

## Simplex Causatives and Sub-lexical Scope<sup>1</sup>

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Word Count: 9,465

### Abstract

*This thesis investigates 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 further examine the empirical predictions of Martin's proposals, I conducted a pilot experiment, as well as a small follow-up, with 11 English native informants. The results of these experiments indicate 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 and the concomitant options for sub-lexical scope. This thesis explores two potential mechanisms for achieving sub-lexical scope, demonstrating how the data obtained from the experiments can be analysed by each approach.*

**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 the so-called restitutive reading of the presuppositional adverbial *again* in (1):

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<sup>1</sup> 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 readings. Under the repeated action reading (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 such 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 a sub-lexical part of the lexical semantics of the verb *open*.<sup>2</sup>

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)

- (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.]

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<sup>2</sup> 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 through a process of repairing a conflict between two presuppositions generated by contrastive focus and *again*.

- 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 a 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 of (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 their 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.<sup>3</sup>

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<sup>3</sup> 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.

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

(Martin, 2020: 147; emphasis added)

She proposes to account for these facts by having agentive and eventive external arguments introduced into the syntactic structure by two different Voice heads. The choice of Voice head in turn 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 agents that act non-intentionally. 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 the agentive and eventive cases should be treated separately, because only the agentive case shows sensitivity to intentions. However, my informants’ responses raised another possibility, namely that explicitly mentioning the causing event, whether in an eventive subject or in a *by*-phrase, can make sub-lexical scope readings accessible. I ran a follow-up experiment to examine this, and it materialised that mentioning the causing event has the effect of facilitating the ‘stretching’ of the causal chain in the agentive case, which in turn facilitates a sub-lexical scope reading for a modifier, provided that the agent can be held accountable for the outcome of the event.

Based on the results of the two experiments, this thesis also explores another potential theory that the sub-lexical scope phenomena can be captured by a unified mechanism, inspired by Alexiadou et al.’s (2015) Voice theory and some degree of event decomposition. This approach proposes (i) that a *single* Voice head is responsible for introducing external arguments, (ii) that sub-lexical modification targets a constituent that corresponds to the result, and (iii) that the interpretive effect of foregrounding the accountability/intentionality makes sub-lexical scope less achievable in the agentive condition.

This thesis is organised as follows: in Section 2, I review Martin’s (2018, 2020) account of 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 a causing event that is distant from the caused event. Section 5 compares and contrasts two theories of sub-lexical scope and spells out how each approach captures the experimental results. In doing so, I also provide suggestions about what factors appear to be involved in the computation of complex causation events. Finally, Section 6 concludes this thesis.

## 2. Martin's account of 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 that this 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 –  $\text{Voice}_{\text{ag}}$  and  $\text{Voice}_{\text{c}}$  – are responsible for introducing agentive subjects and eventive subjects, respectively, and that the event variable denoted by the VP (here *kill Fido*) is tokenised differently, depending on the Voice head that introduces its external argument.

Following her account, agentive subjects are introduced by  $\text{Voice}_{\text{ag}}$ . 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,  $\text{Voice}_{\text{c}}$ . 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 this VP-event  $e$  is 'tokenized by *change-of-state* of the theme referent' (p.150). Thus, for example, the event type denoted by the VP *kill Fido* in (6b) is identified as Fido's *dying* event. Consequently, this example is interpreted in the same way as (7), in which the 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 both fall within the 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 also footnote 2). Since there is no further eventuality introduced by the subject DP, it is impossible to identify any action of Fred’s on December 23 as being contained in the causal chain, as can be seen in the top-left panel.

By contrast, eventive subjects introduce a causing eventuality ( $v$ ) of the causal chain. Hence, 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).

