TRANSITIVE AND INTRANSITIVE CONSTRUCTIONS IN JAPANESE AND ENGLISH: A PSYCHOLINGUISTIC STUDY

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Transitivity has been extensively researched from a semantic point of view (e.g., Hopper & Thompson, 1980). Although little has been said about a prototypical intransitive construction, it has been suggested that verbs that denote actions with an agent and a patient/theme cannot be intransitive (e.g., Guerssel, 1985). However, it has been observed that some languages, including Japanese, have intransitive verbs for actions that clearly involve an animate agent and a patient/theme, such as 'arresting' (e.g., Pardeshi, 2008). This dissertation thus attempts to understand how causality is differentially interpreted from transitive and intransitive constructions, including non-prototypical intransitive verbs, by rating and priming experiments conducted in both English and Japanese. In Experiment 1, participants (native English and Japanese speakers, 20 each) were asked to read sentence pairs with transitive and intransitive verbs in their native language and rate how likely they thought it was that the animate entity mentioned in the sentence pair was responsible for the event. The results show that in Japanese, the sentences with agent-implying intransitive verbs were rated closer to those with transitive verbs and significantly higher than non-agent-implying intransitive verbs. In Experiment 2, participants (42 native English speakers and 46 native Japanese speakers) read the equivalent sentence pairs and answered a question that asked whether the instrument mentioned in the sentences could cause the event to happen. It was hypothesized that participants would respond

faster to the transitive sentence than the intransitive sentences, because it was assumed that the transitive sentences would lead the participants to evoke an agent and thus an instrument whereas the intransitive sentences would not. The results, however, were not consistent with the hypotheses in that the agent-implying verb pairs (both transitive and intransitive) were responded to significantly slower than the non-agent-implying verb pairs. The results are explained through (1) the preference to focus on sub-event (change of state) rather than the super-event (causation) in Japanese, and (2) the telicity and punctuality of the agent-implying verbs.

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KEY TO ABBREVIATIONS

3SG	third person singular
ACC	accusative case
adj	adjective
CAUS.	causative
intr.	intransitive verb
NOM	nominative case
PART	partitive case
PASS	passive
PAST	past tense
PRES.	present
TOP	topic
tr.	Transitive verb

PREFACE

Transitive and intransitive constructions have interested me since I studied Japanese as a third language. This study would not have been possible without my committee members. I would like to express my heartfelt gratitude to my advisor, Yasuhiro Shirai, who has been helping me with my research since my undergraduate years. It was Professor Shirai who further stimulated my interests in Japanese and Japanese linguistics.

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Finally I would like to express my gratitude to my family and my fiancé, who never cease to give me love and the power to move on.

1.0 BACKGROUND

The transitive and intransitive constructions are the two most basic sentence structures in most human languages. While we are using the terms “transitive” and “intransitive” as if they have very clear and simple definitions, we find that this is not the case if we delve deeper into the issue.

Traditionally, transitivity is defined semantically (Kittila, 2002). That is, an event is said to be transitive if it involves a transfer of energy from one participant to another. For example, *he killed the woman* would be a typical transitive event, because it typically involves a transfer of energy from the subject *he* to the object *the woman*, and the object undergoes a change from being alive to dead.

The formal approach, on the other hand, adopts a completely different view. In the formal approach, the number of arguments is the determining factor in whether a sentence is transitive or not: a transitive sentence has two arguments, namely a subject and an object, and an intransitive sentence only has a subject (e.g., Lazard, 1998). It disregards the semantics of the events; in English, both *he killed the woman* and *Susan likes roses* are transitive sentences, although in the semantic approach the second sentence would not be considered as transitive because there is no transfer of energy to or change of state of the object.

One interesting fact about transitivity is that there are mismatches between semantic transitivity and syntactic transitivity across languages. In other words, the range of situations that

can be described by the so-called transitive case frame in one language may not be the same as the range in another language. Kittila (2002) gave examples from various languages and discusses what a prototypical transitive construction is in each of those languages. For example, if we compare the German sentences in (1) and (2) with the Finnish sentences in (3) and (4) given in Kittila (2002), we can see that German and Finnish differ.

(1) er töte-te den Mann
He.NOM kill-PAST.3SG the.ACC man
"He killed the man"

(2) er betrachte-te den Mann
He.NOM look.at-PAST.3SG the.ACC man
"He looked at the man"

(3) hän tappo-i miehe-n
s/he.NOM kill.PAST-3SG man-ACC
"He killed the man"

(4) hän katso-i mies-tä
s/he.NOM see-PAST.3SG man-PART
"He looked at the man"

These examples show that whereas German uses the same accusative marking for both sentences, Finnish uses the accusative marking for (3) and the partitive marking for (4). Thus we can see that there are cross-linguistic differences in the mapping of semantic transitivity and syntactic transitivity (i.e., case markings): the German transitive construction is used for both situations, but the Finnish transitive construction is only used for the situation of relatively high semantic transitivity (i.e., the action of killing), not for the situation of relatively low semantic

transitivity (i.e., the action of looking). In other words, transitive constructions in both languages are prototypically used with prototypical transitive verbs such as *kill* (as the transitive case frame is often defined as the case frame that is used with prototypical transitive verbs), but they differ in the marginal uses (i.e., non-prototypical situations such as *look*).

In fact, this cross-linguistic difference can be so substantial that languages may even use different parts of speech to describe the same situation. For example, in English we would say *John likes Mary*, which, from the formal approach, has a transitive argument structure with the verb *like*. In Japanese, however, one would say *jon-wa marii-ga suki da* 'John-TOP Mary-NOM like (adj.)', where *suki* is an adjective and the sentence has an adjectival construction.

Moreover, different languages have different restrictions on the use of the transitive and intransitive constructions. Some languages such as Japanese and Marathi allow the change of state that must be caused by an animate agent to be described intransitively. For example, whereas English has only a transitive verb for the action of finding, Japanese has both transitive and intransitive counterparts for the action. It follows that English speakers would be unable to describe the action using an intransitive verb. They would have to resort to the passive construction if they prefer to background the agent (e.g., *the book was found*).

If what defines the transitive and intransitive constructions is not consistent across languages, do we understand agentivity, which is the major difference between the transitive and the intransitive construction, in the same way in different languages? This is the question that this study attempts to address.

Despite all of these differences that we have observed in the use of transitive and intransitive constructions in different languages, many linguistic theories treat their definitions as if they are universal. In generative approaches, for example, each verb specifies its theta-grid –

that is, which thematic role(s) it selects – in the lexicon. The thematic roles, specified in the theta-grid, are projected onto the syntactic structure, which will be interpreted through linking rules. Since the Logical Form (LF) level is universal (Hornstein, 1995) and 'transitive' and 'intransitive' are defined at the syntactic level, the assignment of theta-roles such as agent and patient will only differ if the specifications in the theta-grid are different. However, the fact that an intransitive (unaccusative) verb only has one theta-role (i.e., patient or theme) would still be universal. In fact, even some functional approaches, such as Langacker's (2008) Cognitive Grammar, do not address the differences concerning agentivity across languages. This will be discussed in Chapter 2.

The present study focuses on two languages, namely English and Japanese. These two languages were chosen because they exhibit many differences in terms of their use of the transitive and intransitive constructions, which will also be explained in Chapter 2.

Because the terms 'transitive construction' and 'intransitive construction' can have different meanings depending on the approach (i.e., syntactic versus semantic), it is important to define these terms in this dissertation for the ease of explanation. In this dissertation, the 'transitive' construction is defined as the case frame that is used with the most prototypical transitive verbs, such as *kill, destroy,* and *break* (Tsunoda, 1985), in that language. In the case of English, the NOM-ACC case frame is the English transitive construction. In other words, any sentence that has the form [NP V NP] is treated as a transitive sentence. In the case of Japanese, the transitive construction has the form of [NP-*ga*/wa NP-*o* V], where *ga* is the nominative case marker, *wa* is the topic marker, and *o* is the accusative case marker. *Ga* is often replaced by *wa* in natural Japanese discourse because the noun phrase that bears the nominative case marker in a sentence is usually old information that becomes the topic of the sentence. The intransitive

construction is the construction that only accommodates one noun phrase. The English intransitive construction then has the structure [NP V] and the Japanese intransitive construction has the structure [NP-*ga/wa* V].

This dissertation is organized as follows. Chapter 2 introduces the formal and functional approaches to transitivity, and the differences among languages, particularly between English and Japanese, regarding the use of the transitive and intransitive constructions. Chapter 3 describes two experiments, namely the rating experiment and the priming experiment, and reports the results of both experiments. Chapter 4 discusses the results of the studies in relation to the research questions and previous research. Chapter 5 provides the conclusion and directions for future research.

2.0 LITERATURE REVIEW

In this chapter, I will review the different linguistic approaches to the issue of transitivity, as well as empirical studies that examine the use of the transitive and intransitive constructions in different languages.

2.1 FORMAL APPROACH TO TRANSITIVITY

Generative grammar defines the transitive and intransitive constructions based on the number of arguments in a sentence. In this approach, each verb in the lexicon has its own theta grid, which specifies the number and the type of thematic roles the verb can assign (e.g., Carnie, 2006; Chomsky, 1981; Guerssel, Hale, Laughren, Levin, & White Eagle, 1985; Haegemen, 1993). The original proposal was that syntactic structures are generated based on the theta grids of the verbs, and that they go through Logical Form for interpretation (e.g., Carnie, 2006). For instance, the verb *put* has the categorical features [+V, -N], specifying that it is a verb, and the theta grid [AGENT, THEME, GOAL] (Juffs, 1996). Therefore, we obtain a sentence like *John put the book on the table*, and the sentence has three arguments, with *John* being the agent, *the book* being the theme, and *the table* being the goal. It should be noted, however, that there are also disagreements within the framework about the notion of theta roles (e.g., Jackendoff, 1985).

Researchers who adopt this approach also made efforts to understand how syntactic surface structures map onto semantic structures. For example, Pinker (1989) proposed that linking rules, which could be universal and innate, help children learn that the subject of a sentence is an agent, which is true for most transitive sentences.

Regarding intransitive verbs, it has been proposed that there are two kinds of intransitive verbs, namely unergative verbs and unaccusative verbs, and that they have different syntactic structures. Unergative verbs, such as *run, walk, and laugh*, involve a person or an animate entity performing the action. Unaccusative verbs, on the other hand, describe a change of state, and the entity that occupies the subject position usually does not have the ability to perform the action (i.e., is a non-agent). Examples of unaccusative verbs are *break* (intransitive), *appear*, and *melt* (intransitive).

Perlmutter (1978), and later Burzio (1986), proposed that these two kinds of verbs have different deep structures. They argued that unergative verbs have a theta grid with an external argument, whereas unaccusative verbs have a theta grid with an internal argument that will occupy the subject position of the surface sentence through movement. Because of this difference in syntactic structures, they have different meanings: the unergative one has a volitional interpretation, and the unaccusative one has a change-of-state interpretation.

Some researchers under this framework are interested in the origin of the theta grids of verbs. For example, Levin (1993) proposed several groups of verbs that have transitive/inchoative alternations in English. These groups include ROLL VERBS (e.g., *roll*, *slide*, *twirl*), BREAK VERBS (e.g., *chip*, *crack*, *tear*), and VERBS OF CHANGE OF STATE (e.g., *freeze*, *grow*, *increase*). In contrast, groups of verbs that do not allow this alternation include VERBS OF CUTTING (e.g, *saw*, *cut*, *drill*), VERBS OF TOUCHING (e.g., *kiss*, *pat*,

tickle), and VERBS OF KILLING (e.g., murder, assassinate, slaughter). Guerssel, Hale, Laughren, Levin, and White Eagle (1985) looked at four typologically distinct languages, namely English, Berber, Warlpiri, and Winnebago. They explained that a verb such as *break* basically denotes a change of state, and the transitive use of the verb only adds a cause to it. On the other hand, a verb like *cut* involves the use of an instrument, and inevitably requires the existence of an agent. They therefore claim that the verb *cut*[1] "would never be found in the inchoative construction" (Levin, 1993, p. 10). In other words, the verb *cut* would never be intransitive. A similar explanation can be used for the lack of intransitive counterpart for the VERBS OF TOUCHING, since these verbs inevitably involve the body parts of an animate entity.

However, cross-linguistic variations are often not accounted for in this approach. Cross-linguistic differences are explained through language-specific differences in the number of arguments a verb assigns in different languages. For example, English has the verb *catch*, which is always transitive, but as we will see in the next section, some languages, such as Japanese, have an intransitive counterpart for *catch*, which only selects the object being caught to be the subject of the sentence. One could say that this is language-specific: the English *catch* has a theta-grid with two arguments, and Japanese just happens to have an intransitive verb for it. However, this is problematic, because if our conceptualization of the world is universal, as suggested by Guerssel et al. (1985) (i.e., all of us perceive the action of catching to involve two participants), and the way of understanding the theta-grid of a given verb is also universal (i.e., we understand that the action of catching involves two participants and therefore we know that

[1] Note that Japanese has a transitve-intransitive pair of the verb 'cut': *kiru/kireru*. This will be discussed extensively in Section 2.3.

the verb *catch* must have two arguments), we should not see this difference in theta-grids across languages.

