

The Influence of Implicit Causality and End-state Focus on the Processing of Pronouns in Causal Relations

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This study examined two factors that are considered to influence coreferential preferences, viz. 1) Implicit Causality (Koornneef & Van Berkum, 2006; Crinean & Garnham, 2006) which argues for a special status of Implicit Causal verbs and 2) End-state focus hypothesis (Stevenson et al., 1994; 2000) which argues in favour of a focussing strategy for thematic roles. I claim that these two factors cannot be treated independently, but should be seen as affiliated factors. A Sentence Completion Task and an Eye-tracking study were conducted to support my claim. Both methods show that there is no reason to suggest that pronoun resolution is influenced by thematic roles only. In addition, the results show that Implicit Causal verbs have a special status with respect to Reason relations, but not to Consequence relations. Thus, it seems like Implicit Causal verbs carry a special element that endorses the preference of a referent referring to the causal instigator of the event.

Introduction

A fascinating phenomenon in language is the interpretation of pronouns: little words like 'he' and 'she' are used often but language users do not have any difficulties interpreting them. Numerous researchers (e.g. Givón, 1992; Stevenson, Nelson & Stenning, 1995; Stevenson, Crawley & Kleinman, 1994; Stevenson, Knott, Oberlander & MsDonald, 2000; Pander Maat & Sanders, 2009) have tried to develop a theory that explains why language users are well in pronoun resolution. An example sentence can be found in (1a) in which the pronoun can be interpreted as either referring to John or to Pete: it is ambiguous. Two examples of possible interpretations are presented in (1b-c). The bold printed referent is the intended one. Though the ambiguous pronoun in (1a) looks very uncommon, Pander Maat & Sanders (2009) showed in a Dutch newspaper corpus that about 2.2 percent of all male singular pronouns (*he*) remain ambiguous. Nevertheless, language users do not encounter major problems reading these ambiguous pronouns and hence it seems as if they have developed strategies to solve those pronouns.

- (1a) John angered Pete. He hit him.
- (1b) **John** angered Pete, because **he** hit him.
- (1c) John angered **Pete** and for that reason **he** hit him.

One of the most prominent assumptions in explaining pronoun resolution theory is that pronouns are normally used to refer to the most prominent antecedent. Important to know is that the most prominent referent is *preferred* and hence it does not exclude reference to another referent. However, no consensus about *how* antecedents become 'more prominent' has been reached. Traditionally, the most prominent antecedent was accounted for by linguistic principles, e.g. grammatical subject hierarchy and grammatical role parallelism (for an overview see Pander Maat & Sanders, 2009). These studies focused on testing syntactic factors that influence the selection of the proper referent for a pronoun. For example, the grammatical role hierarchy theory (e.g. Givón, 1992) argues that verbal information endorses a focus on the higher-ranked entity, in this respect the Subject. Another example is the grammatical role parallelism theory (e.g. Stevenson, Nelson & Stenning, 1995) which claims that the referent of the pronoun has a similar grammatical role as it had in the previous context. In effect, both theories can easily account for (1b), but cannot explain what happens in (1c). The problems that are encountered are a first indication that pronominal reference cannot be treated as an independent phenomenon and other factors, including non-linguistic ones, should be taken into account as well.

Thus, pronominal reference seems to be a complex phenomenon. It is not surprising that more recent studies have focussed on the interaction of several factors that might influence pronominal reference (Stevenson, Crawley & Kleinman, 1994; Stevenson, Knott, Oberlander & MsDonald, 2000; Pander Maat & Sanders, 2009). One of the factors is the influence of coherence on coreference (Au, 1986; Stevenson et al., 1994; Stevenson et al., 2000; Crinean & Garnham, 2006). For our example this would mean that for (1b) another mechanism accounts for the preferred referent than in (1c). I follow Kehler (2002), who re-introduces the coherence and coreference theory -originally introduced by Hobbs (1979)- in which "pronominal reference is not an independent process at all, but instead results as a by-product of more general reasoning about the most likely interpretation of an utterance, including the establishment of coherence relations." (Kehler, 2002: 145). Thus, it seems like coherence is one of the key factors that can help explaining pronoun resolution.

Studies on the influence of coherence on coreference have indeed shown that coherence is an important factor: different coherence relations show different preferences. However, no consensus has been reached since conflicting results lead to conflicting theories. Two of those theories will be discussed in this paper, viz. Implicit

Causality/Consequentiality and End-state focus. I will argue that the conflicting results are due to the fact that these factors are confounded. First of all, the two theories are similar with respect to their focussing mechanism; the event structure of an event is important in this respect. However, Implicit Causality/Consequentiality literature argues that pronominal preferences can only be found for a special group of verbs (the so-called Implicit Causal verbs). On the other hand, the End-state focus hypothesis argues that the preferences are the result of thematic roles and hence should apply to all groups of verbs. In this paper, I will elaborate on the similarities and differences of the two theories and explain why a slight difference in perspective has a large theoretical impact.

In order to test the theories, I will test both Implicit Causal and non-Implicit Causal verbs and compare their pronominal preferences. In this respect, I argue that it is important not to look at corpus data, since several factors cannot be controlled for in a corpus study. In order to control all conditions well, it is much more productive to look at production and processing tasks. Production has often been tested by Sentence Completion Tasks, in which language users need to continue a sentence like 'John angered Pete. He...' and encircle the intended referent. The frequency of continuations on a referent provides information about the preferred referent.¹ For processing, reading times can provide valuable information about problematic (non-prominent/non-preferred) and easy (prominent/preferred) interpretable pronouns as well. Easily interpretable pronouns are considered to be more central units and elicit faster reading times.

The aim of this paper is to provide an insight in what factor is best in explaining referential preferences, i.e. Implicit Causality or End-State focus hypothesis. First, I provide a brief overview of studies on Implicit Causality and End-state focus and predict the processing of different causal coherence relations. Secondly, a comparison of the two accounts is made in which I claim that the two hypotheses are more similar than one would expect. Thereafter, the hypotheses are tested in two experiments. Experiment 1 is Sentence Completion Task in which I aim to replicate the results for activity verbs found by Stevenson et al. (1994) while controlling for Implicit Causality. Then an eye tracking experiment is conducted to find out about the online processes involved in pronoun resolution. The implications of the results of the two experiments are discussed in the final section.

¹ The results of the pre-task of Experiment 2 will show that the verb *angered* has a strong (81%) bias towards NP1.

Influence of Implicit Causality

The first factor that is considered to be of main importance when explaining the *processing* of pronouns is the influence of Implicit Causality. Implicit Causality (IC) is extensively tested and has shown to have an impact on the processing of pronouns as presented in (2).

- (2a) **David** apologized to John, because **he**...
- (2b) **David** apologized to Linda, because **he**...
- (2c) Linda apologized to **David**, because **he**...
- (2d) David apologized to **John**, so **he**...

An important notion in Implicit Causal literature is the Implicit Causal bias. Some verbs have a bias towards the first referent (NP1-biased verbs) and other show preferences to the second referent (NP2-biased verbs). In example (2a), the IC-verb *apologize* is considered to be an NP1-biased verb: when you ask language users to complete the sentence they will, most probably, choose for a continuations with *he* referring to the first antecedent (*David*). NP2-biased verbs like *praise* have opposite preferences. As Koornneef (2008: 200) puts it: "if you *praise* somebody, you will typically do so because of *his or her* behaviour, not yours. However, if you *apologize* to somebody the most likely relevant cause is *your* behaviour, not theirs." Note that this indicates that the position of the referent does not necessarily predict its preference (cf. grammatical role hierarchy and grammatical role parallelism).

The preferences for a certain verb are usually tested in a sentence completion task. Participants are instructed to continue sentences as '*David fascinated John, because he...*' and encircle the intended referent. This production task provides an insight in preferences, but it does not provide information about the online processing of the pronouns at all. Nevertheless, reading experiments have shown that these preferences in production influence reading times. The results indicate that when the continuation of a sentence is congruent with its bias, it results in shorter reading times for the second clause compared to sentences with an incongruent referent (Vonk, 1985). For our example this means that (2b) is processed faster than (2c). However, the exact location of the processing effect remains undetermined. Several studies have argued in favour of the integration hypothesis (e.g. Garnham, Traxler, Oakhill & Gernsbacher, 1996). Integration takes place at the end of a sentence, since at that moment all information is accessible to the reader. Incongruent pronouns are considered to be more difficult to integrate. However, more recent, Koornneef & Van Berkum (2006) showed that the processing advantage already visible right after the pronoun was encountered, indicating that there is an immediate focussing effect (e.g. Green

& McKoon, 1995; Koornneef & Van Berkum, 2006). This result suggests that the first clause elicits an expectation that enhances the preference for a certain referent. When the referent is not congruent with its expectation, this will immediately result into longer processing times.

In addition to Implicit Causality, researchers have suggested Implicit Consequentiality (Au, 1986; Crinean & Garnham, 2006). These studies found that the preferences found in (2a) reversed for Consequence relations (2d). They explain this notion with reference to thematic roles (see Table 1). In other words, NP1- and NP2-preferences are caused by the focus on certain thematic roles: in Reason relations the focus is on the antecedent with the Agent or Stimulus role and in Consequence relations the effect is reversed: the focus is on the Patient or Experiencer role. Example sentences are presented in (3-4) and explain the difference in preference. Preferred referents are printed in bold.

- (3a) **John (Agent)** lied to Patrick (Patient) *because he...*
- (3b) John (Agent) lied to **Patrick (Patient)** *so he...*
- (4a) **John (Stimulus)** annoys Patrick (Experiencer) *because he...*
- (4b) John (Stimulus) annoys **Patrick (Experiencer)** *so he...*

TABLE 1
Definitions of Thematic roles (adapted from Stevenson et al. (1994), emphasis mine)

Verb type	Thematic role	Description
Transfer	Goal	Someone or something <i>towards</i> which something moves
	Source	Someone or something <i>from</i> which something moves
Action	Agent	The instigator of an action
	Patient	Someone or something affected by an action
State	Experiencer	Someone or something having a given experience
	Stimulus	Someone or something giving rise to a certain experience

What is important to note here, is that Implicit Causal preferences mentioned in (3-4) are tested in Sentence Completion Tasks. It does not provide information about the online processing of the pronouns at all. And although Koornneef & Van Berkum (2006) confirm the hypothesis that the preferred referent in Reason relations show a processing advantage, no conclusions can be drawn with respect to the processing of Consequence relations. Moreover, an experiment on non-causal connectives (Koornneef, 2008) shows that the processing advantage for the preferred referent disappears when *and* and *but* are used as connectives. Hence, the coherence relation, or more precisely the connective, does influence the processing of pronouns.

