so way downstream in the Dordogne, by opening the sluice.
Locational: –*by*-phrase (3.36) → +*by*-phrase (4.70)

John flooded the town in a violent manner, by opening the sluice.
(Mean Acceptability Score: 2.18 without the *by*-phrase → 3.30)

For the [*flood*, manner] condition like (27), 4 informants reported that they had difficulty in getting the intended reading (i.e., *the town was flooded in a violent manner*). This factor could have impacted the acceptability judgement, and this point will be discussed further in Section 5.2.

As illustrated in the graph below, the results of this follow-up survey were consistent with the second prediction of Hypothesis 3. The effect of intentionality was small in the eventive condition: the difference in acceptability between the intentional and unintentional condition was 0.33 ([eventive, intentional]: 4.59 vs. [eventive, unintentional]: 4.26). By contrast, the acceptability of sentences with an agentive subject was more likely to be influenced by the presence/absence of agent's intentions (and note that intentionality implies accountability). In the [–*by*-phrase] condition, the gap between the intentional and unintentional cases was 0.97 ([–*by*-phrase, intentional]: 3.44 vs. [–*by*-phrase, unintentional]: 2.47). The [+*by*-phrase] condition showed the same pattern, in that the presence/absence of the agent's intentions resulted in a difference of 1.06 points ([+by-phrase, intentional]: 4.62 vs. [+by-phrase, unintentional]: 3.56).

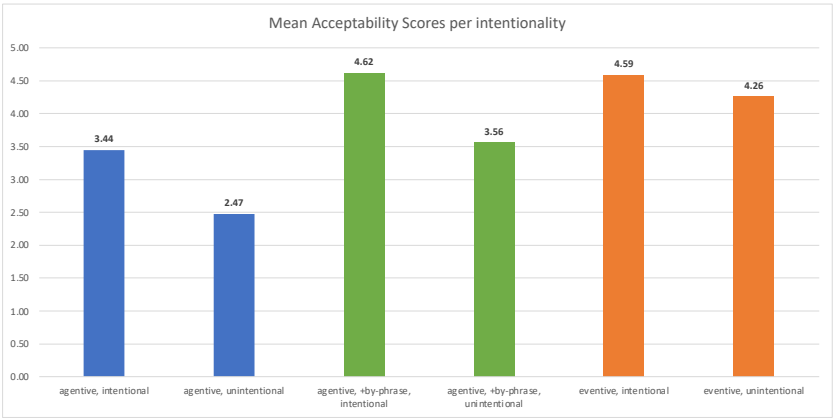


Figure 8: Mean Acceptability Scores per Intentionality in the Three Conditions

This pattern holds even when the *kill* data is removed, which means that the overall result in Fig.8 is not due to the low acceptability of two [*kill*, unintentional] sentences (26a, b):

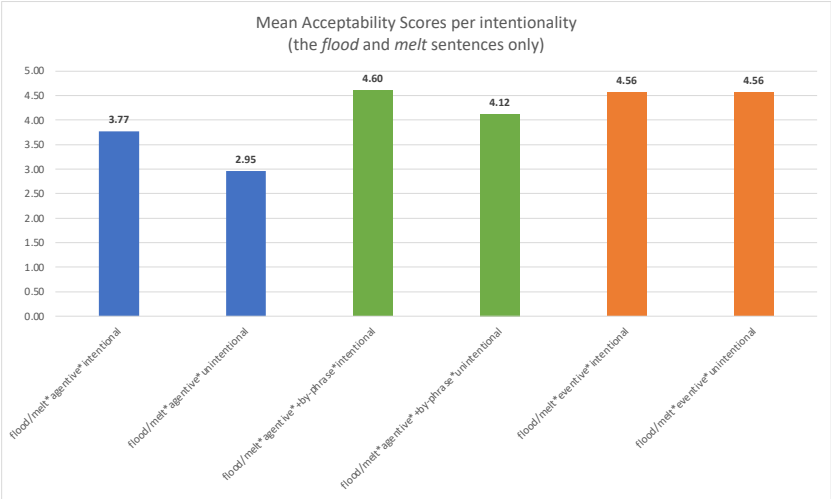


Figure 9: Mean Acceptability Scores per Intentionality in the Three Conditions (on the basis of the 'flood' and 'melt' data)