In fact, theta theory was also questioned by many (e.g., Bowerman, 1988; Juffs, 1996; Pinker, 1979) in relation to language acquisition. Juffs (1996) claimed that the theory is not enough to explain how children acquire the fact that some verbs allow alternations while others do not. For example, in English one can say *He loaded the trucks with bricks* or *He loaded the bricks onto the truck*, but one can only say *He poured the water into the glass*, not **He poured the glass with water*. A similar situation occurs in the transitive/intransitive alternation: both *The sun melted the ice* and *The ice melted* are grammatical, whereas only *John sweated* (not **The sun sweated John*) is grammatical. Juffs (1996) argued that the acquisition mechanism of these alternations is different from that of past tense morphology (i.e., children overgeneralize *-ed* to irregular verbs, such as *runned* instead of *ran*), because in the latter case children would eventually hear the correct form (i.e., *ran*), which will remove the erroneous form from their grammar. In contrast, in the case of verb alternation, the transitive and intransitive constructions can co-exist without ruling one another out. He therefore suggested that there must be some 'internal resources' (p. 183) that guide children to acquire these alternations, such that they know which verbs can alternate and which cannot.

2.1.1 Decomposition of verb meanings

Seeing the inadequacies of the theta theory, Jackendoff (1985, 1987) introduced the notion of a conceptual structure, which has access to both the linguistic system and the cognitive system. The conceptual structure consists of a number of innate rules, which are in turn made up of 'primitive conceptual categories' (1987, p. 375), such as EVENT, PLACE, THING, PATH,

etc. For example, for the sentence *John went in to the room*, the conceptual structure would look like: [$_{Event}$ GO ([$_{Thing}$ JOHN], [$_{Path}$ TO ([$_{Place}$ IN ([$_{Thing}$ ROOM])])])].

Under this theory, the conceptual structure is specified in the verb. For example, the lexical entry for the verb *enter* has the specifications shown in (5):

(5) enter
[- N, + V]
[_____ (NP_j)]
[$_{Event}$ GO ([$_{Thing}$]$_i$, [$_{Path}$ TO ([$_{Place}$ IN ([$_{Thing}$]$_j$)])])] (Jackendoff, 1987, p. 377)

As we can see from (5), the verb not only specifies the argument structure (i.e., [_____ (NP_j)]), but also specifies the conceptual structure, as shown in the fourth line in (5).

Juffs (1996) further developed this theory to explain how the acquisition of alternations is facilitated. For example, he suggested that a verb containing a PATH element will allow the argument structure exemplified by *John poured the water into the glass*, but not *John poured the glass with water*. On the other hand, a verb containing a STATE element will allow the opposite – that is, *John covered the bed with a sheet*, but not *John covered a sheet onto the bed*. Verbs that allow alternations (e.g., *load*) will have an empty slot in the conceptual structure, which will be filled by either PATH or STATE, depending on the intention of the speaker.

But how do we develop such an argument structure as well as a conceptual structure that is associated with a particular verb? Jackendoff (1985) proposed that we have conceptual well-formedness rules (WFRs) that are innate. These conceptual well-formedness rules, together with the inputs from the visual system, motor system, etc, create a conceptual structure of a 'projected world' (p. 28) (see Figure 1). The projected world is the world that we experience; it may differ from the true world, and because of that the projected world is subjective. However, Jackendoff argued that, although our conceptual structure is based on the subjective projected world rather than the real world, it would not pose a problem in communication, because the processes we use

to create the projected world in each of us are the same (p. 30). In other words, although the projected world is subjective, we end up creating very similar projected worlds through the use of the same organizing processes. Jackendoff's ideas are summarized in Figure 1 (adapted from 1983, p. 21).

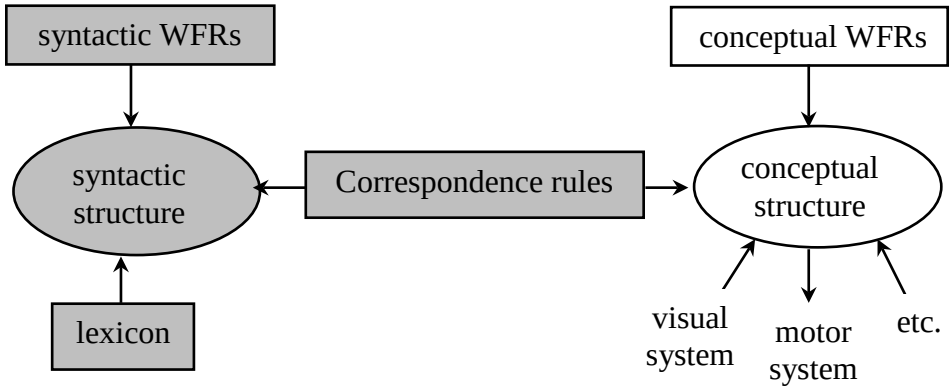


Figure 1. The organization of the language system under Jackendoff's theory (the cells in grey are part of the linguistic system; the module for phonetic representation is not shown here)

If it is really the case that we perceive the world in similar ways and differ only in the way we describe them, we would still need to spell out the crosslinguistic differences in the syntax-semantics mappings we observed, especially regarding transitive/intransitive alternations. In Jackendoff's terms, if the conceptual WFRs are the same for all human beings regardless of their native tongue, then there must be cross-linguistic differences in the correspondence rules.

To summarize, the formal approach defines transitivity in terms of the number of arguments associated with a verb, which is in turn determined by the theta-grid of the verb specified in the lexicon. It has also been argued that our universal conceptualization of the event is responsible for how we understand the number of arguments, and thus theta-grids, of different verbs. However, these proposals fail to account for cross-linguistic variations or for tendencies in what can be, and are more often, lexicalized as transitive or intransitive verbs. Decomposition of

verb meanings has been proposed to supplement these inadequacies, but we are still bound to spell out the differences between languages regarding what can be described using transitive or intransitive constructions.

2.2 FUNCTIONAL APPROACHES TO TRANSITIVITY

This section turns our attention to the functional approaches to transitivity. Before reviewing two functional approaches, Construction Grammar and Cognitive Grammar, I will first discuss transitivity from a more general semantic perspective.

2.2.1 Transitivity from a semantic perspective

In opposition to syntactic transitivity, which has a clear boundary between transitive and intransitive constructions, Hopper and Thompson (1980) proposed that semantic transitivity is a continuum measured by a number of components (Table 1). As an example given by Hopper and Thompson, *Jerry knocked Sam down* is higher in transitivity than *Jerry likes beer*, because the former is an action, is telic, punctual, and has high affectedness and individuation of the object, whereas the latter has a low value in each of these components. It is generally agreed that the most transitive, or the prototypical transitive construction in every language, would be the case frame that is used for an event that has a 'high' value for all the parameters in a particular language. A typical event would be an action such as 'killing' or 'breaking,' which has one participant who transfers a force to another participant, and a second participant who undergoes a

complete change of state. In English, for example, the transitive case frame would be [NP-nom V NP-acc], as in *John killed Mary*.

Table 1. Hopper and Thompson's (1980) components of transitivity

	HIGH	LOW
A. PARTICIPANTS	2 or more participants, A and O	1 participant
B. KINESIS	action	non-action
C. ASPECT	telic	atelic
D. PUNCTUALITY	punctual	non-punctual
E. VOLITIONALITY	volitional	non-volitional
F. AFFIRMATION	affirmative	negative
G. MODE	realis	irrealis
H. AGENCY	A high in potency	A low in potency
I. AFFECTEDNESS OF O	O totally affected	O not affected
J. INDIVIDUATION OF O	O highly individuated	O non-individuated

This semantic analysis is useful in helping us define a prototypical transitive sentence. This will be discussed further in Chapter 4. In the following, two functional approaches, namely Construction Grammar and Cognitive Grammar, will be discussed.

2.2.2 Construction Grammar

In Construction Grammar, everything from a morpheme (e.g., plural *-s*) to a general syntactic structure (e.g., the transitive construction) is treated as a construction (Croft, 2001). This is in contrast to Generative Grammar, which distinguishes between lexical items and syntactic rules. There is no distinction between surface and deep structures in Construction Grammar, either. Instead, constructions are directly mapped onto meanings. For example, a ditransitive construction, such as *John baked Mary a cake*, has the meaning of one entity (‘John’) causing (‘cake’) another entity (‘Mary’) to receive something (‘a cake’) (Goldberg, 1995). In this

theory, language users have an abstract construction [NP_1 V NP_2 NP_3] stored, and it is linked to the meaning 'NP_1 transferring NP_2 to NP_3.' This linkage between the abstract construction and the meaning is formed through receiving input of similar sentences (e.g., *I gave him the book, she handed her dog some leftovers*, etc.). The construction is eventually abstracted to become a construction with empty slots in which certain NPs can be placed. What type of NPs can fit into which slot is also acquired through abstraction. For example, since most (if not all) ditransitive sentences in the input have an animate NP_2, language users find it less acceptable for the second NP to be inanimate (e.g., *#she handed the box a book*) (e.g., Tomasello, 2003). It also follows that syntactic constructions are no different from other lexical items such as nouns, verbs, etc. in the sense that syntactic constructions are also directly linked to some kind of meaning.

Moreover, in this approach, constructions can be language-specific. That is, constructions present in one language are not necessarily also present in another language. For example, the plural construction in English [noun-s] does not exist in Chinese.[2] Following this argument, the transitive construction in English is not necessarily equal to the transitive construction in Japanese, in the sense that the English transitive construction may cover a different range of situations than the Japanese transitive construction does. As illustrated above, the English transitive construction covers a wide range of situations, including those with low semantic transitivity such as *John likes Mary*. In Japanese, an adjectival construction would be used for this situation (i.e., *Mari-ga suki-da* '(someone) like (adj)' Mary). Similar cross-linguistic differences can also be found in the intransitive constructions, which will be discussed further later in this chapter.

[2] Although Chinese does have the plural marker *men*, its uses are very restricted and it can only attach to pronouns (e.g., *ta* 'he/she) and some human nouns (e.g., *tongxue-men* 'students').

The advantage of construction grammar over theta theory is that the former is able to capture both universal similarities and variations across languages. For example, in the case of transitivity, Croft (2001) proposed a semantic map for different situation types, as shown in Figure 2.

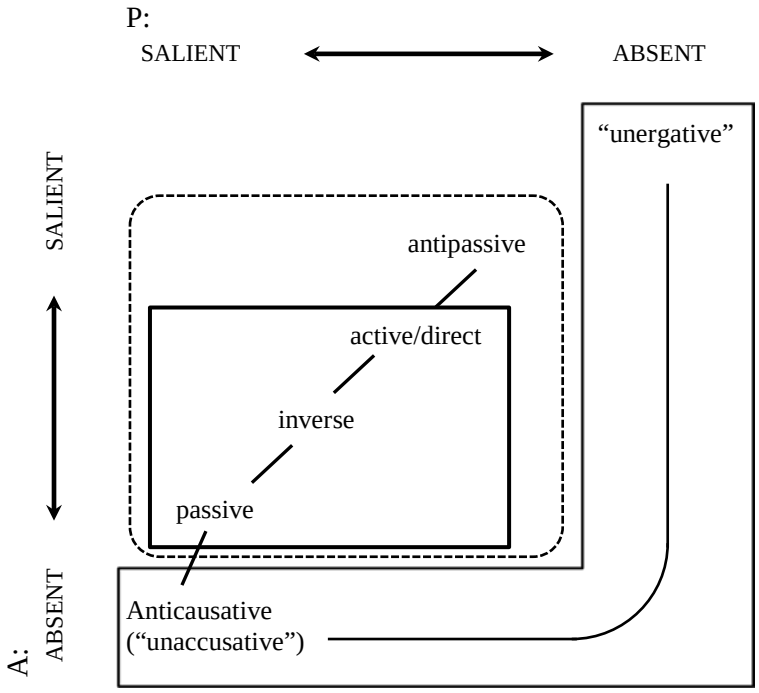


Figure 2. The conceptual space for voice and transitivity (adapted from Croft, 2001, p. 317)

Figure 2 illustrates the conceptual space for transitivity and the syntactic structures used based on the conceptual space. For instance, if the patient is salient and the agent is suppressed, a passive construction would be used. Linguistic universals are therefore captured through the postulation that all linguistic constructions in a particular domain (e.g., argument structure) are based on the same conceptual space (e.g., the saliency of the agent and the patient). Linguistic

diversity, on the other hand, is explained in terms of different constructions occupying different areas of the same semantic map.

The advantage of Construction Grammar is that it allows fuzziness at the boundary regarding the mapping of syntax and semantics. For example, the basic factors (i.e., saliency of agent and patient) shown in Figure 2 may be true for all languages, but different languages may have different 'area sizes' for each construction. The anticausative/unergative area may be larger for Japanese than for English because Japanese allows more types of events to be described intransitively. However, Construction Grammar is still insufficient for pinpointing the differences: how large, for example, can the anticausative/unergative area become? Although this is not the main question of this dissertation, I will address this issue in the Discussion section in Chapter 4.

2.2.3 Cognitive Grammar

Another functional approach that helps us understand the syntax/semantics mapping in transitivity is Cognitive Grammar, proposed by Langacker (1986; 2008). Cognitive Grammar provides more semantic characterizations that generative grammarians seldom address (but see Jackendoff, 1990). It is concerned with the relationship between conceptualization and language form, which will be the objective of the present study. Before discussing how transitive and intransitive constructions are described in Cognitive Grammar, I will first discuss two of the most relevant construal dimensions suggested by Langacker (2008), namely 'focusing' and 'prominence.'

