

How Causal Relation Affects the Construction of Problem-Solution in Argumentation Essays

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Received: January 8, 2024

Accepted: January 28, 2024

Online Published: January 29, 2024

doi: 10.5539/elt.v17n2p25

URL: <https://doi.org/10.5539/elt.v17n2p25>

Abstract

The Problem-Solution text pattern is often used in academic writing. The present study investigates how Problem-Solution is used in non-native speaker (NNS) argumentation essays by Japanese speaking students, in comparison with native speaker (NS) essays by American students. By taking the clause relational approach, the present study attempts to find how the students use causal relation when employing the Problem-Solution pattern in their essays. The investigation focuses on *problem*, which is a causative device, as well as a shell noun that can construct the text. This paper will show that in the two corpora the students' use of causal relation was similar in frequency and drew on the same types of causal categories; however, how the causal categories were expressed in lexico-grammatical patterns was often different. Furthermore, NNS students used *problem* in non-causal relation significantly more frequently than NS students did. This paper points to what lacked in NNS essays in order for the students to use causal relations in the same ways as NS students did in their essays (e.g., type of verbs, rheme-theme development). A discussion of the pedagogical implications of the findings provides insights which could be helpful to educators developing syllabi and teaching academic writing to NNS students.

Keywords: causal relation, Problem-Solution, clause relational approach, shell noun, discourse analysis

1. Introduction

One theory of teaching English draws on English as a Lingua Franca (ELF) (e.g., Jenkins, 2012; Seidlhofer, 2011), and considers English used by non-native speakers to be as legitimate as English used by native speakers. While applicable to speaking, this line of thinking might not be appropriate for some written genres, such as academic essays. Academic essays have standard patterns, are usually read with certain expectations of the genre (Bhatia, 1993; Upton & Connor, 2001), and graded in accordance to L1-based patterns. Therefore, it is important for NNS students to understand how to employ L1 genre patterns in the writing of academic essays.

In Japan, prior to their enrollment in university, students in general have little experience in writing academic essays that would be commensurate with the standards of western universities. A commonly used approach to teach academic essay writing at the university level relies on paragraph writing, which focuses on the structure of topic sentence, supporting details and conclusion. For the writing of longer texts, the Introduction-Body-Conclusion pattern is often taught as an expanded version of the paragraph writing format, as evidenced in some writing coursebooks for Japanese university students (Tajino, A., et al, 2020, Yoneda, M. et al, 2023).

While the Introduction-Body-Conclusion structure is widely used in education, another type of text structure Problem-Solution seems to have been paid little attention, despite its being 'the main organizing principle of many different kinds of written and spoken texts ranging from advertisements to workplace reports' (Flowerdew, 2008: 1). Elsewhere, Flowerdew (2003) notes that the Problem-Solution structure is particularly used in academic writing. Previous studies, such as those by Flowerdew (2003, 2008), suggest some differences in the ways Problem-Solution is used in NNS and NS student essays. She reports a difference in the types of vocabulary (i.e., Inscribed and Evoking items) used to construct the Problem and the Solution segments. Tahara (2020), who examined NNS and NS argumentation essays from the use of shell nouns (Schmid, 2000), notes a difference in expressing a reason by such nouns as *problem* and *reason* to form a sequence of the Problem-Solution pattern. (Note 1) Difference in expressing a reason between NNS essays, whose L1 is

Japanese, and NS essays is also noted in other inquiries. Izumi (2018) reports difference that appeared in sentences describing cause-effect relations in essays by Japanese speakers and English speakers. Also Murata (2001) suggests there is a different way of expressing causation from thinking patterns; Japanese speakers have a 'therefore thinking pattern' and English speakers have a 'reason thinking pattern'. These findings indicate that how the writer expresses causation can be a source of perceived difference in Problem-Solution in NNS and NS student essays – this paper explores this question. In addition, although some studies experimented with the teaching of Problem-Solution to NNS students (e.g., Galán & Pérez, 2004), the issue of what vocabulary should be introduced in the teaching process has not been fully addressed yet. The present study is an attempt to find to what extent causal relation affects the construction of Problem-Solution in the writing of argumentation essays, and what should be included in the teaching of the Problem-Solution pattern. The study focuses on the use of *problem*, which is a causative device as well as shell noun that can mark discourse (see Section 3.2).

This paper will begin by explaining theoretical background (Section 2), followed by the methodology (Section 3) and the procedures (Section 4). The paper then examines the use of *problem* for causal relation and Problem-Solution (Section 5). After reflecting on the pedagogical implications, the paper concludes by considering the directions for further inquiry. The findings will be useful in designing syllabi for the teaching of Problem-Solution in academic essays.

2. Theoretical Background

The examination of the use of causal relation in argumentation essays is conducted by taking the clause-relation approach (Hoey & Winter, 1986). It 'looks at not only connections between clauses and sentences, but also relations across larger stretches of text, thus accounts for the coherence of text both at a local and global level' (Hoey, 1983, in Flowerdew, 2008: 1). In other words, causal relation, which emerges when interpreting the meaning of adjacent sentences, and the overall text pattern are rhetorical patterns that can be considered complementary to each other.

