How Much Do English Textbooks Present Implicit Causality Verbs?: A Corpus-Based Analysis of Verbs from Hosoda's (2021) Study

Masaya Hosoda

Abstract

This study examined frequencies of implicit causality (IC) verbs in high school English textbooks in Japan. Japanese learners of English have been shown to struggle with using IC verbs in discourse processes. While researchers often attribute this difficulty to the limited input of IC verbs learners receive, few empirical studies have quantitatively supported this claim. Addressing this gap, the present study conducted a corpus-based analysis to investigate the extent to which English textbooks present the IC verbs previously tested with Japanese learners (Hosoda, 2021). The results indicate that, with few exceptions, most IC verbs appear four times or less. In particular, frequencies of NP1 (first noun-phrase) verbs that induce referential bias toward the subject (e.g., *disappoint*, *annoy*, and *bother*) are low, regardless of whether they are in transitive (e.g., *Steve disappointed John*) or passive form (e.g., *John was disappointed by Steve*). Taken together, these findings suggest that the IC verb input from English textbooks is insufficient for learners to develop rich lexical representations. Implications for vocabulary instruction are discussed.

Introduction

In English as a Foreign Language (EFL) contexts, one of the most important sources of English input is the English textbook. English classes are usually conducted using government-approved textbooks, and tests are constructed primarily based on their content. Therefore, linguistic features of input provided by English textbooks are supposed to characterize EFL students' second-language

(L2) representations. On this account, this study sought to reveal how frequently and what types of verbs appear in English textbooks. Given that an English sentence is centered around a verb, the verbs to which learners are exposed occupy a central position in their English input.

Specifically, this study focuses on occurrences of *implicit causality* (IC) verbs in English textbooks used in Japan. IC verbs are a type of interpersonal verb that attributes the cause of an event to either a subject- or object-position entity. This induces a well-known referential interpretation bias known as *IC bias* (e.g., Garvey & Caramazza, 1974; Kehler et al., 2008; Koornneef et al., 2016). For example, readers tend to interpret *he* in *Steve disappointed John because he* as referring to *Steve*. This is because semantics of the verb *disappointed* attributes the causality of the event to the subject (e.g., Steve made a careless mistake, which is why he disappointed John). Conversely, readers usually interpret *he* in *Steve praised John because he* as *John*, because the event causality in this case is attributed to the object-position entity (John did a great job, which is why Steve praised him).

As these examples show, IC bias results from verb semantics and exerts its influences on cognitive processes at a discourse level, like pronoun interpretation (e.g., Kehler et al., 2008; Sostad & Bott, 2022). Thus, the use of IC bias functions as a bridge between word- and discourse-level comprehension. This is a crucial area for EFL learners who often have to focus on word-level processes, primarily due to limited cognitive resources and under-developing L2 representations.

Despite the importance of IC, Japanese EFL learners have been shown to struggle with the utilization of IC bias (e.g., Hijikata, 2021; Hosoda, 2020, 2023). One reason posited for this difficulty is the limited input Japanese learners receive for IC verbs, which results in their lexical knowledge of these verbs being insufficiently detailed (Hosoda, 2025; Sato, 2002). Meanwhile, studies that quantitatively examine the prevalence of IC verbs within learners' input sources are quite limited. It remains unclear to what extent and in what ways IC verb input is insufficient for EFL learners. To address this gap of the literature, the present study aimed to quantitatively clarify the extent to which IC verbs appear

in high-school English textbooks through a corpus-based analysis. The findings of this study may inform how to introduce IC verbs, potentially guiding effective interventions to support EFL learners in overcoming difficulties with IC verb usage.

