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Deriving and processing experiencer subject causatives

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This paper examines experiencer subject causatives in Japanese, where the animate subject functions as an experiencer rather than an agent (e.g., *Taro-ga kyoohuu-de boosi-o tob-asi-ta* 'Taro's cap got blown off on him due to the strong wind'). The paper is divided into two parts: formal and experimental. In the first part, adopting the functional head *Affect* (Bosse et al. 2012), I propose that the experiencer subject merges with the Spec of AffectP, which is positioned between the causing-event-introducing CauseP and the semantically contentless expletive VoiceP (i.e., CauseP < AffectP < expletive VoiceP). To account for the possessor–possessum relationship between the subject and object, I argue for a pragmatic analysis over potential syntactic alternatives. Additionally, I adopt the view that each lexical entry contains syntactic structures to explain lexical idiosyncrasies. My proposal comprehensively captures the key aspects of experiencer subject causatives. I further claim that the inanimate causer adjunct (e.g., *kaze-de* 'due to the wind') adjoins to CauseP, positioned above VP, which introduces the theme (e.g., *boosi-o* 'his cap'). The second section reports on a sentence-processing experiment designed to distinguish between the proposed *high-causer* analysis and the alternative *low-causer* analysis, where the causer is located below the theme. The results reveal that the theme–causer order takes longer to process than the causer–theme order, lending support to the high-causer analysis. These findings provide insight into the long-standing issue regarding the syntactic position of inanimate causers.

1 Introduction

In Japanese lexical causatives with either an overt or null causative morpheme, an animate subject is typically interpreted as an agent.[1]

(1) a. Hanako-ga eda-o ot-ta.
Hanako-NOM branch-ACC break-PST
'Hanako broke branches.'

b. Hanako-ga kami-hikooki-o tob-asi-ta.
Hanako-NOM paper-plane-ACC be.flown-CAUS-PST
'Hanako flew a paper plane.'

What is of interest here is that this is not always the case: Japanese allows causatives in which an animate subject can be interpreted as an experiencer. Consider (2). Ignoring the phrases in parentheses, the subject Hanako is ambiguous between an agent and an experiencer.[2] Under the experiencer reading, Hanako is an individual experiencing but not causing the event. I will hereafter refer to causatives with an experiencer reading of their subject as *experiencer subject causatives*.

(2) a. Hanako-ga (ziko-de) ude-o ot-ta.
Hanako-NOM (accident-due.to) arm-ACC break-PST
Agentive reading (ignoring *ziko-de*): 'Hanako broke an arm.'
Experiential reading: 'Hanako$_1$'s arm broke on her$_1$ (due to the accident).'

b. Hanako-ga (kyoohuu-de) boosi-o tob-asi-ta.
Hanako-NOM (blast-due.to) cap-ACC be.flown-CAUS-PST
Agentive reading (ignoring *kyoohuu-de*): 'Hanako flew a cap.'
Experiential reading: 'Hanako$_1$'s cap got blown off on her$_1$ (due to the blast).'

The non-causer interpretation of the subject is confirmed by the fact that a causer adjunct with the postposition *-de* 'due to' can appear, as indicated by the parentheses in (2).[3] The relevance of the subject's ability to experience the event is illustrated by the example in (3) below. In this case, Hanako is in a coma and non-sentient; hence, she cannot experience the event of her house burning down, resulting in the unacceptability of the sentence under the intended reading.[4]

[1] We set aside periphrastic causatives because they do not allow an experiencer reading for the subject, which is the main focus of this paper (e.g., Oehrle & Nishio 1981; Miyagawa 1989; Pylkkänen 2008; Hasegawa 2007). See Harley (2008: 24) for further distinguishing properties of the two types of causatives.

[2] For the remainder of this paper, I will not indicate the possible agentive reading in each example unless necessary.

[3] Akimoto (2017: 2) suggests that the presence of a causer adjunct is a requirement for experiencer subject causatives to be well-formed. However, this is incorrect, as one can easily interpret the subject as an experiencer without the causer PP, as shown in the examples provided throughout this paper and in previous studies cited later in this section.

[4] Harley (2008: 31) treats *yaku* 'burn' as a simple transitive verb, but this does not appear to be a standard analysis, as it has an inchoative counterpart *yak-e-ru* 'burn (intransitive).'

(3) *konsui-jootai-no Hanako-ga kazi-de ie-o yai-ta.
coma-state-GEN Hanako-NOM fire-due.to house-ACC burn.down-PST
Intended: 'Hanako$_1$'s house burned down on her$_1$ due to the fire while she$_1$ was in a coma.'

To my knowledge, experiencer subject causatives were first discussed by Inoue (1974; 1976) within the generative linguistic framework and have since been examined by numerous researchers under various terms (e.g., adversity causatives (Oehrle & Nishio 1981; Miyagawa 1989; Harley 1995a; Pylkkänen 2000; 2008; Wood & Marantz 2017; Yasuhara 2017); possessor raising constructions (Hasegawa 2007); affected subject transitives (Akimoto 2017)). However, a satisfactory analysis has yet to be developed. This paper seeks to address this gap.

A note on terminology is in order. This paper adopts none of the terms used in the previous literature for the following reasons. First, I do not adopt the term *adversity causatives* because the experiencer subject does not necessarily have to be adversely affected. In the following sentence, for instance, the subject is a beneficiary.

(4) Yoshiko-ga hahaoya-kara-no-tegami-de kimoti-o nagom-ase-ta.
Yoshiko-NOM mother-from-GEN-letter-due.to feeling-ACC calm-CAUS-PST
'Yoshiko$_1$ felt calm due to the letter from her$_1$ mother.'

Second, I do not use the term *affected subject transitives* because not all transitive verbs allow an experiencer subject; only causative verbs permit this interpretation (Harley 1995a; Pylkkänen 2000; Wood & Marantz 2017). For instance, activity verbs only allow an agentive reading.

(5) a. Taro-ga ude-o osi-ta
Taro-NOM arm-ACC push-PST
'Taro pushed an arm.'

b. Junko-ga saihu-o sagasi-ta.
Junko-NOM wallet-ACC serach-PST
'Junko searched for a wallet.'

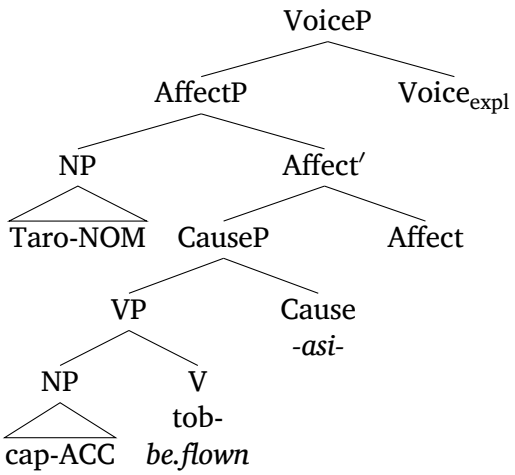
Finally, I do not adopt the term *possessor raising constructions* because it implies that possessor raising occurs in the syntactic derivation. As I will demonstrate in Section 4, experiencer subject causatives do not involve such an operation.

The paper proceeds as follows: Section 2 presents four basic properties of experiencer subject causatives. Section 3 provides a syntactic account of three of them. Adopting the notion of the Affect head (Bosse et al. 2012), I propose the following syntax and semantics:[5]

[5] I omit the syntax and semantics above the verbal domain (e.g., Tense and Aspect) throughout the paper.

(6) a. Taro-ga boosi-o tob-asi-ta.
Taro-NOM cap-ACC be.flown-CAUS-PST
'Taro$_1$'s cap got blown off on him$_1$.'

b.



c. ⟦VoiceP⟧ = λe$_3$∃e$_4$e$_2$. be.flown(e$_2$,cap) ∧ Cause(e$_3$,e$_2$) ∧ experience(e$_4$) ∧ experiencer(e$_4$,Taro): ∀e$_5$ ∃e$_2$. be.flown(e$_2$, cap) ∧ Cause(e$_5$,e$_2$) → Source (e$_5$,e$_4$)

I also hypothesize, following Bruening (2021), that verbal lexical entries can include syntactic structures to capture the lexical idiosyncrasies exhibited by experiencer subject causatives. Notice that in (6a), the experiencer subject is interpreted as the possessor of the theme object. This possessor–possessum relationship receives a pragmatic explanation in Section 4. Section 5 presents a syntactic analysis of the causer adjunct with the postposition *-de* 'due to'. I claim that it adjoins to projections introducing the causing event, such as CauseP, and as a result, it originates above the theme object. Section 6 provides psycholinguistic evidence in favor of this claim. Specifically, the sentence processing data confirm the prediction that the causer adjunct precedes the theme object in the canonical word order. Section 7 concludes the paper.

2 Characteristics of experiencer subject causatives

This section discusses four basic characteristics of experiencer subject causatives.

2.1 Unpassivizability

Below are examples of experiencer subject causatives.

(7) a. Taro-ga (ziko-de) ude-o ot-ta
Taro-NOM (accident-due.to) arm-ACC break-PST
'Taro$_1$'s arm broke on him$_1$ (due to the accident).'

b. Hanako-ga (kazi-de) ie-o yai-ta.
Hanako-NOM (fire-due.to) house-ACC burn.down-PST
'Hanako$_1$'s house burned down on her$_1$ (due to the fire).'

At first glance, the subjects in these sentences appear similar to those in experiencer-subject psych-verb constructions and accidental agent constructions, as illustrated by (8) and (9), respectively.

(8) a. minna-ga Taro-o sui-teiru.
everyone-NOM Taro-ACC like-PROG
'Everyone likes Taro.'

b. minna-ga Hanako-o kirat-teiru.
everyone-NOM Hanako-ACC hate-PROG
'Everyone hates Hanako.'

(9) a. Taro-ga ukkari eda-o or-ta.
Taro-NOM accidentally branch-ACC break-PST
'Taro accidentally broke the branches.'

b. Hanako-ga ayamatte syorui-o yai-ta.
Hanako-NOM mistakenly document-ACC burn.down-CAUS-PST
'Hanako mistakenly burned the documents.'

However, they are not identical. Experiencer subject causatives differ from the other two constructions in terms of passivization. Experiencer subject causatives cannot undergo passivization (Amano 1987; 2002). When passivized, the experiencer interpretation disappears, leaving only the agent interpretation, as demonstrated by the passivized forms of (7) in (10). In these sentences, the *ni* 'by' phrases must be interpreted as an agent.

(10) a. ude-ga Taro-ni or-are-ta.
arm-NOM Taro-by break-PASS-PST
'The arm got broken by Taro.'

b. ie-ga Hanako-ni yak-are-ta.
house-NOM Hanako-BY burn-PASS-PST
'The house got burned by Hanako.'

In contrast, experiencer subject psych-verb constructions and accidental agent constructions can be passivized without changing their basic meaning. (11) and (12) are the passive forms of (8) and (9), respectively.

(11) a. Taro-ga minna-ni suk-are-teiru.
Taro-NOM everyone-by like-PASS-PROG
'Taro is liked by everyone.'

b. Hanako-ga minna-ni kiraw-are-teiru.
Hanako-NOM everyone-by hate-PASS-PROG
'Hanako is hated by everyone.'

(12) a. eda-ga ukkari Taro-ni or-are-ta.
branch-NOM accidentally Taro-by be.broken-PASS-PST
'The branches got accidentally broken by Taro.'

b. syorui-ga ayamatte Hanako-ni yak-are-ta.
document-NOM mistakenly Hanako-BY burn-PASS-PST
'The documents got mistakenly burned by Hanako.'

According to Bruening (2013), passivization is a morphosyntactic operation that prevents the external argument from being realized in a usual way. Asami (2024) argues that this is also true of passives in Japanese (cf. Jo & Seo 2023). In light of this view, the inability of experiencer subject causatives to be passivized indicates that their subject is not an external argument, unlike those in experiencer-subject psych-verb and accidental agent constructions.

2.2 Possessor–possessum relation between subject and object

In experiencer subject causatives, a subject and object establish a possessor–possessum relation (Oehrle & Nishio 1981; Nishio 1982; Amano 1987; 2002; Pylkkänen 2000; Hasegawa 2001; 2004; 2007; 2016; Akimoto 2017; Wood & Marantz 2017; Yasuhara 2017). Consider the sentences in (13). These examples illustrate that the possessor–possessum relation can be either inalienable or alienable. In (13a), Taro inalienably possesses an arm; in (13b), Hanako alienably possesses a house.

(13) a. Taro-ga ude-o ot-ta
Taro-NOM arm-ACC break-PST
'Taro$_1$'s arm broke on him$_1$.'

b. Hanako-ga ie-o yai-ta.
Hanako-NOM house-ACC burn.down-PST
'Hanako$_1$'s house burned down on her$_1$.'

In (13), if the possessor of the possessum is distinct from the referent of the subject, the experiencer reading of that subject becomes impossible. As a result, the sentences are construed as agentive (e.g., 'Hanako broke someone else's arm' and 'Hanako burned down someone else's house' in (13a) and (13b), respectively).

It is worth noting that the following sentences are unacceptable under the experiencer reading when uttered without context (I will discuss why the sentences are marked with '#' to indicate a pragmatic oddity shortly). In these cases, the possessor position of the object NP is occupied

by an overt element that is not co-referential with the subject. As a result, the possessor of the possessum is interpreted as distinct from the referent of the subject by default.

(14) a. #Hanako-ga ziko-de robotto-no ude-o ot-ta.
Hanako-NOM accident-due.to robot-GEN arm-ACC break-PST
'Hanako$_1$'s robot's arm broke on her$_1$ due to the accident.'

b. #Ken-ga kyoohuu-de kodomo-no boosi-o tob-asi-ta.
Ken-NOM strong.wind-due.to child-GEN cap-ACC be.flown-CAUS-PST
'Ken$_1$'s child's cap got blown off on him$_1$ due to the strong wind.'

Importantly, as pointed out by Akimoto (2017), seemingly unacceptable cases like (14a) and (14b) become acceptable with supporting contexts. Specifically, the contexts in (15a) and (15b), inspired by Akimoto (2017: 3–4), make the sentences in (14a) and (14b) acceptable. These contexts facilitate the interpretation of the complex object as the possessum of the subject.

(15) a. Context for (14a): Hanako was a mechanical engineer and she spent many hours developing a robot every day. One day, her robot's arm broke due to the accident and it mattered to Hanako.

b. Context for (14b): Ken was holding his child's cap and a strong wind blew it off. It bothered Ken.

Therefore, the occupation of the possessor position within the object does not necessarily prohibit the experiencer reading of the subject, as long as an appropriate context is provided.

2.3 At-issue and not-at-issue meanings

I now turn to the types of meanings contributed by experiencer subject causatives, with special attention to the distinction between at-issue and not-at-issue meanings (Karttunen 1973; Karttunen & Peters 1979; Potts 2005). Unlike at-issue meanings, not-at-issue meanings project beyond entailment-canceling operators such as negation, questions, and conditionals. Based on this criterion, I will demonstrate that in experiencer subject causatives, the experiential interpretation contributes the not-at-issue meaning, while the experiencer subject contributes the at-issue meaning.