It is true that the gap becomes smaller in the [+*by*-phrase] condition in Fig.9, but adding a *by*-phrase to sentences with an agent does not have exactly the same effect as having an eventive subject. Notice that no effect of intentionality can be seen in the eventive condition in Fig.9.

Another piece of evidence that sentences with an agentive subject are linked to the effect of accountability could be drawn from the *flood* sentence (28):

(28) [CONTEXT: John works at the dam. One day, he got very tired at work and unwittingly opened the sluice on the dam. When the dam was built, residents of downstream regions had already worried that a worker at the dam might accidentally flood a town…]

and indeed John did so way downstream in the Dordogne, by opening the sluice. (Intended reading: *did so* = flood a town)

The test sentence (28), which continues from the above-mentioned context, achieved the acceptability score of 4.70 by adding a *by*-phrase.[15] In this scenario, even though the agent acted 'unwittingly', the reference to the long-standing concern of downstream residents in the context may have promoted an interpretation that John is *accountable* for the accidental flooding. Thus, (28) satisfies the conditions to be judged more acceptable: (i) the causing event is mentioned, and (ii) the agent can be held accountable for the result.

[15] Without *by opening the sluice*, (22) got the acceptability score of 3.36.

5. Two theories of sub-lexical scope

Based on the results of the two experiments, this section evaluates two possible approaches to sub-lexical scope – the split and unified mechanisms. Contrary to Martin's (2018, 2020) account, this thesis argues that VPs are always tokenised in the same way, and external arguments are introduced by a single version of Voice, whether they are agentive or eventive. The reason why it becomes more difficult to achieve sub-lexical scope with agentive subjects can be captured in terms of the interpretive effect of foregrounding accountability/intentionality when mentioning the agent and the limited scope of intentionality.

5.1 The split mechanism

Superficially, the agentive/eventive contrast observed in the first experiment appears to indicate the need for separate mechanisms to license sub-lexical scope. While Martin (2018, 2020) attempts to capture this contrast by assuming two different voice heads and event-tokenisation, this account fails to explain why mentioning the causing event can facilitate sub-lexical scope in the agentive condition. This thesis thus proposes that choices of the subject are associated with different interpretive effects, thereby causing a contrastive degree of availability of sub-lexical scope.

To begin with, speakers make choices when describing a certain situation. As a result, truth-conditionally same things can be expressed in different ways. In particular, whether or not to mention an agent is closely related to the speaker's wish to foreground or background the matter of accountability. Consider (29) for example:

(29) Mom! The vase got broken!

(Huddleston and Pullum, 2002: 1445)

Here, the most likely reason for the speaker to use the passive is to avoid specifying who is responsible for the situation (cf. Huddleston and Pullum (2002)). In other words, the matter of accountability or intentionality is backgrounded by not mentioning the agent. In such cases, the question of 'who did it?' is not the main aspect of information speakers want to convey. Thus, when eventive subjects are used, the agent's intentions are not at play; what is highlighted is only the relationship between the event encoded by the subject and the resultant state specified by the causative verb. This observation is consistent with the experimental result that the acceptability scores for the eventive condition were not influenced by intentionality. Consequently, a long causal chain becomes available, provided that the causing event can be

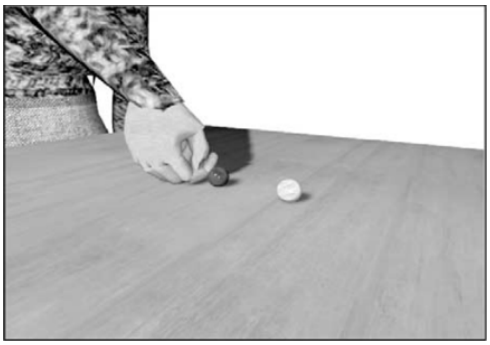
interpreted as deterministically culminating in the result, even following a number of sub-events that are not under the agent's control. The gunsmith's faulty repair in (17) and Bill's terrible blows in (18) do not satisfy this criterion, hence the low acceptability of these sentences.