In the clause relational approach, textual relations are signalled by grammatical (e.g., *and*, *when*, *because*) and lexical items (e.g., *reason*, *condition*, *conclusion*) (McCarthy, 1991, 29; Holland & Lewis, 2000: 32). In the present study, however, the text analysis is conducted by emphasizing the role of lexical signals – note that grammatical signals are not focused on in the study. The text analysis draws on the concept that 'a number of vocabulary items characteristically cluster around the elements of larger patterns in texts' (McCarthy, 1991: 79). Problem-Solution is normally comprised of [Situation-Problem-Solution/Response-Evaluation] functional segments (Hoey, 1983, 2001), in which the Problem element is identified by such signalling vocabulary as *concern*, *difficulty* and *dilemma*, and the Response element as *change* and *come up with*. Thus, taking the clause-relation approach, the present study explores how the use of causal relation affects the construction of Problem-Solution in the NNS and NS texts.

3. Methodology

In order to find to what extent Problem-Solution is affected by the use of causal relation, the present study explores the following specific questions:

- (1) Is *problem* used for causal relation in NNS essays as much as in NS essays?
- (2) Is there difference in the way causation is expressed in the two corpora?
- (3) Is there a correlation between causal relation and Problem-Solution expressed by *problem* in the two corpora?

3.1 NNS and NS Essays

To identify features of NNS students' essays, the present study uses NS students' essays as a reference corpus, rather than essays by professional writers (PWs). Some researchers (e.g., Adel, 2006, Leech, 1998) argue that NS students are not fully proficient writers; hence, their essays cannot be a good model for NNS students to follow. However, student essays can form a specific genre, and NS essays are comparable to NNS essays in many respects, such as topics, target readership, and writing context in which the writing is to be evaluated for a test, as stated in Lorenz (1999).

The NNS argumentation essays in the study are written by L1 Japanese students, and drawn from the Japanese subcorpus of the International Corpus of Learner English (JICLE). The NS essays are written by L1 English American students, and drawn from the US subcorpus of the Louvain Corpus of Native English (US). JICLE is comprised of 366 essays with 202,099 word tokens, while US is comprised of 176 essays with 150,530 word tokens. As for essay topics, there are some common topics in the two corpora (e.g., death penalty, nuclear energy), but many topics appear in only one of the essays reflecting the interests in each of the societies at the

time of writing; e.g., learning of English, seniority system, future career in JICLE; and religious and racial discrimination, euthanasia, and abortion in the US corpus.

3.2 'Problem' as Target Vocabulary

The noun used for the examination of causal relation is *problem* as a causative device (refer to Table 2, Xuelan & Kennedy, 1992). Although not as explicit a causative device as *reason*, its causative role can be known because 'problem statements are commonly found in some type of causal relation' (Flowerdew, 2008: 54) as seen in the following example: *Construction of building will cause a noise problem.*

Problem in the present study is also a shell noun (Schmid, 2000), which is general and unspecific noun and can mark the discourse by recovering its meaning expressed in the text. It occurs in the following syntactic patterns (underlined is the the referent of problem; [referent] is a segment longer than a clause):

- (1) N-be-CL (e.g. *problem is that you do not know how to swim.*)
- (2) N:CL (e.g. ... *problem that too many cats are thrown away.*...)
- (3) th-N (e.g. [referent] *We have to think more about this problem...*)
- (4) th-be-N (e.g. [referent] *This is a problem...*)

Of these syntactic patterns, the target *problem* examined is one operating anaphorically, or occurring for the th-N and th-be-N pattern. This is because causal relation is 'overwhelmingly expressed via... causative verbs' that are collocated with a noun (Flowerdew, 2008: 58). For N:CL, *problem* is not combined with a verb, and for N-be-CL the *be* verb always has stative meaning denoting the existence of a problem.

3.3 Causal Categories

Causal relation is identified using Crombi's (1985) cause-effect relations, which has the following causal categories (taken from Flowerdew, 2008: 54; the examples are from Crombi, 1985: 20):

- (1) Reason-Result: the reason member gives a reason why a particular effect comes about (e.g. ... *export scheme will create a noise problem*).
- (2) Means-Result: the means member states how a particular result is achieved (e.g., ... *thereby averting an odour problem*).
- (3) Grounds-Conclusion: a deduction is drawn on the basis of some observation (e.g., ... *and so flooding is not a serious problem*).
- (4) Means-Purpose: the purpose member outlines the action that is undertaken with the intention of achieving a particular result (e.g., ... *surrendered the girl in order to alleviate the problem*).
- (5) Condition-consequence: the consequence is a dependent on a hypothetical contingency (e.g., ... *If there is a problem with...*).

In Crombi (1985) there is no mention of causal relation employed to express 'what is the cause of the problem' as in '*Such a problem arises from carelessness*'; however, in the present study this usage is included in the Reason-Result category (type 1, above).

4. Procedures

The text analysis is conducted by using the KWIC (Key word in context) and the Text View functions of AntConc (Anthony, 2012).