Literature Review

IC Verbs and Their Difficulty for Japanese EFL Learners

In recent years, IC bias has been investigated among L2 learners, and the research has shown that IC bias influences L2 referential interpretation and predictive processing (e.g., Cheng & Almor, 2017, 2019; Hijikata, 2021; Hosoda, 2023; Kim & Grüter, 2021; Wang & Gabriele, 2022). At the same time, L2 researchers also indicate that the influence of IC is often more limited for L2 learners compared to native speakers (Cheng & Almor, 2017; Kim & Grüter, 2021; Wang & Gabriele, 2022). Specifically, Japanese EFL learners are reported to face greater difficulties with verbs that generate IC bias toward the subject-position entity, known as NP1 (first noun phrase) verbs (e.g., *disappointed* in the example in the previous section), than native English speakers or their own L1 (Hijikata, 2021; Hosoda, 2020, 2023). This difficulty with NP1 verbs has been evidenced by both online and offline tasks, requiring learners to use IC bias for pronoun interpretation and/or prediction of upcoming entities.

Interestingly, this observation has been found only in Japanese EFL learners and not in learners from other L1 backgrounds. For example, L1-Chinese learners are shown to struggle more with NP2 (second noun phrase) verbs, which generate IC bias toward the object-position entity (e.g., *praised* in the previous example) rather than NP1 verbs. This is attributable to the fact that NP2 verbs are less common than NP1 verbs in Chinese (Cheng & Almor, 2017, 2019), which leads L1-Chinese learners to prefer NP1 reference.

To explain the difficulty experienced by Japanese EFL learners with NP1 verbs, previous research often attributes it to their limited exposure. Researchers assume that NP1 verbs are often presented in the passive form (be verb + past

participle; e.g., *John was disappointed by Steve*) in English textbooks and tests used in Japan, while occurring less frequently in the transitive causative form (e.g., *Steve disappointed John*). Several studies support this claim through questionnaires (e.g., Hosoda, 2020). However, only a few studies have quantitively confirmed this view with textbook corpus analysis. It remains, therefore, unclear how frequently Japanese EFL learners encounter IC verbs in textbooks and to what extent the input of NP1 verbs falls short in meeting Japanese EFL learners' exposure needs.

Corpus-Based Research on English textbooks

While there is substantial research on English textbooks, studies that specifically examine verb frequency are limited. The only direct antecedent to this study is Katsufuji (2008). This study compared frequencies of nine types of verbs, including stimulus-experiencer (SE) psychological verbs (a type of NP1 verb) and experiencer-stimulus verbs (a type of NP2 verb), in high school English textbooks (as of 2007) and textbooks for native English speakers, which served as the reference corpus. Results revealed that both type and token of SE verbs were lower in the English textbooks than in the reference corpus. Furthermore, in the English textbooks, SE verbs appeared significantly less frequently than ES verbs. These findings suggest that the input of NP1 verbs in English textbooks at the time of Katsufuji's (2008) study was more limited than NP2 verbs.

While the above findings inform us about Japanese EFL learners' difficulties with IC verbs and possible causes, there are notable limitations in the existing literature. First, it remains unclear how frequently IC verbs appear in English textbooks currently in use. Katsufuji (2008) examined textbooks that were employed over 15 years ago. Since then, the *Course of Study* has been revised twice, leading to updates in English textbooks. Therefore, the findings from Katsufuji (2008) cannot be directly applied to the IC verb input currently received by learners. Additionally, Katsufuji (2008) did not distinguish between forms of IC verbs (transitive vs. passive). Japanese EFL learners' limited exposure to NP1 verbs is considered to be pronounced for the transitive form, given the previous

research's assumption that these verbs are often introduced in the passive form (Hijikata, 2021; Hosoda, 2020). Consequently, even if learners know the meaning of these verbs, they experience specific difficulty using them specifically in the transitive form (Hosoda, 2023; Sato, 2002). Given these considerations, research distinguishing between transitive and passive forms of IC verbs is needed to understand features of their input. Lastly, Hosoda (2020) reported that many learners stated they had little exposure to NP1 verbs in the transitive form, but this result was obtained through questionnaires. Responses to questionnaires are subjective and may not always accurately reflect objective reality. Taken together, these limitations of the literature suggest that a definitive conclusion cannot be drawn about the extent to which Japanese EFL learners encounter IC verbs in English textbooks.