As I just illustrated, Implicit Causal literature has failed to account for processing differences among other (causal) coherence relations. One of the major reasons is, according to Koornneef (2008), that implicit causal literature adopts the notion of Implicit Causality as “a feature of verb roots that selects one entity as the ‘probable instigator or causal source of a series of events’.” (Kehler et al., 2008:31). In other words, the properties of the verb select the causal instigator and the antecedent that represents this instigator. Koornneef (2008:241) argues that “it is unlikely that Implicit Causality verbs have the inherent ability to bias people to the cause of an event”. However, a recent online eye tracking study of Mak & Sanders (2008) suggests that readers do predict Reason relations. As a pre-test, De Leeuw (2008) conducted a judgement task in which experts on discourse representation were asked to predict whether a sentence like ‘The boys quarrelled with their parents’, would continue with a Temporal or Causal (*Reason*) relation. For some verbal phrases (e.g. *the boys quarrelled with their parents*) the causal expectations was significantly higher than for other verbal phrases (e.g. *the tourists were instructed by the tour guide*).² Most importantly, for verbal phrases indulging a high causal *expectation*, the processing strategy did not depend on the connective per se. When readers were presented with the ambiguous connective *toen* – which can be used to signal Temporal relations (cf. *when*) or Reason relation (cf. *because*) – the NP-preference was still present. Thus, the *expectation* of the causal relation was sufficient to focus on a particular referent.

Summarizing, the Implicit Causal literature is consistent towards their predications on the preferred referent and processing advantage for Reason relations, i.e. the preferred referent has a processing advantage compared to the non-preferred referent. The question remains whether NP-biases can shift from the probable instigator to the probable effecter of the event. In this respect, I follow the results of Au (1986) and Crinean & Garnham (2006) who argue that the bias is reversed, i.e. not consistent with the bias indulged by the Reason relation.

Influence of End-state focus

A second theory that predicts the preferred referent for a pronoun is the End-state focus hypothesis. Stevenson et al.’s (1994) base this hypothesis on the results of their Sentence Completion Task. In this experiment they examined three verb types (transfer/action/state) and four coherence relations (*and/so/full stop/because*). Example sentences can be found in (5-6). The results of their study show that there was no difference among coherence

² Note that De Leeuw (2008) and Mak & Sanders (2008) used verbal phrases in which not only the verb is considered to influence the causal expectation of the sentence, but only in combination with the arguments involved.

relations in preferred referent for transfer (John passed the comic to Bill) and action (Joseph hit Patrick) verbs. For action verbs an example is given in (5). However, Stevenson et al. did find an effect of coherence for state verbs: the preferred referent of the connectives *and* and *so* is the Experiencer and for the *full stop* and *because* version participants preferred the Stimulus referent (6). Again, bold printed referents are the preferred ones.

- (5) a. Joseph (Agent) hit **Patrick (Patient)**, because he...
b. **Patrick (Patient)** was hit by Joseph (Agent), because he...
c. Joseph (Agent) hit **Patrick (Patient)**, so he...
d. **Patrick (Patient)** was hit by Joseph (Agent), so he...
- (6) a. Ken (Experiencer) admired **Geoff (Stimulus)**, because he...
b. **Ken (Stimulus)** impressed Geoff (Experiencer), because he ...
c. **Ken (Experiencer)** admired Geoff (Stimulus), so he...
d. Ken (Stimulus) impressed **Geoff (Experiencer)**, so he ...

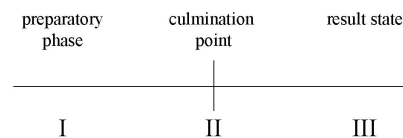
As can be seen in examples (5) and (6), there is reason to suggest that the verbal aspect (verb type) and the direction of causality are important factors in predicting the preferred referent. Two follow-up studies by Stevenson et al. (2000) show that the direction of causality is indeed important. The first study re-analyzed the (1994) data. Since the connective *so* is ambiguous between Purpose and Result relations, Stevenson et al. disentangled those two meanings. The analysis shows that Result relations are related to a Patient preference and the Purpose is not. In a second study the connective *whereupon* – which redirects the attention to the consequences of that event – was tested. The preferred referent was on Patient roles. Thus, since the analysis on coherence relations shows similar results, it can be concluded that it is not the connective itself that is important with respect to the preferred referent, but the coherence relation it signals.

According to Stevenson et al., the results can be explained along the lines of aspect and end-states of the event: “the default focus in clauses describing events is on the thematic role associated with the endpoint of the event, a focus that is attenuated when the connective redirects attention to the cause.” (Stevenson et al., 2000:229). Since state verbs are considered to have no endpoint it lacks a default focus and hence the focus depends on the type of coherence relation. Stevenson et al. (2000:229) claim that “a subsequent connective can *convert* the state into an event having a pre-condition and an endpoint.” Thus, the connective *because* redirects attention to the precondition (reason) and *so*

redirects attention to the endpoint (result). For state verbs the connective is thus of great importance.

Before we move on, it is important to discuss the difference between event verbs and state verbs, because it is a main element in the End-state focus hypothesis. In this respect, the event structure of a verb is important. Generally, the event structure is divided into different stages, which are presented in Figure 1 below.

FIGURE 1
Stages in the event structure

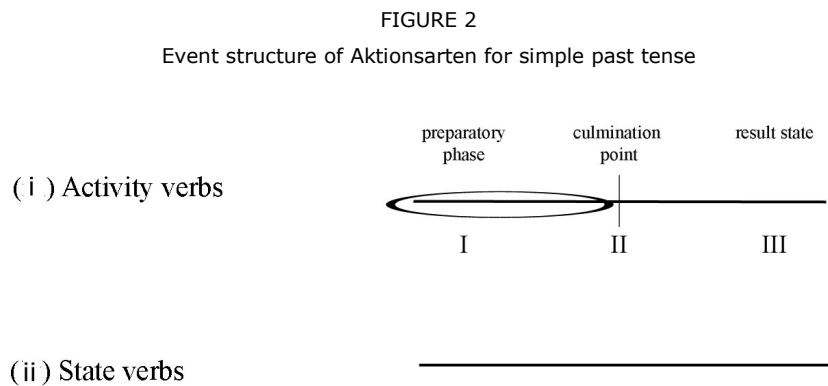


The sentence "Mary wrote the letter" is used to explain the different stages of the event structure. The first stage is the *preparatory stage* and in this stage Mary was actually writing the letter. This process can be either brief or time-consuming, but must be durative. Furthermore, the purpose is to *finish* the letter, so an endpoint is expected. When Mary finished the letter, she has reached the *culmination point*. Note that this *culmination point* is not a durative event. After she finished the letter this fact remains for eternity. Mary has therefore reached the *state* in which she finished the letter. Although this phase is durative, it is not an activity and is hence considered to be a state.

The event structure can be used to illustrate differences among verb types. Though the division of verbs (called *Aktionsarten*) introduced by Vendler (1967) distinguishes four kinds of verbs - accomplishment, achievement, activity and state verbs- I focus on the difference between activity (or action) and state verbs. First, an activity verb has no culmination point. For instance, note the difference between the accomplishment verb *write* and the activity verb *walk*. Whereas you can *walk* without an endpoint or purpose, you cannot *write* without a purpose. Writing necessarily implies that you are writing something and the goal is to finish this (now or in the future)³. On the other hand,

³ Although we can say 'Mary writes', this is not considered to be an activity verb. The sentence describes a habitual event (namely: Mary is a writer/ Mary writes very often) and not an event. It is not comparable to 'Sarah walks' because this is a non-habitual description and describes the present tense of the event of walking.

you can describe an activity verb without referring to a culmination point. 'Sarah walks' does not assume an endpoint though it is possible to define an endpoint with the help of the adverb 'to the beach' or 'for hours'. It is important to note that although this endpoint can be set, the verb itself does not indulge this particular endpoint. Contrastingly, the state verb is totally different, since it does not describe events. The distinction between state and event can best be described as the condition of the event over a period *i*. Whenever a sentence describes some kind of change, this is considered to be an event. The "condition, which obtains when the event begins, is terminated by the event and gets replaced by another." (Kamp & Reyle, 1993:507) On the other hand, if a state verb "obtains over some interval *i* [it] means that some conditions remain in force for the duration of *i*." (Kamp & Reyle, 1993:507). Dowty (1979) describes tests which are useful in differentiating state from action verbs. One of the tests is the 'only non-statives occur in the progressive test' (Dowty, 1979:55) which states that only event verbs can be used in the progressive tense.



Note that the event structure we discussed so far is only valid for the simple past tense. For example, we explained that 'Mary wrote the letter' described all stages in the event structure, this is not true for all tenses. When we say 'Mary writes the letter' this does not entail that she will finish it at all, though it is expected that she will finish the letter somewhere in the future. However, the sentence itself only describes the activity in the preparatory phase. The same is true for the past continuous: 'Mary was writing the letter'. On the other hand, the present perfect does entail that Mary finished writing. We cannot read 'Mary had written the letter' without concluding that the letter was finished. The importance of this observation is that the event structure can be influenced by tense.

When we get back to the End-state focus hypothesis, this implies that tense and aspect affect the preferred referent of an event. Kehler et al. (2008) show that, when you change transfer verbs⁴ into state verbs, this influences the pronominal reference preference. Activity verbs can be transformed into states as well, e.g., 'Mary pushed John' is an activity, while 'Mary was pushing John' is a state (Dowty, 1979; Schenner, 2005). Thus, when activities would be changed into states with the help of tense, I would expect the connective to redirect attention in the same way it does in 'normal' states. The connective is then very important in redirecting attention.

Implicit Causality similar to End-State focus?

In the previous two sections, two theories were discussed that might explain pronominal reference. However, these two theories might be confounded. I argue that the reverse effect of Implicit Consequentiality is related to the End-state focus hypothesis in a way that the Patient and Experiencer are most likely to be the effectors of an event. In a similar way, Agent and Stimulus roles are often similar to the probable instigator. Hence, the two theories are similar on a cognitive psychological level. However, the fact that End-state focus relies on thematic roles indicates that preferences would be across the board. No special status for IC-verbs is assumed. Examples are presented in Table 2 to show similarities and differences.

TABLE 2
Pronominal preferences for different verb-types in Reason and Consequence relations according to the Implicit Causal and End-state focus hypothesis.