- (1) Firstly, with the KWIC function formulate the appropriate concordance lines by inputting *problem* as a search item, with the setting of a list order at level 1 and L1 (left one word).
- (2) Of all the tokens of *problem*, identify the target *problem* with the Text View function – one whose meaning is expressed in the segment longer than a clause in the preceding segment, and then sort them into the thN or the th-be-N syntactic types.
- (3) Identify the causal category for each instance of (*the*) *problem* in accordance with Crombie's (1985) model, and interpret the Problem-Solution pattern constructed by *problem* through signalling vocabulary indicating the functional segments of the text pattern. The interpretation of Problem-Solution is not only by *problem* in causal-relation, but also by *problem* in non-causal relation, because *problem* is a shell noun and, by definition, can serve as a discourse marker, regardless of its involvement in causal relation or not.
- (4) For frequency analysis, raw data is normalized to a base figure of 'per 100,000 words', and the log-likelihood (hereinafter LL) test is applied. The critical value for the LL test will be 3.84, using the 0.05 significance

level for rejecting the null hypothesis.

5. Results of the Analysis

This section examines the frequencies of *(the) problem* in causal, as well as non-causal, relation in JICLE and US (Section 5.1). It also identifies the causal categories and Problem-Solution formed by *problem* (Section 5.2). (In the analysis, the term Response is used for Solution when referring to the individual parts of the Problem-Solution pattern, as Response can express either a positive or negative evaluation.)

5.1 'Problem' as Target Vocabulary

The total occurrences of *(the) problem*, including both in causal and non-causal relation, are larger in JICLE than in US at 53:25 in JICLE and US, respectively (normalized at 26:17; LL 3.72), but not significantly different in the 0.05 significance level (refer to Section 4). Regarding *problem* in causal relation, there are several *problems* which form incorrect collocations combined with causative verbs; nonetheless those *problems* are counted as being in causal relation when their meanings are adequately communicated. The result is that the overall frequencies of *problem* in causal relation are similar at 22:22 (normalized at 11:15, LL 0.95), as well as frequencies for the individual syntactic types, as shown below in Table 1:

Table 1. Frequencies of problem in anaphoric function in JICLE and US

shell syntactic patterns	(Total raw frequencies) [normalized, JICLE:US, LL]	(Raw frequencies in causal relation) [normalized, JICLE:US, LL]
thN+v	(13:6) [6:4, LL 0.99]	(4:5) [2:3, LL 0.60]
th-N		
v+thN	(20:8) [10:5, LL 2.38]	(9:6) [4.4, LL 0.04]
inPhrase-thN	(5:6) [2:4, LL 0.62]	(5*:6) [2:4, LL 0.62]
th-be-N	(15:5) [7:3, LL 2.72]	(4:5) [2:3, LL 0.17]
Total	(53:25) [26:17, LL 3.72]	(22:22) [11:15, LL 0.95]

Note: The * mark in JICLE indicates an inclusion of incorrect use of verbs combined with problem.

While a similarity in the frequencies of *(the) problem* in causal relation in the two corpora, one clear difference is the ratio of *problem* in causal relation against the total occurrences: *problem* is almost always in causal relation in US (22 in 25), while it is less than half in JICLE (22 in 53)

5.2 Causal Relation and Problem-Solution Involved in 'Problem'

This section shows how *problem* in anaphoric function has occurred in causal, as well as non-causal, relation and served to construct the Problem-Solution pattern in the two corpora. The occurrences of *problem* for th-N is examined by dividing the syntactic pattern into the subtypes based on the position of thN in the clause (i.e., 'thN+v', 'v+thN', 'InPhrase-thN').

5.2.1 'Problem' as the Subject for thN+v

For 'thN+v', *(the) problem* is the grammatical subject. Almost all the occurrences of *problem* (5 out of 6) are in causal relation in US, while only four out of 13 are in causal relation in JICLE. Shown, below, is the occurrences in the US corpus (non-causal relation is marked with *):

Concordance 1: *Problem* for thN+v in US

ocile and backward in modern standards, the **problem*** still exists. From the very beginning the
rand illusion of welfare reform. Rather, the **problem** can be solved only by providing more training
n high school and college environment. This **problem** could easily be curtailed by lowering the
respond to antibiotic treatment at all. This **problem** is compounded by the fact that not all illness
but the administrators who allow them, the **problem** is not dealt with as it should be, but pushed
erfere with living healthy. Of course this **problem** is not the model's fault, they are doing t
hey have nothing to stand on. The **problem** with discrimination in the workplace isn't always financial.

Most of the *problems* in causal relation, above, are combined with implicit causative verbs (i.e., *solve*, *curtail*, *compound*, *deal with*) which 'entail the meaning of make somebody/thing do something' (Xuelan & Kennedy, 199: 65). Meanwhile, *problem*, occurring in the lexico-grammatical pattern of '*problem* + (can) + passive verb + *by-doing*', is in the Means-Result causal category. In terms of Problem-Solution, *problem* refers back to the Problem segment and shifts it to a Response (signaled by the verbs), and is functioning to shift the discourse from [Problem to Response]. This suggests these verbs are acting as a two-way signal (Flowerdew, 2003, 2008)

shifting the segment from Problem to Solution. The use of *be* verb is noteworthy, as it has a meaning similar to *attributed to* or *stem from*, in the sentences ‘*problem is not financial*’ and ‘*problem is not model’s fault*’. Functionally, these *problems* are not making a major shift of functional segments, but in the Problem segment it shifts the focus to a cause of the problem.