I will begin with the experiential reading. The experiencer subject causative is embedded under negation in (16). As indicated by (i), this sentence can mean that the event of Kenji's arm breaking did not occur, while still conveying the interpretation that Kenji would have been affected if the event had happened. This interpretation shows that the experiential reading can survive under negation. By contrast, as demonstrated by the unacceptable reading in (ii), it is impossible to negate the experiential event without also negating the arm-breaking event. I will discuss (iii) shortly when addressing the experiencer subject.

(16) Kenji-ga ude-o ot-ta wakedewanai.
Kenji-NOM arm-ACC break-PST it.is.not.the.case
'It is not the case that Kenji$_1$'s arm broke on him$_1$.'
(i) Kenji$_1$'s arm did not break but if it had, it would have affected him$_1$.
(ii) *Kenji$_1$'s arm broke but it did not matter to him$_1$.
(iii) It is not Kenji$_1$ who got his$_1$ arm broken on him$_1$.

Next, the sentence in (17) presents the experiencer subject causative embedded in a yes/no question. In this sentence, the speaker can ask the addressee whether or not Kenji broke his arm, implying that if he did, he would have been affected. The experience is implied but not questioned; therefore, the addressee cannot simply answer "no" if they know that Kenji's arm did break, but it did not matter to him.

(17) Kenji-wa ude-o ot-ta-no?
Kenji-TOP arm-ACC break-PST-Q
'Did Kenji$_1$'s arm break?' (If it did, it would matter to him$_1$.)

Finally, let us consider the experiencer subject causative embedded in a conditional in (18). In this case, the experiential interpretation does not alter the condition under which the speaker gives Kenji 10,000 yen. That is, regardless of whether Kenji is affected or not, the speaker will give him 10,000 yen if his arm breaks.

(18) Kenji-ga ude-o ot-ta-ra, tiryoohi-tosite 10,000-en ageru-yo.
Kenji-NOM arm-ACC break-PST-if medical.expenses-as 10000-yen give-SFP
'If Kenji$_1$'s arm breaks on him$_1$, I will give him 10,000 yen as medical expenses.'

To sum up, the sentences in (16), (17), and (18) demonstrate that the experiential reading of experiencer subject causatives projects beyond negation, question, and conditional operators, respectively. Therefore, it is not-at-issue.

In contrast, the experiencer subject can be targeted by negation, question, and conditional operators. In the sentence in (16), the subject can be the target of negation, as indicated by the possible reading in (iii). In the sentence in (18), the experiencer subject contributes to the truth condition of the conditional. The speaker does not have to pay 10,000 yen to Kenji if someone else's arm breaks. An example of the yes/no question is provided in (19) below.[6] In this question, the speaker can ask the hearer whether or not it is Kenji who had his arm broken.

(19) Kenji-ga ude-o ot-ta-no?
Kenji-NOM arm-ACC break-PST-Q
'Is it Kenji$_1$ who had his$_1$ arm broken on him$_1$?'

[6] The subject bears the nominative Case to indicate that it is the focus of the question.

Based on these data, I conclude that the experiencer subject under discussion is at an at-issue tier.

2.4 Lexical idiosyncrasy

Prior studies have stated that experiencer subject causatives can be formed only if a verb has an inchoative counterpart (Harley 1995a; Pylkkänen 2000; Wood & Marantz 2017). I provide some relevant pairs below.

(20) a. 'break': or-u (causative) – or-e-ru (inchoative)
b. 'burn': yak-u (causative) – yak-e-ru (inchoative)
c. 'fly': tob-as-u (causative) – tob-u (inchoative)
d. 'calm': nagom-ase-ru (causative) – nagom-u (inchoative)

This generalization correctly accounts for the impossible experiencer reading in (21) below. The verbs used in these sentences (*taberu* 'eat' and *sagasu* 'search') are activity verbs and do not have inchoative counterparts in Japanese.

(21) a. Hanako-ga yasai-o tabe-ta.
Hanako-NOM vegetable-ACC eat-PST
'Hanako ate vegetables.'
b. Junko-ga saihu-o sagasi-ta.
Junko-NOM wallet-ACC serach-PST
'Junko searched for her wallet.'

Crucially, the experiencer reading on the subject is not fully productive with alternating verbs, as noted by Oehrle & Nishio (1981: 167) and Miyagawa (1989: 129). A significant number of causative/inchoative verbs are not permitted in experiencer subject causatives, as shown below. The (a) sentences are intended to be experiencer subject causatives, while the (b) sentences are their inchoative counterparts.[7]

(22) a. ??Taro-ga hasiri-sugi-de kutuhimo-o hodoi-ta.
Taro-NOM run-too.much-due.to shoelace-ACC untie-PST
(Intended) 'Taro$_1$'s shoelace got untied on him$_1$ due to too much running.'
b. Taro-no kutuhimo-ga hasiri-sugi-de hodok-e-ta.
Taro-GEN shoelace-NOM run-too.much-due.to untie-INCH-PST
'Taro's shoelace got untied due to too much running.'

[7] A reviewer finds (23) acceptable. I speculate that this is due to individual differences in the acceptability of particular experiencer subject causatives. See the relevant discussion in Section 3.3.

(23) a. ??Hanako-ga gyooseki-huryoo-de idoo-o kim-e-ta.
Hanako-NOM achievement-poorness-due.to relocation-ACC decided-CAUS-PST
(Intended) 'Hanako$_1$'s relocation got decided on her$_1$ due to her$_1$ poor performance.'

b. Hanako-no idoo-ga gyooseki-huryoo-de kim-at-ta.
Hanako-GEN relocation-NOM achievement-poorness-due.to decided-INCH-PST
'Hanako's$_1$ relocation got decided due to her$_1$ poor performance.'

(24) a. ??Junko-ga toppu-de akusesarii-o tot-ta.
Junko-NOM sudden.wind-due.to accessory-ACC come.off-PST
(Intended) 'Junko$_1$'s accessory came off on her$_1$ due to a sudden wind.'

b. Junko-no akusesarii-ga toppu-de tor-e-ta.
Junko-GEN accessory-NOM sudden.wind-due.to blow.away-INCH-PST
'Junko's accessory came off due to a sudden wind.'

(25) a. ??Kenji-ga sutoresu-de kami-o nui-ta.
Kenji-NOM stress-due.to hair-ACC fall.out-PST
(Intended) 'Kenji$_1$'s hair fell out on him$_1$ due to stress.'

b. Kenji-no kami-ga sutoresu-de nuk-e-ta.
Kenji-GEN hair-NOM stress-due.to fall.out-INCH-PST
'Kenji's hair fell out due to stress.'

These data are far from exhaustive, as many more examples with other alternating verbs can easily be generated. These examples underscore the fact that having inchoative counterparts is a necessary but not sufficient condition for verbs to allow experiencer subject causatives.

The situations that the unacceptable (a) sentences above are intended to express are easy to imagine as experiential events. Yet, they sound unacceptable as experiencer subject causatives. Thus, pragmatic appropriateness alone does not determine the acceptability of experiencer subject causatives. At this point, I do not observe any predictable factor governing which alternating verbs can appear in experiencer subject causatives. Therefore, I consider this observation an instance of lexical idiosyncrasy.

2.5 Summary

To sum up, this section has reviewed the following four characteristics of experiencer subject causatives.

(26) a. Experiencer subject causatives are not passivizable; hence, their subject is not an external argument.
b. A subject and object have a possessor–possessum relationship.

c. An experiential interpretation and an experiencer subject contribute a not-at-issue meaning and an at-issue meaning, respectively.
d. Which lexical causative verb can feed an experiencer subject causative is idiosyncratic.

3 Syntactic analysis of experiencer subject causatives

This section provides a syntactic analysis of experiencer subject causatives, which captures their three characteristics. (A pragmatic account of the possessor-possessum relation will be discussed in Section 4.)

3.1 Theoretical assumption

The analysis I propose adopts the concept of the Affect head (Bosse et al. 2012; Jo & Seo 2023). To understand how Affect works, I will first go over key aspects of Jo and Seo's (2023) analysis of indirect passives in Japanese (see also Asami (2024)). In indirect passives, such as (27), the subject is interpreted as an experiencer indirectly affected by the event described by the rest of the sentence (e.g., Taro's praising of his daughter).[8]

(27) Hanako-ga Taro-ni musume-o home-rare-ta.
Hanako-NOM Taro-by daughter praise-PASS-PST.
'Hanako was affected by the event of Taro$_1$ praising his$_1$ daughter.'

To explain indirect passives, Jo & Seo (2023) adopt the functional head Affect ((28); Bosse et al. 2012: 1210). Affect takes an event property of type ⟨st⟩, introduces an experiencing event, and takes an individual to fill its experiencer argument. It also conventionally implicates the event denoted by its complement as the source of the experiencing event, as indicated by what follows the colon in the denotation.

(28) a. $[\![\text{Affect}]\!] = \lambda f_{\langle st \rangle} \lambda x \lambda e \exists e_1 . f(e) \wedge \text{experience}(e_1) \wedge \text{experiencer}(e_1, x)$: $\forall e_2 . f(e_2) \rightarrow \text{Source}(e_2, e_1)$
b. Source $\rightarrow \lambda e\, \lambda e_1$. e is the source of e_1

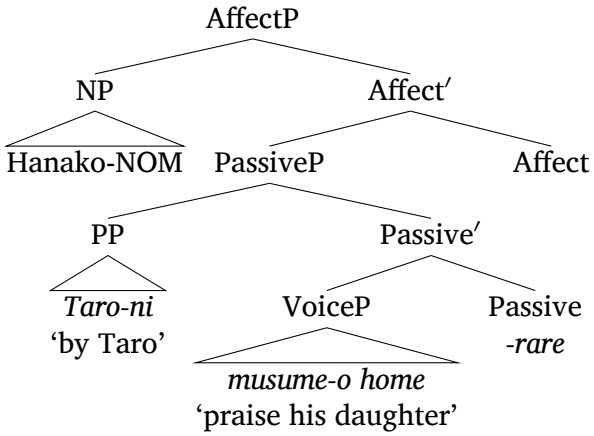
[8] The daughter in sentence (27) is intended to be understood as Taro's, not Hanako's. This interpretation is necessary because if the subject *Hanako* serves as the possessor of the daughter, the sentence could be derived by possessor raising from the internal position of the accusative object *musume* 'daughter'. Consequently, the sentence would instantiate a direct passive based on its active counterpart (i) (Kubo 1992).

(i) Taro-ga Hanako-no musume-o home-ta.
Taro-NOM Hanako-GEN daughter praise-PST.
'Taro praised Hanako's daughter.'

If we consider *Taro* as the possessor of the daughter, we can rule out this possibility. I thank a reviewer for calling my attention to this point.

Developing Bosse et al. (2012)'s *high* AffectP analysis, where AffectP occurs hierarchically above VoiceP, Jo & Seo (2023) propose that indirect passives, such as (27), have the syntax and semantics like (29).[9] The combination of Voice and its complement is achieved by Event Identification (Kratzer 1996). All other semantic compositions are done via Function Application (Heim & Kratzer 1998). A functional head, Passive, syntactically selects an agentive VoiceP with an unsaturated external argument and existentially closes that external argument (Bruening 2013). If existential closure does not occur, Passive inherits the unsaturated external argument from the Voice head, allowing an oblique phrase to saturate it, as seen in the current example. The Affect head syntactically selects PassiveP and projects an experiencer argument in its specifier position.

(29)



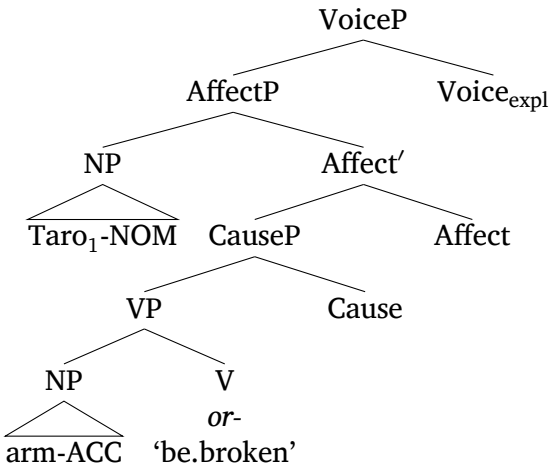
a. ⟦VoiceP⟧ = λxλe.praise(e,daughter) ∧ agent(e,x)
b. ⟦Passive⟧ = $\lambda f_{\langle e,st\rangle}$.f
c. ⟦Passive′⟧ = λxλe.praise(e,daughter) ∧ agent(e,x)
d. ⟦PP⟧ = $\lambda f_{\langle e,st\rangle}\lambda e.f(e,Taro)$
e. ⟦PassiveP⟧ = λe.praise(e,daughter) ∧ agent(e,Taro)
f. ⟦Affect′⟧ = $\lambda x\lambda e\exists e_1$.praise(e,daughter) ∧ agent(e,Taro) ∧ experience(e_1) ∧ experiencer(e_1,x): $\forall e_2$. praise(e_2,daughter) ∧ agent(e_2,Taro) → Source (e_2,e_1)
g. ⟦AffectP⟧ = $\lambda e\exists e_1$.praise(e,daughter) ∧ agent(e,Taro) ∧ experience(e_1) ∧ experiencer(e_1,Hanako): $\forall e_2$. praise(e_2,daughter) ∧ agent(e_2,Hanako) → Source (e_2,e_1)
≈ Taro praises his daughter and this event is conventionally implicated as the source of the experience of Hanako.

[9] We are abstracting away from the semantics of the possessor–possessum relationship between Taro and *musume* 'daughter'.

3.2 Low AffectP analysis of experiencer subject causatives

I propose that the Affect head can syntactically select not only PassiveP but also CauseP. The functional head Cause introduces an implicit event that brings about the eventuality denoted by its complement (Pylkkänen 2008). If Affect combines with PassiveP, the indirect passive results, as argued by Jo & Seo (2023); if it combines with CauseP, the experiencer subject causative obtains. My proposed *low* AffectP analysis of experiencer subject causatives is illustrated in (30). In this analysis, AffectP is positioned below semantically contentless expletive VoiceP (Schäfer 2008; Alexiadou et al. 2015). The expletive Voice is projected to indicate the phase edge.