		Implicit Causality	End-State focus
IC-Verb	John angered Pete, <i>because</i> he hit him.	John (NP1)	John (Agent)
	John angered Pete <i>and for that reason</i> he hit him.	Pete (reversed NP1-effect)	Pete (Patient)
Non-IC-Verb	John helped Pete, <i>because</i> he likes him.	No preference	John (Agent)
	John helped Pete <i>and for that reason</i> he likes him.	No preference	Pete (Patient)

To my knowledge, no study on End-state focus has controlled for NP-biases and vice versa. The aim of this paper is to integrate the two in order to determine which of the two factors is best (or most important) in explaining coreference. I even might end up concluding that the two accounts are indeed confounded. Thus, where End-state focus could be an explanation for NP-biases, End-state focus could also be confounded by NP-biases. Nevertheless, there is reason to suggest to that controlling for Implicit Causality is of great importance. De Leeuw (2009) conducted an eye tracking study in which she found that non-IC verbs were

⁴ Transfer verbs are considered to be accomplishment verbs and contain their own endpoints. By changing the tense into progressive this endpoint disappears. Kehler et al. (2008) found when the endpoint is removed, the preference for the pronoun changes.

processed differently: in non-IC verbs there was no significant difference between NP1- or NP2-continuation in Reason relations. This leads us to the conclusion that non-IC verbs have a special feature that enhances a prediction that influences the processing mechanism. Nonetheless, there was no control for aspectual issues, which might have influenced the results. In addition, verbal phrases were used, so verbs could also be pragmatically biased by their arguments, not by thematic roles per se. These factors will be carefully controlled for in order to tease the two theories apart.

Experiment 1: Sentence Completion Task

Aim

The first Experiment aims to disentangle the Implicit Causal and the End-state focus hypotheses. The Implicit Causal hypothesis argues in favour of a special status for IC-verbs. In contrast, the End-state focus hypothesis argues that for all verbs the information of verbal aspect is crucial in selecting the proper referent. Hence, readers prefer to focus on the end-state of a certain event for action verbs. For state verbs this end-state focus is not applicable, since state verbs do not have a full event structure and do not have an end-point.

In order to test the hypothesis mentioned above, an experiment was designed which manipulated aspect in such a way that action verbs are converted into state verbs. For this reason, the focus of this experiment is on Agent-Patient verbs. The reason for the choice for this type of verb is threefold. First, action verbs have an event structure with all elements as described by Stevenson et al. (1994). Second, for action verbs it is possible to manipulate aspectual issues (perfective/imperfective). Conversely, for state verbs this would not be possible, since states are not ongoing, e.g. 'John was loving Marie' is not appropriate. Third, the action verbs used in this experiment are previously tested on implicit causal biases in Dutch while transfer verbs were not tested earlier.

Method

Participants Participants were 45 native speakers of Dutch (28 female, mean age 27, range 16-63 years) who volunteered.

Materials Based on translations of IC-verbs used in Crinean & Garnham (2006) and Dutch verbs from Koornneef & Van Berkum (2006), 52 verbs were selected. All verbs were either tested or synonyms of NP1-verbs. As mentioned before, only Agent-Patient verbs were selected, since these are the only verbs that can be used in progressive tense. In order

to control for Implicit Causality, half of the verbs were IC-verbs and the other half were non-IC verbs.

For every verb, four conditions were created: A) Past continuous – Reason, B) Past continuous – Consequence, C) Past perfect – Reason and D) Past perfect- Consequence. In addition, thirteen NP2 verbs were selected to ensure that people do not develop an NP1-flow: they choose only NP1 referents. Examples for every condition can be found in Table 3.

TABLE 3
Example sentences Experiment 1

A	Past continuous – Reason	Jesse was Ruben aan het bellen. De reden was dat hij... <i>"Jesse was calling Ruben. The reason was that he..."</i>
B	Past continuous – Consequence	Jesse was Ruben aan het bellen. Het gevolg was dat hij... <i>"Jesse was calling Ruben. The consequence was that he..."</i>
C	Past perfect – Reason	Jesse had Ruben gebeld. De reden was dat hij... <i>"Jesse had called Ruben. The reason was that he..."</i>
D	Past perfect- Consequence	Jesse had Ruben gebeld. Het gevolg was dat hij... <i>"Jesse had called Ruben. The consequence was that he..."</i>

Every verb was accompanied by two boy names. No girl names were selected, because the female pronoun 'zij' (she) is ambiguous in Dutch: i.e. it can refer to either plural or female singular. All names were selected from a list of popular boy names 2008 (SVB, 2009) and for each item the names were selected that had an equally frequency. It is important to control for name frequency to limit effects of name popularity on the preferred referent. Further, only western-type names were selected, in order to prevent stereotypical preference for a particular referent and hence limit the effect of pragmatics.

Four experimental lists were constructed. The experimental items and fillers were pseudo randomly divided over the lists. All participants were presented with only one variant of the same set.

Procedure All participants were presented with a paper and pencil task, for which they read a two-clause passage; the complete first clause and the beginning of the second clause. Participants were instructed to imagine a natural continuation of the passage, writing down the first thing that came into mind.

(7) Jesse was Ruben aan het bellen. De reden was dat hij...
"Jesse was calling Ruben. The reason was that he..."

After they finished writing all the continuations, participants were asked to encircle the intended referent of the ambiguous pronoun. The participants were asked to encircle the

referents themselves, because they know their *intended* referent. This information could never be retrieved in analyzing sentences by a researcher, while many cases would remain ambiguous for researchers. However, the individual knows its intensions best and thus it seems reasonable to ask the participant the intended referent. The reason for asking the participants to encircle the referent *after* filling out the sentence completion task was to ensure that the research purpose would not be known to the participant until they finished all continuations. Knowledge about the research purpose could influence the type of continuations, because the participant would search for patterns in pronoun activation.

Predictions Considering Implicit Causality, only predictions with respect to IC-verbs can be formulated. However, the Implicit Causal literature states that IC-verbs have a special status, it is expected that non-IC verbs behave differently, but no expectations about this different behaviour can be formulated. It is predicted that for IC-verbs on Reason relations similar preferences are found as the ones found by Koornneef & Van Berkum (2006). For Consequence relations, a reversed effect is expected as suggested by Au (1986) and Crinean & Garnham (2006).

Following results of previous research claiming an End-state focus, it is expected that the factors Aspect and Causality will have an interaction effect on both IC- and non-IC-verbs. In continuous cases, in which no end-state is present, Reason and Consequence continuations are predicted to be influenced by the connective. In contrast, in perfective cases, for which an end-state focus is possible, it is expected that for the consequence relation people prefer to focus on the end-state. These expectations result into the following hypotheses:

Implicit-causality hypothesis:

- *Implicit-causality*: Items containing IC-verbs are continued **more often** with an **Agent** (NP1) antecedent in Reason relations
- *Implicit-consequentiality*: Items containing IC-verbs are **more often** continued with a **Patient** (NP2) referent in Consequence relations

End-state focus hypothesis

- *Conversion-of-End-state-focus*: In Reason relations, Past-Continuous tense elicit **more** continuations to the **Agent** (NP1) and Past-Perfect tense are continued **more** often with a **Patient** (NP2) antecedent
- *End-state-focus*: In Consequence relations, all tenses are continued **more often** with a **Patient** (NP2) referent

Analysis All lists were collected and preferred referents were scored. If the participant had marked a preferred NP1 referent the trial was scored as 1, and if it was marked with a NP2 referent it was scored as 2. Mean NP1-probability scores were calculated for participants and items. In addition, one item was deleted from further analysis, since this item ('feliciteren') was an NP-verb with .05 NP1-bias (Koorneef & Van Berkum, 2006). Ten participants were deleted from analysis, since their continuations only referred to NP1, although previously tested NP2-biased verbs were included as fillers. Hence, these participants must have developed a NP1-strategy while filling out the task and their behaviour cannot be considered to be representative.

Results and Conclusion

The results were compared in a repeated measure GLM with three factors: Aspect (Past Continuous/Past Perfect), Causality (Reason/Consequence) and Verb type (IC/non-IC). The results are discussed by hypothesis. Effects are considered to be significant when they show an effect by subjects (F_1) and by items (F_2). Means are calculated by subject. The NP1-probability scores per condition can be found in Table 4. Individual scores were also tested against chance with a t-test.

Implicit Causality hypothesis

The results reveal an interaction of Causality and Verb type [$F_1(1, 47) = 4.139, p < 0.05, \eta^2 = 0.081$; $F_2(1, 28) = 9.433, p < 0.01, \eta^2 = 0.252$]. In addition to this interaction, two main effects were found. The first main effect was on Verb-type [$F_2(1, 28) = 75.132, p < 0.001, \eta^2 = 0.729^5$] and the second main effect was on Causality [$F_1(1, 47) = 20.556, p < 0.001, \eta^2 = 0.304$; $F_2(1, 28) = 17.171, p < 0.001, \eta^2 = 0.380$]. The main effect on Verb-type indicates that non-IC verbs indeed have a special status.

A further investigation of the interaction of Causality and Verb-type shows that the preferred referent of IC-verbs *is* influenced by Causality [$F_1(1, 15) = 23.390, p < 0.001, \eta^2 = 0.609$; $F_2(1, 35) = 11.100, p < 0.01, \eta^2 = 0.241$]. Thus, the preference for the referent is different for the given coherence relations in IC-verbs; language users prefer a continuation with a NP1-referent to a smaller extent in Consequence relations (IC-verbs: $M = .62, SD = 0.23$) compared to Reason relations (IC-verbs: $M = .84, SD = 0.12$). As can be deduced from Table 4, all preferences for Reason relations are significantly different from chance and hence the implicit-causality hypothesis is confirmed. However, no evidence was found for a

⁵ No F_1 can be calculated for the main effect on verbttype, since verbttype is considered as a within-subject variable.

reversed effect and hence the *implicit-Consequentiality hypothesis* should be rejected. On the basis of the non-significant item-analysis we conclude that there is no NP1-preference for Consequence relations.

End-State focus hypothesis

With respect to the End-state focus hypothesis, the interaction of Causality and Verb-type shows that there is a no effect of Causality on Non-IC verbs [$F_1(1, 32) = 4.167, p < 0.05, \eta^2 = 0.115; F_2(1, 28) = 2.547, ns$]. This result leads to the conclusion that the End-state focus hypothesis must be rejected. First of all, there is no NP2-preference for any condition at all. Compared to the hypothesis this is striking, since three out of four

TABLE 4

Results of sentence completion task based on GLM by subject. All IC-verbs were either tested by Koornneef & Van Berkum (2006) or in the pre-test of Experiment 2 and had a minimum probability of .68. Nine presumed NP1-verbs were removed from the IC-verb category and placed into the Non-IC category.