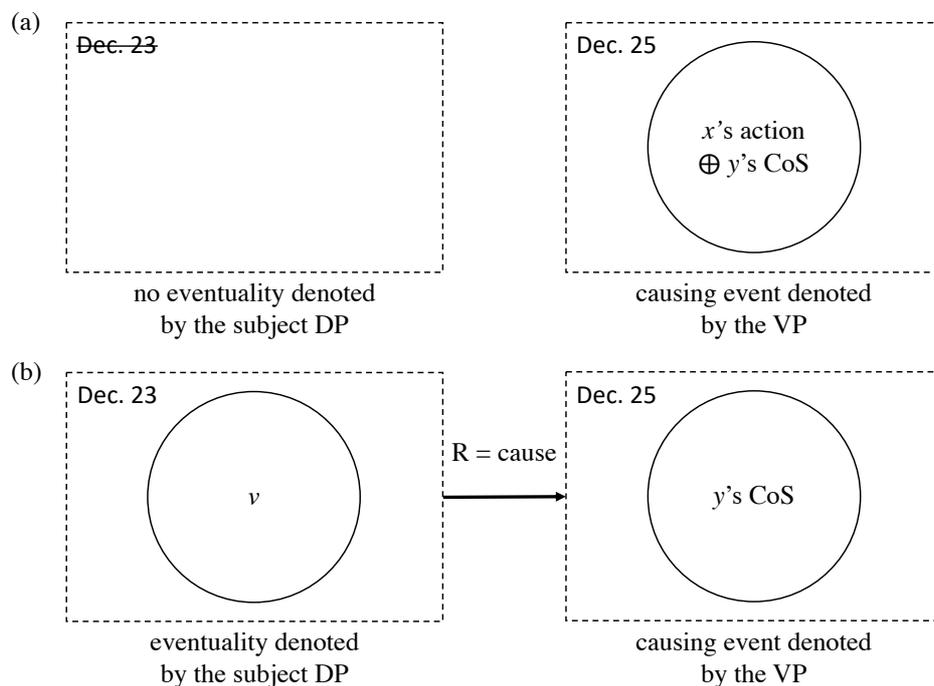


Figure 1: Causal chains denoted by lexical causative statements

(adapted from Martin, 2020:151)

## ***2.2 Potential areas for further investigation***

In line with 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 a VP-event is tokenised is determined solely by whether Voice identifies an additional eventuality in 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 overall 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 veterinary hospital* and manner modifiers like *in an agonising manner* can be about where or how Fido dies, instead of about where/how he is killed.

In conclusion, Martin’s (2018, 2020) theory gives rise to the following two research questions, both of 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 sub-lexical 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 Hypotheses 1 and 2

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

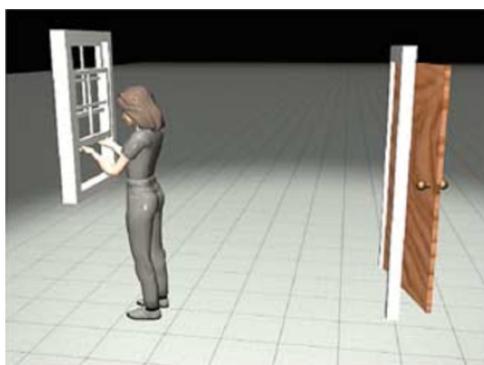
##### **Hypothesis 1:**

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 allowing a breeze to come into the room, so that the door opens as a result. Wolff (2003) 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' judgements about sub-lexical modification vary depending on the presence/absence of intentionality on the part of the agent (→ Hypothesis 1). Note that if Martin's account is correct, the null hypothesis will be confirmed, as it predicts that entity-denoting subjects introduced by Voice<sub>ag</sub> are incompatible with sub-lexical modification, regardless of its referent's intentionality.

Second, 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 presence of an eventive subject, 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 should be able to modify the eventuality (*v*) denoted by the subject DP and the VP-event (*e*) separately. Since locational and 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 sub-lexical modification, depending on the subject type.

### ***3.2 Design of the experiment***

To investigate Hypotheses 1 and 2, I conducted an acceptability judgement survey with 11 native speakers of English. The design of this experiment is a  $3 \times 2 \times 3 \times 2$  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<sup>4</sup> 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...]

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<sup>4</sup> 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.<sup>5</sup>

(Intended reading<sup>6</sup>: *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°C 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°C to -10°C 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, exemplified by (10a), (11a) and (12a), the subject DP denotes an entity with a mental state, whereas in the eventive condition, exemplified by (10b), (11b) and (12b), the subject is an eventuality that describes the causing event. This eventive argument consistently includes an agentive DP.

In the intentional condition, there is an agent who acts intentionally to bring about the resultant

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<sup>5</sup> 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 VP *flood a town*. Consequently, the test sentences are presented as a continuation of the story.

<sup>6</sup> 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 discussed and accounted for in Section 5.

state denoted by the VP. In other words, the result of the event denoted by the VP falls within the scope of the agent's intention in the mental model. For instance, in the *kill* story in (10), Mary attached a booby trap to John's vault door with the intention 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 opened the sluice on the dam with the intention to cause a flood.