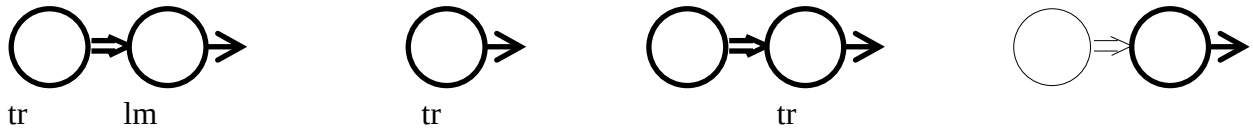
In Cognitive Grammar, the meaning of an expression is closely associated with how the speaker construes an event, and the construal is grounded in general cognitive abilities. As Croft

(1990) claims, any event can be described along a causative-inchoative-stative continuum. Which is uttered depends on what the speaker wants to focus on and to which elements of the event he/she wants to give prominence. In describing John opening a door, it is clear that the causative sentence *John opened the door* gives prominence to both the causer *John* and the causee *the door*, and focuses on what John does, whereas the inchoative sentence *the door opened* only gives focuses on *the door* and the change of state, and does not give prominence to the causative nature of the event. The stative sentence *the door was open* only focuses on the final state of the door.

Some of the basic terms involved in event construal in Cognitive Grammar are scope, base, profile, trajectory, and landmark. The scope of an expression is 'the conceptual content appearing in the subjective viewing frame inherent in its apprehension' (Langacker, 2008, p. 63). The base is a selection of 'a certain body of conceptual content' (p. 66). It can be maximally the entire scope, or narrowly only certain part of the scope. Langacker also metaphorically describes the base as something being 'onstage.' A profile is a substructure of the base that receives attention. A trajectory is an entity that receives primary focus, and a landmark is one that receives secondary focus. In the case of the word *elbow*, which Langacker uses as an example to illustrate these concepts, the human body is the scope, the arm is the base because it is impossible to talk about an elbow without evoking the idea of an arm, and the elbow is the part that gets the profile.

Now we turn back to the constructions of interest. The intransitive construction and the passive construction, according to Langacker (2008), differ in terms of profiling. He claims that the intransitive construction profiles the event as a 'thematic process' and does not mention the force or the agent that causes the change (p. 385), whereas the passive construction profiles both

the theme and the agent, but does not give 'prominence' to the agent. In other words, in an intransitive construction, the causer and the transfer of force do not even form part of the base, whereas in a passive construction the causer and transfer of force are part of the base and are also profiled. This is illustrated in Figure 3, which is adapted from Langacker (2008). The profiling of the transitive construction and the middle construction are also included for comparison.



(a) transitive (b) intransitive (c) passive (d) middle

Figure 3. Profiling of different constructions (adapted from Langacker, 2008, p. 385; thickened lines indicate the aspect of the event being profiled, the simple arrows indicate the change of state, the double arrows represent the exertion of force, "tr" stands for "trajectory", and "lm" stands for "landmark.")

From Figure 3 we can see the image schemas of the different constructions. A transitive construction such as *John killed Mary* has *John* as the trajectory, who exerts a force on *Mary* (illustrated by the double arrow), who is the landmark and undergoes a change of state from being alive to dead (illustrated by the single arrow), and the entire process is profiled. The intransitive construction is the same as the passive construction in that they both give prominence or foreground to the entity that undergoes changes. They differ in that the intransitive construction does not evoke an agent, whereas the passive construction does evoke an agent or a causer and profile it. On the other hand, Langacker explains, a middle construction such as *the door opened easily* does evoke an agent, because the adverb *easily* implies a

volitional exertion of force by an agent; thus, it is part of the 'onstage' element, but it is not profiled.

This characterization seems perfect for English intransitive verbs, since unergative verbs (e.g., *run*, *laugh*) that describe the mostly volitional action of an agent do not involve an external causer, and English unaccusative verbs also do not imply an agent. However, Japanese agent-implying unaccusative verbs (e.g., *tsukamaru* 'be caught'), which will be discussed in the next section, pose a problem for Langacker's characterization of intransitive constructions, since it does not profile an agent and causation, whereas the agent-implying verbs clearly evoke an agent. The schema of these verbs seems to resemble the passive or the middle construction.

2.2.4 What is the prototypical intransitive construction?

Interestingly, whereas the prototypical transitive construction is often defined, as we have seen previously, the prototypical intransitive construction is not, either in the formal or the functional approach. Malchukov (2005) pointed out that the intransitive construction is often defined "in negative terms, as a clause not conforming in formal and semantic terms to the transitive prototype" (p. 80).

Many linguists, however, have implicitly agreed that intransitive constructions are often used with events that involve only one participant, at least in our conception of these events. For example, we have discussed above the arguments of Guerssel et al. (1985) and Levin (1993). Following Guerssel et al. (1985), Haspelmath (1993) also argued that "the most important specific semantic condition on inchoative/causative verb pairs is the absence of agent-oriented meaning components" (p. 93). He contrasted *cut* with *tear*: *Cut* has the agent-oriented

component, because it involves the use of a sharp instrument, whereas *tear* does not. The result is that *tear* has an inchoative counterpart and *cut* does not.

However, this does not help us identify a prototypical intransitive construction, because there is a split in intransitivity, either from a syntactic or semantic perspective. As mentioned above, generative linguists distinguish between unergative and unaccusative verbs. This distinction was demonstrated by Perlmutter (1978), who argued that Dutch, together with French and Italian, uses different auxiliaries for the two types of intransitive verbs (which is often termed aux-selection). Moreover, as illustrated by Croft (2001), the intransitive construction is used when either the agent or the patient is salient. This phenomenon appears to be universally attested (e.g. van Valin, 1990). For example, Pardeshi (2010) describes Marathi as having two types of verbs, one involving an actor with intention (e.g., run, stand, etc.) and the other an actor without intention (e.g., die, fall, etc.). Similarly, Matsuse and Kiryu (2010) also characterize a prototypical intransitive construction in Newari as a case frame that is used with unergative and unaccusative verbs.

Summarizing this section, we have discussed transitivity from a semantic perspective, and reviewed the analyses of the issue of transitivity from two functional approaches, namely Construction Grammar and Cognitive Grammar. Construction Grammar has the advantage of capturing the universal aspects of language while still allowing cross-linguistic differences. Cognitive Grammar describes the transitive and intransitive constructions in terms of event conceptualization, but I argue that the characterization for the intransitive construction may not work as well in Japanese.

The possibility of a prototypical intransitive construction was also discussed. It is generally concurred that an intransitive construction is the case frame that is used to describe an

event with only one participant. However, unlike the prototypical transitive construction, which is often discussed in the literature (Hopper & Thompson, 1980; Tsunoda, 1985), the intransitive prototype is not addressed in the literature, perhaps because of the split in intransitivity that poses difficulty for characterizing an intransitive prototype. In the following, I will discuss a type of intransitive verbs called 'agent-implying' intransitive verbs in Japanese, which seems to be in the middle of this split in terms of its semantics.[3]

2.3 TRANSITIVE AND INTRANSITIVE CONSTRUCTIONS IN ENGLISH AND JAPANESE

In previous sections, we have seen (1) how transitivity is defined in syntactic and semantic terms, (2) the treatment of transitivity in different linguistic theories, and (3) that there is a lack of attention to a prototypical intransitive construction. This section focuses on the differences between English and Japanese, which are the target of the present study, especially in the use of the intransitive construction.

[3] One might wonder why the term 'agent-implying intransitive verb' is used instead of the term 'middle construction,' which already exists in the literature. The reason is that the term middle construction is not very clear, and is 'applied to a wide range of grammatical phenomena' (Croft, Shyldkrot, & Kemmer, 1985. p. 179). The new term therefore helps us identify the major grammatical issue that is of interest to us.

2.3.1 The Japanese verb system

2.3.1.1 **Lexical versus morphological transitivity**

Before I discuss the differences between English and Japanese, it would be useful to describe Japanese to readers who are not familiar with the language. Japanese is an agglutinating language: morphemes can be added to verb stems and each morpheme usually has one clear meaning. For example, the past/perfective morpheme *–ta* can be added to a verb like *korosu* 'kill' to form *koroshi-ta* to mean 'killed.' More morphemes can then be added to it. For example, the passive marker *–rare* can be added to form *koros-are-ta* 'was killed.'

Japanese also has a causative morpheme *–sase*. For instance, it can be attached to the verb *nomu* 'drink' to form *nom-ase-ru* 'make (somebody) drink' (Kuroda, 1965). It follows that this morpheme increases the number of arguments (i.e., valency) associated with the verb. That is, the number of arguments increases to two if the morpheme is added to an intransitive verb, which originally allows only one argument.

One question raised is how the morphologically complex verbs differ from their transitive counterparts, because in English, a transitive verb such as *break* can be paraphrased into *cause to break*, and the morphology *–sase* in Japanese appears to be doing a similar job.

However, although the end product would look like a transitive verb in the sense that it can have two arguments, it has a different meaning than the transitive counterpart. According to Shibatani (1973), in the *-sase* construction the subject of the matrix sentence (i.e., the noun phrase that has *-ga/wa* as the case particle) is typically the causer and the subject of the embedded sentence (i.e., the noun phrase that has *-o* as the case particle in the case of an intransitive verb and *-ni* in the case of a transitive verb) is the causee. For example, in (6b), *Tarō* is the causer who caused *Jirō* to run.

(6) a. *Jirō-ga hashir-u*

Jiro-NOM run-present

'Jiro runs.'

b. *Tarō-ga Jirō-o hashir-ase-ta*

Taro-NOM Jiro-ACC run-CAUS-PAST

'Taro caused Jiro to run.'

In addition, since the 'causee' is the agent of the verb in the embedded sentence, it has to be animate or something perceived to be able move on its own (i.e., a robot, a car, etc.) in the case of motion verbs. For example, one cannot say **Tarō-ga isu-o taore-sase-ta* to mean 'Taro caused to chair to fall down,' because *isu* 'chair' is inanimate.[4] It should also be noted that *-sase* has another meaning apart from 'causing'; it can also mean mean 'let' or 'giving an opportunity to do something' (Shibatani, 1973), and generally cannot mean direct causation.

Another issue concerns the regularity of the morphological processes involved in the transitive/intransitive alternation in Japanese. Although there are some regular alternating patterns, it is not at all predictable from any (e.g., semantic) aspects. For example, verb pairs such as *tsuku* (intransitive)/*tsukeru* (transitive) and *aku* (intransitive)/*akeru* (transitive) might make one think that the one with *-ϕ-* is intransitive and the one with *-e-* is transitive. However, there are also verb pairs, such as *wareru* (intransitive)/*waru* (transitive) 'break,' in which the opposite is true.

In sum, the lexical causatives are different from the morphologically complex verbs formed from the addition of *-sase*. Moreover, although there appears to be some morphological

[4] It should be noted that there are exceptions. For example, McCawley (in press) suggested that one can say *Tarō-ga enzin-o tamar-ase-ta* 'Taro caused the engine to stop,' where the embedded subject is inanimate. However, Shibatani (1973) stated that this sentence can only be used when Taro stopped the engine in an unusal way (e.g., striking it with a big hammer).

regularity in the transitive/intransitive verb pairs, there are many exceptions (Jacobsen, 1992). In this dissertation, I only focus on the transitive lexical verbs, and not the morphologically derived causative verbs.

2.3.1.2 **Morphological and semantic markedness**

Regarding the relationship between morphological complexities and the conceptualization of events, Jacobsen (1992) proposed that the less morphologically complex counterpart in a verb pair indicates the more basic 'cause' of the event. In other words, if a change in state of an entity is more often seen to be caused by an external force (e.g., break, destruct, etc.), the transitive will be unmarked and its intransitive counterpart will be marked; on the other hand, if a change is more often seen to occur spontaneously (e.g., sink, grow, etc.), the intransitive will be unmarked and its transitive counterpart will be marked. For example, the transitive *waru* 'break (an egg)' is morphologically unmarked and its intransitive counterpart *wareru* '(an egg) break' is marked, because the action of breaking is often perceived to occur under the influence of an external force. Similarly, the intransitive *sodatsu* 'grow' is morphologically less complex than its transitive counterpart *sodateru*, because the event of growing is often seen to occur spontaneously.

Interestingly, many agent-implying verb pairs in Japanese used in this study are equipollent, which means both counterparts are equally unmarked (or marked) morphologically[5]. In a sense, this contrasts with Jacobsen's proposal, because agent-implying events, as the name suggests, often involves agents, and thus the influence of an outside force. For example, although

[5] One might argue that the Japanese verb pairs used in this study may not be representative of the entire set of paired Japanese verbs. For the purpose of the present study, the verbs were selected randomly in the sense that attention was not paid to morphological markedness. The issue of representativeness, and thus Jacobsen's claim about morphological markedness, is left for future research.

the action of finding must involve a person or another animate entity that catches another entity, the transitive *mitsukeru* 'find' is equally morphologically complex to its intransitive counterpart *mitsukaru*. For *tsukamaeru* (transitive) and *tsukamaru* (intransitive), the intransitive counterpart is even less morphologically complex, although the action of catching typically involves two distinct entities. I will continue this discussion in Chapter 4.