		IC-verbs		Non-IC verbs	
		<i>NP1-Probability (SD)</i>	<i>Comparison with mean</i>	<i>NP1-Probability (SD)</i>	<i>Comparison with mean</i>
<i>Past Continuous</i>	<i>Reason</i>	.87(0.10)	$t_1(35) = -11.281, p < .001;$ $t_2(15) = -14.826, p < .001$	.53 (0.24)	$t_1(35) = -1.312, ns;$ $t_2(32) = -0.823, ns$
	<i>Consequence</i>	.63(0.25)	$t_1(35) = -3.787, p < .05;$ $t_2(15) = -2.113, ns$	.46 (0.22)	$t_1(35) = 0.730, ns;$ $t_2(32) = 0.987, ns$
<i>Past Perfect</i>	<i>Reason</i>	.80(0.17)	$t_1(35) = -8.484, p < .001;$ $t_2(15) = -7.178, p < .001$	.55(0.29)	$t_1(28) = -1.353, ns;$ $t_2(32) = -1.152, ns$
	<i>Consequence</i>	.60(0.26)	$t_1(35) = -3.635, p < .05;$ $t_2(15) = -1.651, ns$	.46(0.24)	$t_1(35) = 0.788, ns;$ $t_2(32) = 0.872, ns$
<i>Total</i>	<i>Reason</i>	.84(0.12)	$t_1(35) = -12.927, p < .001;$ $t_2(15) = -10.842, P < .001$	.55(0.23)	$t_1(35) = -1.839, ns;$ $t_2(24) = 0.263, ns$
	<i>Consequence</i>	.62(0.23)	$t_1(35) = -4.312, p < .001;$ $t_2(15) = -2.104, ns$	.46(0.20)	$t_1(35) = 0.843, ns;$ $t_2(24) = 1.065, ns$

conditions were considered to have Patient (NP2) continuations. Two conclusions can be drawn: firstly, the non-IC verbs did not show a NP1-preference in the reason nor the consequence cases. Secondly, it can be argued that the choice in preferred referent is arbitrary since the choice of referent remains undetermined. Hence, it could be argued that these non-IC verbs do not have a preferred referent at all, independent of coherence relation.

In addition, the hypothesized effect of Aspect on the preferred referent was not significant [$F_1(1, 47) = 0.336, ns; F_2(1, 28) = 0.678, ns$]. As the figures in Table 4 indicate, there was no preferred referent in any of the non-IC conditions [$M = .47, SD = 0.19; t_1(35)$

= 0.865, *ns*; $t_2(24) = 0.811$, *ns*]. Hence, changing the aspect of the verb does not change the preferences for a certain referent in any way.

Discussion

It can be concluded from Experiment 1 that the preference for a certain referent is influenced by causal coherence in IC-verbs, but not in non-IC verbs. In non-IC verbs chance level distribution is found, suggesting that there is no focus on either of the referents. For IC-verbs it can be stated that the focus on the hypothesized thematic role associated with the end-state focus is not confirmed by the results of this experiment. Instead, I suggest, on the basis of chance level distribution of the referents, that the focus on NP1 disappears in Consequence relations (Note that it does not reverse)

The conclusion stated above is counterevidence for the End-state focus hypothesis. It looks like the results Stevenson et al. (1994; 2000) found were confounded by Implicit Causality. Where Stevenson et al. found an overall Patient preference for action verbs, this experiment showed that in these cases coherence *does* influence the preference for a certain referent, but not for IC-verbs.

My findings are more in line with Implicit Causal literature: the idea that IC-verbs have a special property that endorses a preference for a certain referent. They do not show a reversed effect for Consequences. The results presented here are reason to confirm the idea that IC-verbs do only provide information about causes. Thus, the IC-verb seems to trigger a focus on the causal instigator. Only when the coherence relation involved is in line with this causal information of the verb, this results in a processing advantage for a particular antecedent.

Nevertheless, compared to the study of Au (1986) and Crinean & Garnham (2006) my study differs to a certain extent. The absence of an NP2-bias might be due to a difference in tasks. Both Au (1986) and Crinean & Garnham's (2006) results were based on experiments in which participants were not forced to continue the sentence with a pronoun. The choice of referent was free and the sentence could easily be continued with a full NP, name or pronoun. And since the choice of full NP, name or pronoun is "heavily influenced by the sentence position of the antecedent" (Stevenson et al. 1994:531), this might have resulted in different findings. Hence, it could be the case that people do focus on the non-biased antecedent in implicit consequential contexts, but do not prefer to use a *pronoun*. Although the use of the pronoun in our experiment might have reduced the focus on the Patient, participants did choose a Patient continuation for the NP2 filler items. Thus, apart from the difference in task, I do not believe the forced use of a pronoun influenced the results to a great extend.

Another interesting result is that Aspect is not able to influence a shift in focus. So either there is no effect or the manipulation of tense was not very successful. Remember that Kehler et al. (2008) successfully manipulated transfer verbs in this manner. Two elements are important to mention with respect to my experiment. First of all, the cue phrase might have overridden the effect of aspect. Kehler et al. (2008) did not use a cue phrase or connective. The coherence relation was left open and the participant could construct it themselves. In my task, the coherence relation was given. It could be the case that aspect might have influenced the prediction of the coherence relation, but not the preferred referent. Second, the results found by Kehler are based on English in which the difference in meaning between past continuous and past perfect is more apparent than in Dutch. In Dutch, past continuous is not often used and some participants considered these sentences as 'unnatural'.

Summarizing, the results of this experiment support the idea that Implicit Causal verbs are special element and trigger a preference for the causal instigator. To confirm our results on IC-verbs, Experiment 2 investigates the processing of Reason and Consequence relations.

Experiment 2: Eye Tracking

Aim

The results of Experiment 1 show that there is an interaction of coherence and coreference: where Reason relations in IC-verbs show a preferred referent (the Agent), Consequence relations do not show this preference. If this is true, there should be a difference in the processing of the pronouns of these sentences. In this experiment it is tested whether there is indeed a difference in the processing of pronouns in Reason and Consequence relations.

Method

Participants Participants were 42 native speakers of Dutch (36 female, mean age 22, range 19-29 years). All participants were self-reported non-dyslectic and had good vision. All participants were paid 5 euro for participation.

Materials The implicit causal verbs of Experiment 1 were selected. Because eye tracking data have a large variance an additional amount of verbs was needed to ensure that the results would have enough statistical power. For this reason, state verbs were added to the design. In addition, all non-tested verbs were tested for their preference before using them for the eye tracking experiment. The verbs were divided over two list and both lists had two

orders. In total 97 first-year Communication- and Information science students were asked to complete sentences like “Tim manipuleerde Jan, omdat hij ...” (Tim manipulated John, because he...). For consistency reasons, participants were instructed similar to the task in Koorneef & Van Berkum (2006) and they were asked to continue the sentence and *immediately* encircle the intended referent. With the help of the NP1 preference test, 40 verbs with the highest NP1-bias ($M=82.21$, $SD=8.45$) were selected. An overview of all preferences can be found in Table 5.

TABLE 5
NP1-preference in percentage for the verbs selected for Experiment 2

Verb (translation)	% NP1	Verb (translation)	% NP1
zijn excuses aanbieden (apologize)	100	verbazen (astonish)	82
facineren (fascinate)	100	verontrusten (alarm)	82
bekennen (confess)	96	boos maken (anger)	81
teleurstellen (disappoint)	96	iriteren (irritate)	78
zich verontschuldigen tegenover (apologize to)	95	kwetsen (offend)	78
vervelen (bored)	95	liegen tegen (lied to)	78
slijmen (suck up to a person)	94	bang maken (frighten)	78
hinderen (annoyed)	91	misleiden (mislead)	78
woedend maken (enrage)	91	boeien (grip the attention)	77
jokken (fib)	90	inspireren (inspire)	77
oplichten (swindle)	87	intimideren (intimidate)	77
manipuleren (manipulate)	87	charmeren (charm)	74
kwellen (harass)	86	overdonderen (flabbergasted)	73
storen (disturb)	86	paaieren (appease)	73
opwinden (get worked up)	86	verbijsteren (perplex)	73
besmetten (infect)	83	vernederen (humiliate)	73
omkopen (bribe)	83	vleien (flatter)	73
smeken (bag)	83	in de weg staan (stand in the way)	72
bellen (call)	82	ondervragen (question)	68
ergeren (annoy)	82	verzoeken (request)	68

Similar to Experiment 1, every verb was accompanied by two names. Since unambiguous sentences were needed to indulge a processing effect, I followed Koorneef & Van Berkum (2006) and disambiguated at the pronoun. Thus, all verbs were accompanied by a boy and a girl name that had similar frequency throughout the last 24 years (Netwerk Naamkunde, 2009). Half of the items had a girl-boy order and the other half had a boy-girl order to control for strategy-like behaviour. Thus, for half of the cases, the male pronoun is the preferred referent and vice versa. For every verb, four conditions were created, as can be seen in Table 6. In addition, 60 fillers were added to mask the purpose of the experiment.

Four experimental lists were constructed. The experimental items and fillers were pseudo randomly divided over the lists and blocks. All participants were presented with only one variant of the same set. One fifth of the items were followed by a statement, which the

participants needed to verify or falsify. These statements were included to ensure concentration throughout the experiment.

TABLE 6
Example sentences Experiment 2

A	Reason – NP1	Anna belde Jeffrey. De reden was dat zij als eerste alles wilde weten over zijn trouwplannen. <i>"Ann called Jeffrey. The reason was that she wanted to be the first to know everything about his marriage."</i>
B	Reason – NP2	Anna belde Jeffrey . De reden was dat hij als eerste alles wilde weten over haar trouwplannen. <i>"Ann called Jeffrey. The reason was that he wanted to be the first to know everything about her marriage."</i>
C	Consequence – NP1	Anna belde Jeffrey. Het gevolg was dat zij als eerste alles wist over zijn trouwplannen. <i>"Ann called Jeffrey. The consequence was that she was the first who knew everything about his marriage."</i>
D	Consequence – NP2	Anna belde Jeffrey . Het gevolg was dat hij als eerste alles wist over haar trouwplannen. <i>"Ann called Jeffrey. The consequence was that he was the first who knew everything about her marriage."</i>

Procedure All experimental and filler items were presented on a CRT monitor. The eye movements were recorded by the Eyelink I, which has a recording frequency of 250 Hz. Participants were first instructed about the apparatus. In addition, they were instructed to move their head as little as possible to optimize data collection. Further, they were asked to blink as little as possible in order to track the eye as well as possible. They were advised to blink frequently during verification statements and breaks and take long breaks if they felt their eyes were dehydrated.