In the unintentional condition, on the other hand, the stories indicate that the resultant state denoted by the VP is the 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:

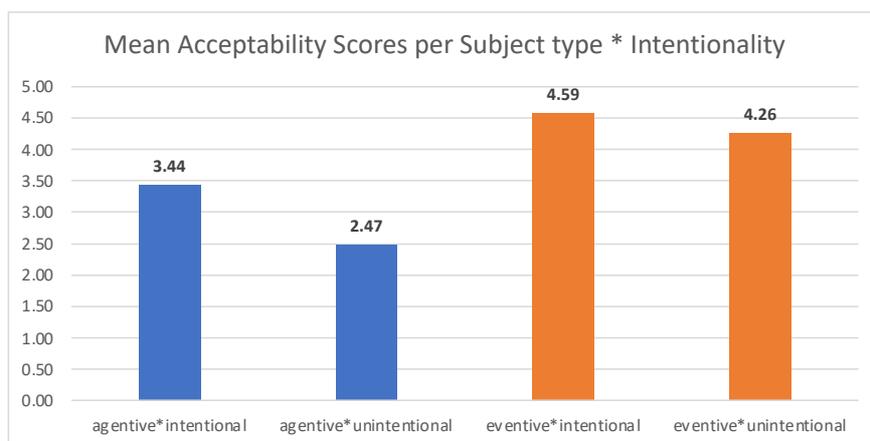


Figure 2: Mean Acceptability Scores per Subject type and Intentionality

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 considered *melt* sentences such as (15) degraded, 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 compatible with Martin's account:

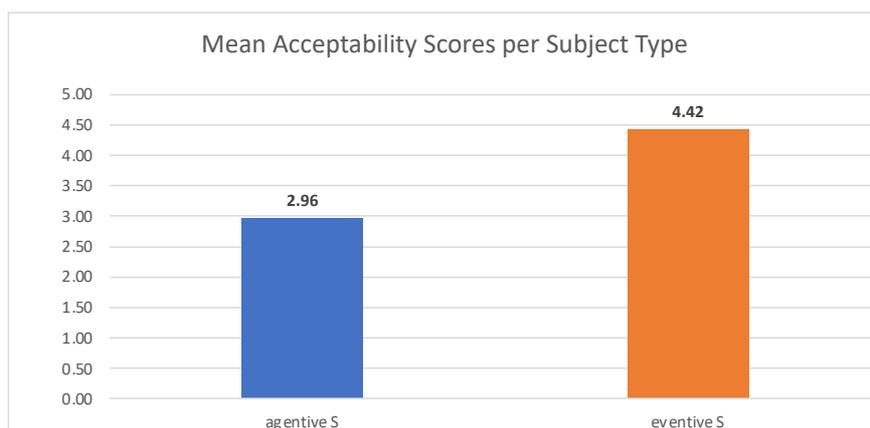


Figure 3: Mean Acceptability Scores per Subject Type (agentive/eventive)

Furthermore, modifier type does not seem to affect acceptability judgements:

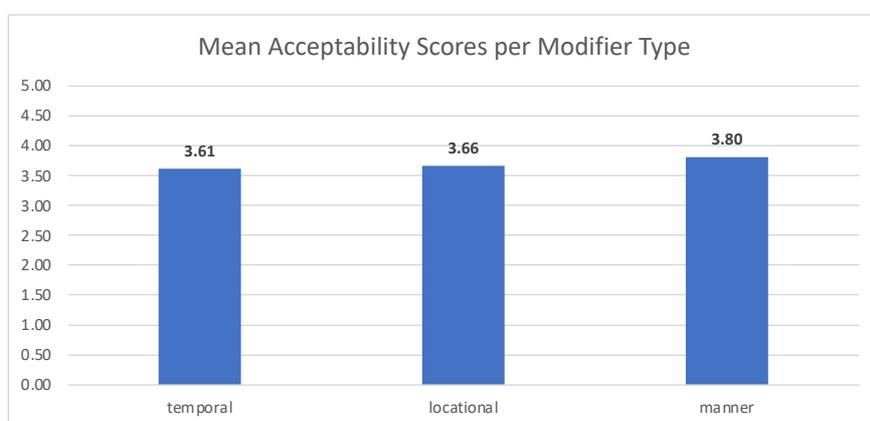


Figure 4: Mean Acceptability Scores per Modifier Type (temporal/locational/manner)

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.]<sup>7</sup>

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<sup>7</sup> 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):

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.]

Bill's terrible blows killed John in the hospital.

[*kill*, eventive, locational, unintentional] (Mean Acceptability Score = 2.46)

For (17), 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 (18), six informants said that this sentence sounds as if Bill hit John in the hospital. Another two informants suggested that this sentence would be better without the locational modifier (i.e., *Bill's terrible blows killed him.*)<sup>8</sup>.

Considering that the overall results presented in Figure 2 could be affected by the peculiarity of *kill* sentences (17) and (18), I constructed another graph based on the *flood* and *melt* data only:

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

In this experiment, the agentive counterpart for this scenario received a 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.

<sup>8</sup> I thus suspect that the lower acceptability scores for (17) and (18) 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 (17), 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 (18) 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.