The Present Study

Purpose and Research Question

The present study was designed to reveal frequencies of IC verbs in English textbooks, focusing on biases (NP1, NP2) and forms (transitive, passive). This article reports on a corpus analysis of a subset of IC verbs examined in Hosoda (2025). Specifically, Hosoda (2025) examined a total of 150 IC verbs (75 NP1 and 75 NP2 verbs). Of these, this study focuses specifically on 28 IC verbs (14 NP1 and 14 NP2 verbs) that have been used as experimental materials in studies testing Japanese EFL learners (Hosoda, 2021, 2022). The following research question was addressed in this study.

How do frequencies of IC verbs in English textbooks differ according to biases (NP1, NP2) and forms (transitive, passive)?

Predictions

This study made two predictions:

1. Frequencies of NP1 verbs would be lower than those of NP2 verbs, specifically in the transitive form.
2. NP1 verbs would appear less frequently in the transitive form than in the passive form.

These predictions are based on prior studies' claim that NP1 verbs are typically introduced in the passive form and seldom used in the transitive form in Japan's English learning environments. They are also informed by the observation that Japanese EFL learners experience specific difficulty with the use of NP1 verbs, unlike NP2 verbs.

Method

Textbooks

Eighteen Japanese high school English textbooks were analyzed in this study. They were published from 2022 to 2024 by two publishers (Tokyo Shoseki, Sanseido). They were selected because of the high adoption rates in high school. Table 1 lists the textbooks and the number of their tokens. This study tested high school English textbooks because most of the IC verbs are introduced in high school English lessons; they are therefore supposed to rarely appear in junior high school English textbooks.

Each publisher issues three series corresponding to levels of English proficiency. Table 1 labels these three levels as Basic, Intermediate, and Advanced (not officially announced, though). From each series, three textbooks (one per grade) were selected.

Table 1

Textbooks Analyzed in This Study

		English Communication I	English Communication II	English Communication III
Tokyo Shoseki	Basic	VISTA I (2,294)	VISTA II (7,203)	VISTA III (7,242)
	Intermediate	MY WAY I (5,974)	MY WAY Ⅱ (7,509)	MY WAY III (10,957)
	Advanced	CROWN I (9,413)	CROWN Ⅱ (11,300)	CROWN III (15,046)
Sanseido	Basic	All Aboard! I (2,580)	All Aboard! II (3,966)	All Aboard! III (5,780)
	Intermediate	Power On I (5,524)	Power On II (6,289)	Power On III (9,547)
	Advanced	PROMINENCE I (9,246)	PROMINENCE II (13,440)	PROMINENCE III (17,210)

Note. The number of tokens is in the parentheses.

Textbook Corpus

The textbooks were digitized and compiled into a corpus. First, the textbooks were scanned using a scanner with the OCR function and loaded onto a PC in the PDF format. The main text of each lesson and the texts of units focused on reading comprehension were analyzed (Honda & Shimura, 2017; Katsufuji, 2008; Tanaka & Usukura, 2023). Other parts (e.g., instructions, grammar exercises, vocabulary, and example sentences in appendices) were not included in the analysis.

The texts from the PDF files were copied and passed to create plain text (txt) files. The author carefully checked OCR errors and any discrepancies between the pasted and the original text. The author made corrections by referring to the original text when necessary. A plain text file was created for each lesson or unit. The text files were loaded into *Sketch Engine* (Kilgarriff et al., 2004; https://www.sketchengine.eu/), and the textbook corpus was compiled.

IC Verbs

In this study, 14 NP1 and 14 NP2 verbs used in IC research involving Japanese EFL learners were selected (Hosoda, 2021). Table 2 lists the verbs. They were originally derived from Ferstl et al. (2011), a norming study of English IC

verbs. Later, Hosoda (2021) confirmed that these verbs induce referential bias toward the NP1 or NP2 direction in both English and Japanese. These verbs are ranked 3000 or below in the New JACET (Japan Association of College English Teachers) 8000 List (JACET Basic Word Revision Committee, 2016). Words within this rank are presumed to be introduced in English lessons up to high school in Japan and are therefore expected to appear in high school English textbooks.