After instruction, a calibration procedure was started to match the information of the eye movement with the exact location on the screen. For this procedure, the participant was instructed to follow a red dot that moved to every corner of the screen. When necessary, the calibration procedure was repeated until a good calibration was obtained. After the calibration procedure, participants were presented with five practice items to show what kind of items they could expect, which button to press and to stress that they should read at a normal pace. A normal pace was explained as 'not studying the items', but read it well enough so you 'understand what the sentences are about'.

Every item started with a drift correction point, which is identical to the red dot of the calibration procedure. The drift correction point indicates the beginning of the upcoming sentence. When the participant fixated on the dot, it disappeared and the next item was displayed. All items were presented similarly; the first sentence was presented on the first line and the rest of the items was presented on the second (and when necessary a third) line. This was to ensure that the critical region was displayed on the middle of the screen.

After reading the sentence, the participant was instructed to press a button and either a verification statement or a new item was presented.

All participants were presented with one of the four lists, consisting of 100 items divided over four blocks. After each block, the participant was asked whether he/she was ok, whether their headset was ok and whether they felt their eyes weren't dehydrated. The whole experiment took about thirty minutes, including ten minutes of instruction and calibration.

Predictions Following the results of Koornneef & Van Berkum (2006), it is expected that for Reason relations the pronoun in the NP1 version is processed faster than the pronoun in the NP2 version. For Consequence relations it is expected that there is either a) no difference between the processing of the NP1 or NP2 pronoun or, according to the implicit-consequentiality hypothesis b) there is a preference for the NP2 pronoun.

- *Implicit-causality:*

H0: for *Reason* relations the processing time of the NP1 referent is **not different** from the processing time of the NP2 referent.

H1: for *Reason* relations the processing time of the NP1 referent is **faster** than the processing time of the NP2 referent.

- *Implicit-consequentiality:*

H0: for *Consequence* relations the processing time of the NP2 **not different** from the processing time of the NP2 referent.

H1: for *Consequence* relations the processing time of the NP2 **faster** than the processing time of the NP2 referent.

Analysis All items were divided into different regions. An example can be seen in (9). The target-regions are the cue phrase (*The reason was*), the pronoun (*that [pronoun]*) and the spill-over region (see also Table 7). The latter region consisted of a constituent (either NP or PP) that was consistent over all conditions. Other regions were not analysed, since these were not similar in length or content and hence it is not possible to draw conclusions in the comparison of these regions.

- (9) Anna/ belde/ Jeffrey./ **De reden was/ dat zij/ als eerste/** alles wilde weten over zijn trouwplannen.
Ann/ called/ Jeffrey./ **The reason was/ that she/ the first/** everything to know about his marriage.
"Ann called Jeffrey. The reason was that she wanted to be the first to know everything about his marriage."

Before analyzing, 53 trials were deleted from analysis, which was 3% of all data. The loss was either caused by mistakes within the item or caused by the poor quality of the eye tracking data. Thereafter, five measures were computed. The first measure is the *first-pass reading time*, which indicates all the time a participant spent in that region before it moving on to another region. This movement can be either to a previous region (regressive) or to an upcoming region (progressive). The second measure is the *regression path duration*, which includes all time the reader spends reading that region and regressions to previous regions, before the reader moves on to an upcoming region. The third measure is the *first fixation duration*. This measure represents the duration of the first fixation within a particular region. Fourthly, the *gaze duration* is the sum of all fixations within a region, including regressive fixations within that region. Lastly, the *percentage of regressions* was calculated. This measure is used to show the relative amount of regression of a region and hence gives us insight in the frequency with which readers look back at other regions. Finally, all data was transposed from milliseconds to natural logarithmic numbers to ensure a normal distribution of the data.

Results and Conclusion

The results were compared in a repeated measure GLM with two factors: Causality (Reason/Consequence) and NP-referent (NP1/NP2). Effects are considered to be significant when they show an effect by subjects (F_1) and by items (F_2). Means are calculated by subject. All results are summarized in Table 7. First the effects considering the hypotheses are discussed. Thereafter, other significant results are presented.

Causality vs. Consequentiality

Testing the main hypotheses, significant results are only found on the regression path duration (summarized in Table 7 and Figure 3A-B). An interaction effect on the pronoun region was found [F_1 (41) = 4.555, $p < 0.05$, $\eta^2 = 0.100$]; F_2 (39) = 1.084, $p < 0.05$, $\eta^2 = 0.140$]. This interaction shows that there is a significant difference between Reason and Consequence relations with respect to the NP-preference. The comparison of NP1 and NP2 preference shows that the difference in processing times of NP1 and NP2 is significant in Reason relations [F_1 (41) = 7.237, $p < 0.010$, $\eta^2 = 0.150$; F_2 (39) = 7.312, $p < 0.01$, $\eta^2 = 0.158$] but not for Consequence relations [F_1 (41) = 0.014, *ns*, $\eta^2 = 0.014$; F_2 (39) = 0.010, *ns*, $\eta^2 = 0.000$]. The implicit causal NP1-preference effect on Reason relations found by Koornneef & Van Berkum (2006) is hence replicated and the implicit-causal H1 hypothesis can be accepted. In addition, the non-preference of NP in Consequence cases found in Experiment 1 is confirmed. No indications about a reverse effect of referent focus (as

predicted by the End-state hypothesis) are found and hence the implicit-consequential H1 must be rejected and H0 is accepted.

TABLE 7
Results of item analysis Experiment 2. Logarithmic numbers are presented first and numbers by milliseconds are presented in italic, * significant difference F_1 & F_2

	Cue Phrase De reden was Het gevolg was		Pronoun dat hij/zij		Spill-over als eerste	
	Logarithmic results	Results in milliseconds	Logarithmic results	Results in milliseconds	Logarithmic results	Results in milliseconds
First pass						
Reason – NP1	5.81 (0.17)*	370.76 (75.50)	5.50 (0.15)	266.60 (46.72)	5.99 (0.31)	456.57 (138.38)
Reason – NP2	5.79 (0.16)*	364.34 (67.12)	5.56 (0.15)	289.55 (55.16)	5.03 (0.29)	476.31 (121.72)
Consequence – NP1	5.88 (0.19)*	399.80 (76.60)	5.49 (0.13)	268.98 (38.88)	5.99 (0.30)	466.93 (135.33)
Consequence – NP2	5.88 (0.19)*	399.99 (84.17)	5.49 (0.18)	273.74 (74.01)	6.04 (0.34)	475.64 (152.45)
Regression path						
Reason – NP1	5.84 (0.17)*	380.29 (71.09)	5.56 (0.19)*	292.91 (68.31)	6.12 (0.32)	539.05 (194.09)
Reason – NP2	5.87 (0.17)*	401.08 (76.31)	5.65 (0.17)*	323.96 (67.86)	6.14 (0.28)	526.93 (135.53)
Consequence – NP1	5.94 (0.18)*	423.00 (79.40)	5.60 (0.20)*	320.67 (96.22)	6.14 (0.30)	545.09 (157.76)
Consequence – NP2	5.94 (0.22)*	420.46 (89.22)	5.55 (0.22)*	305.44 (103.40)	6.15 (0.32)	533.37 (159.98)
First fixation						
Reason – NP1	5.40 (0.11)*	230.21 (24.74)	5.30 (0.09)	203.76 (20.63)	5.32 (0.09)	213.17 (22.22)
Reason – NP2	5.39 (0.08)*	226.43 (19.78)	5.31 (0.10)	209.58 (22.28)	5.33 (0.11)	212.74 (23.47)
Consequence – NP1	5.31 (0.08)*	208.07 (14.56)	5.30 (0.87)	209.28 (22.57)	5.34 (0.10)	217.46 (22.31)
Consequence – NP2	5.30 (0.13)*	208.95 (25.54)	5.30 (0.12)	208.14 (28.76)	5.34 (0.08)	215.45 (24.26)
Gaze duration						
Reason – NP1	5.83 (0.17)*	378.14 (77.27)	5.53 (0.17)	279.83 (56.00)	6.06 (0.34)	501.96 (164.94)
Reason – NP2	5.82 (0.15)*	376.49 (64.55)	5.60 (0.15)	303.60 (55.67)	6.09 (0.30)	507.00 (136.19)
Consequence – NP1	5.91 (0.18)*	407.90 (75.51)	5.54 (0.18)	284.06 (51.84)	6.07 (0.31)	497.92 (146.82)
Consequence – NP2	5.91 (0.21)*	414.90 (112.22)	5.53 (0.19)	285.01 (80.47)	6.09 (0.33)	503.08 (161.93)
Percentage regression						
Reason – NP1	0.02 (0.04)	-	0.06 (0.09)	-	0.10 (0.08)	-
Reason – NP2	0.05 (0.07)	-	0.07 (0.09)	-	0.08 (0.09)	-
Consequence – NP1	0.03 (0.06)	-	0.09 (0.10)	-	0.12 (0.11)	-
Consequence – NP2	0.05 (0.06)	-	0.05 (0.08)	-	0.09 (0.09)	-

State vs. Activity

I concluded in Experiment 1 that there was no effect of aspect and tense. A GLM analysis with verb type (action/state) as a within-subject factor was run to ensure that there was indeed no effect. No interaction-effect was found on the regression path duration of the critical region; nor a significant interaction of Causal relation and Verb type [$F_1(1, 38) = 0.234$, ns; $F_2(1, 38) = 0.207$, n], nor a significant interaction of NP-preference and Verb-type [$F_1(1, 38) = 1.286$, ns; $F_2(1, 38) = 0.165$, ns] was found. In addition, not three-way interaction of Causal relation, Verb type and NP-preference was found [$F_1(1, 38) = 0.028$, ns; $F_2(1, 38) = 1.226$, ns]. Thus, the preference for a certain referent as discussed in the previous section is independent of verb type.

Cue Phrase

As can be seen in Table 7, for all measurements on the cue phrase region a main effect of Causality was found [first pass: $F_1(1, 41) = 5.270$, $p < 0.05$, $\eta^2 = 0.114$; $F_2(1, 39) = 13.939$, $p < 0.001$, $\eta^2 = 0.263$, regression Path: $F_1(1, 41) = 7.837$, $p < 0.01$, $\eta^2 = 0.160$; F_2

FIGURE 3A
Mean Regression Path duration (logn) for target regions Reason relations.
Significant effect on pronoun region.