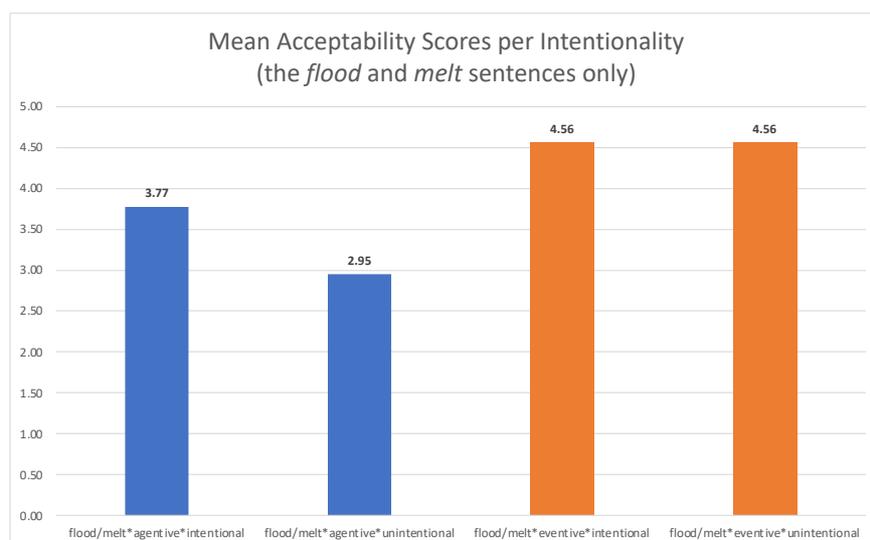


Figure 5: Mean Acceptability Scores per Intentionality (on the basis of the 'flood' and 'melt' data)

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

### 3.4 Further questions raised by unsolicited informant responses

One of the informants suggested that if the way Mary killed John is specified in (14a, b), these sentences become much more acceptable. Compare (19a, b) and (19a', b'), respectively:

- (19) a. Mary killed John when he entered his vault.  
 a'. Mary killed John when he entered his vault, by placing a booby trap.  
 b. Mary killed John in his vault.  
 b'. Mary killed John in his vault, by placing a booby trap.

This suggests that: (i) the default interpretation of simplex causatives with agentive subjects is 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 with an extended 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 a contradiction about the timing of Mary's action in the vault scenario: 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:

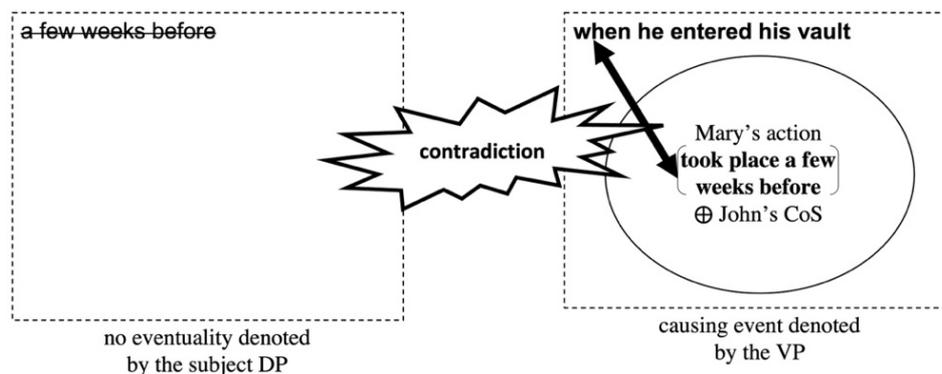


Figure 6: Event-tokenisation of 'Mary killed John when he entered his vault by attaching a booby trap to the vault door', based on Martin's (2020) account

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 the effect of permitting an interpretation with an extended causal chain, but only if 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 should become smaller.

However, speakers are able to make a choice between (20a) and (20b) to describe the identical

scenario given in (10). Indeed, intuitively, these sentences seem to highlight different aspects of the scene. If this is correct, then having an agent and a *by*-phrase does not have equivalent interpretive effects as 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) for the coming about of the resultant state. This crucial contributory factor is distinguished from other factors that fall in what they call the *ceteris paribus* category (i.e., factors that are considered non-essential in the case at hand). The external argument of a causative is assumed to identify 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 is presented as 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.

Furthermore, still 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]<sup>9</sup> 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. For example, in case of a non-intentional killing, one can still be charged with accidental manslaughter in a court of law.

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).<sup>10</sup> 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 sub-lexical modification in the [agentive, intentional] cases will be accepted in general, as the agent can

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<sup>9</sup> 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.