(30) Taro-ga ude-o ot-ta
Taro-NOM arm-ACC break-PST
'Taro$_1$'s arm broke on him$_1$.'



a. ⟦or⟧ = λxλe. be.broken(e,x)
b. ⟦VP⟧ = λe.be.broken(e,arm)
c. ⟦Cause⟧ = λf$_{\langle st\rangle}$e$_1$∃e$_2$.f(e$_2$) ∧ Cause(e$_1$,e$_2$)
d. ⟦CauseP⟧ = e$_1$∃e$_2$.be.broken(e$_2$,arm) ∧ Cause(e$_1$,e$_2$)
e. ⟦Affect′⟧ = λxλe$_3$∃e$_4$e$_2$. be.broken(e$_2$,arm) ∧ Cause(e$_3$,e$_2$) ∧ experience(e$_4$) ∧ experiencer(e$_4$,x): ∀e$_5$∃e$_2$.be.broken(e$_2$,arm) ∧ Cause(e$_5$,e$_2$) → Source (e$_5$,e$_4$)
f. ⟦AffectP⟧ = λe$_3$∃e$_4$e$_2$. be.broken(e$_2$,arm) ∧ Cause(e$_3$,e$_2$) ∧ experience(e$_4$) ∧ experiencer(e$_4$,Taro): ∀e$_5$∃e$_2$. be.broken(e$_2$,arm) ∧ Cause(e$_5$,e$_2$) → Source (e$_5$,e$_4$)
g. ⟦Voice$_{expl}$⟧ = λP.P
h. ⟦VoiceP⟧ = λe$_3$∃e$_4$e$_2$.be.broken(e$_2$,arm) ∧ Cause(e$_3$,e$_2$) ∧ experience(e$_4$) ∧ experiencer(e$_4$,Taro): ∀e$_5$∃e$_2$. be.broken(e$_2$,arm) ∧ Cause(e$_5$,e$_2$) → Source (e$_5$,e$_4$)
≈ Taro's arm breaks and it is conventionally implicated that this event affects Taro.

A reviewer raises the possibility that expletive Voice first combines with CauseP, followed by Affect; consequently, the hierarchical structure would be CauseP < expletive VoiceP <

AffectP. While this alternative produces the same semantics as my proposal, since expletive Voice is semantically contentless, it faces some challenges. Specifically, it complicates the explanation for why experiencer subject causatives are possible only with causative verbs. My proposal captures this fact more effectively by framing it as a matter of selection: Affect selects CauseP, thereby preventing non-causative verbs, such as activity verbs, from allowing experiencer subject causatives. Additionally, if we assume that Affect combines with expletive VoiceP, the resulting hierarchical structure would be expletive VoiceP < AffectP, which mirrors the structure for indirect passives (PassiveP < AffectP), given that Passive is a type of Voice head. Since indirect passives can occur with any agentive verb, this alternative fails to explain why experiencer subject causatives are not as productive as indirect passives. For these reasons, I conclude that the correct hierarchical relation is CauseP < AffectP < expletive VoiceP.

My low AffectP analysis captures the first and third properties of experiencer subject causatives, repeated below:

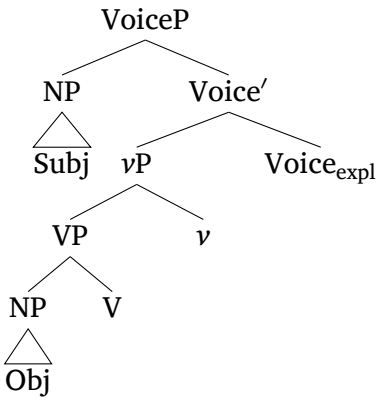
(31) a. Experiencer subject causatives are not passivizable; hence, their subject is not an external argument.
b. An experiential interpretation and an experiencer subject contribute a not-at-issue meaning and an at-issue meaning, respectively.

First, it accounts for (31a) in conjunction with the view that Passive is an independent syntactic head, which selects an agentive VoiceP that has not yet projected an external argument in its specifier (Bruening 2013).[10] Passive cannot combine with the VoiceP in experiencer subject causatives, since it is of expletive type. Consequently, experiencer subject causatives cannot be passivized.

It is worth addressing Yasuhara's (2017) analysis here. According to his analysis, the experiencer subject in the construction under discussion is introduced in Spec of expletive VoiceP, as shown in the structure (32), which is based on Yasuhara (2017: 461, (13)). Yasuhara (2017: 462) suggests that the impossibility of passivized experiencer subject causatives stems from there being "no thematic argument to be absorbed by the passive morphology." This conjecture itself aligns well with my current analysis. However, I will not adopt Yasuhara's (2017) analysis because it does not clearly explain how the experiencer subject and the experiential interpretation contribute at-issue and not-at-issue meanings, which I will address next.

[10] Jo & Seo (2023) propose that the Passive head in Japanese is compatible with expletive VoiceP, but Asami (2024) argues this is incorrect.

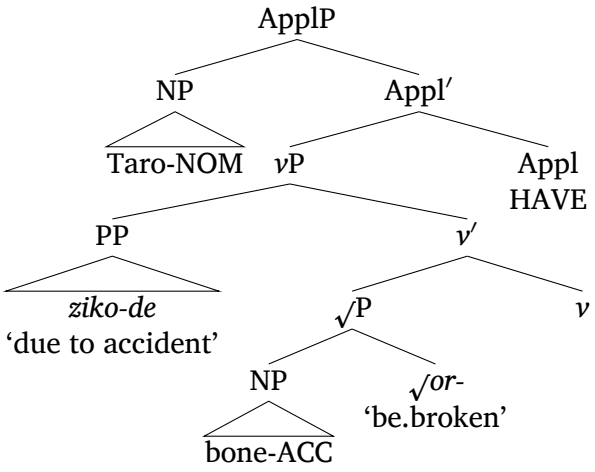
(32)



The not-at-issue status of the experiential interpretation and the at-issue status of the experiencer subject (31b) follow from the meanings contributed by Affect. According to the denotation in (28), the experiential meaning is conventionally implicated, while the experiencer is introduced as an at-issue meaning. The distinction in at-issueness between the experiential meaning and the experiencer role is independently supported by what Bosse et al. (2012) describe as affected experiencer constructions across various languages.

Crucially, the distinction between at-issue and not-at-issue meanings helps differentiate my analysis from Akimoto's (2017) Appl(icative)P analysis. At first glance, my low AffectP analysis appears similar to the ApplP analysis, which is shown below:[11]

(33)



[11] I include the causer adjunct in the structure because Akimoto (2017) considers it as a requirement for experiencer subject causatives. However, as I noted in footnote 3, this is incorrect.

Under this analysis, NP in Spec of ApplP is interpreted as the experiencer of a change-of-state event expressed by *v*P. Setting aside details, Akimoto (2017) argues that this interpretation is achieved through the abstract HAVE relation between the subject NP and *v*P, mediated by Appl. However, this analysis immediately encounters a problem regarding the not-at-issue experiential interpretation of experiencer subject causatives. The ApplP analysis suggests that the experiential reading is due to the abstract HAVE relation between the subject and the event, which would predict a parallel between experiencer subject causatives and possessive sentences. However, this prediction is not confirmed. The possessive meaning contributed by possessive sentences is at-issue, as it can be negated, which is at odds with the not-at-issue experiential interpretation of experiencer subject causatives (see Section 2.3).

(34) Taro-wa kuruma-o mot-teiru-wakedewanai. kari-teiru.
Taro-TOP car-ACC have-PROG-it.is.not.the.case borrow-PROG
'Taro doesn't have a car. He is borrowing it.'

We could salvage the ApplP analysis by stipulating that the abstract HAVE relation expressed by Appl is distinct from the canonical possessive meaning contributed by verbs like *motu* 'have.' However, such a stipulation would significantly weaken the analogy between the possessive relation and the experiencer interpretation. In contrast, my current analysis does not derive the experiential meaning from the HAVE relation and, therefore, does not encounter this problem. I conclude that the ApplP analysis is not a compelling account of experiencer subject causatives.

The next subsection turns to the fourth property, lexical idiosyncrasy.

3.3 Modeling lexical idiosyncrasy

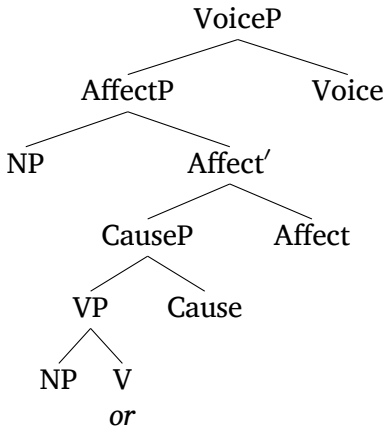
The fourth property of subject experiencer causatives involves lexical idiosyncrasy, as reiterated in (35).

(35) Which lexical causative verb can feed an experiencer subject causative is idiosyncratic.

As discussed in the preceding section, non-causative verbs, such as activity verbs, do not project CauseP and are therefore incompatible with Affect. This explains why experiencer subject causatives can only be formed with causative verbs. However, it remains unclear why not all causative verbs permit this construction.

To account for the idiosyncrasy, I adopt the view that lexical entries for each verb can include syntactic structures (Bruening 2021) (see also Ramchand (2008; 2018)). According to this view, for instance, the lexical entry for *or* 'break' includes a structure like (36).

(36)



Causative verbs that cannot form experiencer subject causatives, such as *hodok-* 'untie,' simply do not have a structure like (36) in their lexical entries.

The current view contrasts with another perspective, which holds that lexical entries or roots contain no syntactically relevant information (Marantz 1997; Borer 2005). A comprehensive argument for one view over the other is beyond the scope of this paper. However, it is worth noting that the view I adopt is motivated by the prevalence of idiosyncrasies within the verbal domain (e.g., the flexibility of the spray/load alternation (Iwata 2008), the flexibility of dative alternation (Hovav & Levin 2008), the flexibility of the selectional properties of verbs (Ramchand 2008), and the licensing and interpretation of implicit arguments (Bruening 2021), among others). The idiosyncrasy of experiencer subject causatives adds to these cases. It is unclear how these idiosyncrasies can be adequately captured if all the syntactic information is severed from lexical entries or roots.[12]

A reviewer raises questions about the implications of the current assumption for individual differences. Specifically, they ask whether language learners must learn, based on experience without negative evidence, whether a particular causative verb can appear in an experiencer subject causative frame. The reviewer also suggests that, if this is the case, individual differences in the acceptability of specific experiencer subject causatives would arise. It seems that the reviewer is on the right track. The same reviewer finds the particular experiencer subject causative in (23a)

[12] A reviewer—different from the one mentioned in the next paragraph—points out that the current assumption appears heavily lexical. In fact, the opposite is true: it is heavily syntactic. This is because the assumption relies solely on syntactic structures, which are independently necessary, rather than on lexical structures derived through lexical operations or rules. Under the current view, the lexicon merely serves as a storehouse of lexical entries with syntactic structures (and possibly other information like phonological information). Such a storehouse is motivated by general assumptions about human long-term memory. For these reasons, the current assumption is minimally, rather than heavily, lexical.

acceptable, while the speakers I have consulted find the same sentence unacceptable. Harley (2008: 48, note 11) observes that some Japanese speakers do not accept certain experiencer subject causatives, crediting this observation to Yosuke Sato (personal communication). I also find that participants' acceptability of experiencer subject causatives in my experiment, reported in Section 6, ranges from 25.0 to 100.0% (mean = 81.5%; SD = 38.9). Since no predictable factor determines which causative verbs can form experiencer subject causatives, these individual differences likely stem from variations in linguistic experience. Further research is required to explore individual differences in the acceptability of experiencer subject causatives (as well as other constructions mentioned above).

4 Pragmatic analysis of the possessor–possessum relation

We are now left with the final property of experiencer subject causatives: the possessor–possessum relation between the subject and object, as repeated below.

(37) A subject and object have a possessor–possessum relationship.

I propose that this relation arises from a pragmatic inference. Assuming that the single verbal domain, or the first phase (Ramchand 2008), denotes a single macro-event (Kageyama 1993; Tomioka 2006), the experiencer subject causative expresses a macro-event consisting of sub-events. Inspired by Washio's (1993: 84, (93)) affectedness principle, I argue that for an individual to be affected by a sub-event within the macro-event, that individual must be associated with the sub-event in some way. This condition is stated in (38).

(38) For an individual to be affected by a sub-event *e* within the single macro-event *E*, that individual must be associated with *e* in some way.

If the individual is a patient in the event denoted by a verb, this criterion is easily met. For instance, in the sentence *Mary kicked John*, it is straightforward to infer that John was affected by the kicking event, as he is the patient in that event. In experiencer subject causatives, however, this reasoning does not apply because the experiencer subject is not a participant in the sub-event expressed by the verb. The experiencer is introduced by Affect, meaning it is not directly related to the sub-event expressed by the verb. As a result, the only way to ensure that the individual is the affected experiencer within the single macro-event is to establish a relationship between the individual and the object undergoing the event. The most plausible relationship here is possession, and this relationship can be relatively loose due to its pragmatic nature. For example, the possession can be either alienable or inalienable, as demonstrated in the following examples.

(39) Taro-ga ziko-de ude-o ot-ta
Taro-NOM accident-due.to arm-ACC break-PST
'Taro$_1$'s arm broke on him$_1$ due to the accident.'

(40) Hanako-ga kyoohuu-de boosi-o tob-asi-ta.
Hanako-NOM blast-due.to cap-ACC be.flown-CAUS-PST
'Hanako$_1$'s cap got blown off on her$_1$ due to the blast.'

In contrast to my pragmatic analysis, Hasegawa (2001; 2004; 2007; 2016) and Wood & Marantz (2017) argue that the possessor–possessum relation is due to a possessor raising operation. According to this view, the experiencer subject initially merges into the possessor position of the object, and then moves to a higher position (i.e., Spec of TP) for Case or EPP reasons.

(41) Subject$_1$ [t$_1$ Object] Verb

In what follows, I demonstrate that there is no convincing evidence to support the possessor raising analysis. The relevant facts involve overt possessors, scrambling, and sloppy pronouns. I also address and refute a possible binding analysis, in which the subject binds a phonetically null pronoun or anaphor in the possessor position of the object, as schematized below (cf. Akimoto 2017: 5).

(42) Subject$_1$ [pro$_1$ Object] Verb

4.1 Overt possessor

Hasegawa (2001; 2007) bases the possessor raising analysis on the observation that experiencer subject causatives prohibit an overt realization of the possessor that is coreferential with the subject. This is illustrated by the following examples, which include either a reflexive (*zibun-no* 'self's') or a pronoun (*kare-no* 'his' or *kanozyo-no* 'her'). These examples are acceptable only under the agentive reading, not the experiential reading.

(43) a. Hanako$_1$-ga ({??zibun$_1$-no/??kanozyo$_1$-no}) hone-o ot-ta.
Hanako-NOM ({self-GEN/her-GEN}) bone-ACC break-PST
'Hanako$_1$'s bone broke on her$_1$.'

b. Taro$_1$-ga ({??zibun$_1$-no/??kare$_1$-no}) ie-o yai-ta.
Taro-NOM ({self-GEN/his-GEN}) house-ACC burn.down-PST
'Taro$_1$'s house burned down on him$_1$.'