In comparison, in JICLE *problem* occurred four times in causal relation, as shown below:

Concordance 2: *Problem* in causal relation for thN+v in JICLE

achers in English in elementary school. This **problem** is going to be solved. The Ministry of Education
ts former condition. **Now** the most difficult **problem** was solved! Many problems which should be solv
something like this can happen. Also this **problem** may make other new problem. Some people who
she had eaten. The doctor said that this **problem** didn't come from her physical problem but it

The *problems*, above, are in the Reason-Result causal category, with *problem* combined with causative verbs (i.e., *solve*, *make*, *come from*). Unlike in US where *problem* functioned to form a regular pattern of Problem-Solution, Problem-Solution in JICLE is not in a regular pattern. In the first example, the *problem* shifts the discourse from [Problem to Response (signaled by *solve*)], but in the second example, the discourse is terminated as indicated by *solve* in the passive past tense (*was solved*), as well as by *Now* and the exclamation mark (!). In the third example, combined with *make*, *problem* functions to shift the discourse from [Problem to Problem]. Such irregularity of Problem-Solution seems attributed to the varied forms of the verbs in JICLE.

Now shifting to *problem* in non-causal relation for thN+v, in JICLE it occurred much more than in causal relation, as shown below:

Concordance 3: *Problem* in non-causal relation for thN+v in JICLE

traffic light is "green". Like this, the **problem*** of colors can provide us with a matter of sciene
WWII ended, did it bring us happiness? The **problem*** still last now. Germany invaded Jewish person.
o the highhanded attitude of settlers, the **problem*** consists in lack of correct information, They
n and study self-paced but everyday. Cost **problem*** is still remained, but more and more company
it and neglects people's will. **Whenever** the **problem*** happens between people and official organizatio
m the people without permission. **Could** the **problem*** of land happen in Japan? In Japan, there abili
that it might be a fraudulence. This **problem*** has often happened these days. **Thirdly**, indivi
r about computers. In car factories, the **problem*** is serious, I think. Industrial robots work
mself. It should respect the privacy. The **problem*** of privacy was more complicated. It must res

The *problems*, above, are in non-causal relation, being combined with stative verbs (e.g., *provide*, *last*, *consist*), and the *be* verb also has a stative meaning, combined with an evaluative adjective (e.g., *be serious*, *be complicated*). These *problems*, as discourse marking shell nouns, serve to construct the text, and the discourse is shifted from [Problem to Response (signaled by verbs)]. The Response, however, seems not explicit, as the signaling verbs have stative meaning. By using such vocabulary as *Whenever*, *Thirdly* and *Could* at the shift of the discourse, the functional shift seems to be made explicit in JICLE.

Here is a summary of the use of *problem* for thN+v in the two corpora:

- (1) In the US corpus, *problem* is often in the Means-Result causal category, occurring in the ‘*problem* + (*can*) + passive verb + *by-doing*’ lexico-grammatical pattern. Combined with implicit verbs, *problem* is functioning to construct a discourse shift from [Problem to Response]. There is also a use of *be* verb which is used as a causative verb, having a similar meaning to *attributed to*.
- (2) In JICLE, *problem* is in the Reason-Result category, and forms a random Problem-Solution patterns, maybe attributed to the irregular forms of verbs. Another feature in JICLE is high frequency of *problem* in non-causal relation, combined with stative verbs. *Problem* shifts the discourse from [Problem to (weak) Response], with the Response signaled by stative verbs. The use of explicit discourse marking devices (e.g., adverbial connectives, conjunctions) may be to make explicit a shift to the Response.

5.2.2 ‘*Problem*’ as Object of Verb for v+thN

For ‘v+thN’, *problem* is the object of verb. The subjects are in different types in the two corpora: agent in JICLE and inanimate entity in US. Shown below is the US use of *problem* (* indicates *problem* in non-causal relation):

Concordance 4: *Problem* for v+thN in US

obvious that Mr Gingrich does not understand the **problem*** of Welfare Reform at all. None of these
rd of Trustees at USC should closely examine this **problem***. The university requires that teacher's

gather evidence, they will eliminate much of the **problem** with the credibility. <ICLE US MRQ 0046> onlies???) Gallon size zip-lock bags, solve this **problem**. In these a person can fit a whole bottle name of life. **Symptom treatment exacerbates** the **problem** by forcing more people into the medical regency spending bill. **This bill** only stalls the **problem**. If the government does not pass the k and the Great Depression began. **This made** the **problem** of homelessness become more numerous t orance and inequality. **It** is not dealing with the **problem**, but ignoring it and in some ways igniting

The majority of the *problems* are in causal relation combined with implicit verbs (e.g., *eliminate*, *solve*, *exacerbate*). The preceding segment to *problem* is the Response and it is terminated with an evaluation (signaled by implicit verbs; e.g., *stall*, *exacerbate*, *deal with*, *eliminate*), thus, *problem* shifts the discourse from [Response to Evaluation] to terminate the Response. Focusing on the subject, it is an inanimate entity or demonstrative (e.g., *Symptom treatment*, *This bill*, *It*, *They*). Most of these subjects are elements that occurred in the preceding segment and form a thematic development, as shown below:

Ex. 1: *This pact between the United States Congress and the President is just another name for an emergency spending bill. This bill only stalls the problem.*

Ex. 2: *Tying this to an already stereotyped black population is the cause of further ignorance and inequality. It is not dealing with the problem, but ignoring it.*

In Ex. 1, the subject *This bill* follows the zig-zag pattern where ‘an element which is introduced in the rheme in [the preceding clause] gets promoted to become the theme of [the following clause] (Eggins, 2004: 324). In Ex. 2, the subject *It* follows the theme reiteration pattern, where the text is kept focused and made coherent by simply reiterating an element (Eggins, 2004: 324).

Shifting to the JICLE corpus, a feature not observed in US is that *problem* in causal relation occurred mostly with an agent subject, except for some inanimate subjects, as follows:

Concordance 5: *Problem* in causal relation for v+thN in JICLE

ting a punishment. But this will not solve this **problem**. Of course it is very important but if surroundings. To kill criminals don't solve the **problem**.// Death penalty can solve nothing. Crie using own name as an alias does not solve the **problem** at all. In fact, one must change most lly, It is tme that the men cause these terrible **problem** for our own comfortability. But, it . ion. The government office should set about this **problem** in no time. But smokers consideration Iso the government should do something with this **problem**, as long as we take pride in being What can the Japanese Government do toward this **problem**? This is only my idea but I think i understand English. If we overcome this serious **problem**, we can get native speaker's thought. ll do the same thing if we don't try to solve the **problem** from the bottom. I think it is unreasonab

With inanimate subjects (e. g., *to kill criminals, using own name*), *problem* terminates the discourse in a [Response to Evaluation] shift, similar to in the US (see Concordance 4). However, with agent subjects (e.g., *we, the government*), *problem*, by referring to the preceding segment, shifts the discourse from [Problem to Response (signaled by verbs)]. The shift to the Response (e.g., *the government office should set about this problem*) appears abrupt, as the agent subject is newly introduced to the discourse. These *problems* in Concordance 5 are in the Reason-Result category, but there are also two occurrences of Condition-consequence (signaled by *if*-clause), which is embedding Reason-Result. Condition-consequence, which actually occurred in both corpora, though not appearing in Concordance 4, seems employed as a strategy to make a smooth shift to Response segment.

While *problem* for v+thN in JICLE was in causal relation (Concordance 5), as many *problems* were in non-causal relation as well, as shown below in Concordance 6 (Note 2):

Concordance 6: *Problem* in non-causal relation for v+thN in JICLE

ernet has vastly complicated the law-enforcement **problem*** by providing a powerful, worldwide medium it back to former condition. He bothered on this **problem*** for a long time. And one day, seeing his se" As I couldn't speak Chinese, I told him the **problem*** in my bathroom by English. Because I u imitated earnestly. I notice such a fundamental **problem*** one by one, and the English writing whi reak such situations? As we can't consider this **problem*** without private problem between man and country. We have to think some more about this **problem*** because the situation is changing all think about the other side's opinion and the **problem***. The other side's opinion was this; teach pupils and students much more clearly about the **problem*** of gender discrimination and tell lped us to look at the Ainu. We must look at the **problem*** of a minority people not only in Japan

d, without considering. We have not to take the **problem*** as easy. After all, I think marriage, ave to pay much money. We should not leave this **problem*** as it is. Sex education's role is how

For v+thN, regardless of whether *problem* was in causal (Concordance 5) or non-causal (Concordance 6) relation, the subject in JICLE was mostly agent. What differentiates causal from non-causal *problem* is the type of the verb combined with *problem*. While *problem* in causal relation is combined with causative verbs, *problem* in non-causal relation is mostly with mental verbs (e.g., *bother*, *notice*, *think*, *consider*), which describe what people think or feel (Biber et al. 1999: 371). The *problems* in non-causal relation shift the discourse from [Problem to Response (signaled by verbs)]. However, as the signaling verbs are mostly mental verbs, the Response is not explicit. The use of modals (e.g., *should*, *must*) may be used to make the response explicit.

In summary, the use of *problem* for v+thN is as follows:

- (1) In US, *problem* is almost always in causal relation and the subject is an inanimate entity that is taken up following the rheme-theme development pattern, and functioning to make the text coherent. For Problem-Solution, *problem* functions to terminate the discourse from [Response to Evaluation].
- (2) In JICLE, most of the *problems* are with the agent subject (e.g., *we*, *I*). In causal relation it occurs at the shift from [Problem to (sudden) Response], where the shift to Response is sudden, accounted for by the agent subject. Many of the *problems* are also in non-causal relation, combined with a mental verb. Accordingly, while the discourse shifts from [Problem to Response], the meaning of response is vague, being signaled by a mental verb.