By contrast, if the agent is mentioned, the matter of accountability is foregrounded (e.g., *I broke the vase!*). This means that when simplex causatives are used agentively, the agent must be construed as accountable for the result (Neeleman and Van de Koot (2012)). Given that accountability is guaranteed by intentionality (but not vice versa), the [agentive, unintentional] sentences in the current study are less likely to be acceptable. As pointed out in Section 4.1, unintentional agents can still be held accountable for the result, but in a long causal chain with various intermediaries, it becomes more difficult to obtain an interpretation that attributes accountability to the unintentional agent.

The [agentive, intentional] condition, on the other hand, would be acceptable if the agent can be considered accountable for the outcome specified in the context. However, the scope of intentionality is limited: outcomes that can truly result from the agent's intentions are temporally contiguous in many cases. For example, in the 'intentional flooding' scenario in (16), what the agent (= John) can intentionally control is only his action of opening the sluice on the dam (at 2 pm). Once it is opened, the water at the dam will start to flow downstream due to gravity, leading decisively to the consequence of the flood of the town four hours later if nothing happens in between. But this part of the causal chain is not under the control of the agent. This observation is consistent with the responses from two informants who found it unnatural to say 'John flooded the town around 6 pm, *exactly as planned*'.

Relatedly, Wolff's (2003) Experiment 2 demonstrates that participants who were shown animations in which a hand flicks a marble at another marble, causing the latter to move (as depicted in the figure below) are more likely to use lexical causatives (30a) to describe the first marble, which made physical contact with the hand, than the second marble, than the second marble, whose movement was mediated by another marble:[16]

[16] In fact, Wolff (2003) reports that participants were more tolerant of using lexical causatives when mediated causal chains are initiated by a sentient as in (30) than a non-sentient causer, as in a situation in which a marble bumps into a second one, which subsequently bumps into a third. In a situation which involves an agent and two marbles, it may be possible to interpret that the man used the first marble as a tool to move the second one, which is his intention. However, I suspect that simplex causatives will be less preferred as the number of intervening marbles increases.



(30) a. The man moved the blue marble.
b. The man caused the blue marble to move.

(the picture is adapted from Wolff, 2003:16)

Here again, it is only the first marble that can be controlled intentionally by the agent. Combining the interpretive effect of foregrounding the issue of accountability (and of intentionality) by mentioning an agent on one hand, and the limited scope of intentionality on the other, therefore, people tend to minimise the causal chain by default when simplex causatives are used with an agentive subject. Accordingly, the [agentive, intentional] sentences did not reach high acceptability scores overall, especially without mentioning the causing event.

The results of the follow-up experiment provide support for Hypothesis 3 that referring to the causing event distant from the caused event has an effect of (slightly) stretching the causal chain. Yet still, since the subject is agentive, the [agentive, +*by*-phrase] sentences were also sensitive to accountability, as predicted. Arguably, the *kill* sentences in the 'booby-trap' scenario improved because (i) the default reading of the minimal causal chain was cancelled by clarifying in a *by*-phrase that the causing event is remote from the result, and (ii) the result can easily be interpreted as included in the scope of the agent's intentions: since Mary herself attached a booby-trap to John's vault door, it is natural to imagine that the timing (= when he entered his vault) and location (= in his vault) of John's death were parts of her plan. Presumably, the participants preferred the [agentive, +*by*-phrase] condition to the eventive counterpart in this scenario (see footnote 13) because premeditated murder is often linked to the question of accountability.