Hasegawa (2001; 2007) argue that the unacceptability arises from competition between the trace of the subject and the overt element in the same possessor position.[13]

However, I argue that the apparent impossibility of the experiential reading in (43) is due to pragmatics rather than syntax. To my ears, these sentences, when presented out of the blue, convey a contrastive meaning such that Hanako broke her own bone, but not someone else's,

[13] Some speakers accept the experiential interpretation of causatives with the overt possessor *zibun-no* 'self's,' as reported by Pylkkänen (2000: 409) and Akimoto (2017: 3, ft3).

and Taro burned down his own house, but not someone else's. Based on this intuition, I propose that the prominent agentive reading in (43) is influenced by the Gricean Maxim of Manner (Grice 1975), which states that speakers should avoid ambiguous constructions by using unambiguous alternatives. Under this analysis, the speaker uses the overt possessor co-referential with the subject to avoid ambiguity caused by a potential alternative. This alternative would involve a possessor that is not co-referential with the subject, as in (44). These sentences allow only an agentive reading. Consequently, the sentences in (43), which are alternatives of (44), are also interpreted as agentive.

(44) a. Hanako-ga Jiro-no hone-o ot-ta.
Hanako-NOM Jiro-GEN bone-ACC break-PST
'Hanako broke Jiro's bone.'

b. Taro-ga Jiro-no ie-o yai-ta.
Taro-NOM Jiro-GEN house-ACC burn.down-PST
'Taro burned down Jiro's house.'

The same reasoning can be applied to cases with the overt pronominal possessor *kare-no* 'his' or *kanozyo-no* 'her' in (43).

It is well-established that the Gricean Maxim of Manner can be canceled or rendered irrelevant in certain contexts. This predicts that the overt realization of the possessor does not necessarily block the experiential reading if appropriate contexts are provided. This prediction is indeed borne out.

(45) Context: One day, Taro and Hanako went on a trip by car but they got into a car accident.
Taro$_1$-wa Hanako-no asi-o kabat-ta toki {zibun$_1$-no/kare$_1$-no} asi-o
Taro-TOP Hanako-GEN leg-ACC protect-PST when {self-GEN/his-GEN} leg-ACC
ot-ta rasii.
break-PST I.hear
'I hear that when he$_1$ protected Hanako's leg, Taro$_1$'s leg broke on him$_1$.'

(46) Context: Taro and his sons, Jiro and Saburo, were playing in the park. Taro was wearing his own cap and holding Jiro's and Saburo's caps in his hands. There was a sudden gust of wind.
Taro$_1$-wa Jiro-to Saburo-no boosi-o mamor-e-ta ga
Taro-TOP Jiro-and Saburo-GEN cap-ACC protect-be.able.to-PST but
{zibun$_1$-no/kare$_1$-no} boosi-o tob-asi-ta rassii.
{self-GEN/him-GEN} cap-ACC blow.off-CAUS-PST I.hear
'I hear that Taro$_1$ managed to hold Jiro's and Saburo's cap in his hands, but his$_1$ cap got blown off on him$_1$.'

These examples allow the experiential reading even with the overt possessor. The possessor raising analysis incorrectly predicts that the overt possessor would compete with the trace or copy of the experiencer subject in the same possessor position within the object, thus prohibiting the experiential reading, contrary to fact. In contrast, under my pragmatic analysis, nothing inherently prevents the overt realization of the possessor, allowing the relevant sentences to be felicitous.

4.2 Scrambling

Hasegawa (2001) provides another piece of apparent evidence for the possessor raising analysis, based on scrambling. She observes that the experiential reading becomes impossible when the object is scrambled to a position in front of the subject.

(47) a. Hanako-ga kosi-o itam-e-ta.
Hanako-NOM back-ACC be.injured-CAUS-PST

b.*?kosi-o Hanako$_1$-ga t_1 itam-e-ta.
back-ACC Hanako-NOM be.injured-CAUS-PST
Intended: 'Hanako$_1$ got her$_1$ back injured on her$_1$.'

Hasegawa argues that the unacceptability of the experiential reading in (47b) results from a violation of the proper binding condition: a moved element must c-command its trace (Fiengo 1977). Under the possessor raising analysis, the structure of the sentence in (47b) would resemble (48). In this structure, the trace $t_1$missing is not c-commanded by Subject$_1$ because the object containing that trace has been scrambled to the sentence-initial position. As a result, the proper binding condition is violated.

(48) *[t_1 Object]$_2$ Subject$_1$ t_2 Verb

However, I contest this analysis. First, the validity of the proper binding condition has been challenged (e.g., Hiraiwa 2010). More importantly, the low acceptability does not necessarily stem from a purely grammatical factor. Various grammar-external factors, such as working memory demands, marked meaning, and discourse context, are known to influence the acceptability of a given sentence (Myers 2009: 412).

Although it is difficult to assess the relative influence of each factor on the observed acceptability, the most relevant factor in this case is discourse context. Kuno (1978) argues that when scrambling occurs, the scrambled accusative object tends to represent old information, while the nominative subject introduces new information, following the old–new information ordering. According to this discourse–pragmatic analysis of scrambling, a scrambled sentence

presented out of the blue cannot maintain the proper old–new information flow. As a result, it is degraded, if not ungrammatical.

Given this background, let us consider (49). In this example, the appropriate context precedes the experiencer subject causative with the scrambled object, making the experiential reading acceptable. The accusative objects *hizi-o* 'elbow' and *kata-o* 'shoulder' in (49b) are explicitly referred to in the preceding context (49a), and the nominative subjects in (49b) represent new information. As a consequence, pragmatic felicity results.

(49) a. yakyuu-sennsyu-ni-wa hizi-ya kata-o itam-e-ru hito-ga iru.
baseball-player-DAT-TOP elbow-or shoulder-ACC be.injured-CAUS person-NOM exist
'Some baseball players$_1$ got their$_1$ elbow or shoulder injured on them$_1$.'

b. tatoeba, hizi-o$_1$ Ohtani-ga t_1 itam-e-te, kata-o$_2$
for.example elbow-ACC Ohtani-NOM be.iunjured-CAUS-and shoulder-ACC
Matsuzaka-ga t_2 itam-e-ta.
Matsuzaka-NOM be.injured-CAUS-PST
'For example, Ohtani$_1$ got his$_1$ elbow injured on him$_1$ and Matsuzaka$_2$ got his$_2$ shoulder injured on him$_2$.'

If the unacceptability of sentence (47b) were due to a violation of some grammatical constraint, we would not expect to see an improvement in acceptability in (49). For instance, contextual support cannot improve the low acceptability caused by the violation of a grammatical rule, such as question formation in English (e.g., **Has the man who t_1 bought chicken has played in the park?*). Therefore, I take the improved acceptability in (49b) as evidence that the low acceptability in (47b) does not arise from a purely grammatical factor.

It is worth noting that the experiencer subject causative with a scrambled object, when presented out of the blue, is unacceptable under the intended experiential reading but acceptable under the agentive reading.[14] Consider (50). In these examples, the subject is interpreted as an agent.

(50) a. hone-o$_1$ Taro-ga t_1 ot-ta
bone-ACC Taro-NOM break-PST
'Taro broke the bone.'

[14] The verb *itam-e-ru* 'injure' in (47) seems very marginal under the agentive reading, presumably because the lexical entry for this verb idiosyncratically specifies that it lacks an agentive frame. For this reason, I will not discuss whether the scrambled word order with this verb permits an agentive reading.

(i) ?sinpais-are-ru-tame-ni Hanako-ga kosi-o itam-e-ta.
worry-PASS-in.order.to Hanako-NOM back-ACC be.injured-CAUS-PRES
Lit: 'In order to make someone worried about her, Hanako injured her back.'

b. ie-o$_1$ Hanako-ga t_1 yai-ta
house-ACC Hanako-NOM burn-PST
'Hanako burned down the house.'

This fact can also be explained under a discourse–pragmatic account. When these sentences are presented out of the blue, they are interpreted as follows. As mentioned above, a transitive sentence with a scrambled object tends to follow a given–new order (Kuno 1978). Under this consideration, for instance, one forces themselves to infer that the scrambled accusative phrase *hone-o* 'bone' in (50a) represents old information, while the nominative phrase *Taro-ga* new information. On the other hand, for the experiencer reading of Taro to be felicitous, Taro must be the possessor of the referent of the scrambled phrase *hone-o* 'bone.' This leads to a conflict: the old information *hone* 'bone' in the sentence-initial position implies that Taro is the possessor, but Taro is introduced as new information after the scrambled phrase. This conflict results in a processing cost. In contrast, the agentive reading does not cause such a conflict because *hone* 'bone' can refer to someone else's bone, allowing Taro to be introduced as new information in the second position without any issue. I suggest that this is why the agentive reading is preferred over the experiential reading in scrambled experiencer subject causatives by default. The same reasoning applies to (50b).

Needless to say, the scrambled experiencer subject causatives are completely felicitous under the experiential reading if embedded under the appropriate context. Below is an example.

(51) A: kotosi-wa hone-o ot-ta hito-ya, ie-o yai-ta hito-ga
this.year-TOP bone-ACC break-PST person-and house-ACC burn-PST person-NOM
i-ta-yo.
be-PST-SFC
'This year, someone$_1$ got their$_1$ bone broken on them$_1$ and someone$_2$ got their$_2$ house burned down on them$_2$.'

B: hontoo-ni?
really
'Really?'

A: Un, hone-o$_1$ Taro-ga t_1 ot-te, ie-o Hanako-ga t_2 yai-ta-ndayo.
yes bone-ACC Taro-NOM break-and house-ACC Hanako-NOM burn-PST-SFC
'Yeah, Taro's$_1$ arm broke on him$_1$ and Hanako's$_2$ house burned down on her$_2$.'

Also note that when a possessor co-referential with a nominative subject is overtly pronounced within the scrambled object, an agentive reading is preferred over an experiential reading (when the relevant sentences are used out of the blue).[15] Consider (52). In these cases, there is a conflict

[15] I thank a reviewer for calling my attention to this case.

of the sort mentioned earlier, regardless of whether one attempts to derive the experiential or agentive reading.

(52) a. [zibun$_1$-no hone-o]$_2$ Taro$_1$-ga t$_2$ ot-ta
self-GEN bone-ACC Taro-NOM break-PST
'Taro$_1$ broke his$_1$ bone.'

b. [zibun$_1$-no ie-o]$_2$ Hanako$_1$-ga t$_2$ yai-ta
self-GEN house-ACC Hanako-NOM burn-PST
'Hanako$_1$ burned down her$_1$ house.'

This preference is explained by the general assumption that, all else being equal, an unmarked meaning is preferred over a marked meaning. For instance, when one hears the word *sentence*, the most salient meaning would be a string of words because this is its most common, unmarked meaning, but it would be unlikely that a legal judgment or punishment imposed by a court comes first because it is its less frequent, marked meaning. The experiential reading of causatives is marked, as it is permitted only in a subset of causative verbs. In contrast, the agentive reading is unmarked. Consequently, the agentive reading is preferred over the experiential reading by default.

I conclude that the effect of scrambling does not constitute strong evidence for the possessor raising analysis.

4.3 Sloppy pronoun

I now offer evidence against the possessor raising analysis based on the sloppy identity of a pronominal object. Overt pronouns are known to allow sloppy identity in certain contexts (Karttunen 1969; Tomioka 2014; Sato 2020). The following is an example from Tomioka (2014: 254, (8)): In the second sentence of the example, the possessor of the overt pronoun *sore* 'it' is understood to be the subject of the same sentence, Kazuki, rather than the subject of the first sentence, *Kazuki igai-no subete-no kodomo* 'every child except Kazuki.' Hence, the picture that Kazuki tore up and threw away is the one that he drew.

(53) Kazuki-igai-no subete-no kodomo-wa zibun-no kai-ta e-o
Kazuki-except-GEN all-GEN child-TOP self-GEN draw-PST picture-ACC
oya-ni mise-ta. Kazuki-wa sore-o yabut-te sutete simat-ta.
parent-DAT show-PST. Kazuki-TOP it-ACC tear-GERUND throw.away complete-PST
'Every child$_1$ except for Kazuki showed to their parents the picture that they$_1$ drew. Kazuki$_2$, on the other hand, tore it (= the picture that he$_2$ drew) up and threw it (= the picture that he$_2$ drew) away.'

Crucially, the sloppy reading of the overt pronoun also occurs in experiencer subject causatives. In the following examples, B's sentences include an overt pronominal object with the object in

the preceding sentence as its antecedent. What is of interest here is that the pronoun allows a sloppy interpretation, where the possessor of the entity expressed by that pronoun is the subject in B's sentences but not in A's sentences.

(54) A: Hanako-ga ziko-de asi-no oyayubi-no hone-o ot-ta rasii-yo.
Hanako-NOM accident-due.to leg-GEN big.toe-GEN bone-ACC break-PST hear-SFP
'I hear that a bone of Hanako$_1$'s big toe broke on her$_1$ due to the accident.'

B: Taro-mo kyonen ziko-de soko-o ot-ta-yo.
Taro-also last.year accident-due.to there-ACC break-PST-SFP
'It (= a bone of Taro's big toe) also broke on Taro due to the accident last year.'

(55) A: Taro-ga kazi-de Tyomusukii-no sain-iri-no LGB-o yai-ta rasii-yo.
Taro-NOM fire-due.to Chomsky-GEN sign-with-GEN LGB-ACC burn-PST hear-SFP
'I hear that Taro$_1$'s LGB signed by Chomsky got burnt on him$_1$ due to the fire.'

B: Hanako-mo kyonen kazi-de sore-o yai-ta-yo.
Hanako-also last.year fire-due.to it-ACC burn-PST-SFP
'It (= Hanako$_1$'s LGB signed by Chomsky) got burnt on him$_1$ due to the fire last year.'

The sloppy readings in B's sentences are problematic for the possessor raising analysis because the pronouns used here are incompatible with overt possessors (e.g., ??*Taro-no soko* 'Taro's there' and ??*Hanako-no sore* 'Hanako's it'). If possessor raising were a necessary condition for the formation of experiencer subject causatives, B's sentences in question would be unacceptable under the intended sloppy reading, contrary to fact. Under my pragmatic analysis, however, the sloppy identity of the pronouns can be explained in the same way as previously observed examples, such as (53). A detailed account of the sloppy identity of the overt pronoun must be left for future research.

4.4 Against a possible binding analysis

Let me now address another possible syntactic account, namely, a binding analysis, as schematized below. In this analysis, a subject binds a phonetically null pronoun or anaphor in the possessor position of the object.

(56) Subject$_1$ [pro$_1$ Object] Verb

Although I have not found any concrete proposals using the binding analysis in the literature, it is worth addressing this alternative because it does not encounter the same challenges as the possessor raising analysis. I will demonstrate that the binding analysis has both theoretical and empirical issues.

A theoretical problem concerns the requirement for binding. It is unclear what necessitates that the subject bind the silent anaphor or pronoun within the object for the well-formedness of experiencer subject causatives.