2.3.2 Cross-linguistic differences in lexical transitivity

As previously discussed, Croft (1990) argued that any event can be described in any form along the "causative-inchoative-stative" continuum. However, languages differ regarding what is allowed to be described inchoatively using an intransitive verb. English, for example, does not allow the action of finding to be described using an intransitive verb (e.g., **The book found*). If the speaker prefers to background the agent, he/she has to use a passive construction (i.e., *the book was found*).

As also discussed earlier, Guerssel et al. (1985) and Levin (1993) proposed that verbs that describe actions that involve an agent, such as verbs of cutting, cannot be intransitive (e.g., *I cut the rope* versus **the rope cut*). However, some languages such as Japanese and Marathi do allow the change of state that must be caused by an animate agent to also be described intransitively. In fact, it is possible to say *cut* in Japanese as inchoative as in (8). An example with the transitive counterpart is given in (7). It is noted that although the English translation uses a passive form of the verb because there is no corresponding intransitive verb in English, the verb in the Japanese sentence is an intransitive verb.

(7) *Ken-wa roopu-o kit-ta.*

Ken-TOP rope-ACC cut(tr.)-PAST

"Ken cut the rope"

(8) *roopu-ga kire-ta*

rope-NOM cut(in.)-PAST

"(the) rope was cut"

Interestingly, the verb *kireru* can also be used to describe a situation where the rope is broken not as a result of cutting, but as a result of attrition or strong pull without any intention of cutting, even though it forms a pair with the transitive *kiru* 'cut', which denotes an action of cutting with the use of scissors or a knife.[6] It is used to indicate the resultative state that the rope, for example, is broken. Therefore, one may argue that its meaning is close to the English verb *sever*.

A more typical example that shows that an intransitive verb can be used to describe an event that must involve an agent in Japanese is *tsukamaru* 'catch' (intransitive), which is demonstrated in (9), and its transitive counterpart is shown in (10).

(9) *hannin-ga tsukamat-ta*

criminal-NOM catch(in.)-PAST

'(the) criminal was caught'

(10) *kēsatsu-ga hannin-o tsukame-ta*

police-NOM criminal-ACC catch(tr.)-PAST

'(the) police caught (the) criminal'

[6] Exceptions are metaphorical uses such as *en-o kiru* 'to cut the connection with someone.' However, even here Japanese allows the intransitive counterpart *en-ga kireta* 'the connection was (spontaneously) severed .'

Again it is noted that *tsukamaru*, despite its passive translation in English, is an intransitive verb and the person who was caught is the subject of the sentence. The structure is parallel to that of an English sentence with an unaccusative verb, such as *the cup broke.* The event of catching (or being caught) is obviously caused by an animate agent, and in English one can only say *the criminal was caught*, using the passive construction.

Pardeshi (2008) calls this type of intransitive verbs "agent-implying" intransitive verbs. This is similar to the antipassive (e.g., *Mary ate*) in the sense that although an object is not overtly expressed, the presence of an object, or the patient, is understood (Kittila, 2002). The difference between agent-implying intransitive verbs and the antipassive is that agent-implying intransitive verbs have the patient or theme as the subject of the verb and the agent is 'hidden' (e.g., in *hannin-ga tsukamat-ta* 'criminal got caught,' it is clear that X (agent) caught the criminal, but X is not expressed), whereas the antipassive has the agent expressed but the patient or theme hidden (e.g., in *Mary ate*, it is clear that Mary ate something – that is, *Mary ate X* (patient), but X is not expressed).

Interestingly, the difference between agent-implying intransitive verbs and the non-agent-implying intransitive verbs is also manifested in the syntax of Japanese. To demonstrate the contrast between Japanese and English, let us first consider the English example in (11).

(11) a. John broke the window.

b. The window was broken (by John).

c. *The window broke by John.

d. The plate broke by itself. (Levin & Rappaport, 1995, p. 88)

(11a) is an ordinary transitive construction. (11b) is a passive sentence, and adding *by John* is possible, because the passive implies an agent. On the other hand, (11c) is not

grammatical. However, Levin and Rappaport Hovav (1995) suggested that it is possible to say (11d), where adding 'by itself' to an intransitive sentence is acceptable. It is acceptable because "itself" is not an external causer. This shows that the fact that the addition of "by John" would make an intransitive sentence unacceptable is a result of a semantic violation and not a syntactic violation, because "by itself," which has the same syntactic status as "by John," is acceptable. Thus it further supports the claim that English intransitive verbs do not imply an external agent.

Now consider the Japanese examples in (12) and (13). *Kowasu/kowareru* 'break' in Japanese also behaves like English *break*, since it is grammatical to add *jon-ni* 'by John' to the passive sentence (12b) but ungrammatical to the intransitive sentence (12c). However, in (13), the verb pair *tsukamaeru/tsukamaru* 'catch/get caught' actually allows *jon-ni* 'by John' to be added to the intransitive sentence. It should be noted that although (13c) is translated into passive in English, the Japanese sentence has an intransitive verb meaning 'catch,' which is absent in English.

(12) a. *tarō-wa mado-o kowashi-ta*
Taro-TOP window-ACC break-PAST
'Taro broke the window.'

b. *mado-wa jon-ni kowas-are-ta*
Window-TOP John-by break-PASS-PAST
'The window was broken by John.'

c. **mado-wa John-ni koware-ta*
window-TOP John-by break(intr.)-PAST
'The window broke by John.'

(13) a. *kēsatu-wa hannin-o tsukamae-ta*

Police-TOP offender-ACC catch-PAST

'The police arrested the offender.'

b. *hannin-wa kēsatu-ni tsukamaer-are-ta*

Offender-TOP police-by catch-PASS-PAST

'The offender was caught by the police.'

c. *hannin-wa kēsatu-ni tsukamat-ta*

Offender-TOP police-by catch(intr.)-PAST

'The offender was caught by the police.'

From this simple test, we can see that there seem to be two types of intransitive verbs in Japanese, non-agent-implying and agent-implying: for the non-agent-implying verbs (e.g., *kowareru* 'break'), adding the agent to the sentence using NP-ni 'by NP' is not acceptable. On the other hand, for the agent-implying verbs (e.g., *tsukamaru* 'get caught'), adding NP-ni to indicate the agent is acceptable.

To summarize, I have discussed how Japanese and English manifest differences in what can be lexicalized as transitive and intransitive verbs: English does not allow events that must involve an agent to be described intransitively, whereas Japanese does. Moreover, unlike ordinary unaccusative verbs such as *break* in English, agent-implying verbs in Japanese, while taking the patient or theme as the subject, allow an agent to be expressed with the use of a postposition *ni* 'by.'

2.4 CROSS-LINGUISTIC DIFFERENCES IN THE PREFERENCE FOR THE TRANSITIVE AND INTRANSITIVE CONSTRUCTIONS

Different languages also differ in terms of how the transitive and the intransitive constructions are used. Ikegami (1981, 1991) proposed that there are languages (e.g., English) that prefer to give prominence to the human, and there are languages (e.g., Japanese) that prefer to describe an event as if it happens spontaneously, and that these two types of languages are on a continuum in terms of how much prominence is given to a human agent. Ikegami further suggested that English and Japanese form the two extremes of this continuum. The tolerance of Japanese for causative events being described intransitively, as we have seen above, seems to be consistent with Ikegami's proposal: intransitive constructions do not give prominence to the agent and causation, and since Japanese has more types of intransitive verbs, the language should allow more for causative events to be described intransitively, and thus make less mention of agent and causation.

Alfonso (1966) argued that although English has both a transitive construction (i.e., *we decided that.*…) and a passive construction (i.e., *it was decided that.*…), which is often used for agent-backgrounding, English-speakers do not seem to prefer one form over the other. However, he suggested that Japanese speakers do have a preference for agent-backgrounding constructions, especially in the form of intransitive constructions. Jacobsen (1992) also expressed a similar view. He states that there are many situations where a transitive construction would be preferred in English, as in (14a), but the same event would be expressed with an intransitive construction in Japanese, as in (14b).

(14) a. *Have you found an apartment yet?*

b. *Apāto wa mō mitsukari-mashi-ta ka?*

Apartment TOP already find(intr.)-POL-PAST Q

'Has an apartment been found yet?' (Jacobsen, 1992, p. 106)

As noted above, Ikegami claimed that other languages also fall onto this continuum of human agent prominence. Ikegami (1991) proposed that German and Old English should be between English and Japanese on the continuum. An example he gave to support his claim is that in German one would say something that literally means 'I raised the hand,' without giving prominence to the owner of the hand, whereas in English one would say *I raised my hand*, explicitly stating the owner of the hand. In the case of Old English, the only way to say "I made him come" is *ic dide þæt he cume*, which literally means 'I did that he comes,' whereas *I made him come* in Modern English has causality more explicitly encoded. He claimed that the agentivity of this sentence is very low, because it basically means 'I acted in such a way that he might come,' and does not seem to involve direct causation. Thus, he suggested that neither German nor Old English prefer to give prominence to human beings as much as Modern English does. As mentioned above, Pardeshi (2008) suggested that some South Asian languages, such as Marathi, Hindi, Tamil, and Telugu, also utilize intransitive constructions to denote actions that must be brought about by an animate agent, even though they are from different language families (Marathi and Hindi are Indo-European languages, while Tamil and Telugu are Dravidian languages). In fact, a study by Pardeshi and Yoshinari (2010), the details of which will be discussed in section 2.4, seems to suggest that Marathi's preference to suppress a human agent is even stronger than that of Japanese, which in turn is stronger than that of Korean.

Combining the discussions of previous studies, we might hypothesize a hierarchy of human agent prominence, as shown in (15).

(15) Hypothesized hierarchy of human agent prominence

Marathi → Japanese → Korean → Old English/German → Modern English

The observation that English prefers transitive constructions more than Japanese seems to be manifested in the differences in the use of the 'transitive case frame' in the two languages. Tsunoda (1985) proposed that two-place predicates are prototypically used at the left end of the scale, as shown in (16), and more different case frames are used as one goes down the scale.

(16) Direct effect on patient (e.g., *kill, break*) > perception (e.g., *see, hear*) > pursuit (e.g., *wait, search*) > knowledge (e.g., *know*, *understand*) > feeling (e.g., *love*, *need*) > relationship (e.g., *possess, lack*) > ability (e.g., *capable, proficient*)

For example, whereas only the NOM-ACC case frame is available for the action of killing, which belongs to the leftmost category (i.e., the verb *kill* only occurs in a NOM-ACC case frame), there are at least two frames for 'feeling': NOM-ACC (e.g., Mary likes apples) and NOM-OBL (e.g., Mary is angry with him).

As shown in Tsunoda (1985), although the NOM-ACC frame has a rather similar distribution in both English and Japanese, Japanese has more case frames available at the right end of the scale. For example, in Japanese, the transitive case frame is used for perception (e.g., *Jon-wa fujisan-o mi-ta* 'John saw Mt. Fuji'), and the transitive case frame is also used for some of the perception verbs (e.g., *John saw Mt. Fuji*). However, for feeling, which is further down the scale, Japanese uses different case frames such as NOM-ACC, NOM-DAT, NOM-NOM, and

DAT-NOM, whereas English uses NOM-ACC and NOM + prepositional phrase (e.g., NOM angry with X) (Tsunoda, 1985).

Malchukov (2005), on the other hand, has a slightly different view. He pointed out that Tsunoda's scale does not predict which is preferred by the language among all the options available. He further modifies Tsunoda's scale into a dichotomous hierarchy, as shown in Figure 4.

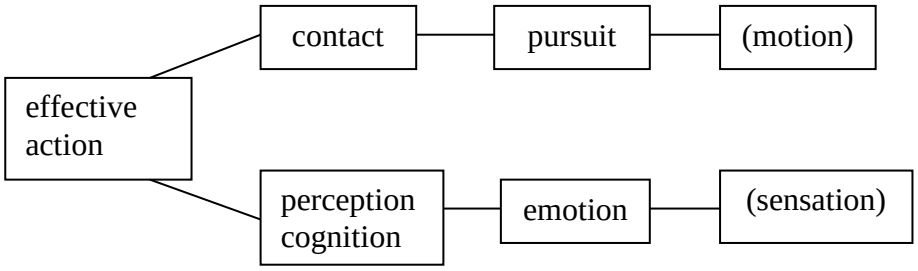


Figure 4. Dichotomous verb type hierarchy proposed by Malchukov (2005, p. 81)

Malchukov claims the following:

> Japanese is more permissive in extension of the transitive pattern along the first sub-hierarchy, as noted above it treats pursuit predicates (and even many motion verbs) as transitive. On the other hand, English is more liberal than Japanese in extending of the transitive pattern along the second sub-hierarchy as it assimilates mental verbs to the transitive pattern (Malchukov, 2005, p. 91).

In other words, Malchukov proposed that whereas English uses more transitive constructions in some ways, Japanese uses more transitive constructions in others.

As mentioned in previous section, Malchukov (2005) pointed out that a prototypical intransitive construction is usually not defined semantically. In other words, we do not have any

predictions on the distribution of the intransitive case frame along any continuum in each language, and thus the differences between languages. That is, whereas a prototypical transitive construction is defined and it is plausible for us to predict that it is used for prototypical transitive events such as effective actions, a prototypical intransitive construction is not defined. Therefore, we are unable to pinpoint what kind of situation an intransitive construction is mostly used for.