The following table summarises the proposal given in this subsection:

Table 1: Interaction Between Mentioning an Agent and Mentioning a Causing Event in a by*-phrase*

	+Agent	**–Agent**
–*by*-phrase	+Accountability Short Causal Chain	–Accountability Longer Causal Chain
+*by*-phrase	+Accountability Stretching Effect	(N/A)

5.2 The unified mechanism

As an alternative to Martin's split mechanism, this thesis proposes that the sub-lexical scope phenomena summarised in Table 1 are captured by a unified mechanism, by considering decomposition of VP and assuming a single Voice, as proposed by Alexiadou et al. (2015). Following their Voice hypothesis, the sentence with a simplex causative *open* (31a) is represented as in (31b):

(31) a. John opened the door.
b. [John *Voice* [v-CAUSE [the door √OPEN]]]

(Alexiadou et al. 2015: 28)

The idea of VP decomposition presupposes that the semantics of causation involves a complex event structure, which is represented in syntactic structure (cf. Alexiadou et al. (2015), Ramchand (2013), and Neeleman and Van de Koot (2020)). Traditional decomposition theories such as Hale and Kayser (1993) assume that lexical causatives have the structure given in (32), which consists of three predicates CAUSE, BECOME, STATE, corresponding to a causing event, a process (change of state), and a resultant state respectively:

(32) [x CAUSE [BECOME [y <STATE>]]]

(Alexiadou et al. 2015: 23)

The key difference between the traditional view as in (32) and Alexiadou et al's approach is that the latter discards the assumption of the BECOME event in the lexical semantics of simplex causatives, which captures the unavailability of manner modification to target the theme referent's change of state, as illustrated in (2b), repeated below as (33):

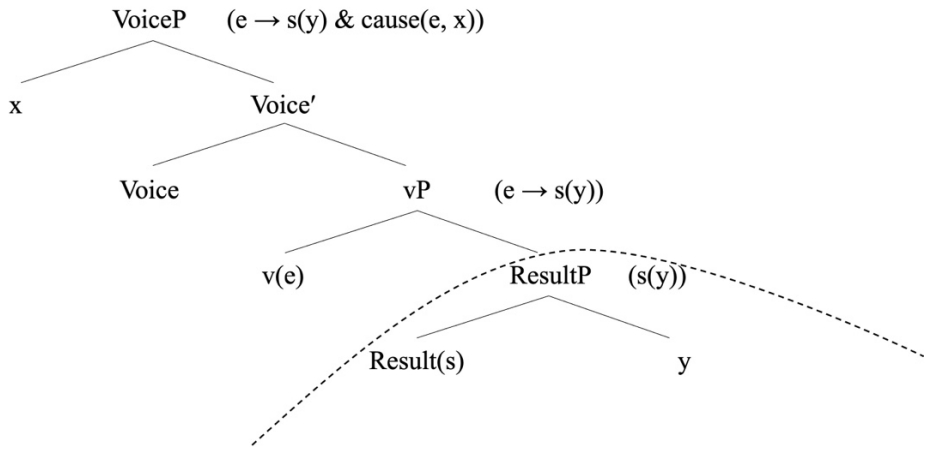
(33) John awoke Bill grumpily. (False if John was not grumpy.)

Under this VP-decomposition, the event variable (*e*) which corresponds to vP is a causing event (e.g., an opening event) that culminates in the resultant state (s) denoted by the root (e.g., the door being open):

(34) ¬s(y) e s(y)

This means that VP-events are always tokenised in the same way. The functional head Voice is responsible for introducing the external argument to the vP-event, and here we suppose that both agents and eventive causers are introduced by a single version of Voice, unlike Martin's proposal. Furthermore, this structured decomposition makes sub-lexical scope systematically available: precisely, we assume that sub-lexical modification scopes over a constituent that corresponds to the result, as depicted by the dotted line in (35):

(35)



(35) contrasts with Martin's approach, which assumes no decomposition of VP and sub-lexical scope is regarded as scope over a VP, which is available if and only if the VP in question is tokenised in such a way that the event it encodes excludes the action of the agent.