An empirical issue concerns the difference between experiencer subject causatives and their inchoative versions regarding the meaning of temporary possession.[16] Consider (57). Given the context in (57), (57a) is felicitous as an experiencer subject causative, while is its inchoative version in (57b) is not. In (57a), the subject appears as the overt possessor of the surface subject. What is notable is that the relationship between Taro and the cap differs in these two sentences. The context indicates that Taro temporarily holds his friend's cap, and this temporary possession is inferable in (57a). In contrast, the same temporary relation is difficult to infer in (57b). This sentence is acceptable only if the possession relation is not temporary. It is this unavailability of the temporary possession meaning that leads to the infelicity in (57b).

(57) Context: Ken was holding his friend's cap and a strong wind blew it off. It bothered Ken.

a. Ken-ga kyoohuu-de boosi-o tob-asi-ta.
Ken-NOM strong.wind-due.to cap-ACC be.flown-CAUS-PST
'Ken$_1$'s friend's cap got blown off on him$_1$ due to the strong wind.'

b. #Ken-no boosi-ga kyoohuu-de ton-da.
Ken-GEN cap-NOM strong.wind-due.to flow-PST
'Ken$_1$'s friend's cap got blown off.'

This subtle but significant difference poses a challenge to the binding analysis. The reason is that it predicts no interpretative difference between (57a) and (57b) in terms of possession meaning, since experiencer subject causatives and their inchoative counterparts share the same syntax concerning possession. Specifically, the possession meaning is expected to arise from the complex NP consisting of the possessor NP and its host NP.

A reviewer points out that the temporary possession reading becomes available if we paraphrase (57) into (58), where the possession meaning is expressed by the predicate *motu* 'hold' within the relative clause.

(58) [Ken-ga mot-teiru] boosi-ga kyoohuu-de ton-da.
Ken-NOM hold-PROG cap-NOM strong.wind-due.to flow-PST
'The cap that Ken was holding got blown off.'

The contrast between (57b) and (58) can be attributed to the difference between attributive possession and predicative possession (Heine 1997). In attributive possession, possession is expressed within a complex NP consisting of a genitive phrase and its host NP. In predicative

[16] The possessor raising analysis also faces the same issue.

possession, it is expressed by a predicate, such as *motu* 'hold' in a clause. Akimoto (2017) independently observes that the temporary possession relation, analogous to my example, can be expressed by predicative possession but not by attributive possession. This observed contrast strongly suggests that the possessor–possessum relation in experiencer subject causatives does not arise from the attributive possession assumed in the binding analysis (or the possessor raising analysis).[17]

4.5 Summary

In summary, only my pragmatic analysis is compatible with all the empirical data regarding the possessor–possessum relation in experiencer subject causatives (i.e., the overt possessor, scrambling, sloppy pronoun, and temporary possession meaning).

5 Remarks on causer *-de* phrases

As seen in Section 1, experiencer subject causatives permit inanimate causer adjuncts marked by *-de* 'due to'.

(59) a. Taro-ga ziko-de ude-o ot-ta.
Taro-NOM accident-due.to arm-ACC break-PST
'Taro$_1$'s arm broke on him$_1$ due to the accident.'

b. Hanako-ga kazi-de ie-o yai-ta.
Hanako-NOM accident-due.to house-ACC burn-PST
'Hanako$_1$'s house burned down on her$_1$ due to the fire.'

Their inchoative counterparts can also take inanimate causer adjuncts

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[17] The same reviewer observes that (57b) seemingly allows the temporary possession meaning under a context where Hanako had Ken and Taro each hold one of her two caps. I attribute this observation to the effect of contrastive focus rather than possession meaning. The genitive phrase can appear without any possessive meaning if it is contrastive. The following is an example:

(i) a. Context: Taro and Jiro were watching a baseball game between the Giants and the Dragons on TV in the living room while Tatsuya was cooking dishes for them in the kitchen. Taro supported the Giants. Jiro supported the Dragons. Tatsuya did not know the names of these baseball teams because he was not interested in baseball. It turned out that the Dragons won against the Giants. Hearing Jiro's scream of joy from the living room, Tatsuya thought …

b. Jiro-no tiimu-ga kat-ta yooda.
Jiro-GEN team-NOM win-PST seem
'It seems that Jiro's team (= the team that Jiro supported) won.'

This example indicates that the apparent temporary possession meaning in (57b) under the reviewer's context has nothing to do with the possession semantics per se. To the extent that my conjecture is correct, the reviewer's observation does not necessarily falsify the claim that attributive possession cannot express temporary possession.

(60) a. Taro-no ude-ga ziko-de or-e-ta
Taro-GEN arm-NOM accident-due.to be.broken-INCH-PST
'Taro's arm broke due to the accident.'

b. Hanako-no ie-ga kazi-de yak-e-ta.
Hanako-GEN house-NOM fire-due.to be.burned-INCH-PST
'Hanako's house burned down due to the fire.'

A comprehensive theory of experiencer subject causatives must include an analysis of the causer-denoting *-de* phrase. I propose it in this section.

5.1 Interpretation of *-de* phrases

I list some nouns that can be used as causer adjuncts below, categorized into two broad types: eventualities and natural forces.[18]

(61) a. Eventuality: *kazi* 'fire', *ziko* 'accident', *hukyoo* 'depression', *sensoo* 'war', *bakuhatu* 'explosion', etc.
b. Natural force: *taihuu* 'typhoon', *kyoohuu* 'strong wind', *zisin* 'earthquake', *ooyuki* 'heavy snow', *ooame* 'heavy rain', *ame* 'rain', *kaze* 'wind', *yuki* 'snow', etc.

Nouns denoting eventualities, as in (61a), are compatible with Vendler's (1967) narrow container verbs, such as *occur* (*okoru* in Japanese).[19]

(62) {kazi/ziko/hukyoo/sensoo/bakuhatu} -ga okoru riyuu
fire/accident/depression/war/explosion-NOM occur reason
'The reason why {fire/accident/depression/war/explosion} occurs'

The following example shows that the natural force nouns in (61b) are also compatible with *okoru* 'occur'.

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[18] This classification is not clear-cut. For instance, Martin et al. (2023b) categorize *earthquake* in English as an eventuality, while I consider its Japanese version as a natural force. As we will see later, both eventuality and natural force nouns in (61) are identified as eventuality-denoting in Japanese, forming a natural class. Therefore, my intuitive classification should not pose a problem for the current discussion.

[19] A reviewer notes that *hukyoo* 'depression' is incompatible with *okoru* 'occur' but the Japanese speakers I have consulted do not share this judgment. For example, the following sentences are completely acceptable:

(i) a. hukyoo-ga okoru kakuritu-wa hikui.
depression-NOM occur probability-TOP low
'The probability that the depression will occur is low.'

b. hukyoo-ga okot-ta toki-no tameni …
depression-NOM occur-PST time-GEN for
'In case that the depression occurs …'

At this point, I do not understand why inter-speaker variation occurs with the combination of *hukyoo* 'depression' and *okoru* 'occur.'

(63) {taihuu/kyoohuu/zisin/(?)ooyuki/(?)ooame/(?)kaze/(?)yuki/(?)ame} -ga okoru
typhoon/strong.wind/earthquake/heavy.snow/wind/snow/rain -NOM occur
riyuu
reason
'The reason why {typhoon/strong wind/earthquake/heavy snow/wind/snow/rain} occurs'

These facts suggest that *-de* 'due to' takes an eventuality-denoting noun.

Two reviewers note that *okoru* 'occur' does not sound entirely natural with nouns such as *ooyuki* 'heavy snow,' *ooame* 'heavy rain,' *kaze* 'wind,' or *ame* 'rain.' Some Japanese speakers I consulted share this judgment. However, they also mention that the acceptability improves when these collocations appear in academic contexts, such as science textbooks or lectures. This intuition is empirically supported by the following acceptable example.

(64) sanseeu-ga okoru riyuu
acid.rain-NOM occur reason
'The reason why acid rain occurs'

I find this example completely acceptable, as do the other Japanese speakers I have consulted. I speculate that this is because *sanseeu* 'acid rain' is a technical term, making it easier to envision the academic context in which the collocation *sanseeu-ga okoru* 'acid rain occurs' is used.

Relatedly, one of the same two reviewers notes a difference between *ooyuki* 'heavy snow' and *ooame* 'heavy rain,' on the one hand, and *kaze* 'wind,' *yuki* 'snow,' and *ame* 'rain,' on the other. Specifically, the reviewer finds that the former two are more compatible with *okoru* 'occur' than the latter three. A similar contrast is also observed between *kyoohuu* 'strong wind' and *kaze* 'wind.' Two reviewers find the former acceptable with *okoru*, but not the latter. The only apparent semantic difference in these pairs seems to be the intensity of the eventuality denoted by them (e.g., *kyoohuu* 'strong wind' is stronger than *kaze* 'wind'). Thus, the acceptability difference cannot be attributed to *kaze* 'wind,' *yuki* 'snow,' and *ame* 'rain' being non-eventuality-denoting, because it would be unreasonable to assume that only their stronger counterparts denote eventualities. Thus, I suggest that the acceptability difference arises from extra-linguistic factors and does not undermine my conclusion that all the nouns under discussion denote eventualities.

Note that *-de* 'due to' cannot take an animate noun denoting an agent, either in experiencer subject causatives or inchoatives (I will come back to these cases later).

(65) a. ??Taro-ga Hanako-de ude-o ot-ta.
Taro-NOM Hanako-due.to arm-ACC break-PST
Lit.: 'Taro$_1$'s arm broke on him$_1$ due to Hanako.'

b.??Hanako-ga Taro-de ie-o yai-ta.
Hanako-NOM Taro-due.to house-ACC burn-PST
Lit.: 'Hanako$_1$'s house burned down on her$_1$ due to Taro.'

(66) a. *Taro-no ude-ga Hanako-de or-e-ta
Taro-GEN arm-NOM Hanako-due.to be.broken-INCH-PST
Lit.: 'Taro's arm broke due to Hanako.'

b. *Hanako-no ie-ga Taro-de yak-e-ta.
Hanako-GEN house-NOM fire-due.to be.burned-INCH-PST
Lit.: 'Hanako's house burned down due to Taro.'

The unacceptability of these sentences follows from the standard assumption that animate nouns are individual-denoting. Note that these sentences may sound very marginally acceptable only if the animate nouns are coerced to express a property or event related to the referent of the animate noun (e.g., Hanako's fault causes Taro's arm to break in (66a)).

5.2 Instrument-like *-de* phrases

The *-de* phrases present one complexity: the homophonous postposition *-de* can also head an instrument adjunct in agentive sentences.

(67) a. haisya-ga kigu-de ha-o ot-ta.
dentist-NOM tool-with teeth-ACC break-PST
'The dentist broke the teeth with a tool.'

b. Yoshiko-ga yasasii-kotoba-de minna-o nagom-ase-ta.
Yoshiko-NOM kind-words-with everyone-ACC calm-CAUS-PST
'Yoshiko made everyone calm with kind words.'

What is of interest here is that these phrases also seem to appear in experiencer subject causatives and inchoatives, as shown in (68) and (69), respectively. (In these examples, I gloss *-de* as 'due to' rather than 'with,' because I will argue shortly that the NPs it introduces are eventuality-denoting.)

(68) a. Hanako-ga katai-bisuketto-de ha-o ot-ta.
Hanako-NOM hard-biscuit-due.to teeth-ACC break-PST
'Hanako$_1$'s teeth broke on her$_1$ due to the hard biscuit.'

b. Yoshiko-ga hahaoya-kara-no-tegami-de kimoti-o nagom-ase-ta.
Yoshiko-NOM mother-from-GEN-letter-due.to feeling-ACC calm-CAUS-PST
'Yoshiko$_1$ felt calm due to the letter from her$_1$ mother.'

(69) a. Hanako-no ha-ga katai-bisuketto-de or-e-ta.
Hanako-GEN teeth-NOM hard-biscuit-due.to break-INCH-PST
'Hanako's teeth broke due to the hard biscuit.'

b. Yoshiko-no kimoti-ga hahaoya-kara-no-tegami-de nagon-da.
Yoshiko-GEN feeling-NOM mother-from-GEN-letter-due.to calm-PST
'Yoshiko's$_1$ feeling got calm due to the letter from her$_1$ mother.'

The nouns introduced by *-de* in (68) and (69) fail to pass Vendler's (1967) narrow container test.

(70) *{katai bisuketto/hahaoya-kara-no-tegami} -ga okoru riyuu
hard biscuit/mother-from-GEN-letter -NOM occur reason
Lit.: 'The reason why the {hard biscuit/letter from one's mother} occurs'

Additionally, they are incompatible with Vendler's (1967) loose container verbs, such as *expect* (*yokisuru* in Japanese), which are known to take fact-denoting (and eventuality-denoting) nouns.[20]

(71) ??{katai bisuketto/hahaoya-kara-no-tegami} -o yokisuru
hard biscuit/mother-from-GEN-letter -ACC expect
Lit.: 'Expect the {hard biscuit/letter from one's mother}'

The results of the narrow and loose container tests indicate that the nouns introduced by *-de* in (68) and (69) align with neither eventuality-denoting nor fact-denoting nouns, similar to the canonical instruments in (67), which also fail to pass either of these tests.[21]

(72) *{kigu/yasasii kotoba} -ga okoru riyuu
instrument/kind words -NOM occur reason
Lit.: 'The reason why the {instrument/kind words} occurs'

(73) ??{kigu/yasasii kotoba} -o yokisuru
instrument/kind words -ACC expect
Lit.: 'Expect the {instrument/kind words}'

The incompatibility of the *-de* phrases in (68) and (69) with narrow/loose containers points to the possibility that they are individual-denoting, similar to canonical instruments in (67). However, I argue that this is not the case. First, the presence of instruments typically entails the presence

[20] A reviewer finds *hahaoya-kara-no-tegami-o yokisuru* 'I expect the letter from my mother' acceptable. This suggests that some people, though not all, can coerce *hahaoya-kara-no tegami* 'the letter from my mother' to be eventuality- or fact-denoting. This is consistent with my overall conclusion that it can be indeed eventuality-denoting under a certain environment.

[21] The same reviewer from footnote 20 finds *yasasii kotoba-o yokisuru* 'predict the kind words' acceptable. As with footnote 20, I interpret this to suggest that some people can consider such noun phrases to be fact- or eventuality-denoting in certain contexts.

of agents. Yet, neither experiencer subject causatives nor inchoatives permit agents in any form. This is demonstrated by the fact that they do not allow overt agent-denoting adjuncts or rational clauses, even when instrument-like adjuncts are present, as shown in (74) and (75), respectively.

(74) a. Yoshiko-ga (*hahaoya-ni/-niyotte) tegami-de kimoti-o nagom-ase-ta.
Yoshiko-NOM (Hahaoya-by/-by) letter-due.to feeling-ACC calm-CAUS-PST
'Yoshiko$_1$ felt calm due to the letter (by her$_1$ mother).'

b. Yoshiko-no kimoti-ga (*hahaoya-ni/-niyotte) tegami-de nagon-da.
Yoshiko-GEN feeling-NOM (Hahaoya-by/-by) letter-due.to calm-PST
'Yoshiko$_1$ feeling got calm due to the letter (by her$_1$ mother).'