2.4.1 A note on ergative and active languages

So far we have only discussed nominative-accusative languages, where the sole argument in the intransitive construction bears the same case marker as the subject of the transitive construction (e.g., nominative case as in *she died* instead of accusative case as in **her died*). However, in some languages, the argument in the intransitive construction is marked with the same case marker that is used for the object of the transitive construction. These languages are called ergative languages. In these languages, the subject of the transitive is marked with ergative case, and the object with absolutive case. The argument in the intransitive construction is therefore also marked with absolutive case. There are also languages that are called active languages, in which the argument of the intransitive construction is sometimes marked with the case of the subject of the transitive construction and at other times marked with the case of the object of the transitive construction.

From a functional perspective, the way in which the intransitive argument is marked in ergative languages does not seem to have much effect on how we understand transitivity, because the marking system is a syntactic or morphological issue and has less to do with the

semantics.[7] For example, even if we use the accusative case for the argument in intransitive sentences such as *her runs* or *him died*, it does not affect how we understand the events, because this is what an intransitive construction looks like in that language.

However, this may be an interesting issue in active languages, where there is a split in the markings for the sole argument in the intransitive construction. For example, Holisky (1987) described Tsova-Tush as having this split: If the subject is in the first or second person, for intransitive verbs that denote uncontrollable states (e.g., tremble), the argument is marked with the nominative case, which also marks the patient in a transitive sentence (i.e., resembling ergative languages). On the other hand, for intransitive verbs that denote intentional actions (e.g., run), the argument is marked with the ergative case, which also marks the subject of a transitive sentence.

An even more interesting fact about this language is that some verbs can bear either the nominative or the ergative case, depending on how much intention is involved. For example, one can say 'I fell' using either the nominative or the ergative case: When the nominative case is used, it denotes a situation where the falling was accidental, whereas when the ergative case is used, it means the falling was intentional.

This interesting phenomenon in active languages leads us into thinking about the status of unergative and unaccusative languages. More on this will be discussed in Chapter 4.

In this section, we have seen that researchers have made claims about how English and Japanese differ in the use of transitive and intransitive constructions. Specifically, Japanese

[7] This may be a problem for the formal approach that adopts the idea of a deep structure, since the deep structure distinguishes between an external and internal argument based on the meaning of the verb, and movements to the 'subject' position are involved, while the notion of a subject is not properly defined in ergative languages because of the use of the absolutive case for both the transitive 'object' and the intransitive 'subject' (e.g., Croft, 2001; Dixon, 1979). However, since this dissertation is not adopting this approach, this issue will not be pursued further. Discussions of ergative languages from a formal perspective can be found in works by Alec Marantz (e.g., Marantz, 2000).

prefers to suppress the notion of a human agent and use more intransitive constructions. It has also been suggested that English uses the transitive case frame more liberally in some ways than Japanese does, which is probably one of the reasons that English appears to prefer to give prominence to the agent more than Japanese does.

2.5 EMPIRICAL EVIDENCE FOR THE CROSS-LINGUISTIC DIFFERENCES IN THE ATTENTION TO THE AGENT

Now we turn to some evidence from a psycholinguistic experiment that is related to the difference in attention to the agent in native speakers of different languages. Psycholinguistic evidence is important because even if there are cross-linguistic differences in transitive and intransitive constructions, there may not be differences in comprehension or event conceptualization. Psycholinguistic evidence is thus essential in exploring the universal and language-specific aspects in these areas.

Fausey, Long, Inamori, and Boroditsky (2010) compared the attention and memory of English and Japanese native speakers on the agent. They conducted two experiments. In the first experiment, they asked English and Japanese native speakers to view 16 videos that were either intentional or accidental events (e.g., popping balloons using a tack vs. popping a balloon while reaching). The participants were instructed to describe the situations in their native languages. They found that native speakers of both languages mostly use the transitive construction to describe intentional events, but for accidental events, English native speakers tend to use more transitive constructions than Japanese native speakers. In the second experiment, participants were asked to view videos of an actor performing an action, and after each video they were

shown photos of two persons, the person in the video they saw and another actor who did not appear in the video. They then had to answer the question “who did it the first time?” using the keyboard. What they found was consistent with their hypotheses: whereas both the English and Japanese native speakers remember the agent equally well for intentional events, the English native speakers remember the agent significantly better than the Japanese native speakers do for accidental events. They attributed the results to the more frequent mentioning of the agent through the use of transitive constructions in English for accidental events.

Similar to Fausey et al. (2010), Pardeshi and Yoshinari (2010) compared how Japanese, Korean, and Marathi native speakers describe intentional and unintentional events. They were interested in the correlation between the intention of the agent and the use of the transitive construction. They showed videos to the three groups of participants, and asked them to describe what happened in the videos in their native language. They found that the native speakers of all three languages use more transitive constructions for intentional events. In contrast, for unintentional events, Japanese and Marathi native speakers prefer intransitive constructions, whereas Korean native speakers still prefer transitive constructions for unintentional events. Marathi uses even more intransitive constructions than Japanese does for unintentional events. These results showed that languages differ in the criteria by which they determine which construction to use: Japanese and Marathi put more weight on intentionality than Korean, such that when intentionality is removed, far fewer transitive constructions are used.

Yoshinari, Pardeshi, and Chung (2010) investigate how native speakers of Japanese, Korean, and Marathi describe unintentional events. The participants were instructed to imagine they were invited to have dinner at a friend’s place, during which an event (e.g., a dish broke) happened under different situations (e.g., “being drunk,” “being careless,” “being dizzy,” and

"earthquake"). They were then asked to rate how responsible they were for causing the event to happen and how capable they were of avoiding causing the event to happen. They were also asked what they would say to the friend about what had happened.

They found that the three groups of native speakers did not differ in how responsible they felt in each situation except for the "being dizzy" situation, but they showed different preferences in their use of transitive and intransitive verbs. Among the three language groups, the Japanese participants used the most transitive verbs, whereas the Marathi participants used almost no transitive verbs when describing the event. They thus concluded that the use of transitive verbs is correlated with responsibility in Japanese, but not in Marathi, and to a lesser degree in Korean.

Luk (2010) compared the frequencies of the use of transitive, intransitive, passive, and adjectival constructions in Chinese, English, and Japanese. She used a Japanese novel and its Chinese and English translated versions as a parallel corpus. She also used Hopper and Thompson's (1980) parameters as a measure of semantic transitivity. She found that whereas all three languages prefer to use transitive constructions for high semantic transitivity events, only Japanese prefers intransitive constructions for low semantic transitivity events. Moreover, for some of these incidences, it is impossible to describe the events using the intransitive construction in English. The results are consistent with Fausey et al's (2010) and Pardeshi and Yoshinari's (2010) studies, which claim that the languages do not differ in terms of the use of the transitive construction when the semantic transitivity is high, but they do differ when the semantic transitivity is low.

To summarize, we have seen that languages vary in the way they use the transitive and intransitive constructions. From the studies discussed, we saw that the intransitive construction does not seem to have the same properties across languages: unlike English, Japanese allows

agent-implying events to be described intransitively, and it uses intransitive constructions to described unintentional events. Moreover, Japanese has a higher tendency to use intransitive constructions. However, for pragmatic reasons, Japanese native speakers use more transitive constructions when the speakers themselves may be responsible for causing an event to happen. In other words, it appears that showing responsibility is more important than the presence of an agent in choosing a transitive construction over an intransitive construction.

Cognitive approaches to linguistics have become popular in recent decades as an alternative theory to generative linguistics to explain the nature of human language (e.g., Croft, 1990, 2001; Croft & Cruse, 2004; Evans, Bergen, & Zinken, 2007; Geeraerts, 2010; Langacker, 2008; Talmy, 2000; Tomasello, 2003). However, little psycholinguistic evidence has been collected to show the various claims made by cognitive linguists (but see Gonzalez-Marquez, Mittelberg, Coulson, & Spivey, 2007). For example, the image schemas proposed by Langacker (2008) have not been supported by experiments that test how native speakers understand these constructions. The present study thus attempts to test these claims using a psycholinguistic experiment.

2.6 A MODEL OF DISCOURSE COMPREHENSION: A SITUATION MODEL

So far we have discussed several linguistic theories, both from the formal and functional perspectives, which provide descriptions of transitive and intransitive constructions and their differences. However, what do readers actually have in their minds when reading these sentences? How do we test whether these descriptions are correct? Before going into the research

questions, the next section introduces a psycholinguistic model for discourse comprehension on which I will rely in this dissertation: the Situation Model.

The Situation Model is one of the well-researched theories of discourse comprehension first proposed by Kintsch and van Dijk (1978). They proposed that while reading a narrative, the reader integrates the information and constructs a mental representation called the situation model. In this theory of discourse processing, there are three basic levels, namely the surface code, the textbase, and the situation model. The surface code refers to the exact wording and the syntax. The textbase is a text proposition derived from the surface code. The textbase, together with the reader's world knowledge and experience, is further transformed into the situation model, which is a 'microworld' created by the reader. In the present study, a comprehension theory is necessary for designing the methodology. While Cognitive Grammar provides a linguistic theory that outlines the differences between the linguistic constructions of interest, a psycholinguistic theory is needed as the basis for understanding what hearers or readers do with the linguistic information they have heard or read, such that a plausible methodology can be developed.

Various studies have shown the existence of a situation model in the mind of a reader. For example, before the term "situation model" was coined, Bransford, Barclay, and Franks (1972) conducted an experiment that showed that the situation described by a sentence can affect the memory of the hearer about the sentence. Participants listened to either (17a) or (17c), and were later presented with (17b) or (17d) and asked whether it was the sentence that they heard.

(17) a. Three turtles rested *on* a floating log, and a fish swam beneath *them*.

b. Three turtles rested *on* a floating log, and a fish swam beneath *it*.

c. Three turtles rested *beside* a floating log, and a fish swam beneath *them*.

d. Three turtles rested *beside* a floating log, and a fish swam beneath *it*.

They found that participants who listened to (17a) were more frequently mistaken that they had heard (17b) than people who heard (17c) and were presented with (17d). The reason is that (17a) and (17b) basically lead to the construction of the same situation model, and the participants recalled their memory based on the situation model. However, (17c) and (17d) do not lead to the same situation model, and thus do not alter the participants' memory.

Johnson-Laird (1983) claimed that at least five dimensions are involved in a situation model, namely temporal, spatial, causal, motivational, and person- and object-related information. A handful of studies have investigated each of these dimensions (e.g., for temporal: Magliano & Schleich, 2000; Rinck, Hähnel, & Becker, 2001; Therriault & Raney, 2007; for spatial: Blanc & Tapiero, 2001; Dutke, Ribback, & Wagner, 2003; Hakala, 1999; Zwaan & van Oostendorp, 1993; for causal: Blanc, Kendeou, van den Broek, & Brouillet, 2008; Fletcher & Bloom, 1988; Singer, Halldorson, Lear, & Andrusiak, 1992; Suh & Trabasso, 1993; Trabasso & van den Broek, 1985; for person- and object-related information: de Vega, 1995; Radvansky, Wyer, Curiel, & Lutz, 1997; Wilson, Rinck, McNamara, Bower, & Morrow, 1993).

Although the situation model is said to be a product of linguistic and pragmatic knowledge as well as world knowledge (Glenberg, Meyer, & Lindem, 1987), few studies are dedicated to investigating the role of linguistic knowledge in the construction of different situation models. To my knowledge, there are only two studies that have investigated the effect of linguistic knowledge on the construction of situation models, both of which focused on tense-aspect markers. Magliano and Schleich (2000) tested how different aspect markers affect the

activation of a certain event in the construction of a situation model. In one experiment, the participants were asked to read passages on a computer screen in one of two conditions, either action in progress or completed. After some sentences in the passages, a verb phrase appeared on the screen and the participants had to respond as quickly and accurately as possible whether the verb phrase occurred in the passage. They found that the participants responded faster for in-progress actions than completed actions, and thus claimed that activation for in-progress actions is maintained longer than for completed actions.

Madden and Zwaan (2003) also investigated the role of perfective and imperfective aspect markers in the construction of a situation model in English. They conducted three experiments. In the first experiment, participants read a sentence having either the perfective (i.e., past tense) or imperfective (i.e., progressive) marker and then were presented with two pictures, one showing a completed event and the other an event in progress. The participants then had to choose the picture that they thought was a better representation of the event described by the sentence. They found that the participants were more likely to choose the pictures showing completed events than those showing on-going events after reading perfective sentences (e.g., *The man made a fire*), but were equally likely to choose either picture after reading imperfective sentences (e.g., *The man was making a fire*). In the second experiment, the same sentences were used, but only one picture was shown after reading a sentence, and the participants had to respond whether the picture matched the sentence. The results showed that the participants responded faster to pictures showing completed actions than pictures showing on-going actions after reading perfective sentences, but they did not respond differently to either type of picture after reading imperfective sentences. In the last experiment, the pictures were shown before the sentences, and the participants had to respond whether the pictures and the sentences are related.

Again, they found that they responded faster to completed pictures than the ongoing ones after reading perfective sentences, whereas there was no difference in response times after reading imperfective sentences. The results therefore suggest that readers utilize perfective markers as cues to construct a situation model of a completed event. In the case of the imperfective sentences, the lack of effect may mean that readers construct situation models of different stages of an ongoing event.