<sup>10</sup> The reason for this, I propose, is the limited scope of intentions, which is discussed in Section 5.1.

be held accountable for their intentional actions. The acceptability scores for this condition, therefore, are expected to achieve as high as their eventive counterparts.

On the other hand, improvement in the acceptability scores in the [agentive, unintentional] sentences may vary, depending on whether the result can be construed as being within the scope of the agent’s accountability. In our experimental materials, John in the accidental flooding scenario could still be held accountable for the result, and Bill, who melted John’s ice by his incorrect programming, may get the blame for it.<sup>11</sup> Hypothesis 3-(ii) thus predicts improved results for the [agentive, +by-phrase, unintentional] sentences in the *flood* and *melt* conditions. Note also that this prediction does not hold if the agentive subjects are associated only with the effect of intentionality but not with accountability. Table 1 summarises the different predictions made by each possible hypothesis:

*Table 1: Predictions about the [agentive, +by-phrase] condition made by different hypotheses*

<b>Hypothesis</b>	<b>Prediction</b>
Martin’s account	The [agentive, +by-phrase] sentences should be worse than their eventive counterparts.
Mentioning a causing event is enough. (as assumed in RQ3)	All the [agentive, +by-phrase] sentences should show improved results.
Mentioning a causing event facilitates sub-lexical scope, provided the result can be considered as being within the scope of the agent’s <i>intentionality</i> .	All the [agentive, +by-phrase, intentional] sentences should show improved results, whereas their unintentional counterparts should not improve.
Mentioning a causing event facilitates sub-lexical scope, provided the agent can be interpreted as <i>accountable</i> for the result. (Hypothesis 3-(ii))	(i) All the [agentive, +by-phrase, intentional] sentences should show improved results. (ii) A subset of the [agentive, +by-phrase, unintentional] sentences should also show improved results, depending on the context.

<sup>11</sup> 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.

#### 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')<sup>12</sup>:

- (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]
- 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],

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<sup>12</sup> See Appendix for all the materials.

[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.

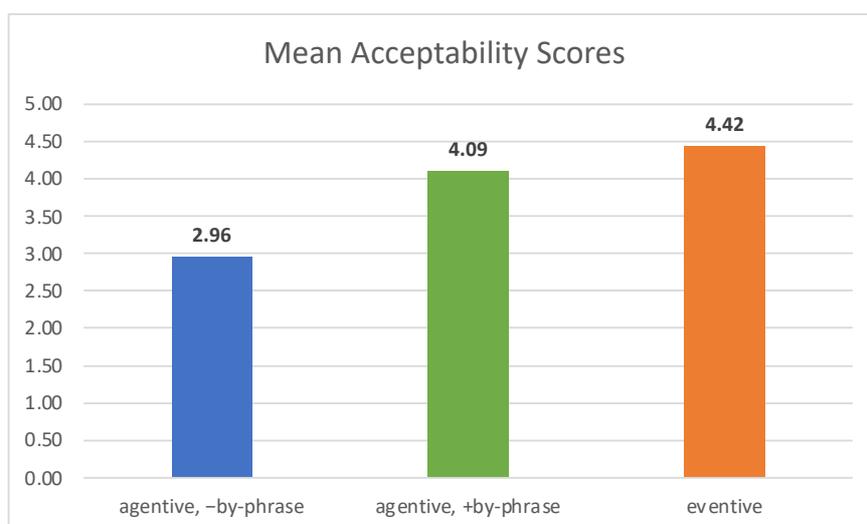


Figure 7: Mean Acceptability Scores per Three Conditions

In particular, the acceptability scores for the [*kill*, intentional] sentences (19a, b) increased by 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, one the causing event was clarified.<sup>13</sup>

In addition, the [*melt*, locational, intentional] sentence in (25) was judged close to ‘totally acceptable’ once the *by*-phrase was added:

- (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, this example is understood as implying 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)

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

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

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<sup>13</sup> In fact, (24b) outscored the eventive counterpart below:

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

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

- (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.]

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), four 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 Hypothesis 3 in that only the agentive condition displayed sensitivity to intentionality and accountability. 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 the 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).