(75) a. (*sinpais-are-ru tameni,) Kanako-ga hootyoo-de yubi-o kit-ta.
(worry-PASS-PRES in.order.to) Kanako-NOM knife-due.to finger-ACC cut-PST
'(In order to make someone worried about her$_1$,) Kanako$_1$'s finger got cut on her$_1$ due to the knife.'

b. (*sinpais-are-ru tameni,) Kanako-no yubi-ga hootyoo-de
(worry-PASS-PRES in.order.to) Kanako-GEN finger-NOM knife-due.to
kir-e-ta.
be.cut-CAUS-PST
'(In order to make someone worried about her$_1$,) Kanako's$_1$ finger got cut due to the knife.'

Furthermore, unlike instruments, the referents of the instrument-like phrases under discussion do not need to be actively used in the events expressed by experiencer subject causatives or inchoatives. Consider (76). In (76a) and (76b), the branch falls without Taro's intervention.

(76) a. Taro-ga otitekita-eda-de kuruma-o kizutu-ke-ta.
Taro-NOM fallen-branch-due.to car-ACC be.damaged-CAUS-PST
'Taro$_1$'s car got damaged on him$_1$ due to the fallen branch.'

b. Taro-no kuruma-ga otitekita-eda-de kizutu-i-ta.
Taro-GEN car-NOM fallen-branch-due.to be.damaged-INCH-PST
'Taro's car got damaged due to the fallen branch.'

This suggests that the *-de* phrases in examples like (76) are not instruments in the strict sense. Note that they fail to pass the narrow or loose container tests, as shown below.

(77) *{otitekita eda/hadaka-no naihu} -ga okoru riyuu
fallen branch/be.naked-GEN knife -NOM occur reason
Lit.: 'The reason why the {fallen branch/naked knife} occurs'

(78) ??{otitekita eda/hadaka-no naihu} -o yokisuru
fallen branch/be.naked-GEN knife -NOM expect
Lit.: 'Expect {fallen branch/naked knife}'

We now find ourselves in a contradictory situation: the instrument-like phrases in experiencer subject causatives and inchoatives seem to behave differently from both eventuality-denoting nouns and canonical instruments. A set of suggestive data to resolve this issue comes from paraphrasability. The sentences in (79) and (80) are paraphrased versions of (68) and (69), respectively. In these paraphrased sentences, the instrument-like phrases in the original sentences are replaced with clauses introduced by either *okage-de* or *sei-de*. *Okage-de* and *sei-de* introduce an adjunct clause expressing the cause of the eventuality described by the main clause. The former typically introduces a beneficial event, while the latter introduces an adverse event. Since this distinction is not relevant here, I gloss both as 'because.'

(79) a. Hanako-ga [bisuketto-ga katai seide] ha-o ot-ta.
Hanako-NOM biscuit-NOM hard because teeth-ACC break-PST
'Hanako$_1$'s teeth broke on her$_1$ because the biscuit was hard.'

b. Yoshiko-ga [hahaoya-no tegami-o yon-da okage-de] kimoti-o
Yoshiko-NOM mother-GEN letter-ACC read-PST because feeling-ACC
nagom-ase-ta.
calm-CAUS-PST
'Yoshiko$_1$ felt calm because she read the letter from her$_1$ mother.'

c. Taro-ga [eda-ga otite-ki-ta sei-de] kuruma-o kizutu-ke-ta.
Taro-NOM branch-NOM fall-come-PST because car-ACC be.damaged-CAUS-PST
'Taro$_1$'s car got damaged on him$_1$ because the branch fell on it.'

d. Hanako-ga [naihu-ga hadaka-dat-ta sei-de] yubi-o kit-ta.
Hanako-NOM knife-NOM be.naked-COP-PST because finger-ACC cut-PST
'Hanako$_1$'s finger got cut on her$_1$ because the knife was naked.'

(80) a. Hanako-no ha-ga [bisuketto-ga katai sei-de] or-e-ta.
Hanako-GEN teeth-NOM biscuit-NOM hard because break-INCH-PST
'Hanako's teeth broke because the biscuit was hard.'

b. Yoshiko-no kimoti-ga [hahaoya-no tegami-o yon-da okage-de] nagon-da.
Yoshiko-GEN feeling-NOM mother-GEN letter-ACC read-PST because calm-PST
'Yoshiko$_1$ feeling got calm because she read the letter from her$_1$ mother.'

c. Taro-no kuruma-ga [eda-ga otitekita sei-de] kizutu-i-ta.
Taro-GEN car-NOM branch-NOM fall-come-PST because be.damaged-INCH-PST
'Taro's car got damaged because the branch fell on it.'

d. Hanako-no yubi-ga [naihu-ga hadaka-dat-ta sei-de] kir-e-ta.
Hanako-GEN finger-NOM knife-NOM be.naked-COP-PST because be.cut-INCH-PST
'Hanako's finger got cut because the knife was naked.'

The canonical instruments in the agentive sentences in (67) cannot be paraphrased in the same way.

(81) a. *haisya-ga [kigu-o tukat-ta okagede] ha-o ot-ta.
dentist-NOM tool-ACC use-PST because teeth-ACC break-PST
Intended: 'The dentist broke the teeth because he used a tool.'

b. *Yoshiko-ga [yasasii kotoba-o it-ta okagede] minna-o nagom-ase-ta.
Yoshiko-NOM kind words-ACC say-PST because everyone-ACC calm-CAUS-PST
Intended: 'Yoshiko made everyone calm because she said kind words.'

The paraphrasability of the instrument-like phrases suggests that they are eventuality-denoting, similar to those in (61), rather than individual-denoting so that they can be paraphrased into a clause describing a causing event.[22] One question that arises here is why they are incompatible with narrow or loose container tests. I propose that while these tests can demonstrate that a noun is eventuality-denoting, they cannot definitively show that a noun is never eventuality-denoting. This is supported by the observation that animate nouns, which are canonically considered individual-denoting, can behave like eventuality-denoting nouns in certain cases. We observe this pattern in the examples in (65) and (66), repeated here as (82) and (83), respectively. These sentences seem very marginally acceptable if the animate nouns are interpreted as events or properties associated with their referents.

(82) a.??Taro-ga Hanako-de ude-o ot-ta.
Taro-NOM Hanako-due.to arm-ACC break-PST
Lit.: 'Taro$_1$'s arm broke on him$_1$ due to Hanako.'

b.??Hanako-ga Taro-de ie-o yai-ta.
Hanako-NOM Taro-due.to house-ACC burn-PST
Lit.: 'Hanako$_1$'s house burned down on her$_1$ due to Taro.'

(83) a.??Taro-no ude-ga Hanako-de or-e-ta
Taro-GEN arm-NOM Hanako-due.to be.broken-INCH-PST
Lit.: 'Taro's arm broke due to Hanako.'

b.??Hanako-no ie-ga Taro-de yak-e-ta.
Hanako-GEN house-NOM fire-due.to be.burned-INCH-PST
Lit.: 'Hanako's house burned down due to Taro.'

Another piece of evidence supporting the current view comes from experiencer object psych verbs (e.g., Martin et al. 2023b). Consider (84). This sentence is ambiguous between an agentive reading and a non-agentive reading. In the agentive reading, Hanako intentionally bothers Taro (e.g., by making a lot of noise). In the non-agentive reading, something about Hanako, such as her bad behavior, bothers Taro, and Hanako does not need to act intentionally.

[22] Another possibility is that the instrument-like phrases are fact-denoting. I will not pursue this possibility in the current analysis.

(84) Hanako-ga Taro-o nayam-ase-teiru.
Hanako-NOM Taro-ACC bother-CAUS-PROG
Agentive reading: 'Hanako is bothering Taro.'
Non-agentive reading: 'Something about Hanako brothers Taro.'

The second reading suggests that *Hanako* can be eventuality-denoting in this sentence, despite the fact that it fails to pass the narrow or loose container tests.

(85) *Hanako-ga okoru riyuu
Hanako-NOM occur reason
Lit.: 'The reason why Hanako occurs'

(86) *Hanako-o yokisuru
Hanako-ACC expect
Lit.: 'Expect Hanako'

The subject in (84) under the non-agentive reading must be eventuality-denoting, as it can be paraphrased into a clause (Cheung & Larson 2015).

(87) Hanako-no seikaku-ga warui koto-ga Taro-o nayam-ase-teiru.
Hanako-GEN personality-NOM bad thing-NOM Taro-ACC bother-CAUS-PROG
'That Hanako has a bad personality bothers Taro.'

The point is that a canonical individual-denoting noun like *Hanako* can behave like an eventuality-denoting noun under certain circumstances. I take this to suggest that while the narrow/loose container tests can demonstrate that a particular noun can be eventuality- or fact-denoting, they cannot definitively show that it cannot be.

I conclude that the instrument-like *-de* phrases in experiencer subject causatives and inchoatives are eventuality-denoting, rather than individual-denoting, unlike canonical instruments.

5.3 Analysis

Let us now turn to a formal analysis of causer *-de* phrases. I adopt Martin et al. (2023a; b)'s view that causers are divided into two semantic types, type s or type e, depending on what they denote. Following Martin et al. (2023a; b), I assume that eventuality- or fact-denoting NPs are of type s, and I use the variable i, which ranges over the domain of situations. This domain encompasses the union of eventualities (v), facts (f), and other states of affairs. In contrast, individual-denoting nouns are of type e. Based on the evidence discussed so far, nouns introduced by *-de* 'due to' in experiencer subject causatives and inchoatives are all eventuality-denoting, and thus are of type s.

I propose that the causer-introducing postposition *-de* 'due to' has the denotation in (88). It first takes an argument of type s as its argument. Assuming that eventuality-denoting nouns like

ziko ‘accident’ are of type s, the resulting *-de* phrase is defined as something like (89). It then takes an event property of type ⟨st⟩ as a second argument, identifying the causing event denoted by its sister. (The event variable itself is still open so it must be closed off by Aspect or Tense later (von Stechow & Beck 2015).)

(88) $[\![\text{-}de_{\text{Causer}}]\!] = \lambda i \lambda f_{\langle st \rangle} \lambda e.f(e) \wedge \text{Causer}(e, i)$

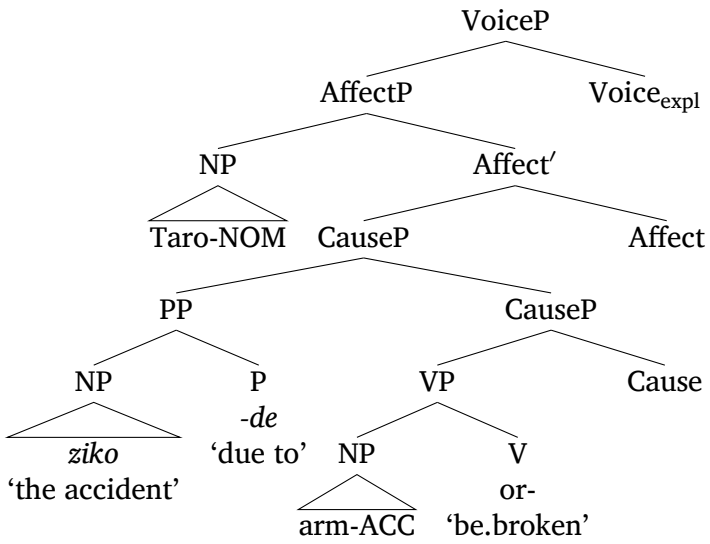
(89) $[\![ziko\text{-}de]\!] = \lambda f_{\langle st \rangle} \lambda e.f(e) \wedge \text{Causer}(e,\text{accident})$

In addition, I assume with Alexiadou et al. (2015) that the causer adjuncts are syntactically affiliated to the projection that introduces a causing event. I hypothesize that the relevant projections here are CauseP and BecomeP for experiencer subject causatives and inchoatives, respectively. This assumption follows from the view that adjuncts syntactically select the category that they modify (e,g., Pollard & Sag 1994).

Under the current analysis, the experiencer subject causatives with the causer adjunct with *-de* ‘due to’ have the syntax and semantics in (90).

(90) a. Taro-ga ziko-de ude-o ot-ta
Taro-NOM accident-due.to arm-ACC break-PST
‘Taro$_1$’s arm broke on him$_1$ due to the accident.’

b.



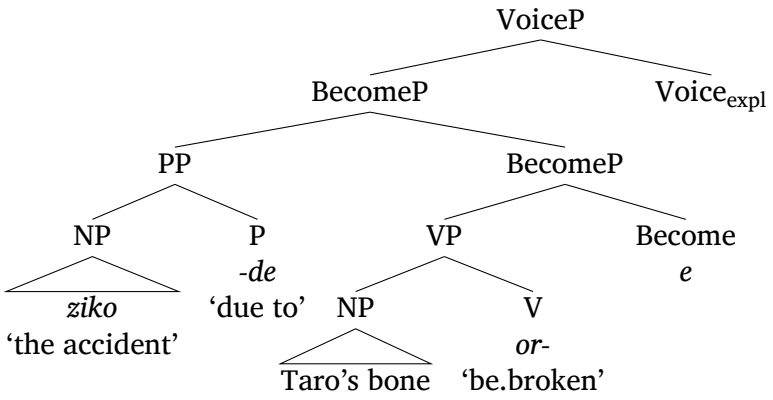
c. $[\![\text{VoiceP}]\!] = \lambda e_3 \exists e_4 e_2.$ be.broken(e_2,arm) ∧ Cause(e_3,e_2) ∧ **Causer(e_3,accident)** ∧ experience(e_4) ∧ experiencer(e_4,Taro): $\forall e_5\ \exists e_2.$ be.broken(e_2,arm) ∧ Cause(e_5,e_2) ∧ **Causer(e_5,accident)** → Source (e_5,e_4)

Below are the syntax and semantics of the inchoative with the causer adjunct. Following Alexiadou et al. (2015), I assume that the inchoative construction has the same event complexity as its

causative counterpart, in the sense that both include a causing event in their semantics. However, departing from Alexiadou et al. (2015), I adopt the view that the inchoative construction projects BecomeP rather than CauseP or its equivalent (cf. Harley 1995b; 2008). This syntactic distinction arises from the fact that the causative morpheme and the inchoative morpheme differ in their Case-assigning properties in Japanese. The former can assign an accusative Case, whereas the latter cannot (e.g., Hasegawa 2001).

(91) a. Taro-no ude-ga ziko-de or-e-ta
Taro-GEN arm-ACC accident-due.to be.broken-INCH-PST
'Taro$_1$'s arm broke due to the accident.'

b.



c. ⟦BecomeP⟧ = λe$_2$ ∃e$_1$ be.broken(e$_1$,Taro's bone) ∧ Cause(e$_2$,e$_1$) ∧ **Causer(e$_2$,accident)**

5.4 Summary

To summarize, I first argued that the inanimate causers in experiencer subject causatives and inchoatives are eventuality-denoting. I then provided a formal analysis of the causer-introducing postposition *-de*. According to this analysis, *-de* takes an eventuality-denoting NP as its argument, and the resulting *-de* phrase adjoins to a projection that introduces a causing event (i.e., CauseP or BecomeP). The consequences of this syntactic analysis will be explored in the next section.