The investigation of transitive and intransitive constructions, which is the goal of the present study, is closely related to causality. Transitive constructions semantically refer to the external cause of change of state (Jackendoff, 1972, 2003; Langacker, 2008). Since causality is a well-researched dimension in the situation model theory, the present study attempts to manipulate the linguistic forms to see how different situation models are constructed in the mind of the reader. In other words, the present study is interested in whether and how readers create a situation model of a causative event when reading a transitive and an intransitive sentence, respectively. Section 3.2 will discuss a study by Singer et al. (1992), which examined whether inferences are made from world knowledge during discourse comprehension. While linguistic information was not the major interest of Singer et al. (1992), this dissertation uses the same methodology to investigate the role of linguistic information (i.e., transitive and intransitive constructions) in the Situation Model framework, and thus discourse comprehension.

2.7 SUMMARY

This chapter began by discussing the views of different linguistic theories on transitivity. The formal approach views transitivity from a syntactic perspective, defining a transitive construction

as having two arguments and an intransitive construction as having one argument. Some linguists under this approach attempt to explain the relationship between the meanings of verbs and transitivity alternation. They suggested that actions that imply an agent (e.g., *cut*) cannot be described using an intransitive verb.

The chapter continues with functional approaches, Construction Grammar and Cognitive Grammar. Construction Grammar correlates the different type of constructions (e.g., passive, unergative, etc) with the saliency of agent and patient. Cognitive Grammar also attempts to link syntactic structures with semantics. Using notions such as base, profile, trajectory, and landmark, Cognitive Grammar characterizes the transitive construction as one with an agent and causation, and the intransitive (unaccusative) construction as one without an agent or causation.

However, these theories do not give us very a satisfactory characterization to accommodate agent-implying intransitive verbs, such as *tsukamaru 'be caught'* and *mitsukaru* '*be found,'* found in Japanese and some other south Asian languages such as Marathi but absent in English. These verbs in Japanese allow the agent to be expressed with the postposition (i.e., *ni*) that takes an agent, which suggests that an agent is understood to be involved in the event.

The functional approaches lead us into discussing the prototypes for the transitive and the intransitive constructions. By definition, the transitive case frame is used for prototypically transitive events such as the action of killing. On the other hand, a prototype for the intransitive constructions is not yet clearly defined.

It further reviews previous research on the differences between languages in their preference of the transitive and intransitive constructions in Japanese. English is said to prefer giving prominence to human agents, whereas Japanese prefers to suppress the human agent. This is also manifested in the choice of case frames in these two languages. It is also shown that,

because native English speakers use more transitive constructions for unintentional events than native Japanese speakers do, they have better recall for the agent than native Japanese speakers.

Thus, there is a lack of understanding of the intransitive construction cross-linguistically. The present dissertation fills this gap by investigating how this under-researched kind of intransitive verb is comprehended by native speakers. Moreover, it helps us understand the relationship between grammar and event conceptualization: do English and Japanese speakers have the same situation in mind, but merely use different constructions (i.e., the meanings of the constructions are different in different languages), or do they indeed have different situations in mind, which leads to the use of different constructions (i.e., the meanings of the constructions remain the same across languages)?

This dissertation is important in understanding the universals of transitivity in language. We have seen that there seem to be some universal factors that govern transitivity alternations. For example, the action of killing is cross-linguistically lexicalized as a transitive verb. On the other hand, we also see cross-linguistic differences in the use of both the transitive and intransitive constructions. Therefore, by examining different types of transitive and intransitive verbs, we get a better picture of how much is universal and how much is language-specific, which may inform us about the nature of human language.

Moreover, while there are a considerable number of studies that examine transitive and intransitive in specific languages and in language in general, these studies often only involve the use of linguistic data and examples. There seems to be a lack of use of psycholinguistic experiments to study transitivity. The present dissertation therefore not only deepens our understanding of how language users comprehend transitive and intransitive constructions,

which is new in the field of linguistics, but it also introduces a plausible psycholinguistic methodology for studying the issue of transitivity.

3.0 THE STUDY

3.1 PURPOSE

The purpose of the study is to investigate whether causality, and therefore an agent, is involved in the Situation Model of the reader when native speakers of English and Japanese read transitive and intransitive sentences. It thus psycholinguisically tests Langacker's (1986, 2008) characterizations of different linguistic structures: do we construe transitive constructions differently than we do intransitive constructions? More importantly, it addresses the question of whether native speakers interpret causality from agent-implying intransitive verbs in Japanese the same way as from transitive verbs (or ordinary intransitive verbs). This is important because the processing of transitive and intransitive sentences regarding the presence/absence of an agent is not extensively studied. The study is also the first to examine the processing of non-prototypical intransitive verbs, namely the agent-implying intransitive verbs.

3.2 RESEARCH QUESTIONS

The general questions are: What is the nature of agent-implying verbs? Do Japanese native speakers interpret them the same as they do ordinary (more prototypical) intransitives? The specific research questions are:

Question 1: Are *English* native speakers more likely to interpret causality from *transitive* constructions (e.g., *He broke the cup*) than from *non-agent-implying* intransitive constructions (e.g., *The cup broke*) in English?

Question 2: Are *Japanese* native speakers more likely to interpret causality from *transitive* constructions (e.g., *Ken-wa koppu-o wat-ta* "Ken broke the cup") than from *non-agent-implying intransitive* constructions (e.g., *koppu-ga ware-ta* "the cup broke") in Japanese?

Question 3: Are *Japanese* native speakers more likely to interpret causality from *transitive* constructions (e.g., *kēsatsu-wa Ken-o tsukamae-ta* "the police arrested Ken") than from *agent-implying intransitive* constructions (e.g. *Ken-wa tsukamat-ta*. "Ken got arrested") in Japanese?

Question 4: Are *Japanese* native speakers more likely to interpret causality from *agent-implying* intransitive constructions (e.g., *Ken-ga tsukamat-ta* "Ken got arrested") than from *non-agent-implying* intransitive constructions in Japanese (e.g., *koppu-ga ware-ta* "the cup broke")?

Question 5: Are *Japanese* native speakers more likely to interpret causality from *non-agent-implying intransitive* constructions in Japanese (e.g., *koppu-ga ware-ta* "the cup broke") than *English* native speakers are with English counterparts (e.g., *The cup broke*)?

Question 6: Are *Japanese* native speakers more likely to interpret causality from *transitive* constructions in Japanese (e.g., *Ken-wa koppu-o wat-ta* "Ken broke the cup") than *English* native speakers are with English counterparts (e.g., *Ken broke the cup*)?

3.3 SINGER ET AL. (1992)

In the following, I discuss Singer et al's (1992) priming study on causal bridging inference, on which the methodology of the present study is based. Because transitivity is

closely related to causality, and the priming nature of the experiment enables us to detect subtle differences between transitive and intransitive in terms of whether each of them implies an agent, Singer et al (1992) forms a good basis for the present study.

In the first experiment, Singer et al. (1992) investigated whether causal inference is made through general knowledge when situation models are constructed. The participants read either of the two-sentence passages in (18a) and (18b), and responded to a question regarding general knowledge as in (18c):

(18) a. Dorothy poured the bucket of water *on* the fire. The fire went out. (causal)

b. Dorothy placed the bucket of water *by* the fire. The fire went out. (temporal)

c. Does water extinguish fire?

It is noted that although the items in (18) also involve some degree of linguistic manipulation, it was not their goal to investigate the effect of the linguistic form. They found that the participants were able to answer the question in (18c) faster in the causal condition than in the temporal condition. They also found that the participants took longer to read the second sentence in the temporal condition than in the causal condition. They explained that this is because the participants were primed by the first sentence in the causal condition, where the participants constructed a situation model in which the water extinguished the fire as a result of Dorothy pouring water on it, with reference to the common knowledge that water extinguishes fire.

In the third experiment, they looked at the relationship between the degree of causation and the response time. There were three conditions, namely near causal (i.e., *stepped on*), far

causal (i.e., *didn't see*) and temporal (i.e., *jumped over*), shown in (19) (the three different conditions are separated by slashes).

(19) a. Ken (stepped on/didn't see/jumped over) the banana peel.

b. Ken fell down.

c. Are banana peels slippery?

They found that the reading times for the second sentence in the near causal condition were significantly faster than in the far causal condition, for which the reading times were in turn significantly faster than in the temporal condition. However, they found that the answer times for the near causal condition were only marginally significantly faster than for the far causal condition, for which the answer times were also only marginally significantly faster than for the temporal condition. These results suggest that different degrees of inferences are made based on learners' general knowledge and experience. This finding is highly relevant to the present study, because transitive constructions are usually associated with direct causation, and intransitive constructions are often associated with far causation. Instead of using the different degrees of causation as an independent variable as in Singer et al.'s study, the present study uses the different linguistic forms as an independent variable to investigate whether transitive and intransitive constructions would cause readers to construct different situation models.

In summary, the situation model theory is a promising way to tap into the semantics of a linguistic structure, and linguistic forms can alter readers' activation of certain aspects of a situation. Furthermore, Singer et al. (1992) provides us with a good foundation for the present study, in the sense that we can use a similar method to test readers' interpretation of causation

from different linguistic structures. In the present study, linguistic forms will be the independent variable – that is, we will manipulate the linguistic forms to examine what kind of inferences participants make with transitive and intransitive constructions.

3.4 EXPERIMENT 1

Experiment 1 is a rating study involving the offline judgment of transitive and intransitive sentences in both English and Japanese. In particular, it explores whether native Japanese speakers understand the presence/absence of an agent the same way for both agent-implying intransitive verbs and non-agent-implying intransitive verbs.

3.4.1 Participants

Experiment 1 consists of a rating task that has two versions: one in English and one in Japanese. In each version, there were two lists, which will be explained in the following section. The English version was administered to English native speakers and the Japanese version to Japanese native speakers.

20 English native speakers completed the English version of the rating tasks. They were all in the vicinity of Pittsburgh, Pennsylvania when the task was administered to them. They were recruited through friends. They were native speakers of English with little knowledge of a second language. This was confirmed orally before they participated in the experiment. Ten of them completed List A and ten of them completed List B.

20 Japanese native speakers completed the Japanese version. 17 of them lived in Tochigi and Aichi Prefecture, Japan, and three of them lived in Pittsburgh when the task was administered. Those who lived in Aichi Prefecture or Pittsburgh were graduate students who were believed to know English, whereas those who lived in Tochigi were adults who were working and were believed to have limited experience with another language, including English. Again, ten of them completed List A and ten of them completed List B of the Japanese version.

3.4.2 Method

The rating task consists of sentence pairs like the one in (20). The participants were instructed to read the sentence pairs and answer how likely that the event was caused by the person mentioned in the pair of sentences by rating a statement like (20c) on a 7-point scale, 7 being very likely and 1 being very unlikely. In other words, the larger the number, the more likely that the participants interpreted the event as a causative one.

(20) a. John was playing basketball inside his house.

b. While he was playing, he broke a clock (transitive)/a clock broke (intransitive).

c. John was responsible for causing the clock to break.

For each context, there are two conditions, namely transitive and intransitive. Each participant only read one of these conditions.

3.4.3 Materials

3.4.3.1 **English version**

The two lists of the English version contain the same sentence pairs as the two lists of the English version in the priming experiment. Since the rating task was created based on Experiment 2, the construction of the questions will be explained in Section 3.5. There were 40 items in each list. The statements that were rated by the participants were all in the format "*X was responsible for causing Y to [intransitive verb],*" where X is the animate agent mentioned in the sentence pair, and Y is the object that undergoes changes. It took the participants about 10-15 minutes to complete the task. The two lists used in the rating task are shown in Appendix A.

3.4.3.2 **Japanese version**

Similarly, the two lists in the Japanese rating task consist of the same sentence pairs as the two lists in the Japanese priming task (see Section 3.5). Because Japanese has agent-implying verb pairs that do not exist in English and one of the purposes of the present study is to investigate the properties of these verbs, 20 additional items were added to each list, making a total of 60 in each list. Unlike in the English version, the statements for rating were of different formats. This is to maintain the naturalness of the language, because in Japanese other factors such as mood can affect the structure of the sentence.

There were 20 contexts constructed with 20 agent-implying verbs. Including the two conditions (i.e., transitive and intransitive), there were 40 items. Both List A and List B had 10 transitive and 10 intransitive items. The participants took about 20-30 minutes to complete the task. The questionnaire is shown in Appendix B.

3.4.4 Hypotheses

Based on the research questions in Section 3.2, we hypothesized the following for the results of the rating experiment:

Hypothesis 1: English native speakers would rate the (non-agent-implying) transitive condition higher than the (non-agent-implying) intransitive condition in English, because the English (non-agent-implying) transitive construction explicitly states the causer of the event, whereas the English (non-agent-implying) intransitive construction with non-agent-implying verbs does not.

Hypothesis 2: Japanese native speakers would rate the (non-agent-implying) transitive condition higher than the (non-agent-implying) intransitive condition in Japanese, because the Japanese (non-agent-implying) transitive construction explicitly states the causer of the event, whereas the Japanese (non-agent-implying) intransitive construction does not.

Hypothesis 3: Japanese native speakers would rate the agent-implying intransitive condition higher than the non-agent-implying intransitive condition in Japanese, because Japanese agent-implying intransitive verbs imply causation, whereas Japanese non-agent-implying intransitive verbs do not.