5.2.3 'Problem' for InPhrase-thN

For InPhrase-thN, all the occurrences of *problem* are in causal relation in both corpora, as shown below:

Concordance 7: *Problem* in causal relation for InPhrase-thN in US

ued. Our lawmakers have done little to solve this **problem**. ne Hundreds of frivolous lawsuits filed r agrees, <*>. The only way to put an end to this **problem** is to institute mandatory drug testing essageive gun control laws are needed to reduce the **problem**. However, legislative measures will wo action must be taken immediately to alleviate the **problem**. People living without shelter has been ng out of control and they show ways to curb this **problem**. The authors cite examples of how this pollution and companies that contributed to this **problem**. Rational Choice Theory urges <*> <R>

Concordance 8: *Problem* in causal relation for InPhrase-thN in JICLE

o meet those goals. I have an idea to solve the **problem**. To support Japanese-Filipino children, ns with parental affection in order to solve this **problem**. Now English is a international language. need countermeasures against them to resolve the **problem**. Also, we must take care not to be infected we and Ainu work together to solve about the Ainu-**problem**. Today we often think about human right. , elementary school, is a good way to solute this **problem**. The second reason is about the equality

In both corpora, most of the *problems* are in the Means-Purpose causal relation, occurring in the lexico-grammatical phrase of [*to* + infinitive + (*the*) *problem*] as an adverbial phrase. In these cases, *problem*, by referring to the preceding segment, shifts the discourse from [Problem to Response]. A difference in the two corpora, however, can be found in the range of the verbs. In US (Concordance 7) the verbs are a variety of implicit causative verbs (e.g., *put an end*, *reduce*, *curb*), but in JICLE (Concordance 8) the verbs are often repetition of solve and other verbs (e.g., *resolve*, *solve about*, *solute*) that are incorrectly used in combination with *problem*, indicating the JICLE students' lack of vocabulary in the area of implicit verbs. Another difference to note in JICLE and US is more use of conjunctive adverbs in JICLE (e.g., *Now*, *Also*, *Today*, *The second*). As similar tendency was also observed for thN+v and v+thN in JICLE, suggesting a general tendency of the JICLE essays.

Thus, the use of *problem* for InPhrase-thN is similar in JICLE and US. In both corpora usage falls within the Means-Purpose causal category and functions to shift the discourse from [Problem to Response]. A difference, however, is a smaller range of implicit verbs in JICLE, and more use of explicit discourse markers, as also found for other syntactic patterns (i.e., thN+v, v+thN)

5.2.4 'Problem' for th-be-N

For the th-be-N pattern, *problem* is in the Reason-Result causal category. This occurred similarly in the two corpora, as shown below:

Concordance 9: *Problem* in causal relation for th-be-N in US

students to join in the prayer does it become a **problem**. The act of trying to force an unwilling
 been compensated by the dollar. This poses a **problem**, since undoubtedly those at-home tasks,
 e to be rightfully theirs. This also causes a **problem** because each group only sees what they are
 quite obvious that it is a very significant **problem**. Examples like this show how stereotypes
 r mom and dad to answer. That's not always a **problem** if the child is old enough to know and it

Concordance 10: *Problem* in causal relation for th-be-N in JICLE

irst son of his family, it's going to be a **problem**. My family tree stops at my parents. My
 If the husband doesn't work, it is heavy **problem**. They can't live a usual life without husba
 everyone always think so. I think that is **problem**. Sometimes master English is very painful
 to meet. I can say exactly why this is a **problem**: When the cell phone was not popular, we

In the examples above, both in US and JICLE, the *be* verb takes on the semantics of a causative verb (e.g., *become*, *pose*, *cause*), and the idiomatic phrase '*be a problem*' has the meaning that 'problem could create a future one' (Flowerdew, 2008: 58). The referent of the *problem* is a Situation and it is shifted to a future problem in the following segment, thus a shift is from [Situation to (future) Problem]. For example, in the first example in Concordance 9, which is in the US corpus, the referent of *problem* in the preceding segment is a Situation, 'students join in the prayer'; it is shifted to a future problem (signaled by *force*, *unwilling*).

However, *problem* in non-causal relation occurred only in JICLE, and its occurrences were three times more than *problem* in causal relation, as shown below:

Concordance 11: *Problem* in non-causal relation for th-be-N

ch as computers. In this situation, it have a big **problem*** from bring up our Japan. But in pertly,
 cell-phone for children. It is very difficult **problem***; I understand why their parents provide
 freedm of expression. This is very difficult **problem*** and doesn't have the end of the argument.
 right to choose the goods. This is the serious **problem*** rather than genetic-engineered food's
 onsider how to say in English. I think that is a **problem***. I wonder what is the best solution of
 examination of Japanese university. It is a big **problem***. In order to increase the number of
 judged by only one standard. This is very big **problem***; it should be judged more values. Because
 y f ew people can do these perfect. It is serious **problem***. School education should improve their
 aren't understand well. I think this is serious **Problem***, and we have to solve this problem. Ma
 ld not watch them. This difference is difficult **problem***. I think the one of solutions is the
 aster v is very important, but that is difficult **Problem*** and we have to think the way to master

The *be* verb is copula joining the subject and the complement, and has a stative meaning. *Problem*, meanwhile, refers back to a situation and it is evaluated as a problem. Without explaining what is a problem, the shift of the discourse is from a Situation to a Response (signaled by *solution*, *increase*, *judge*), thus a shift is from [Situation to Response]. The shift is perceived as abrupt without stating what problem will arise from the situation.