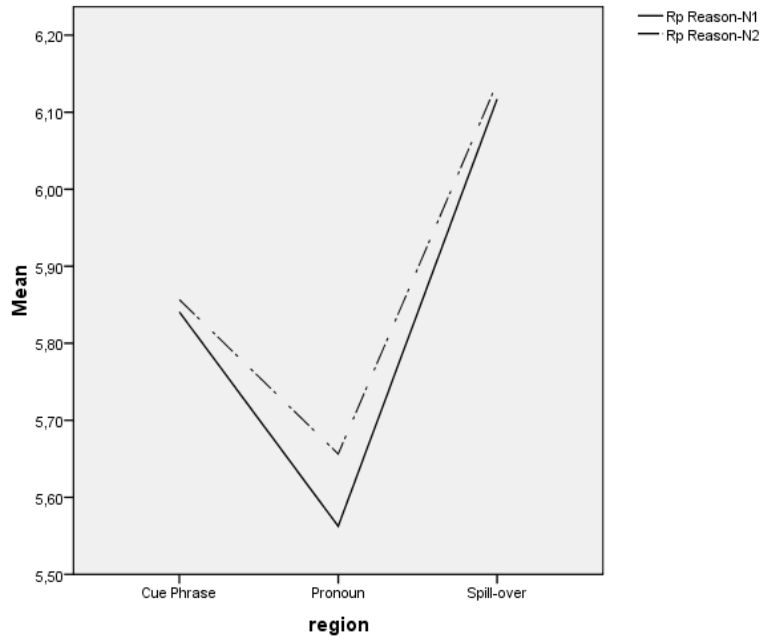
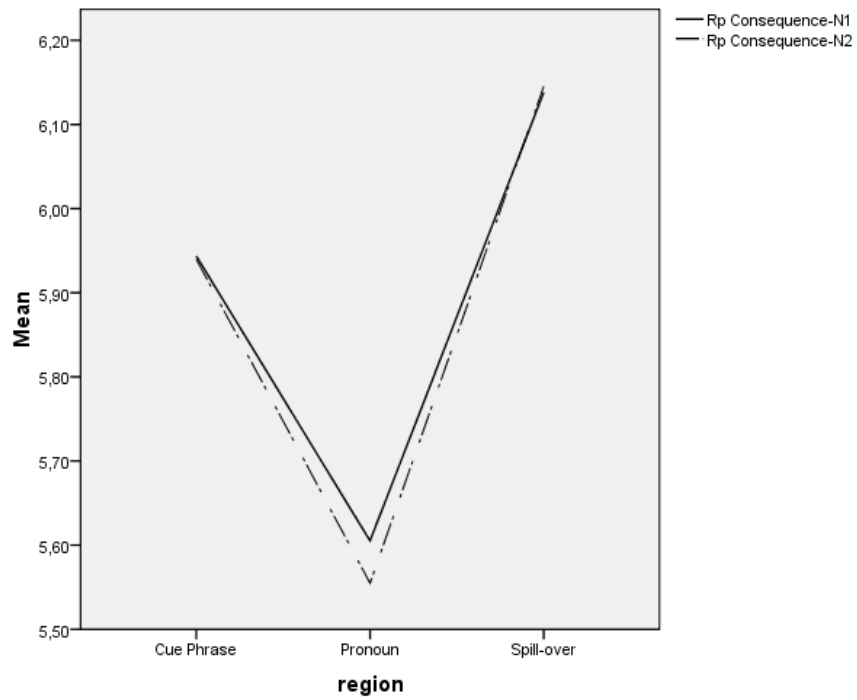


FIGURE 3B
Mean Regression Path duration (logn) for target regions Consequence relations.
No significant effect on pronoun region.



(1, 39) = 12.106, $p < 0.001$, $\eta^2 = 0.237$, first fixation: $F_1(1, 41) = 23.460$, $p < 0.001$, $\eta^2 = 0.364$; $F_2(1, 39) = 42.471$, $p < 0.001$, $\eta^2 = 0.521$, gaze duration: $F_1(1, 41) = 5.035$, $p < 0.05$, $\eta^2 = 0.109$; $F_2(1, 39) = 12.512$, $p < 0.001$, $\eta^2 = 0.243$]. Although any conclusions considering this region must be interpreted with great care because the amount of digits within this region is not entirely equal; 'De reden was' is two digits shorter than 'Het gevolg was'. The considerable effect size is reason to suggest there is more to it than just length. Nevertheless, the *percentage of regressions* showed that there was no effect of causality [$F_1(1, 41) = 0.716$, *ns*; $F_2(1, 39) = 0.355$, *ns*], indicating that the cue phrase on consequence regions is not considered to be more difficult [$M = .09$, $SD = 0.16$] than the reason region [$M = .07$, $SD = 0.09$]. Hence, it cannot be concluded if the processing difference in the cue phrase region is due to length or difficulty.

NP-probability

A Pearson correlation analysis was run to check whether the effects on processing times were influenced by the degree of preference. As was presented in Table 5, not all verbs have the same NP-preference and hence it could be the case that for verbs with higher probabilities for a NP1-continuation this would result in shorter reading times compared to verbs that have a lower probability. First the effect size for both Reason and Consequence relations were measured ($\Delta NP1/NP2$). Thereafter, a Pearson correlation analysis was run for the items to test with the effect size and the NP1-probability were interrelated. The analysis did not show significant effects on any region, in particular the target region [Pronoun: $r^2 = -0.23$, *ns*]. This implicates that the degree of Implicit Causality does not influence the effect.

Discussion

According to the data, I conclude that for NP1 IC-verbs, there is a preference for NP1 in Reason relations. For Consequence relations, the data do not show any processing advantage for any referent. Hence, it is concluded that the preference disappears (note that it does not reverse). The effect was found on the regression path duration only, while Koornneef & Van Berkum (2006:454) found a significant effect on first-pass reading time⁶ as well. They found this latter effect only in the F1-analysis and for that reason I argue that it is not surprising that the results of this experiment do not show any effects on first-pass reading times. Thus, it seems like readers do not have any difficulties reading the pronoun at first, but go back to search for the proper referent. The immediate effect on the pronoun suggests that the reader immediately searches for the proper referent and does not wait till

⁶ Koornneef & Van Berkum (2006) refer to this measurement as first-gaze duration.

the end of the sentence (cf. integration hypothesis). Some participants mentioned that in some cases they felt like 'checking' whether they understood 'who did what to whom'. This 'checking' is exactly what the data shows.

Compared to previous studies, several conclusions can be drawn. The results of Koornneef & Van Berkum (2006) were replicated. Moreover, I confirm that this effect is immediate and hence readers do not wait until the end of the clause. On the other hand, the finding on Consequence relations does not support previous studies of Au (1986), Stevenson et al. (2000) nor Crinean & Garnham (2006), but do confirm my findings of Experiment 1. Again, the results do not support the End-state focus hypothesis.

Although the difference between Consequence NP1 and NP2 was not significant, the data shows a trend towards faster processing times in ms for NP2 (Pronoun, NP1: MS=320.67; NP2: MS=305.44). Hence, it could be the case that the grammatical role hierarchy or grammatical role parallelism masks the significance of this difference: the non-preferred referent (NP1) is processed faster and the preferred referent is processed slower (NP2). The effect on Reason relations may, on the other hand, be exaggerated by the first mention effect: the preferred referent (NP1) is processed faster and the non-preferred referent is processed slower (NP2). Nevertheless, Koornneef & Van Berkum (2006) showed that for NP2-biased verbs there is no problem finding processing advantages for a non-subject and non-parallel antecedent. In addition, the NP2 fillers provide counter evidence as well, since NP2-processing advantage was found for these items too. Hence, other experiments need to be conducted in order to ensure that first mention is not a confounding factor. One suggestion would be to look at both Stimulus-Experiencer (NP1) and Experiencer-Stimulus (NP2) cases in isolation in order to control for these effects. Example sentences can be found in (10). The pronoun that is expected to be processed faster is printed in bold. The advantage of such a setup is that both NP1- and NP2-verbs are used while thematic roles are constant over conditions; the preferred referent is always in Stimulus position. Further, the first mention effect is removed by the fact that there is one condition in which this is problematic (10) and one in which the first mention effect would reduce the effect (11). Note that this setup is similar to Koornneef & Van Berkum's (2006) study, but in this setup thematic roles are controlled for.

- (10a) John (Stimulus) apologized to Mary (Experiencer), *because he...*
- (10b) John (Stimulus) apologized to Mary (Experiencer), *because she...*
- (10c) John (Stimulus) apologized to Mary (Experiencer), *so he...*
- (10d) John (Stimulus) apologized to Mary (Experiencer), *so she...*

- (11a) John (Experiencer) praised Mary (Stimulus), *because* he...
- (11b) John (Experiencer) praised Mary (Stimulus), *because* **she**...
- (11c) John (Experiencer) praised Mary (Stimulus), *so* **he**...
- (11d) John (Experiencer) praised Mary (Stimulus), *so* she...

General Discussion

On the basis of both a Sentence Completion Task and eye tracking data, I have reason to conclude that Implicit Causality is a better predictor of pronominal preferences than the End-state focus hypothesis. First, the Sentence Completion Task showed that for non-IC verbs there was no bias towards any of the referents, indicating that for these verbs no preference was present. Thus, NP-preferences are not across the board, but IC-verbs have a special status in this respect. Nevertheless, this special status is restricted to Reason relations, since nor a NP1 nor reversed effect was found for Consequence relations. Thus, on the basis of my results, it must be concluded that IC-verbs carry a special element that directs the attention of the reader to the probable causal instigator, as often discussed in Implicit Causal literature (e.g. Kehler et al., 2008). No indication about a shift in focus to a probable effector has been found and hence the Implicit Consequentiality hypothesis should be rejected.

Thus, it can be stated that, at this point, it is difficult to conclude that coherence influences coreference, since the results in this paper found preferences for Reason relations only. In other words, neither the Implicit Causality nor End-State focus hypothesis provides good predictions towards the preferred referent for Consequence relations. So, it can either be concluded that coherence relations do influence the processing of the pronoun (although this study did not find any strategies used in non-IC and Consequence IC-cases) or preference are just limited to IC-verbs in combination with Reason relations. The difference in perspective might be investigated by controlling for first mention effects, as discussed at the end of the previous section.