Table 2

IC Verbs Tested in This Study

NP1 verbs	NP2 verbs
annoy	admire
apologize to	answer
approach	employ
attract	guide
bother	hate
confuse	laugh at
disappoint	like
hurt	love
lie to	notice
please	praise
shock	punish
telephone	respect
trouble	thank
upset	worry about

Coding and Analysis

Frequencies of the IC verbs in the textbook corpus were counted using the concordance of Sketch Engine. The frequencies were computed separately for the transitive and passive forms. The analysis excluded other forms, including present participles and imperative uses of the verb. The analysis also excluded cases where the object was non-animate (e.g., "We can play video games"), or the object was absent (e.g., "he called.") because they are irrelevant to the IC bias.

Statistical analyses were performed in R. Frequencies of verbs were analyzed using generalized linear mixed-effects modeling (GLMM). Due to greater

variance than the mean in the data, a negative binomial distribution was used. The fixed effects were bias (NP1, NP2), verb form (transitive, passive), both sum-coded, and the Bias × Verb Form interaction. The model also included a by-item random intercept.

Results

The number of occurrences of the IC verbs is presented in Figure 1. Means and standard deviations of the number of occurrences of the IC verbs are shown in Table 3.

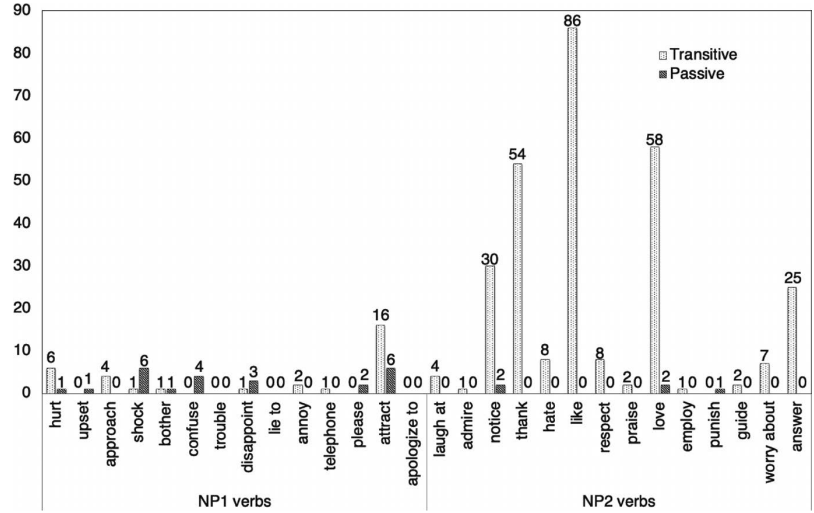

Figure 1
The Number of Occurrences of the IC Verbs

Table 3
Means and Standard Deviations of the Number of Occurrences of the IC Verbs

	NP1 verbs (n = 14)		NP2 verbs (n = 14)	
Verb form	*M*	*SD*	*M*	*SD*
Transitive	2.28	4.32	20.43	27.12
Passive	1.71	2.20	0.35	0.74

Table 4 summarizes the results of the GLMM. A significant main effect of verb form was found, indicating that the transitive form is more frequent than the passive form. The model also revealed the significant Verb Form × Bias interaction.

Table 4

Results of the Linear Mixed-Effects Model of Verb Frequency

Fixed effect	β	*SE*	*z*	*p*
(Intercept)	0.53	0.35	1.52	.128
Verb Form	−1.05	0.22	−4.73	<.001***
Bias	−0.14	0.27	−0.51	.612
Verb Form × Bias	0.98	0.22	4.43	<.001***

Note. ***p <.001. Formula: Frequency~ Verb Form * Bias + (1 | item).

Follow-up tests showed that the transitive form occur less frequently for NP1 verbs than for NP2 verbs (β = −2.24, *SE* = 0.62, z = −3.64, p = .002). Conversely, the passive form exhibited no significant frequency difference between NP1 and NP2 verbs (β = 1.68, *SE* = 0.78, z = 2.15, p = .137).