To summarize, *problem* for the th-be-N pattern in US was all in causal relation with the *be* verb having the causative meaning, and constructing a [Situation to (future) Problem] discourse. The same usage of *problem* is found in JICLE. However, most of the *problems* in JICLE were in non-causal relation, with the *be* verb having a stative meaning, and shifted the discourse from [Situation to Response].

5.3 Summary of the Results Usal Relation

This section summarizes the findings as it provides insight into the three research questions.

5.3.1 Answers to Three Research Questions

Question 1: Is *problem* used for causal relation in NNS essays as much as in NS essays?

The use of *problem* in causal relation was similar in the two corpora in terms of frequencies, at the ratio of 22:22 (normalized at 11:15, LL 0.95). However, in JICLE less than half of the occurrences of *problem* were in causal relation at 23 in 53, whereas nearly all the occurrences of *problem* were in causal relation at 23 in 25. The high frequency of *problem* appearing in non-causal relation in JICLE was accounted for by the use of non-causative verbs. For thN+v, the verbs were often stative verbs; for v+thN, the verbs were often mental verbs (e.g., *bother*;

tell, think) accompanying the agent subject (e.g., *we*); and for th-be-N, the *be* verb was often copula that joined the subject and the complement as shown in Table 2 below:

Table 2. Non-causative verbs with *problem* in non-causal relation in JICLE and US

Syntactic patterns	JICLE	US
thN+v	provide, last, consist, remain, happen (3) be (2)	exist
th-N v+thN (agent subject)	bother, tell, notice, teach, consider, think (2), look at, take, leave	-
v+thN (inanimate subject)	-	understand, examine
InPhrase-thN	-	-
th-be-N	be (10), have	-

Note. Figures after noun (e.g., 2, 3) are raw frequencies. All the other verbs occurred only once.

Question 2: Is there difference in the way causation is expressed in the two corpora?

Problem for a certain shell syntactic pattern (i.e., v+thN, th-be-N, InPhrase-thN) was mostly in the same causal category in the two corpora, but *problem* for thN+v was in different causal category:

- (1) *Problem* for v+thN (e.g., ... *solve the problem*) was involved in the Reason-Result causal category.
- (2) *Problem* for th-be-N (e.g., *This is a problem*) was in Reason-Result causal category.
- (3) *Problem* for InPhrase-thN (e.g., *to solve the problem*) was in the Means-Purpose causal category.
- (4) *Problem* for thN+v was in Reason-Result (e.g., *The problem is going to be solved*), while in US it was in Means-Result (e.g., *The problem can be solved only by providing...*).

The difference for thN+V seems attributed to the students' familiarity with the lexico-grammatical pattern for *problem* of '*problem + (can) + passive verb + by-doing*', but in general, there was not so much difference in the use of causal relation in JICLE and US.

Question 3: Is there a correlation between causal relation and Problem-Solution expressed by *problem* in the two corpora?

While *problem* for the same shell syntactic pattern was mostly in the same causal category, as discussed in Question 2, another question is whether or not *problem* in the same causal categories functions to form the same Problem-Solution pattern. In the present study, there were three types of correlation between causal categories and the Problem-Solution patterns:

The first type was when *problem* was in the same causal category, expressed in the same lexico-grammatical pattern, and formed the same Problem-Solution pattern:

- (1) *Problem* for InPhrase-thN was in Means-Purpose occurring in the lexico-grammatical phrase of '*to solve the problem*', and constructed the [Problem to Response] pattern in both corpora.
- (2) *Problem* for th-be-N was in Reason-Result occurring in the lexico-grammatical pattern of '*This is a problem*', and constructed the [Situation to (future) Problem] in both corpora.

In the second type, *problem* was in the same causal category, but Problem-Solution was different in the two corpora, mostly influenced by the subject type:

- (3) *Problem* for v+thN was in Reason-Result in both corpora. In US, with the inanimate subject *problem* occurred in the sentence form of 'inanimate subject + v + *problem*' (e.g., *This bill only stalls the problem*), and formed a [Response to Evaluation] discourse. In JICLE, the subject was agent, and *problem* occurred in 'agent + v + *problem*' (e.g., *The government office should set about this problem*) formed a [Problem to (sudden) Response] discourse.

In the third type, *problem* was in different causal categories in the two corpora, occurring in different lexico-grammatical patterns and Problem-Solution was also different:

- (4) For thN+v, *problem* in US was in Means-Result expressed in the '*problem + (can) + passive verb + by-doing*' lexico-grammatical pattern and constructed a [Problem to Response] text pattern. In JICLE, *problem* was involved in Reason-Result, occurring in no regular lexico-grammatical pattern, and there was no regular

Problem-Solution pattern.

These results indicate that causal relation has to do with the Problem-Solution text pattern, but more specifically, how causal relation is expressed by *problem* in the sentence (e.g., the subject type, lexico-grammatical patterning) affects Problem-Solution.