Note that this analysis predicts that sub-lexical scope is always possible. However, as discussed in the previous subsection, mentioning the agent has an interpretive effect of foregrounding the question of accountability/intentionality. Due to the limited scope of intentions, interpretations that involve a long causal chain in which the causing event is separated from the caused event become less feasible. Therefore, it becomes difficult to achieve sub-lexical scope when simplex causatives are used agentively. Put differently, sub-lexical scope with agentive subjects is excluded for interpretive rather than syntactic reasons, which is consistent with the data from the second experiment.

In addition, if we assume that the result is a state, then it is expected that sub-lexical manner

modification will be considerably worse than temporal and locational modification, because manner modifiers cannot modify states:

(36) a. Bill awoke grumpily.
b. *John was awake grumpily.

(cf. Neeleman and Van de Koot 2020:503)

The experimental results of the current study do not fit with this prediction, though (see Fig.4 in Section 3.3). Probably this is because the participants subconsciously associated the manner modifiers in the relevant test sentences with the agent's actions, instead of reading those sentences in the intended way. In fact, they often found it difficult to get the intended reading in the manner condition: in particular, five out of 11 informants explicitly reported so when assessing the [*kill*, manner] sentences in (37):

(37) Mary killed John/her husband in an agonising manner.
(Intended reading: John/Her husband died in an agonising manner.)

Furthermore, as mentioned in Section 4.3, the [*flood*, manner] condition such as (27), repeated below as (38), achieved slightly lower acceptability scores:[17]

(38) [context: John works at the dam. One day, he had a very tiresome day and unwittingly opened the sluice on the dam. As a result, a massive wave engulfed a town downstream with catastrophic force.]

John flooded the town in a violent manner, (by opening the sluice).
(Mean Acceptability Score: [–*by*-phrase] = 2.18, [+*by*-phrase] = 3.30)

In this context, it is relatively difficult to associate the manner modifier *in a violent manner* with the way John opened the sluice. Potentially, thus, (38) was less favoured because of the incompatibility of sub-lexical manner modification. When the present pilot experiments are developed into a full-scale version, the materials must include contexts and test sentences that unambiguously force informants to associate manner modifiers with change of state of the theme's referent, to further investigate the validity of the analysis in (35).

[17] The overall acceptability score for the *flood* condition was the following:

(i) temporal: 3.86
(ii) locational: 4.07
(iii) manner: 3.73

6. Conclusion

While it has long been assumed that English simplex causatives do not allow sub-lexical scope, the findings of the pilot experiments conducted in this study demonstrate the possibility that sub-lexical modification of the resultant state is systematically available but filtered out by interpretive factors: to obtain a sub-lexical scope reading, a long causal chain must be assumed, and the availability of such an assumption depends on (i) whether the causing event that is temporally distant from the causing event is clarified, and (ii) the issue of accountability is foregrounded or backgrounded. By considering Alexiadou et al's (2015) Voice theory and event decomposition, therefore, we can capture the sub-lexical scope phenomena by a unified mechanism despite the superficial agentive/eventive contrast, without appealing to the split mechanism proposed by Martin (2018, 2020).

A clear limitation of this pilot study is the small-scale, informal nature of the experiments. To scale this up to a formal, full-scale experiment, a larger number of participants and statistical analysis of the data will be needed. Besides, experimental materials need to be amended to verify the theoretical prediction that speakers are less likely to tolerate sub-lexical scope with manner modifiers, which was not attested in the present study.

Yet still, this thesis could add value to the research on causative predicates, by suggesting how the lexical semantics of simplex causatives is represented, and how people interpret and describe complex causal relations.

Appendix

The full questionnaire used in the experiments are available at: https://bit.ly/3SRian7

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