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- (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)

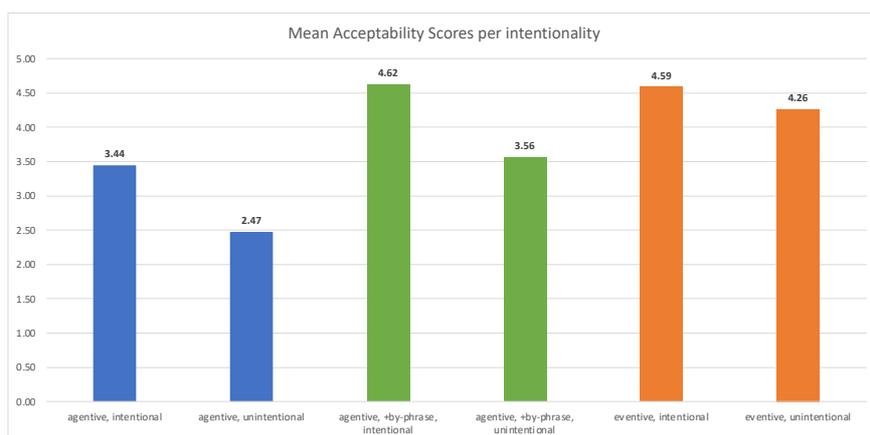


Figure 8: Mean Acceptability Scores per Intentionality in the Three Conditions

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):

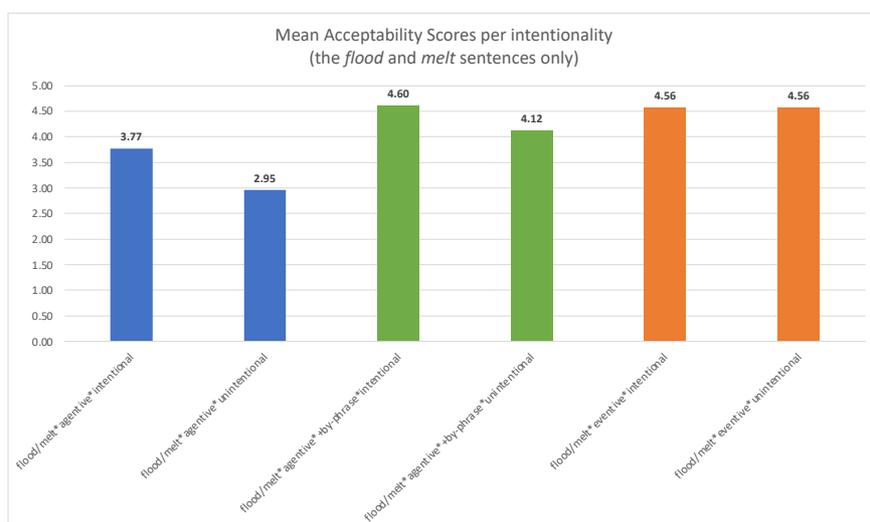


Figure 9: Mean Acceptability Scores per Intentionality in the Three Conditions (on the basis of the 'flood' and 'melt' data)

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 also that no effect of intentionality can be seen in the eventive condition in Fig.9.

Given that adding a *by*-phrase had the effect of increasing the mean acceptability score by 1.17 points (from 2.95 to 4.12) in the [*flood/melt*, unintentional] condition, in which the agent could be considered accountable for the results, it should be concluded that not only intentionality but also accountability was computed when the participants judged the [agentive, +by-phrase] sentences. Otherwise, the unintentional condition would not have shown improved results.

Arguably, the participants may have made different judgements about who was accountable for the accidental flood or the accidental melting of John's ice (i.e., some of them attributed accountability to the agent, while the others considered that the unintentional agent is not accountable for the result). This is a potential reason why the mean acceptability score for this condition did not reach as high as that for the eventive condition.

Another piece of evidence that the scores for sentences with an agentive subject are linked to the effect of accountability (instead of intentionality) 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.<sup>15</sup> 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.

## 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 – one with two mechanisms (one for sentences with agentive subjects and one for sentences with eventive subjects) and one with a single unified mechanism. The former maintains Martin's (2018, 2020) theory while requiring an additional mechanism for achieving sub-lexical scope with agentive subjects. The latter, by contrast, assumes 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

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<sup>15</sup> Without *by opening the sluice*, (22) got the acceptability score of 3.36.



- (30) Fred [Voice<sub>ag</sub> [on December 25 [kill Fido]]]  $\rightsquigarrow$   
 $\lambda e. \exists s(\text{agent}(e, \text{Fred}) \wedge \text{cause}(e, s) \wedge \text{dead}(s) \wedge \text{theme}(s, \text{Fido}) \wedge \tau(e) \subseteq \text{Dec.25})$   
 (N.B. ‘ $\tau(e)$ ’ gives the temporal trace of an event  $e$ .)

(cf. Martin, 2020:148)

While Martin claims that (30) requires Fred to *perform* an action that culminates in Fido’s death on December 25, when viewed in the light of our experimental results, it does not seem necessary that Fred’s action itself takes place on that day. Instead, I propose that: (i) the key factor is whether the agent can plausibly be interpreted as involved in the final CoS event of the causal chain (such as the *killing* event in the case at hand), and (ii) to obtain such an interpretation and thereby achieving sub-lexical scope in sentences with an agentive subject, the agent must be held accountable for the resultant state. If Fred shot Fido on December 23, for example, he is adequately interpreted as accountable for the death of the dog, but it is hard to presume his existence in Fido’s CoS event on December 25.