An important question that rises from this paper is the origin of the special status of IC-verbs: what property the verb carries in order to elicit the focus on 'a probable instigator'. An interesting proposition is given by Pickering & Majid (2007). They argue that Implicit Causality and Consequentiality are not biases caused by the semantic meaning of the verb, but caused by "an inference from a description of the event." (Pickering & Majid, 2007:785). To put it differently, it is not the verb itself that triggers the focus on a certain entity, but the pragmatic information that triggers a stereotypical continuation. This stereotypical continuation would then result in a preference for either an NP1- or NP2-continuation. When we look at the sentences in (12) we might understand what Pickering &

Majid are referring to; stereotypically the teacher compliments the student with his/her work or mark, but finding a stereotypical reason for a student complimenting a teacher is much more difficult. I argue that these stereotypical expectations of an event influence the pronominal reference to a great extent. Hence, the NP-preferences of the verb can be overridden by stereotypical expectations concerning the event and this makes explaining pronominal reference even more complicated.

(12a) The teacher complimented the student, because he...

(12b) The student complimented the teacher, because he...

The two sentences in (12) illustrate another problem: if it were true that either thematic roles or Implicit Causality would indeed influence coreference, it would indicate that for both sentences we would expect similar preferences. However, as I explained before, this is not the case here. Hence, Implicit Causality effects reported in this study are limited to situations in which no contextual factors are present. In future research it is important to find out more about the contextual factors that influence coreference. An example of such an experiment might be a combination of Sentence Completion and eye tracking, i.e. participants will be asked to read sentence (12a) and need to continue these sentence immediately (vocally). Both reading and reaction times are measured. I argue the combination of these measurements is beneficial, since reaction times can tell us something about the predictability of a certain continuation, i.e. stereotypical expectation. On the other hand, based on the results of Experiment 2, regression path duration tells us something about the predictability of the pronoun. In addition, the continuation itself is recorded and analyzed with respect to content. I predict that in sentences like (12a) continuations will be faster in reaction times, have a shorter regression path duration and are more similar in context compared to (12b).

In sum, I can confirm that pronominal reference is a complicated, though interesting, phenomenon. Based on my results I suggest that future research should focus on the properties of Implicit Causal verbs more than on an overall thematic role focus. Further, more research needs to be conducted in order to ensure my conclusion is not influenced by first mention effects. Moreover, additional research needs to be conducted to determine the role of contextual factors on Implicit Causality. And maybe these future experiments reveal some of the complicated mechanisms influencing pronoun resolution.

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APPENDIX I: Overview target items Sentence Completion Task

The sentences below are the Dutch target sentences used in Experiment 1 and their translations. Note that only the Past-Perfect cases are presented. Past-Continuous cases were similar, but contained a continuous form in the first sentence. Also note that not all English translations are congruent with the exact semantic meaning of the Dutch verb.

Implicit-Causal Verbs:

Jesse had Ruben gebeld. De reden/Het gevolg was dat hij...
Jesse had called Ruben. The reason/The consequence was that he...

Thijs had Stijn boos gemaakt. De reden/Het gevolg was dat hij...
Thijs had made Stijn angry. The reason/The consequence was that he...

Sven had Luuk zijn excuses aangeboden. De reden/Het gevolg was dat hij...
Sven had apologized to Luuk. The reason/The consequence was that he...

Max had Sam dwarsgezet. De reden/Het gevolg was dat hij...
Max had annoyed Sam. The reason/The consequence was that he...

Gijs had Jan in de weg gestaan. De reden/Het gevolg was dat hij...
Gijs had stood Jan in the way. The reason/The consequence was that he...

Niels had Tijn gehinderd. De reden/Het gevolg was dat hij...
Niels had stood Tijn in the way. The reason/The consequence was that he...

Daniel had tegen Ryan gejokt. De reden/Het gevolg was dat hij...
Daniel had told a fib to Ryan. The reason/The consequence was that he...

Jasper had Justin opgelicht. De reden/Het gevolg was dat hij...
Jasper had swindled Justin. The reason/The consequence was that he...

Hijmen had tegen Floris gelogen. De reden/Het gevolg was dat hij...
Hijmen had lied to Floris. The reason/The consequence was that he...

Stan had Cas ondervraagd. De reden/Het gevolg was dat hij...
Stan had questioned Cas. The reason/The consequence was that he...

Mike had Bas gepaaid. De reden/Het gevolg was dat hij...
Mike had appeased Bas. The reason/The consequence was that he...

Marijn had Nathan omgekocht. De reden/Het gevolg was dat hij...
Marijn had bribed Nathan. The reason/The consequence was that he...

Rick had bij Joep geslijmd. De reden/Het gevolg was dat hij...
Rick had sucked up to Joep. The reason/The consequence was that he...

Pieter had Kevin gemeekt om een snoepje. De reden/Het gevolg was dat hij...
Pieter had begged Kevin for a candy. The reason/The consequence was that he...

Sander had Tristan gestoord. De reden/Het gevolg was dat hij...
Sander had disturbed Tristan. The reason/The consequence was that he...

Olivier had Benjamin gemanipuleerd. De reden/Het gevolg was dat hij...
Olivier had manipulated Benjamin. The reason/The consequence was that he...

Non-Implicit-Causal Verbs:

Daan had Tim bedonderd. De reden/Het gevolg was dat hij...
Daan had defrauded Tim. The reason/The consequence was that he...

Thomas had Lars beetgenomen. De reden/Het gevolg was dat hij...
Thomas had fooled Lars. The reason/The consequence was that he...

Bram had Nick dwarsgelegen. De reden/Het gevolg was dat hij...
Bram had obstructed Nick. The reason/The consequence was that he...

Tom had Koen lastiggevalen. De reden/Het gevolg was dat hij...
Tom had harassed Koen. The reason/The consequence was that he...

Joel had Owen benadeeld. De reden/Het gevolg was dat hij...
Joel had harmed Owen. The reason/The consequence was that he...

Jelle had Hugo gesard. De reden/Het gevolg was dat hij...
Jelle had provoked Hugo. The reason/The consequence was that he...

Hendrik had Pepijn gestangd. De reden/Het gevolg was dat hij...
Hendrik had aggravated Pepijn. The reason/The consequence was that he...

Hidde had Matthijs tegengewerkt. De reden/Het gevolg was dat hij...
Hidde acted against Matthijs. The reason/The consequence was that he...

Loek had Giel verhuisd. De reden/Het gevolg was dat hij...
Loek had moved Giel. The reason/The consequence was that he...

Rick had Joep geholpen. De reden/Het gevolg was dat hij...
Rick had helped Joep. The reason/The consequence was that he...

Pieter had Kevin geduwd. De reden/Het gevolg was dat hij...
Pieter had pushed Kevin. The reason/The consequence was that he...

Victor had Jeffrey gemasseerd. De reden/Het gevolg was dat hij...
Victor had massaged Jeffrey. The reason/The consequence was that he...

Coen had Jim geschminkt. De reden/Het gevolg was dat hij...
Coen had painted Jim. The reason/The consequence was that he...

Brian had Bjorn gewassen. De reden/Het gevolg was dat hij...
Brian had washed Bjorn. The reason/The consequence was that he...

Jorn had Kay voorgelezen. De reden/Het gevolg was dat hij...
Jorn had read to Kay. The reason/The consequence was that he...

Simon had Adam opgetild. De reden/Het gevolg was dat hij...
Simon had lifted Adam. The reason/The consequence was that he...

Casper had Joris de som uitgelegd. De reden/Het gevolg was dat hij...
Casper had explained the sum to Joris. The reason/The consequence was that he...

Bart had Guus ingehaald. De reden/Het gevolg was dat hij...
Bart had passed/overhauled Guus. The reason/The consequence was that he...

Pim had Siem thuisgebracht. De reden/Het gevolg was dat hij...
Pim had brought Siem home. The reason/The consequence was that he...

Jesper had Jason afbetaald. De reden/Het gevolg was dat hij...
Jesper had paid off Jason. The reason/The consequence was that he...

Luc had Mick verzorgd. De reden/Het gevolg was dat hij...
Luc had taken care of Mick. The reason/The consequence was that he...

Wessel had Roan geconfronteerd met de waarheid. De reden/Het gevolg was dat hij...
Wessel had confronted Roan with the truth. The reason/The consequence was that he...

Maarten had Gerrit genegeerd. De reden/Het gevolg was dat hij...
Maarten had ignored Gerrit. The reason/The consequence was that he...

Mark had Dirk weggebracht. De reden/Het gevolg was dat hij...
Mark had brought Dirk away. The reason/The consequence was that he...
Free translation: Mark had driven Dirk somewhere. The reason/The consequence was that he...

Samuel had Mathijs leren schaatsen. De reden/Het gevolg was dat hij...
Samuel had taught Mathijs how to ice-skate. The reason/The consequence was that he...

Stef had Job vermaakt. De reden/Het gevolg was dat hij...
Stef had amused Job. The reason/The consequence was that he...

Bas had Niek geplaagd. De reden/Het gevolg was dat hij...
Bas had teased Niek. The reason/The consequence was that he...

Martijn had Jacob ingewerkt. De reden/Het gevolg was dat hij...
Martijn had trained Jacob in his new job. The reason/The consequence was that he...

Joost had Chris toegezongen. De reden/Het gevolg was dat hij...
Joost had sung to Chris. The reason/The consequence was that he...

Lukas had Wouter achtervolgd. De reden/Het gevolg was dat hij...
Lukas had followed Wouter. The reason/The consequence was that he...

Milan had Lucas gefotografeerd. De reden/Het gevolg was dat hij...
Milan had photographed Lucas. The reason/The consequence was that he...

Tijs had Rick gecoacht. De reden/Het gevolg was dat hij...
Tijs had coached Rick. The reason/The consequence was that he...

Wesley had Jordy geïnterviewd. De reden/Het gevolg was dat hij...
Wesley had interviewed Jordy. The reason/The consequence was that he...

APPENDIX II: Overview target items Eye Tracking Experiment

The sentences below are the Dutch target sentences used in Experiment 2 and their translations. The first sentence is similar across conditions and is hence presented once. The letters A-D indicate the different conditions, i.e. A) Reason-N1, B) Reason-N2, C) Consequence-N1 and D) Consequence-N2. Note that not all English translations are congruent with the exact semantic meaning of the Dutch equivalent.

Thomas bood Sanne zijn excuses aan./*Thomas apologized to Sanne.*

- A. De reden was dat hij weer goede vrienden wilde worden na hun ruzie.
The reason was that he wanted to become good friends again after their fight.
- B. De reden was dat zij weer goede vrienden wilde zijn na hun ruzie.
The reason was that she wanted to be good friends after their fight.
- C. Het gevolg was dat hij weer goede vrienden werd met haar.
The consequence was that he became good friends again with her.
- D. Het gevolg was dat zij weer goede vrienden werd met hem.
The consequence was that she became good friends again with him.