It was also found that the transitive form is more frequent than the passive form for NP2 verbs (β = −4.05, *SE* = 0.68, z = −5.98, p <.001). For the NP1 verbs, oppositely, there was no significant frequency difference between the transitive and passive forms (β = −0.13, *SE* = 0.57, z = −0.23, p = .996).

Looking at specific frequencies, 11 out of the 14 NP1 verbs appear only two times or less in the transitive form. On the other hand, for NP2 verbs, five verbs appear at very high frequencies in the transitive form (*answer* [25 times], *like* [86 times], *love* [58 times], *notice* [30 times], *thank* [54 times]). Finally, the passive form of NP2 verbs has the lowest occurrence frequency; 11 out of 14 verbs do not appear even once, and the most frequent verbs (*love*, *notice*) appear only twice.

Discussion

The GLMM showed that the transitive form is significantly less common

for NP1 verbs than for NP2 verbs. This finding corroborates the first prediction (Frequencies of NP1 verbs would be lower than those of NP2 verbs, specifically in the transitive form) and aligns with previous studies suggesting that Japanese EFL learners have limited exposure to NP1 verbs in the transitive form (e.g., Hijikata, 2021; Hosoda, 2020). Among the 15 NP1 verbs, only *attract* appear more than 10 times in the transitive form, as shown in Figure 1, while 11 verbs appear two times or less. This observation suggests that Japanese EFL learners receive only negligible input of NP1 transitive verbs from English textbooks.

Previous research estimated this view that Japanese EFL learners have limited input of NP1 verbs in the transitive form based on the questionnaire relying on subjective perception (Hosoda, 2020). In contrast, this study directly investigated frequencies of IC verbs in English textbooks, a primary input source for learners. As a result, this study provides quantitative evidence that NP1 transitive verbs appear less frequently than NP2 verbs in English textbooks.

An additional noteworthy finding is that NP1 verbs do not show high frequencies even in the passive form, as reflected by the lack of a significant frequency difference between their transitive and passive forms. Looking closer at the data, 12 out of the 15 NP1 verbs appear only zero to three times in the passive form. This contrasts with the second prediction (NP1 verbs would appear less frequently in the transitive form than in the passive form). The literature assumed that NP1 verbs are commonly introduced in the passive form in Japan's English learning environments (Hijikata, 2021; Hosoda, 2021; Sato, 2002). However, the corpus analysis in this study suggests that NP1 verbs appear very infrequently in English textbooks, regardless of whether they are in the transitive or passive form. It is apparent that Japanese EFL learners rarely encounter NP1 verbs in English textbooks.

Finally, only a small number of verbs occur repeatedly in textbooks. Specifically, the five NP2 verbs, *like* (86 times), *love* (58 times), *thank* (54 times), *notice* (30 times), and *answer* (25 times), appear most frequently in the transitive form. Aside from these, 57% of the IC verbs (16 out of 28 IC verbs) appear only

four times or fewer. These results indicate that even if IC verbs are introduced in English textbooks, many of them are scarcely repeated after their initial appearance. It seems that Japanese EFL learners gain frequent exposure to only a small set of NP2 verbs from textbooks. This observation suggests that the input of IC verbs provided by textbooks is insufficient for learners to deepen their lexical knowledge of most verbs, regardless of verb bias or form. Rather than focusing on a narrow subset of verbs, teachers should aim to broaden the variety of verbs presented to students to enrich their vocabulary development.

Conclusion

This study examined frequencies of IC verbs in English textbooks. The results indicate that NP1 verbs appear significantly less frequently than NP2 verbs in the transitive form and scarcely appear even in the passive form. Furthermore, except for a small number of NP2 verbs, IC verbs are rarely repeated in textbooks after their first appearance. These findings suggest that the input of most IC verbs from English textbooks is insufficient for learners to deepen their lexical representations.

Based on these findings, this study recommends that teachers provide IC verb input intentionally and purposefully in order to foster learners' ability to use IC information for discourse processing. Particularly for NP1 verbs, input from English textbooks is near minimal regardless of form. Utilizing resources such as corpora to provide more exposure to NP1 verbs in authentic contexts is essential for learners to refine their L2 lexical representations.

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