Hypothesis 4: Japanese native speakers would rate the Japanese agent-implying transitive condition higher than the agent-implying intransitive condition, because the agent-implying transitive condition explicitly gives prominence to the agent, whereas the agent-implying intransitive condition does not.

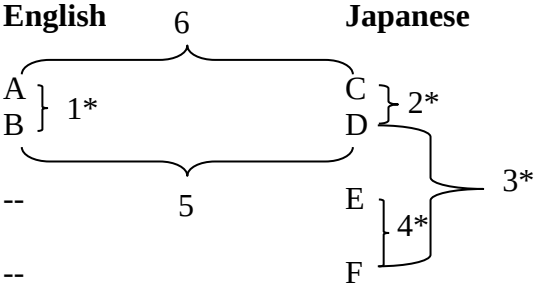
Hypothesis 5: Japanese native speakers would rate the Japanese (non-agent-implying) intransitive condition higher than English native speakers rate the English (non-agent-implying) intransitive verbs, because Japanese native speakers in general use more intransitive constructions to describe causative events.

Hypothesis 6: Japanese native speakers and English native speakers rate the (non-agent-implying) transitive condition in their respective languages equally, because the transitive constructions in both languages explicitly state the causer of the event.

The hypotheses are summarized in Table 2.

Table 2. Summary of hypotheses for Experiment 1

Condition	**English**	**Japanese**
transitive (e.g., *break, kowasu*)	A	C
intransitive (e.g., *break, kowareru*)	B	D
agent-implying transitive (e.g., *tsukamaeru*)	--	E
agent-implying intransitive (e.g., *tsukamaru*)	--	F



Note: The numbers refer to the respective hypotheses mentioned above, and * indicates a significant difference for that comparison.

3.4.5 Results

3.4.5.1 **The English version**

The mean rating was 6.36 (out of 7) for the transitive condition and 4.1 for the intransitive condition. Because the ratings did not follow a normal distribution, a paired Wilcoxon Signed Rank Test was used. Results show that the transitive conditions were rated significantly higher than the intransitive ($W(20) = 397$, $Z = -5.32$, $p < 0.001$), meaning that participants interpreted the transitive sentences to involve causality to a larger extent than the intransitive sentences.

3.4.5.2 **The Japanese version**

For the Japanese version, the mean rating was 5.48 (out of 7) for the transitive condition, 4.17 for the intransitive condition, 5.99 for the agent-implying transitive condition, and 5.08 for the agent-implying intransitive condition. Again, because the ratings did not follow a normal distribution, a Friedman test was used. The test revealed a main effect for constructions (χ^2 (3) = 4.80, $p < 0.001$). A Tukey's HSD post-hoc analysis further revealed that significant differences were found between intransitive and agent-implying intransitive ($p < 0.05$), intransitive and agent-implying transitive ($p < 0.001$), and transitive and intransitive ($p < 0.01$). The mean ratings and the standard deviations of the English and the Japanese versions are summarized in Table 3 and Figure 5, and the pairwise comparisons are shown in Table 4.

Table 3. Mean ratings of causality in English and Japanese (standard deviations in parentheses)

	Transitive	Intransitive	Agent-implying transitive	Agent-implying intransitive
English	6.36 (1.22)	4.1 (1.83)	N/A	N/A
Japanese	5.48 (1.83)	4.17 (2.18)	5.99 (1.77)	5.08 (2.03)

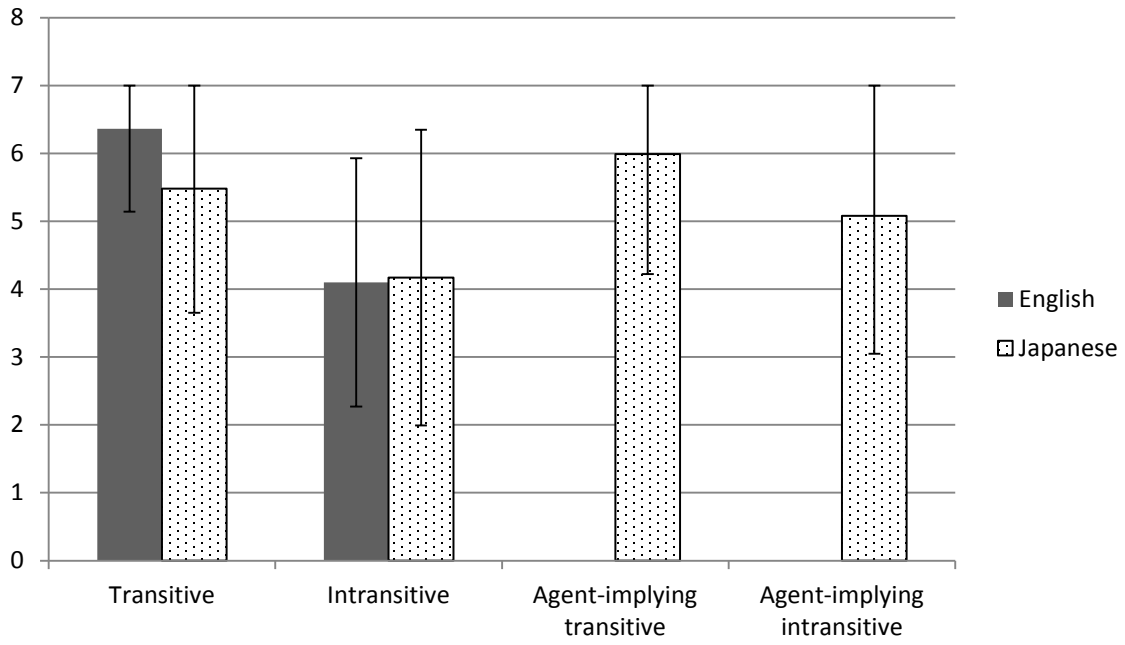


Figure 5. Mean ratings in English and Japanese (error bars = 1SD)

Table 4. Comparisons of ratings in Japanese

	Transitive	Intransitive	Agent-implying transitive	Agent-implying intransitive
Transitive	--	$p < 0.01$	n.s.	n.s.
Intransitive	--	--	$p < 0.001$	$p < 0.05$
Agent-implying transitive	--	--	--	n.s.

3.4.5.3 **Between-language comparisons**

A Mann-Whitney test was run to compare the ratings for the English transitive condition and those for the Japanese transitive condition, as well as the ratings for the English intransitive condition and those for the Japanese intransitive condition. It was found that the English transitive condition was rated significantly higher than the Japanese transitive condition ($W(40) = 110$, $p < 0.05$) was, whereas there was no significant difference between the English intransitive condition and the Japanese intransitive condition ($W(40) = 211.5$, $p > 0.05$).

3.4.6 Discussion

We hypothesized the following in the previous chapter. Based on the results, we have the following generalizations:

Hypothesis 1 is confirmed. The native English-speaking participants rated the (non-agent-implying) transitive condition higher than the (non-agent-implying) intransitive condition in English.

Hypothesis 2 is also confirmed. The native Japanese-speaking participants rated the (non-agent-implying) transitive condition higher than the (non-agent-implying) intransitive condition in Japanese.

Hypothesis 3 is confirmed. The native Japanese-speaking participants rated the agent-implying intransitive condition higher than the (non-agent-implying) intransitive condition in Japanese.

Hypothesis 4 is not confirmed. The native Japanese-speaking participants did not rate the agent-implying transitive condition significantly higher than the agent-implying intransitive condition.

Hypothesis 5 is not confirmed. The native Japanese-speaking participants rated the Japanese (non-agent-implying) intransitive condition equally with the native English-speaking participants in the English (non-agent-implying) intransitive verbs.

Hypothesis 6 is not confirmed. The native English-speaking participants rated the English (non-agent-implying) transitive condition higher than the native Japanese-speaking participants did in the Japanese (non-agent-implying) transitive condition.

In both English and Japanese, participants rated the items higher in the transitive condition than in the intransitive condition. This is expected, because the transitive sentences explicitly state that the human participants in the sentences caused the event to happen, whereas the intransitive sentences (e.g., *the clock broke*) do not state explicitly how the event happened.

Therefore, it was expected that participants would think that the human participant in the sentence was responsible for causing the event to happen when reading the transitive sentences, and thus give higher ratings for those sentences, whereas they would allow other possibilities as to the cause of the event for the intransitive condition, and thus give lower ratings in the intransitive condition.

What is interesting is the result of the Japanese agent-implying intransitive condition. A significant difference was found between the agent-implying intransitive condition and the non-agent-implying intransitive condition, but no significant difference was found either between the agent-implying intransitive condition and the transitive condition, or between the agent-implying transitive condition and the agent-implying transitive condition. We can see that there is a rather large difference between the mean rating in the agent-implying transitive (mean = 5.99) and the agent-implying intransitive (mean = 5.08) conditions, which we would expect to be significant. The lack of significant difference between these conditions may be attributed to the small population size (N=20). However, the data at least suggest that native Japanese-speaking participants see the agent-implying intransitive as being closer to transitive verbs than the non-agent-implying intransitive verbs. This is consistent with our hypothesis that agent-implying intransitive verbs, although they do not require an agent to be expressed in the surface syntactic structure, do imply the presence of an agent. This is in opposition to Langacker's (2008) characterization of the intransitive construction, where no agent is understood.

It was also found that the English transitive sentences were rated significantly higher than the Japanese transitive sentences. However, no explanation is offered at this point.

3.5 EXPERIMENT 2

Experiment 2 consists of a priming experiment. The methodology is largely based on Singer et al. (1992). The major difference is that, instead of manipulating the event such that inference may or may not be made, linguistic structures are manipulated (i.e., are the independent variable). An example is shown in (21).

(21) a. John was playing basketball beside his house.

b. While he was playing, he broke a clock (transitive)/

c. While he was playing, a clock broke (intransitive).

d. Can a basketball break a clock?

All participants read (21a), and then either a sentence involving a transitive structure, as in (21b), or a sentence involving an intransitive structure, as in (21c). Finally, they have to answer a general knowledge question such as (21d).

The rationale is explained in the following. (21a) gives the context of the event. When the participants read (21b), it would be normal for them to infer that John broke the clock with the basketball (e.g., by accidentally throwing the ball in the direction of the clock). Since this inference is created while reading the second sentence, participants would be primed and be able to answer the question in (21d) faster. On the other hand, participants who read the intransitive sentence in (21c) would not immediately infer that it was the basketball that caused the breaking of the clock. In fact, they may be more likely to understand this as "something caused the clock to break while John was playing basketball." Because the situation model of the basketball breaking the window is not created in the participants' minds, they should answer the question in

(21d) more slowly than those participants who have read the transitive counterpart. In other words, the transitive condition is close to the near causal condition in Singer et al. (1992), and the intransitive is close to the far/temporal conditions.

Because (21d) is a general knowledge question, the participants may notice that they do not really need to read the pair of sentences to be able to answer the question. To make sure the participants actually read and understood the sentence pair, a question asking about the content of the sentence pair followed the general knowledge question. In the case of (21), it would be a question such as "Did John play beside a house?"

3.5.1 Participants

The priming task was in two languages: English and Japanese. The English version was completed by native English speakers, and the Japanese version was completed by native Japanese speakers.

42 native English speakers completed the English version. Half of the participants completed List A and the other half completed List B, which will be explained below. They were all college students in the vicinity of Pittsburgh. Because the participants were mainly recruited through announcements in classes that were taught by professors in the Department of Linguistics at the University of Pittsburgh, 90% of them were taking Introduction to Linguistics at the time of participation. None of them are purely monolingual, because they were required to take language courses at the university, but during recruitment it was stressed that only native speakers who did not speak a second language fluently were eligible for the experiment, and this was confirmed orally before the experiment. They were compensated USD$10 for their participation.

46 native Japanese speakers completed the Japanese version. Again, half of the participants completed List A and the other half completed List B. They were all undergraduate students at Nagoya University, Japan. They were recruited through announcements in English classes. Because they were university students, they were believed to be intermediate learners of English. They were compensated JPY¥2000 (about USD$26). The compensation for the Japanese participants was set higher because of the higher living costs in Japan.

3.5.2 Materials

3.5.2.1 **The English version**

In order to construct stimuli like (20), I looked for English verbs that involve causative alternation. For example, *break* as in *John broke the window* is transitive, and *the window broke* is intransitive. Verbs like *eat* are not included; although one can say either *John has eaten lunch already* or *John has eaten*, the intransitive sentence does not involve an unaccusative verb. I found 43 suitable English verb pairs. Then I looked for the equivalents of these English verbs in Japanese. Interestingly, those that exist in English also exist in Japanese, but not the other way around. In other words, if a verb allows transitive/intransitive alternation in English, the corresponding verb in Japanese also allows transitive/intransitive alternation, but an alternating verb pair in Japanese may not be alternating in English. This is not surprising, as discussed in Chapter 2, Japanese is more tolerant than English in terms of allowing alternation, because Japanese also allows actions that must be caused by an animate agent to be described using an intransitive verb.