Tim bekende de diefstal aan Kim./*Tim confessed the theft to Kim.*

- A. De reden was dat hij na al die tijd zijn leugens niet meer voor zich kon houden.
The reason was that he could not hold his lies any longer.
- B. De reden was dat zij na al die tijd zijn leugens niet meer geloofde.
The reason was that she did not believe his lies after all this time.
- C. Het gevolg was dat hij na al die tijd erg opgelucht was.
The consequence was that he was very relieved after all this time.
- D. Het gevolg was dat zij na al die tijd erg teleurgesteld was.
The reason was that she was very disappointed after all this time.

Johannes verontschuldigde zich tegenover Maria./*Johannes apologized to Maria.*

- A. De reden was dat hij tijdens het feest een klap had uitgedeeld.
The reason was that he had hit someone at the party.
- B. De reden was dat zij tijdens het feest een klap van hem had gekregen.
The reason was that she was hit by him at the party.
- C. Het gevolg was dat hij tijdens het feest erg opgelucht was.
The consequence was that he was very relieved during the party.
- D. Het gevolg was dat zij tijdens het feest een dansje met hem maakte.
The consequence was that she danced with him at the party.

Jeroen slijmde bij Laura./*Jeroen sucked up to Laura.*

- A. De reden was dat hij een berg geld wilde van haar.
The reason was that he wanted a lot of money from her.
- B. De reden was dat zij een berg geld moest geven aan hem.
The reason was that she needed to give him a lot of money.
- C. Het gevolg was dat hij een berg geld kreeg van haar.
The consequence was that he received a lot of money from her.
- D. Het gevolg was dat zij een berg geld gaf aan hem.
The consequence was that she gave him a lot of money.

Mark hinderde Fleur./*Mark annoyed Fleur in the way.*

- A. De reden was dat hij de hele nacht zijn muziek niet wilde uitzetten.
The reason was that he did not want to turn down his music all night.
- B. De reden was dat zij de hele nacht zijn muziek niet wilde horen.
The reason was that she did not want to hear his music all night long.
- C. Het gevolg was dat hij de hele nacht last had van een schuldgevoel.
The consequence was that he felt guilty all night.
- D. Het gevolg was dat zij de hele nacht niet kon slapen.
The consequence was that she couldn't sleep all night.

Sander jokte tegen Lieke./*Sander fibbed to Lieke.*

- A. De reden was dat hij een verrassingsfeestje had georganiseerd.
The reason was that he organized a surprise party for her.
- B. De reden was dat zij een verrassingsfeestje zou krijgen.
The reason was that she would get a surprise party.
- C. Het gevolg was dat hij het verrassingsfeestje geheim had gehouden.
The consequence was that he kept the surprise party a secret.
- D. Het gevolg was dat zij het verrassingsfeestje niet verwachtte.
The consequence was that she did not expect the surprise party.

Rick lichtte Britt op./*Rick swindled Britt.*

- A. De reden was dat hij maandenlang geen geld had.
The reason was that he did not have money for months.
- B. De reden was dat zij maandenlang had opgescheept over haar inkomen.

- The reason was that she had bragged about her income for months.*
 C. Het gevolg was dat hij maandenlang de gevangenis in moest.
The consequence was that he needed to go to jail.
 D. Het gevolg was dat zij maandenlang geen geld meer had.
The consequence was that she did not have any money anymore.
- Nick manipuleerde Maud./*Nick manipulated Maud.*
 A. De reden was dat hij extra geld nodig had voor zijn project.
The reason was that he needed extra money for his project.
 B. De reden was dat zij extra geld kon geven aan zijn project.
The reason was that she could give extra money to his project.
 C. Het gevolg was dat hij extra geld kreeg voor zijn project.
The consequence was that he got extra money for his project.
 D. Het gevolg was dat zij extra geld vrijmaakte voor zijn project.
The consequence was that she arranged extra money for his project.
- Lisa kwelde Martijn./*Lisa harassed Martijn.*
 A. De reden was dat zij een lange tijd door hem was gepest in de klas
The reason was that she was bullied by him in class for a long time.
 B. De reden was dat hij een lange tijd vervelend tegen haar had gedaan.
The reason was that he had been annoying her for a long time.
 C. Het gevolg was dat zij een lange tijd genegeerd werd.
The consequence was that she was ignored for a long time.
 D. Het gevolg was dat hij een lange tijd boos was.
The consequence was that he was angry for a long time.
- Floor stoorde Daan./*Floor disturbed Daan.*
 A. De reden was dat zij zo snel mogelijk een afspraak met hem wilde maken
The reason was that she wanted to make an appointment with him as soon as possible.
 B. De reden was dat hij zo snel mogelijk naar de telefoon moest komen.
The reason was that he needed to come to the phone as soon as possible.
 C. Het gevolg was dat zij zo snel mogelijk de deur werd gewezen.
The consequence was that she was turned out as soon as possible.
 D. Het gevolg was dat hij zo snel mogelijk ergens anders ging zitten.
The consequence was that he was going to sit somewhere else as soon as possible.
- Johanna besmette Michael./*Johanna infected Michael.*
 A. De reden was dat zij bij de bloedafname een besmette naald had gebruikt.
The reason was that she used an infected needle during the blood transfusion.
 B. De reden was dat hij bij de bloedafname met besmette naalden was geprikt.
The reason was that he was pricked with an infected needle during the blood transfusion.
 C. Het gevolg was dat zij bij de bloedafname voortaan beter oplette.
The consequence was that she paid more attention during blood transfusions from now on.
 D. Het gevolg was dat hij bij de bloedafname niet meer door haar wilde worden geprikt.
The consequence was that he did not want to get pricked by her during the blood transfusion.
- Roos smeekte Lars om een chocoladereep./*Roos bagged Lars for a chocolate bar.*
 A. De reden was dat zij te weinig had gegeten bij het avondeten.
The reason was that she did not eat enough at diner.
 B. De reden was dat hij te weinig had gekookt voor het avondeten.
The reason was that he did not cook enough for diner.
 C. Het gevolg was dat zij te weinig at bij het avondeten.
The consequence was that she did not eat enough at diner.
 D. Het gevolg was dat hij te weinig repen over had om uit te delen.
The consequence was that he did not have enough bars lefts to share out.
- Iris kocht Wouter om./*Iris bribed Wouter.*
 A. De reden was dat zij belangrijke informatie wilde hebben.
The reason was that she wanted to have important information.
 B. De reden was dat hij belangrijke informatie kon leveren.
The reason was that he could provide important information.
 C. Het gevolg was dat zij belangrijke informatie achter wist te houden.
The consequence was that she could withhold important information.
 D. Het gevolg was dat hij belangrijke informatie achterhield.
The consequence was that he withheld important information.
- Anna belde Jeffrey./*Anna called Jeffrey.*
 A. De reden was dat zij als eerste alles wilde weten over zijn trouwplannen.
The reason was that she wanted to be the first to know everything about his plan to get married.
 B. De reden was dat hij als eerste alles wilde weten over haar trouwplannen.
The reason was that he wanted to be the first to know everything about her plan to get married.
 C. Het gevolg was dat zij als eerste alles wist over zijn trouwplannen.
The consequence was that she was the first to know everything about his plan to get married.
 D. Het gevolg was dat hij als eerste alles wist over haar trouwplannen.
The consequence was that he was the first to know everything about her plan to get married.
- Loes loog tegen Max./*Loes lied to Max*
 A. De reden was dat zij haar problemen niet wilde bespreken.
The reason was that she did not want to discuss her problems.
 B. De reden was dat hij haar problemen niet mocht weten.
The reason was that he did not know about her problems.

- C. Het gevolg was dat zij haar problemen niet hoefde te bespreken.
The consequence was that she did not need to discuss her problems.
- D. Het gevolg was dat hij haar problemen niet te horen kreeg.
The consequence was that he did not hear about her problems.

Nina paaide Bram./Nina appeased Bram.

- A. De reden was dat zij die ochtend graag ontbijt op bed wilde.
The reason was that she wanted to have 'Breakfast in bed' that morning.
- B. De reden was dat hij die ochtend geen zin had om ontbijt op bed te maken.
The reason was that he didn't want to make 'Breakfast in bed' that morning.
- C. Het gevolg was dat zij die ochtend ontbijt op bed kreeg.
The consequence was that she did not get 'Breakfast in bed' that morning.
- D. Het gevolg was dat hij die ochtend ontbijt op bed verzorgde.
The consequence was that he made her 'Breakfast in bed' that morning.

Anouk vernederde Jasper./Anouk humiliated Jasper.

- A. De reden was dat zij in zijn column negatief werd besproken.
The reason was that she was discussed very negatively in his column.
- B. De reden was dat hij in zijn column negatief over haar had gesproken.
The reason was that he talked about her very negatively in his column.
- C. Het gevolg was dat zij in zijn column slecht werd afgespiegeld.
The consequence was that she was discussed in his column very negatively.
- D. Het gevolg was dat hij in zijn column slecht over haar sprak.
The consequence was that he talked about her very negatively in his column.

Eva stond Hendrik in de weg./Eva stood Hendrik in the way.

- A. De reden was dat zij in de mensenmassa niet voor hem opzij kon gaan.
The reason was that she could not step aside for him in the crowd.
- B. De reden was dat hij in de mensenmassa niet om haar heen kon.
The reason was that he could not pass her in the crowd.
- C. Het gevolg was dat zij in de mensenmassa ruimte probeerde te maken.
The consequence was that she tried to make room in the crowd.
- D. Het gevolg was dat hij in de mensenmassa vast kwam te zitten.
The consequence was that he got stuck in the crowd.

Eline verzocht Thijs iets te doen./Eline requested Thijs to do something.

- A. De reden was dat zij het werk niet op tijd af zou krijgen.
The reason was that she could not finish the work in time.
- B. De reden was dat hij het werk nog niet had gedaan.
The reason was that he did not do the work yet.
- C. Het gevolg was dat zij het werk sneller af had.
The consequence was that she finished her work more quickly.
- D. Het gevolg was dat hij het werk snel afmaakte.
The consequence was that he finished the work quickly.

Linda ondervroeg Maarten./Linda questioned Maarten.

- A. De reden was dat zij schokkende feiten had gehoord over het schietincident.
The reason was that she had heard shocking facts about the shooting.
- B. De reden was dat hij schokkende feiten wist over het schietincident.
The reason was that he knew shocking facts about the shooting.
- C. Het gevolg was dat zij schokkende feiten verspreidde over het schietincident.
The consequence was that she spread shocking facts about the shooting.
- D. Het gevolg was dat hij schokkende feiten vertelde over het schietincident.
The consequence was that he told shocking facts about the shooting.