5.3.2 Use of Implicit Causative Verbs

A finding related to causality is difference in the use of implicit verbs in the two corpora. While the US students used a wide range of these verbs, the JICLE students lacked vocabulary. In the case of v+thN, the lack of implicit verbs in JICLE was related to the preferred use of the agent subject (*we, I*) that often entailed the use of mental verbs, and for the InPhrase-thN syntactic type, a lack of implicit verbs in JICLE was exhibited in the repetition of *solve* and incorrect selection of verbs (e.g., *resolve**, *solute**), as shown in Table 3, below:

Table 3. Implicit verbs in JICLE and US

Syntactic patterns	Implicit causative verbs in JICLE (24)	Implicit causative verbs in US (23)
thN+v	solved (2) make	curtail, deal with, save, compound
v+thN (S=agent)	overcome, (not) solve, set about*, do* (2),	-
th-N		
v+thN (S=inanimate)	(not) solve (3)	eliminate, deal with, solve, exacerbate, stall, make
InPhrase-thN	solve (2), resolve*, solve about*, solute*	alleviate, curb, put an end, reduce, solve (2)

Note. The numbers e.g., 2, 3 are raw frequencies. All the other verbs occurred only once.

Implicit verbs can function as a two-way signal and allow a subtle and smooth shift from Problem to Solution. In JICLE, with the lack of implicit verbs, the discourse shift was often made by other linguistic means, such as the use of *we* and *I* and frequent use of connectives. However, the use of these devices often lead to different Problem-Solution patterns, indicating a benefit of using implicit verbs.

6. Pedagogical Implications

The present study examined the use of *problem* as a causative device, as well as a shell noun, in order to find to what extent causal relation is used to construct Problem-Solution in NNS and NS argumentation essays, within the JICLE and the US corpora, respectively. Correlation between causal relation and Problem-Solution was exhibited in the way causal relation involving *problem* was realized in lexico-grammatical patterns. Conversely, use of *problem* in random lexico-grammatical patterns in JICLE often resulted in irregular Problem-Solution patterns. Although the JICLE students constructed the Problem-Solution patterns by relying on the means that they were most comfortable with, such as the use of explicit discourse markers (e.g., conjunctive adverbs, agent subject *we*), these often lead to a sudden shift of the discourse. The findings suggest a need for more explicit and in-depth teaching of causality in commonly used lexico-grammatical patterns for the writing of the Problem-Solution text pattern. More specifically, Japanese students need to be taught the following: a) vocabulary of implicit causative verbs, b) use of inanimate subjects and rheme-theme development pattern, and c) use of the *be* verb in the causative meaning for some syntactic patterns.

The first point to teach is the use of implicit causative verbs. The JICLE students seemed to lack this knowledge, despite the important function of these verbs as a two-way signal that can direct the discourse from Problem to Solution. High frequency implicit causative verbs should be identified and taught with collocational lexico-grammatical patterns; for example, *curtail* occurred in the form of 'passive verb + *by-ing*' (e.g., *This problem could easily be curtailed by lowering...*) for the Means-Result causal relation.

The second point concerns the rheme-theme development pattern. It seemed difficult for the JICLE students to refer to the preceding segment and connect it to the following segment, as exhibited in the lack of the use of an inanimate subject, and instead the preferred use of an agent subject for v+thN. The rheme-theme development pattern forms a cohesion in the text and it should be taught more, along with the use of an inanimate subject.

The third point is about the use of the *be_verb*. The data illustrated a preferred use of the *be* verb in the semantics of causative verb (e.g., *cause, become*) in US, as in the use of *is* in '*It is a problem*', but the *be* verb in JICLE was used more often to express the existence of a problem (see Section 5.2.4). The preferred use of the *be* verb in causal relation in US was also in '*The problem is not financial*', where it had the meaning of to arise from (see

Section 5.2.1). These examples suggest that future studies should explore how NNS students express causal relation through the *be* verb.

7. Conclusion

In the dearth of teaching and literature about NNS students' use of the Problem-Solution text pattern, the present study investigated this pattern from the perspective of causal relation, taking the clause relational approach. The study was conducted focusing on the noun *problem*, which is a causative device as well as shell noun (Schmid, 2000), which can mark a discourse occurring in the shell syntactic patterns. There was not so much difference in the frequency of *problem* in causal relation and in the types of causal category employed in the two corpora, but difference was identified in the way causal categories were expressed in lexico-grammatical patterns. The present study pointed to what was lacking in the NNS student essays in order for them to use causal relations as the NS students did (see Section 6).

This study has limitations. In future inquiries, it will be crucial that the findings of the present study be tested with larger corpora in order for them to be either supported or negated. Furthermore, while the present study investigated causal relation involving *problem*, research will need to further extend the analysis to encompass additional causal language features, going beyond the sole focus on the term *problem*. The Problem-Solution text pattern is a main organizing principle to be used in argumentation essays, and an important consideration in the teaching of argumentation essays. For these reasons, it is imperative that future studies pursue this line of inquiry.

Acknowledgements

This work is supported by a JSPS KAKENHI Grant Number 21K13001.

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Notes

Note 1. In Tahara 2020, the term metadiscursive noun is used for shell noun.

Note 2. Problem in the first concordance is a quote and counted as being in non-causal relation.

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