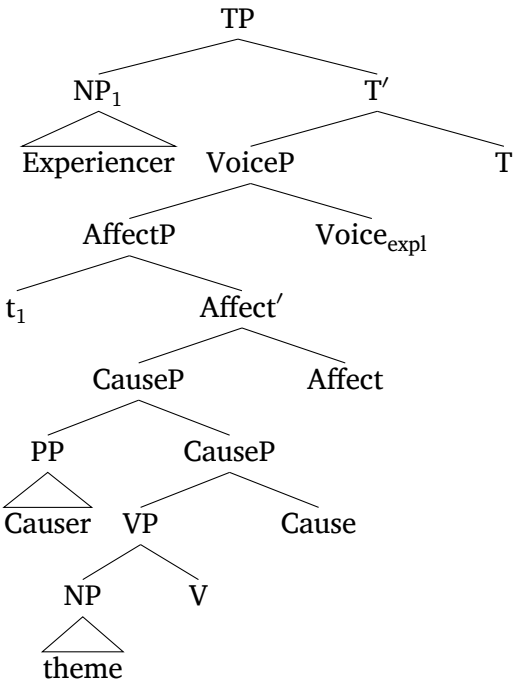
6 Psycholinguistic evidence for the high causer analysis

This section provides psycholinguistic evidence for my analysis proposed in the preceding section.

6.1 Two competing analyses of the syntactic position of the inanimate causer

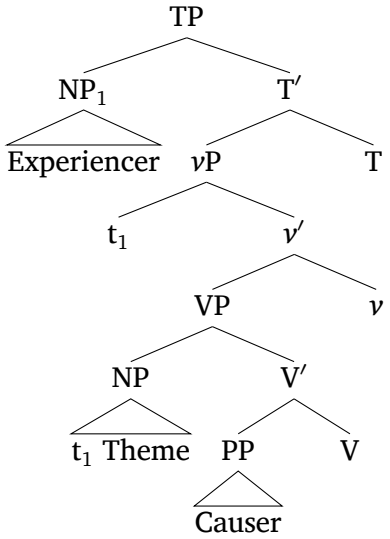
The analysis proposed in Section 5.3 claims that a causer adjoins to CauseP which is above VP. This analysis predicts that the causer precedes the theme. I refer to this as the *high* causer analysis.

(92) High causer analysis:



In contrast, a series of studies by Hasegawa (Hasegawa 2001; 2004; 2007; 2016) argues that the causer adjoins to V′ below the theme which occupies Spec of VP.[23] Consequently, the theme precedes the causer. I refer to this as the low causer analysis.

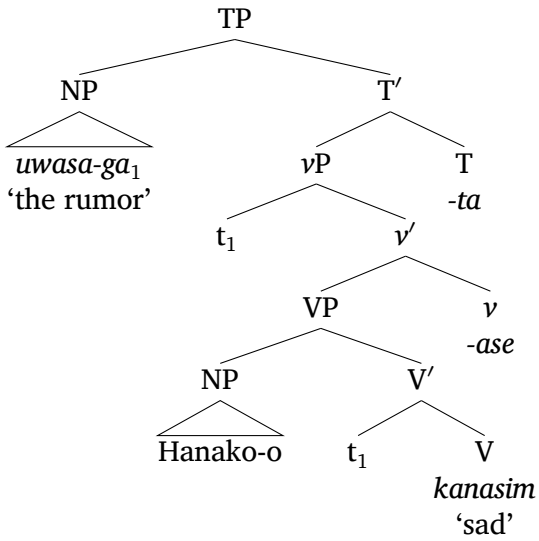
(93) Low causer analysis:



[23] In the structure shown in (93), the surface subject originates as the possessor of the theme object and undergoes possessor raising all the way to Spec of TP. I rejected this analysis in Section 4.

Hasegawa bases this structure on her syntactic analysis of experiencer-object constructions in (94), where the causer subject first merges with V′ and moves up to Spec of TP via the Spec of *v*P, while the experiencer object originates and remains in Spec of VP.

(94) a. uwasa-ga Hanako-o kanasim-ase-ta.
rumor-NOM Hanako-ACC sad-CAUS-PST
'The rumor made Hanako sad.'

b. 

Based on this analysis, Hasegawa argues that the causer adjunct also occurs below the object in experiencer subject causatives.

According to Hasegawa, the structure in (94) is motivated by an inverse c-command relationship between the causer and the experiencer in experiencer-object constructions. First, an anaphor within the causer subject can be bound by the experiencer object, as shown in (95a) (e.g., Akatsuka 1976; Belletti & Rizzi 1988; Pesetsky 1995). Taking Binding Principle A as a 'somewhere' condition (Belletti & Rizzi 1988), the acceptability of (95a) indicates that the experiencer c-commands the causer at some point in the derivation. The agentive subject blocks this backward binding, as shown in (95b).[24]

(95) a. zibun$_1$-nituite-no uwasa-ga Hanako$_1$-o kanasim-ase-ta.
self-about-GEN rumor-NOM Hanako-ACC sad-CAUS-PST
'The rumor about herself$_1$ made Hanako$_1$ sad.'

b. *zibun$_1$-no koibito$_1$-ga Hanako-o kanasim-ase-ta.
self-GEN partner-NOM Hanako-ACC sad-CAUS-PST
'Herself$_1$'s partner made Hanako$_1$ sad.'

[24] Some authors claim that the backward binding phenomenon in experiencer-object verbs is due to the logophoric anaphor (e.g., Landau 2010) and thus has little to do with syntactic relations. For the current purpose, I will set aside this alternative analysis.

Second, a scope-bearing element in the object position can take scope over another in the causer subject position, as shown in (96a) (see also Homma (2004)). Japanese is well-known as a scope-rigid language, where the surface word order reflects the scope relation unless scrambling or movement occurs (Kuroda 1970; Kuno 1973). Therefore, the possible inverse scope relation in (96a) suggests that the experiencer object c-commands the causer subject at some point in the derivation. Notably, the agentive subject prevents the inverse scope relation, as shown in (96b).

(96) a. kaze ka yuki-ga kanarinokazu-no densya-o okur-ase-ta.
wind or snow-NOM a.lot.of train-ACC be.delayed-CAUS-PST
'Wind or snow delayed a lot of trains.'
Ambiguous (OR < A LOT OF; A LOT OF < OR)

b. syasyoo ka untensyu-ga (wazato) kanarinokazu-no densya-o
conductor or motorman-NOM (intentionally) a.lot.of train-ACC
okur-ase-ta.
be.delayed-CAUS-PST
'The conductor or the driver (intentionally) delayed a lot of trains.'
Unambiguous (OR < A LOT OF; *A LOT OF < OR)

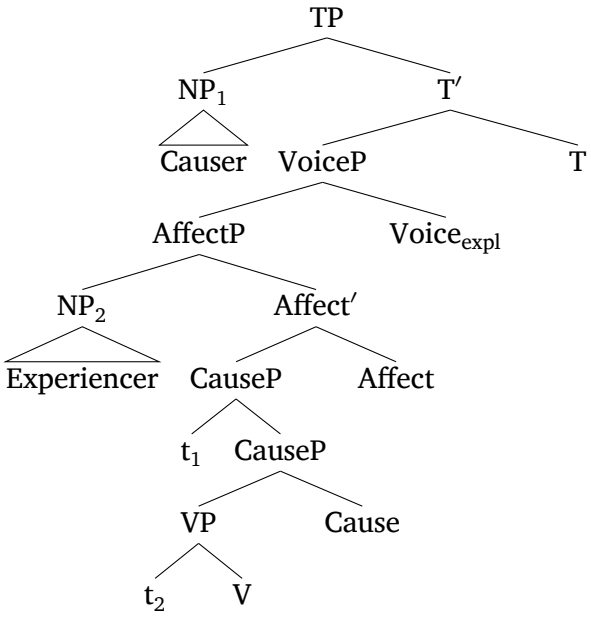
Note that I consider *densha* 'train' in the object position as an experiencer, following Folli and Harley's (2008) conception of teleological capability: an inherent ability of an entity to participate in a certain event. The train is capable of moving, and its movement can be delayed by some external cause, just like other movable animate entities. Therefore, I treat the sentence in (96a) as an instance of the experiencer-object construction.

These two observations lead Hasegawa to claim that the causer subject originates below the direct object in experiencer-object constructions, as shown in (94). The experiencer underlyingly c-commands the causer, accounting for the inverse c-command relation. Note that this type of analysis was first developed by Belletti & Rizzi (1988) and later extended by Cheung & Larson (2015). Based on her analysis of the object experiencer construction, Hasegawa argues that the causer adjunct in experiencer subject causatives also originates below the direct object, as illustrated in (93) above.

However, it is important to point out that the observed inverse c-command relation does not necessarily imply that the inanimate causer subject must originate below the experiencer object. Alternatively, one could propose that the experiencer originally occurs below the causer but moves over the causer later. Several authors have formalized this possibility. Specifically, Fujita (1996), Sato & Kishida (2009), and Alexiadou & Anagnostopoulou (2020) argue that the experiencer originates below the causer but moves up to Spec of AgrOP, Spec of Point of View Phrase, and somewhere within TP, respectively. Furthermore, one could postulate a direct extension of the Affect head to experiencer-object constructions, as shown in (97). In this structure, the causer

appears within CauseP, while the experiencer originates in Spec of VP and moves up to Spec of AffectP, either covertly or overtly. After this movement, the experiencer c-commands the copy/ trace of the causer, resulting in the observed inverse c-command relation.

(97)



Since this is beyond the scope of the paper, I will not provide a detailed discussion on the validity of each alternative analysis here. It suffices to say that in all four of these alternative analyses, the inverse c-command relation in experiencer-object constructions can still be captured, even if the causer subject originates above the experiencer object. All of these analyses are consistent with my high causer analysis of experiencer subject causatives. Therefore, the inverse c-command relation does not provide decisive evidence for the low causer analysis.

To sum up, the high causer analysis and the low causer analysis of experiencer subject causatives posit different hierarchical relations between the causer and the theme. The low causer analysis is motivated by the inverse c-command relation in experiencer-object constructions. However, the high causer analysis can also account for this relation. Therefore, it is difficult, if not impossible, to determine which analysis is preferable purely on theoretical grounds. For this reason, I turn to a psycholinguistic approach.

6.2 Predictions

The two competing analyses predict different basic word orders in experiencer subject causatives. In the high causer analysis, the causer occurs hierarchically above the theme. Assuming the general linearization algorithm, they are linearized as causer–theme. The low causer analysis, in contrast, posits the reverse hierarchical order; as a result, they are linearized as theme–causer.

Given that Japanese allows scrambling, the high causer analysis predicts that the theme–causer order is derived by scrambling the theme over the causer. In contrast, the low causer analysis would claim that the causer–theme order is derived by scrambling the causer over the theme. The basic and scrambled word orders predicted by each analysis are summarized below:

(98) High causer analysis:
  a. Basic: Experiencer Causer Theme Verb
  b. Scrambled: Experiencer Theme_1 Causer t_1 verb.

(99) Low causer analysis:
  a. Basic: Experiencer Theme Causer verb.
  b. Scrambled: Experiencer Causer_1 Theme t_1 Verb

Crucially, the distinction between the two analyses regarding the basic and scrambled word orders can serve as psycholinguistic hypotheses under the linking hypothesis between structural complexity and cognitive load, as stated in (100).

(100) Linking hypothesis:
  All else being equal, sentences with complex structures incur a higher cognitive load than their counterparts with simpler structures. (e.g., Frazier 1985; Pritchett & Whitman 1995; Hawkins 2004; Marantz 2005; Koizumi 2023)

The higher cognitive load associated with complex structures can be reflected in indices such as reaction times (RTs), eye movements, and changes in physiological measures such as ERPs. In what follows, I focus on RTs, because my experiment uses them as the primary dependent measure.

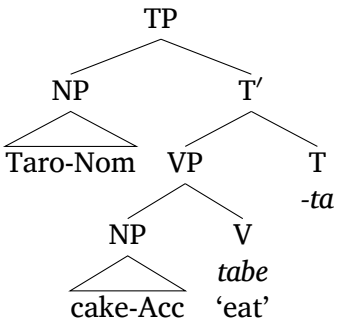
The linking hypothesis (100) effectively captures the so-called scrambling effect in sentence processing: scrambling increases RTs (see Koizumi (2015) for a review). Some languages allow flexible word order, and Japanese is one of them. For instance, a simple transitive sentence may allow either SOV or OSV word order.

(101) a. Taro-ga Keeki-o tabe-ta. [SOV]
  Taro-NOM cake-ACC eat-PST
  b. Keeki-o Taro-ga tabe-ta. [OSV]
  cake-ACC Taro-NOM eat-PST
  'Taro ate the cake.'

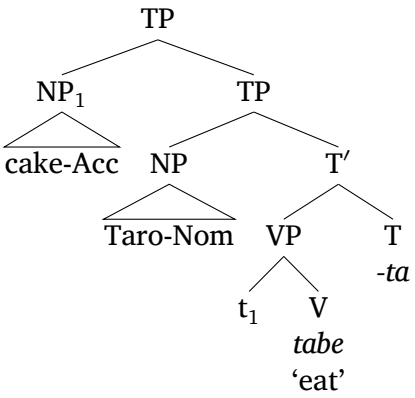
It is generally assumed that the SOV order (101a) is canonical, while the OSV order (101b) is derived by scrambling (e.g., Nemoto 1999). Specifically, in the OSV sentence, the object undergoes scrambling from its original position to the sentence-initial position, as shown in (102b), while no such movement occurs in the SOV sentence, as shown in (102a).[25]

[25] We simplify the VP-internal structure for expository purposes.

(102) a.



b.



Notice that the OSV word order exhibits a more complex representation (i.e., requiring a gap–filling parsing) than the SOV word order. Under the linking hypothesis (100), we should then observe an additional processing load for the OSV sentences relative to their SOV counterparts. This is indeed what previous studies find (Chujo 1983; Tamaoka et al. 2005). Additionally, other studies show that derived word order sentences lead to longer RTs than their canonical counterparts across different languages and different constructions (see Koizumi 2015 for a review).

Note that, as mentioned in Section 4.2, scrambled OSV sentences tend to occur when they follow given–new information flow (Kuno 1978). Crucially, Koizumi & Imamura (2017) find that pragmatically licensed scrambling (i.e., when the scrambled object represents given information and the nominative subject new information) alleviates the scrambling effect (see Kaiser & Trueswell 2004 for the original findings in Finnish). However, scrambled sentences still take longer to process than their canonical counterparts in Japanese. Therefore, I set aside the contextual effect and assume that the scrambling effect occurs regardless of context, as far as RTs are concerned (cf. Yano & Koizumi 2018).