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, which is consistent with the experimental results. As pointed out in Section 4.1, unintentional agents can still be held accountable for the result, but Neeleman and Van de Koot (2012) propose that attribution of accountability is restricted by a locality condition, which they call Local Accountability Assignment (LAA):

- (31) *Local Accountability Assignment (LAA)*

Consider a mental model that contains a causal chain of events  $e_1, e_2, \dots, e_z$ . If an individual who is a participant in  $e_n$  is held accountable for a subsequent event  $e_{n+m}$ , then no individual who is a participant in  $e_i$ , where  $e_i$  intervenes between  $e_n$  and  $e_{n+m}$ , can be held accountable for  $e_{n+m}$ .

(Neeleman and Van de Koot, 2012:33)

Following LAA, for a person to be construed as accountable for a resultant state, there must not be any other individual whose actions in the intervening events of the causal chain in question can be considered crucial for the occurrence of the result. Consequently, in general, it is hard to get an interpretation that attributes accountability to an unintentional agent in a long causal chain with various intermediaries, because all of those participants’ actions must be taken as falling into the *ceteris paribus* category, whereas the agent’s unintended action must exclusively be given the special status as essential to bringing about the resultant state.

The [agentive, intentional] condition, on the other hand, entails that the agent is to be considered accountable for the outcome specified in the context. However, the longer a causal chain, the harder it is to maintain the viability of the agent's intentions. For example, consider the scenario used in Wolff's (2003) Experiment 2:



In this experiment, the participants were shown animations in which a hand flicks a marble at another marble, causing the latter to move. Wolff reports that they were more willing to employ lexical causatives (32a) to describe the event involving the first marble, which made physical contact with the hand, than the event involving the second marble, whose movement was mediated by the first marble:

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

(the picture above and (32a, b) are from Wolff, 2003:16)

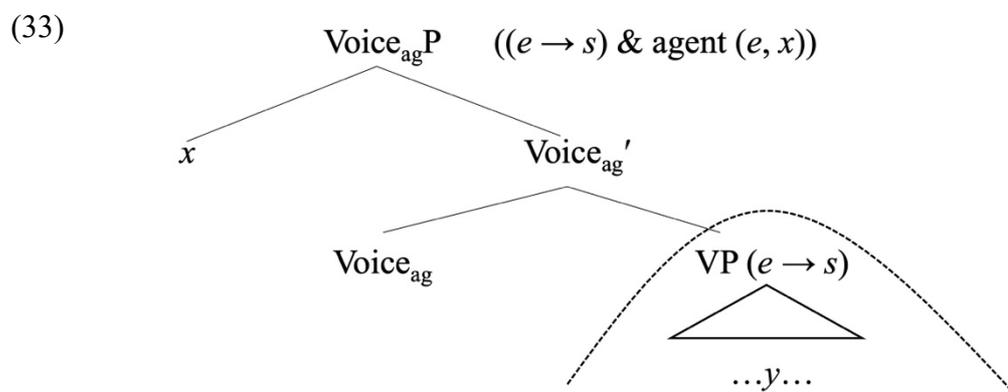
In fact, Wolff's participants were more tolerant of using lexical causatives when mediated causal chains are initiated by a sentient than a non-sentient causer, as in a situation in which a marble bumps into a second one, which subsequently bumps into a third. In a situation which involves an agent and 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 would expect that simplex causatives will be less favoured when the number of intervening marbles increases, because it becomes more difficult to predict that the initial action of the agent will have the desired effect on the last marble in the sequence. The minimisation of a causal chain in the interpretation of simplex causatives with an agentive subject can thus be understood as reflecting the hearer's understanding of the limited 'reach' of intentions. Accordingly, the [agentive, intentional] sentences did not reach high acceptability scores overall, especially without mentioning the causing event. In other words, since the consequence of an intentional agent's actions can be predictable only to a certain extent, it is not feasible to

construct a mental model in which the agent is interpreted as present in the final CoS event of a long causal chain.

The results of the follow-up experiment provide support for Hypothesis 3 that referring to a causing event distant from the caused event has the effect of enabling the (slight) stretching of the causal chain. Arguably, the *kill* sentences in the ‘booby-trap’ scenario improved substantially because 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. Besides, I would suggest that in this scenario the agent is successfully ‘lowered’ in the causal chain in the mental model: 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 all part of her plan. Therefore, in this premeditated murder story, the agent can be interpreted as present in the *killing* event, despite the long causal chain.