Given this background, let us now return to the high causer analysis and the low causer analysis. These two analyses predict different basic and derived word orders, as shown in (98) and (99), respectively, as discussed above. According to the linking hypothesis (100), the high

causer analysis predicts that the theme–causer order takes longer to process than the causer–theme order, while the low causer analysis predicts the opposite pattern. These two distinct predictions are summarized below:

(103) Predictions about Reaction Times ('<' represents 'longer than'):
  a. High causer analysis: causer–theme < theme–causer
  b. Low causer analysis: theme–causer < causer–theme

Testing these two predictions can help determine which analysis provides a better explanation. For this reason, I conducted a sentence-processing experiment.

6.3 Methods

6.3.1 Participants

The data analysis included data from 150 native Japanese speakers. The participants were recruited through Lancers (https://www.lancers.jp), a crowdsourcing platform in Japan, and were paid ¥250 (approximately 1.5 US dollars) for their participation. The experiment reported here was conducted as part of a separate, unrelated main experiment.

Although this type of experiment typically recruits 20–30 participants, I recruited 150. This decision was made due to a high degree of uncertainty about data quality, stemming from various unexpected factors associated with the web-based sentence-processing experiment. Recent psychological research has raised concerns about the reliability of crowdsourcing data (Chmielewski & Kucker 2020; Webb & Tangney 2022). However, there is a lack of research on the reliability of data from Japanese platforms. Few web-based sentence processing studies in Japanese have been published, and at the time of the current experiment, there was no established standard for data collection methods, such as the number of participants or data exclusion criteria. Given this uncertainty, I decided to recruit more participants than usual to mitigate potential noise in the data.

To further ensure data quality, I applied strict data exclusion criteria for the main unrelated experiment as follows: Participants were eligible to take part if they were native Japanese speakers and had an approval rating of 95% or higher on Lancers. All participants needed to score at least 90% correct on both all items (including the stimuli used in the experiment reported below) and experimental items, and they had to have less than 10% missing data for both all items and experimental items. RTs of less than 400 ms or more than 3,000 ms were considered missing data. Recruitment continued until I had 150 participants for my data analysis. Participants were paid regardless of whether they were excluded from the data analysis.

6.3.2 Materials and design

The experiment employed a within-subjects design and manipulated theta-role order with two levels: causer–theme and theme–causer. Example items for each condition are provided in (104), with the relevant phrases in bold.

(104) a. causer–theme:
untensyu-ga **ziko-de** **ude-o** ot-ta.
driver-NOM **accident-due.to** **arm-ACC** break-PST

b. theme–causer:
untensyu-ga **ude-o** **ziko-de** ot-ta.
driver-NOM **arm-ACC** **accident-due.to** break-PST
'The driver$_1$'s arm broke on him$_1$ due to the accident.'

Sixteen sets of experimental sentences, such as the minimal pair in (104), were created, totaling 32 sentences. Due to the limited number of qualified verbs, the same verb was used twice.

The filler items included 152 sentences. Of these, 96 were acceptable sentences for the unrelated experiment. These included active, passive, and unaccusative sentences. Examples of each are provided below:

(105) a. kodomo-ga madogarasu-o war-ta.
child-NOM window-ACC break-PST
'The child broke the window.'

b. madogarasu-ga kodomo-niyotte war-are-ta.
window-NOM child-by break-PASS-PST
'The window was broken by the child.'

c. madogarasu-ga zisin-de war-e-ta.
window-NOM earthquake-by be.broken-INT-PST
'The window broke due to the earthquake.'

Forty-eight of the sentences were unacceptable. The unacceptability arose from either a morphological property of a verb (e.g., an inchoative morpheme used in a transitive sentence) or a negative polarity item (e.g., *-sika* 'only') involving a subject and verb, as exemplified by the following sentences:

(106) a. *hahaoya-ga sentakumono-o kawa-**i**-ta.
mother-NOM clothes-ACC dry-**INCH**-PST
Lit: 'The mother dried (intr.) the clothes.'

b. *kanja-**sika** nomigusuri-o non-da.
patient-**only** pill-ACC take-PST
Lit: 'Only the patient took the pill.'

This design was intended to ensure that participants processed the entire sentence before making a decision in an experimental task to be described in the following subsection. The remaining eight items were acceptable transitive active sentences.

Using a Latin Square design, I divided the experimental sentences into two lists. Each list was then combined with 152 filler sentences, yielding two lists of 168 sentences each. Each list was presented to 75 participants, for a total of 150 participants.

6.3.3 Procedure

The experiment was run using PCIbex (Zehr & Schwarz 2018). I employed a speeded forced-choice judgment task (e.g., Chujo 1983; Tamaoka et al. 2005; Koizumi & Tamaoka 2010). In this task, participants were instructed to decide whether a visually presented sentence was a possible or impossible sentence in Japanese as quickly and accurately as possible via button press. "Possible" and "impossible" correspond to "acceptable" and "unacceptable", respectively, in experimental linguistic terms. We did not use the latter two terms in our instruction to avoid confusion, as all participants were unfamiliar with technical terminology. The trial structure is represented in Figure 1. An eye fixation element ("＋＋＋＋＋＋") first appeared on the screen for 1,200 ms. A whole sentence was then presented visually. Participants were required to respond as quickly and accurately as possible, deciding whether the sentence was a possible sentence in Japanese by pressing 'J' for 'possible' or 'F' for 'impossible.' RT and accuracy for each sentence were recorded. An optional short break was provided midway through the experiment. Every participant completed twelve practice sentences before the actual experiment. The entire experiment lasted approximately 10–15 minutes.

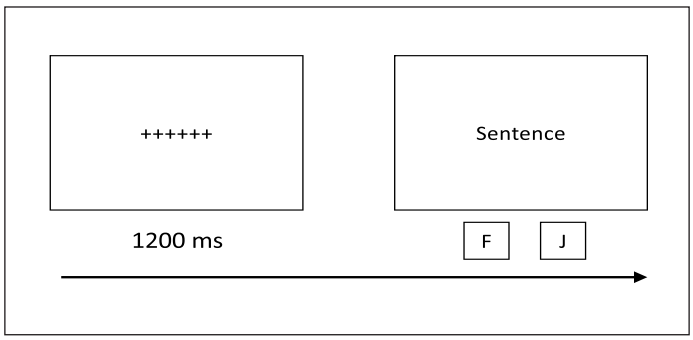


Figure 1: Trial structure.

6.3.4 Pre-processing of data

Following Koizumi & Tamaoka (2004), who investigated the processing of four-phrase sentences using the speeded forced-choice task, I first excluded responses that were too fast (400 ms or less) or too slow (4000 ms or more), which affected 4.5% of the data.

For the analysis of RTs, I further removed responses that evoked an incorrect 'impossible' response, because such negative responses are known to be longer than their positive counterparts (i.e., correct 'possible' responses). This procedure affected 18.5% of the filtered data. Finally, RTs outside of 2.5 standard deviations at both the high and low ranges were replaced by boundaries indicated at 2.5 standard deviations in each condition, which affected 2.3% of the filtered data.

6.4 Results

6.4.1 Accuracy

The mean accuracy and standard deviation for each condition are reported in the right column of Table 1. I conducted the analysis using logistic mixed-effects models with the *lme4* package (Bates et al. 2015) in R (R Core Team 2021). The fixed effect was the theta–role order (causer–theme and theme–causer), and items and participants were treated as random factors. Following Barr et al. (2013), I initially fit by-participant and by-item intercepts and slopes using the converged maximal random effects structure. If the maximal model failed to converge, I planned to remove a random slope using the backward stepwise method and compared converged models using the *anova* function in the lme4 package. The full model converged with by-participant and by-item random intercepts and slopes. I obtained the model summary and *p*-values using the *lmerTest* package (Kuznetsova et al. 2017). The summary of the model is provided in Table 2. There was no significant difference between the theme–causer and causer–theme conditions (82.0% vs. 80.9%; *estimate* = –0.66, *SE* = 0.41, z = –1.6, p = 0.104).

	Reaction time (ms)		accuracy (%)	
Condition	**M**	**SD**	**M**	**SD**
theme–causer	1,946	673	80.9	39.3
causer–theme	1,813	639	82.0	38.5
causer–theme − theme–causer	Δ133		Δ1.1	

Table 1: Mean reaction times and accuracy rates for each condition. M refers to means and SD refers to standard deviations.

	Estimate	***SE***	***t* value**	***p* value**	
(Intercept)	3.15	0.66	4.76	0.000	***
Theta-role order	–0.66	0.41	–1.6	0.104	

Table 2: Summary of the fixed effect in the logistic mixed-effects model of accuracy.

Note that the mean accuracy was 97.9% (SD = 14.3) for acceptable fillers, and 95.0% (SD = 21.7) for unacceptable fillers. This high accuracy indicates that the participants paid close attention during the experiment.

6.4.2 Reaction times

I calculated the mean RTs and their standard deviations for correct "possible" responses, as summarized in the left column of Table 1. For the statistical analysis, I fit linear mixed-effects models. The model fitting and selection procedure was the same as in the accuracy analysis in Section 6.4.1. The full model converged. The summary of the model is provided in Table 3. RTs for the theme–causer condition were significantly longer than those for the causer–theme condition (1,946 ms vs. 1,813 ms; *estimate* = 124.9, *SE* = 46.8, $t = 2.7$, $p = 0.018$).

	Estimate	***SE***	***t* value**	***p* value**	
(Intercept)	1,880.4	78.0	24.1	0.000	***
Theta-role order	128.9	46.6	2.8	0.018	*

Table 3: Summary of the fixed effect in the linear mixed-effects model of reaction times.

6.5 Discussion

The RT results revealed that the theme–causer order took longer to process than the causer–theme order in experiencer subject causatives (i.e., causer–theme < theme–causer). This result confirms the prediction of the high causer analysis proposed in this paper but not the prediction of the low causer analysis. Therefore, I conclude that the high causer analysis is correct: the causer adjunct originates above the theme object in experiencer subject causatives.

Crucially, this conclusion has broader implications for the long-standing issue of the original position of the causer. As mentioned in Section 6.1, there are two schools of thought on the causer's position. One posits that it occurs underlyingly below the object (e.g., Belletti & Rizzi 1988; Cheung & Larson 2015), while the other argues for the opposite relation (e.g., Fujita 1996; Sato & Kishida 2009; Alexiadou et al. 2015). The current results support the second view. The choice of analysis for the causer's position is crucial for the development of the theory of experiencer-object constructions. As discussed in Section 6.1, while the inverse c-command relation in experiencer-object constructions seemingly supports the view that the causer originally occurs below the experiencer (Belletti & Rizzi 1988; Hasegawa 2001; 2004; 2007; 2016; Cheung & Larson 2015), there are several possible accounts of this relation under the view that the causer originates above the experiencer (Fujita 1996; Sato & Kishida 2009; Alexiadou & Anagnostopoulou 2020). It remains to be seen which analysis adopting the high causer position provides the best account of experiencer-object constructions.

7 Conclusion and implications

This paper has proposed a comprehensive analysis of experiencer subject causatives in Japanese. Specifically, I argued that the experiencer subject is introduced in Spec of AffectP, which occurs

above CauseP and below expletive VoiceP. I adopted the view that each lexical entry stores syntactic structures to model how a particular causative verb specifies whether it can appear in the experiencer subject causative construction. Additionally, I proposed a pragmatic analysis of the possessor–possessum relationship between the subject and object in experiencer subject causatives. Finally, I claimed that the causer adjunct occurs above the theme object, a claim supported by sentence processing data. I conclude this paper by discussing the empirical and conceptual implications of this study.

The empirical implication concerns causatives with inanimate, non-causer subjects. The following examples are based on Hasegawa (2016: 9, (12)).

(107) a. doru-ga enyasu-de ne-o age-ta.
dollar-NOM depreciation.of.yen-due.to value-ACC be.risen-CAUS-PST
'The dollar's value rose due to the depreciation

b. kigi-ga taihuu-de ha-o ot-osi-ta.
trees-NOM typhoon-due.to leaf-ACC be.fallen-CAUS-PST
'The trees' leaves fell due to the typhoon.'

Given the general assumption that the notion of an experiencer is applicable only to a salient animate entity, my analysis appears to have nothing to do with data such as (107). However, this is not necessarily the case, as these examples may be subsumed under the category of experiencer subject causatives. This can be achieved by treating experiencer subject causatives as a kind of animacy diagnostic, where the inanimate subject in this construction is interpreted as an experiencer. This approach can be formalized by modifying the experiencer meaning in the denotation of Affect. Notably, Hasegawa (2016) makes a similar suggestion under a different theoretical assumption. This analysis seems reasonable, as previous studies have pointed out that animacy itself is not an adequate notion in grammatical theory (see Martin et al. (2023b: 6) and references therein).

Another possible analysis of the construction under discussion is provided by Schäfer (2024). Schäfer (2024) observes that various languages have causatives like (107). Below is an English example from Schäfer (2024: 3,(4)).

(108) The Mediterranean Sea has raised its temperature by 1.4° since 1982.

He proposes that the subject in these sentences merges into Spec of expletive VoiceP; as a result, it is not interpreted as a causer or agent. He argues that the same analysis applies to Japanese data like (107). The intuitive difference between experiencer subject causatives and sentences like (107) and (108) is that the former conveys an additional meaning related to experience or affectedness, while the latter does not. However, as mentioned above, this intuitive difference does not necessarily require a non-uniform analysis. I leave open the question of whether the

analysis proposed in this paper can be extended to the relevant data or if a distinct analysis, as suggested by Schäfer (2024), is necessary.

The conceptual implication of this study concerns the ingredients and architecture of grammar. My analysis is purely syntactic in that it does not rely on any pre- or post-syntactic combinatory operations to derive experiencer subject causatives. The analysis primarily builds on two functional heads: Cause (Pylkkänen 2008) and Affect (Bosse et al. 2012). If my analysis is correct, this study provides evidence supporting the view that these functional heads are part of the universal grammar (UG) inventory, alongside others such as agentive Voice (Kratzer 1996) and Passive (Bruening 2013). Moreover, to the extent that my syntactic analysis holds, this study aligns with the hypothesis that syntax is the sole generative component of grammar (e.g., Bruening 2018), a result that supports the view of grammar as conceptually simple, with only one combinatory component: syntax.

Abbreviations

ACC = Accusative, CAUS = Causative, COP = Copula, DAT = Dative, NOM = Nominative, INCH = Inchoative, PASS = passive, PST = past, PRES = Present, PROG = Progressive, SFP = Sentence final particle, Q = Question.

Data availability/Supplementary files

Data are uploaded on OSF (https://osf.io/3tsfm/).

Ethics and consent

The experiment reported in this paper was approved by the IRB of Univeristy of Delaware. All the participants in the experiment gave the informed consent.

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Competing interests

The author has no competing interests to declare.

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