To summarise, the split theory assumes that the VP-event is tokenised by a causing event ( $e$ ) that culminates in the resultant state ( $s$ ) in the agentive case, and that modifiers scope over this event:



Note that the split mechanism presupposes the standard theory of scope: modifiers do *not* take scope over any sub-lexical part of simplex causative verbs. Instead, apparent sub-lexical modification results from the way the event denoted by the VP is fleshed out. To achieve apparent sub-lexical scope in sentences with an agentive subject, the process of VP-event tokenisation also involves the lowering of the agent to be present in the final CoS event of a causal chain.

### 5.2 The unified mechanism

In the previous subsection, I outlined a theory that relies on two different mechanisms to achieve (apparent) sub-lexical scope. Here, let us consider a unified mechanism, which is



This contrasts with the split mechanism, which assumes no decomposition of VP.

Note that this analysis predicts that sub-lexical scope is always possible. In pursuing the unified theory, this thesis suggests that sub-lexical scope is allowed at the syntactic level but filtered out by interpretive factors in sentences with an agentive subject. More specifically, whether or not to mention an agent is closely related to the speaker's wish to foreground or background the matter of accountability, thereby causing a contrastive degree of availability of sub-lexical scope. To see how the choice of subject is associated with different interpretive effects, consider (37) for example:

(37) 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)). That is, the matter of accountability and 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. Similarly, when eventive subjects are used, it seems that 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 conjecture 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. As I mentioned previously, the gunsmith's faulty repair in (17) and Bill's terrible blows in (18) arguably do not satisfy this criterion. Hence the low acceptability of these sentences.

By contrast, if the agent is mentioned, the matter of accountability (and probably of intentionality) is foregrounded (e.g., *I broke the vase!*). In other words, when simplex causatives are used agentively, the agent must be construed as accountable for the result, and following LAA, all the individuals involved in the intermediate events must behave in a 'ceteris paribus' fashion to legitimately assign accountability to the agent (Neeleman and Van de Koot (2012)). However, as discussed in the previous subsection, the effects of intervening factors are not entirely predictable in longer causal chains with subsidiary events. Thus, to obtain the interpretive effect of foregrounding accountability/intentionality, causal chains should be kept as short as possible. This captures why the sub-lexical scope reading, which involves assuming

a long causal chain in which the causing event is separated from the caused event, is not feasible in sentences with an agentive subject.<sup>16</sup>

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:

- (38) 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 (39):

- (39) 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 (40), achieved slightly lower acceptability scores:<sup>17</sup>

- (40) [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, (40) was less favoured because of the

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<sup>16</sup> Note, however, that the unified theory would still overgenerate sub-lexical scope, as it predicts that sub-lexical modification should be possible when the causal chain is 'short enough', as in a scenario of pretty much direct causation. Intuitively, it seems that the assumption of a long causal chain is necessary to obtain sub-lexical scope readings, but the precise effect of the length of causal chains should be further investigated in future research.

<sup>17</sup> The overall acceptability score for the *flood* condition was the following: (i) temporal = 3.86, (ii) locational = 4.07, (iii) manner = 3.73

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 the change of state of the theme's referent, to further investigate the validity of the analysis given in (36).

## **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 is available provided that the causing event that is temporally distant from the causing event is clarified, and that the agent is assigned accountability for the result (and thus construed as 'present' in the final CoS event of the causal chain) in the agentive case. To capture this pattern, this thesis has explored two potential proposals: the split and unified mechanisms. The former maintains two different Voice heads as in Martin (2018, 2020) and proposes that there are two ways for achieving (apparent) sub-lexical scope depending on the subject type. On the other hand, the latter enables us to account for the sub-lexical scope phenomena with a unified mechanism despite the superficial agentive/eventive contrast, by adopting Alexiadou et al's (2015) Voice theory and event decomposition.

A clear limitation of this pilot study is its small-scale, and its somewhat informal nature. To scale this up to a formal, full-scale experiment, a larger number of participants and statistical analysis of the data will be required. Besides, it is not easy at the moment to choose between the two potential proposals explored above. Since the split and unified theories make different predictions about sub-lexical manner modification, experimental materials will need to be amended to verify whether speakers are less likely to tolerate sub-lexical scope with manner modifiers, which was not attested in the present study.

Nevertheless, the experimental results obtained here appear robust enough to present clear problems for existing approaches to the syntax and interpretation of simplex causatives. I have made a concrete proposal for how these problems might be addressed, and in the process, I have made several concrete suggestions about the factors that enter into speakers' interpretation and description of complex causal relations.

## **Appendix**

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

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