20 verbs of the 43 verb pairs were then used to make 40 stimuli (2 items per verb) that describe two different situations, resulting in a total of 80 items. The remaining verbs were not

used either because the transitive and intransitive counterparts of a verb can hardly be used in similar situations that only differ in causality (e.g., *the river split into two smaller streams* vs. *John split the river into two smaller streams*) or because they are one verb in Japanese (e.g., both *pop* and *crack* are translated as *waru/wareru* in Japanese). Care was taken to ensure that either possibility – that is, whether the event is caused by a human agent or not – are possible. This was to prevent the participants from making the same inference from the discourse regardless of the linguistic information. For example, in (20), it is possible that John broke the window in the course of playing basketball when the transitive counterpart is used, and when the intransitive counterpart is used, it is also possible that the window broke during the time John was playing basketball, but he had nothing to do with the breaking of the window. In contrast, if the stimulus is "John threw the ball at the window. He broke the window/the window broke," then the stimulus is a bad one because for both the transitive and intransitive verbs, the participants would probably come up with a similar situation – that is, John threw the ball at the window, the ball hit the window, and the window broke into pieces. In this case, there probably would not be a difference in response times because both groups of participants are primed by the same situation model created when they read the sentences.

Other factors that were controlled for were the uses of perfective and imperfective markers, as well as the back- and fore-grounding of the objects mentioned in the questions. As we have seen in Magliano and Schleich (2000) and Madden and Zwaan (2003), readers tend to have a better memory for verbs with imperfective markings than for those with perfective markings in English. Therefore, all the test verbs were in past tense (i.e., perfective). Similarly, backgrounded objects are predicted to be less activated than foregrounded objects. Therefore, this was also controlled.

The 80 items were divided into two lists, namely List A and List B, in the following way: For a given verb, if the transitive item in the first context was in List A, the intransitive version of the same verb in the second context was put in List B. It follows that the intransitive item in the first context and the transitive version in the second context was in List B. In other words, in each list there were one transitive and one intransitive item of the same verb. This is further illustrated in Table 5. The transitive/intransitive verb pairs used in both experiments were *break, wake, ring, shatter, stop, cool, burn, spill, move, roll, collapse, rotate, twist, increase, melt, open, pop, peel, grow,* and *tilt*. A complete list of sentences is shown in Appendix C.

Table 5. Structures of List A and B

Verb	**Context**	**Condition**	**List**
Break	Context 1 (break: clock)	Transitive (*he broke a clock*)	List A
		Intransitive (*a clock broke*)	List B
	Context 2 (break: fence)	Transitive (*he broke a fence*)	List B
		Intransitive (*a fence broke*)	List A

In addition to the 80 items, there were 20 baseline and 40 filler items (shown in Appendix E). The baseline items had a similar pattern to the stimuli, but the second sentence was purely a temporal one. An example would be "Mary was washing dishes. While she was rinsing the dishes, the phone rang." Obviously, the act of washing dishes in no way causes the phone to ring. The purpose of the baseline items was to test whether the participants would respond faster in the controlled conditions (i.e., transitive and intransitive) than when there was no inference can be made.

Each filler item consisted of a general knowledge question about an object that was mentioned in the first sentence, but not related to the situation. For example, after reading "*John was watching a movie with a bowl of popcorn. While he was watching, the popcorn spilled,*" the

participants had to answer the question “Is popcorn made from plastic?” Because all the target and baseline questions would elicit “yes” as an answer, the filler items also served the purpose of introducing “no” as the answer.

Since participants might react faster to sentences with the more frequent counterpart of the verb pair than the less frequent counterpart, the frequencies of the verbs were taken into account. In order to do so, the BNCweb corpus (2010) was consulted. This is the web-based version of the British National Corpus, of which 90% is written texts that consist of regional and national newspapers, journals, academic books, fictions, school and university essays, etc., and 10% is spoken data from people of different ages in a wide range of contexts. The corpus is estimated to have a size of 100 million words.

In order to find out the relative frequency of transitive to intransitive, the following steps were taken. First, the target verbs were searched for in the corpus. The search results came out in the order of the extracts that contain the verb (e.g., the extract that is named A1 will be listed earlier than another extract that is named B3), but they were randomized in order to avoid the effect of factors such as year of publication, nature of the text, etc. Then the first 100 results were analyzed manually, and put into one of the following categories: transitive, intransitive, excluded. Phrasal verbs were excluded. For example, *we broke up* were excluded for the verb *break*. Although one might argue that there is a semantic connection between *break up* and the prototypical meaning of *break*, there is not an easy way to draw a line to include or exclude any of these; therefore, all phrasal verbs were excluded altogether.

The procedures for Japanese verb pairs were simpler. Unlike English verbs, Japanese verbs have distinctive forms for the transitive and intransitive counterparts, and there are no phrasal verbs similar to those in English. For this purpose, *Nihongo no goi tokusei* (Lexical

properties of Japanese) (Amano & Kondo, 2000) was utilized. It is a database that lists the frequencies of the words used in news articles published from 1985 to 1998.

The relative frequencies were then calculated using the formula (transitive frequency)/(transitive frequency + intransitive frequency). This was done because the methods of extracting the frequencies are different for English and Japanese. Whereas the English method results in a fixed total number of tokens (i.e., 100) for each verb pair, the Japanese method does not. The formula thus eliminates this difference.

3.5.2.2 **The Japanese version**

The Japanese version had basically the same test items as the English version, except for 20 extra items. These 20 items were constructed with 20 agent-implying verb pairs[8] that are absent in English (e.g., *tsukamaeru/tsukamaru* "get caught"). The agent-implying verbs were selected from the appendix in Jacobsen (1992). The list of verbs is shown in Table 6. The items are shown in Appendix D, and the filler and baseline items are shown in Appendix F.

[8] The criterion for a verb being agent-implying is that the intransitive counterpart of the verb would be translated by Jacobsen (1992) into English as passive (e.g., *be caught*) or *become* [past participle of the transitive counterpart] (e.g., *become connected*).

Table 6. Japanese verbs used in Experiment 1 and 2

Transitive	**Intransitive**	**Agent-implying transitive**	**Non-agent-implying intransitive**
kowasu 'break'	*kowareru* 'break'	*mitsukeru* 'find'	*mitsukaru*
okosu 'wake'	*okiru* 'wake up'	*tsukamaeru* 'catch'	*tsukamaru*
narasu 'ring'	*naru* 'ring'	*tasukeru* 'help'	*tasukaru*
kudaku 'shatter'	*kudakeru* 'shatter'	*turu* 'fish'	*tureru*
tomeru 'stop'	*tomaru* 'stop'	*soroeru* 'collect'	*sorou*
hiyasu 'cool'	*hieru* 'cool'	*sadameru* 'decide'	*sadamaru*
kogasu 'burn'	*kogeru* 'burn'	*sonaeru* 'provide'	*sonaeru*
kobosu 'spill'	*koboreru* 'spill'	*tsunagu* 'connect'	*tsunageru*
ugokasu 'move'	*ugoku* 'move'	*kimeru* 'decide'	*kimaru*
korogasu 'roll'	*korogaru* 'roll'	*mazeru* 'mix'	*mazaru*
taosu 'collapse'	*taoreru* 'collapse'	*ueru* 'plant'	*uwaru*
mawasu 'turn'	*mawaru* 'turn'	*chirakasu* 'spread'	*chirakaru*
nejiru 'twist'	*nejireru* 'twist'	*tsutaeru* 'inform'	*tsutawaru*
fuyasu 'increase'	*fueru* 'increase'	*todakeru* 'send'	*todoku*
tokasu 'melt'	*tokeru* 'melt'	*umeru* 'bury'	*umaru*
akeru 'open'	*aku* 'open'	*someru* 'dye'	*somaru*
waru 'pop'	*wareru* 'pop'	*hameru* 'fit in'	*hamaru*
muku 'peel'	*mukeru* 'peel'	*tsukeru* 'switch'	*tsuku*
sodateru 'grow'	*sodatu* 'grow'	*nuku* 'remove'	*nukeru*
katamukeru 'tilt'	*katamuku* 'tilt'	*tateru* 'build'	*tatu*

3.5.3 Procedures

The present study largely follows the procedure of Singer et al. (1992), which is described in the following.

The experiment was conducted using the software E-Prime, and the participants read the sentences and questions on a computer screen. The participants read in a self-paced manner. The They first read the first sentence. When they had understood the sentence, they pressed the spacebar to continue. Then the second sentence appeared. After they had understood the sentence, they pressed the spacebar again. A fixation "+" then appeared for 500 ms. Then the first question (i.e., the general knowledge question) appeared. The participant had to answer the question as quickly and accurately as possible within 5s. If no response was received in 5

seconds, the answer was considered as “incorrect.” After the participants had answered the first question, the second question appeared. The participants again had to answer the question in 5 seconds. After the question was answered, the next item appeared, and the procedures repeated.

A training session with 8 items unrelated to the purpose of the present study was administered to the participants to familiarize them with the procedures. All items in the trial session were randomized in such a way that all participants did the items in a different order. The English-speaking participants and the Japanese-speaking participants took 30 and 40 minutes on average, respectively, to finish the task.

3.5.4 Hypothesis

Based on our research questions, the hypotheses were as follows:

Hypothesis 1: English native speakers would respond faster in the (non-agent-implying) transitive condition than in (non-agent-implying) intransitive condition, because (non-agent-implying) transitive constructions, but not (non-agent-implying) intransitive constructions, allow participants to create causative inference.

Hypothesis 2: Japanese native speakers would respond faster in the (non-agent-implying) transitive condition than in the (non-agent-implying) intransitive condition, because transitive constructions, but not non-agent-implying intransitive constructions, allow participants to create causative inference.

Hypothesis 3: Japanese native speakers would respond faster in the agent-implying intransitive condition than in the (non-agent-implying) intransitive condition, because agent-implying intransitive verbs imply causation, whereas non-agent-implying intransitive verbs do not.

Hypothesis 4: Japanese native speakers would respond faster in the agent-implying transitive condition than in the agent-implying intransitive condition, because agent-implying transitive verbs more explicitly allow participants to create causative inference by stating the agent than agent-implying intransitive verbs.

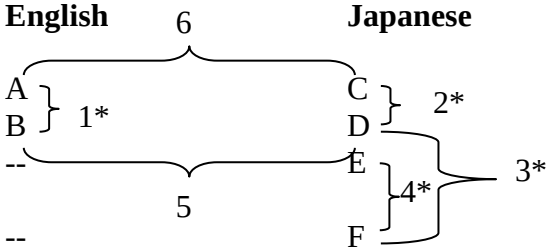
Hypothesis 5: Japanese native speakers would respond faster in the Japanese non-agent-implying intransitive condition than English native speakers in the English non-agent-implying intransitive verbs in Japanese, because Japanese native speakers in general use more intransitive constructions to describe causative events (Fausey et al., 2010).

Hypothesis 6: Japanese native speakers would respond as fast as English native speakers in the transitive condition in their respective languages.

Again, the hypotheses are summarized in Table 7.

Table 7. Summary of hypotheses for Experiment 2

Condition	**English**		**Japanese**
transitive (e.g., *break, kowasu*)	A	1*	C
intransitive (e.g., *break, kowareru*)	B		D
agent-implying transitive (e.g., *tsukamaeru*)	--	5	E
agent-implying intransitive (e.g., *tsukamaru*)	--		F



Note: The numbers refer to the respective hypotheses mentioned above, and * indicates a significant difference for that comparison.

3.5.5 Results

3.5.5.1 **English version**

Questions to which participants did not respond and response times that were greater than 3 standard deviations from the means for each question were excluded. The mean accuracy of answers to the target question was 92.9% (range = 88.0 – 99.0%). The data were treated in this way because response time data can vary considerably (e.g., some participants took particularly long for one question because they were not paying attention at that moment) and it is a common practice to treat response time data (e.g., Wilson, Rinck, McNamara, & Bower, 1993; Rinck, Bower, & Wolf (1998) used 2.5 standard deviation). These treatments excluded about 2% of the entire data. After the exclusion of outliers, the means for the transitive and intransitive constructions were 1402 milliseconds (SD = 598) and 1403 milliseconds (SD = 620).

When the experiment was designed, it was predicted that the relative frequency of transitives and intransitives in discourse (i.e., the frequencies obtained for each verb using the BNCweb) might have an effect on the response times, in the sense that participants would react faster to more frequent member of the verb pair than to the less frequent counterpart. However, an ANCOVA test revealed that the effect of relative frequency was not significant ($p = 0.955$). Therefore, relative frequencies were excluded from the model.

An ANCOVA model with participant as a random effect and the length of the question (measured in number of letters) and type of construction (e.g., transitive and intransitive) as the fixed effects showed a significant effect of lengths of the questions ($p < 0.05$), but the effect of the type of construction was not significant.

3.5.5.2 **Japanese version**

Likewise, zero response times and response times greater than 3 standard deviations from the means for each question were excluded. The mean accuracy of answers to the target question was 95.0% (range = 90.0% - 99.2%). These treatments excluded about 2% of the data. Response times to four items in the agent-implying condition were also excluded. This is because they did not satisfy the criterion that they would be translated into passive or the become-past participle form in English. After the exclusion, the mean response times are as shown in Table 8 and graphically in Figure 6.

Table 8. Mean response times of English- and Japanese-speaking participants in the priming task (standard deviations in parentheses)

	Transitive	Intransitive	Agent-implying transitive	Agent-implying intransitive
English	1402 (598)	1403 (620)	--	--
Japanese	1292 (585)	1328 (618)	1573 (613)	1563 (643)

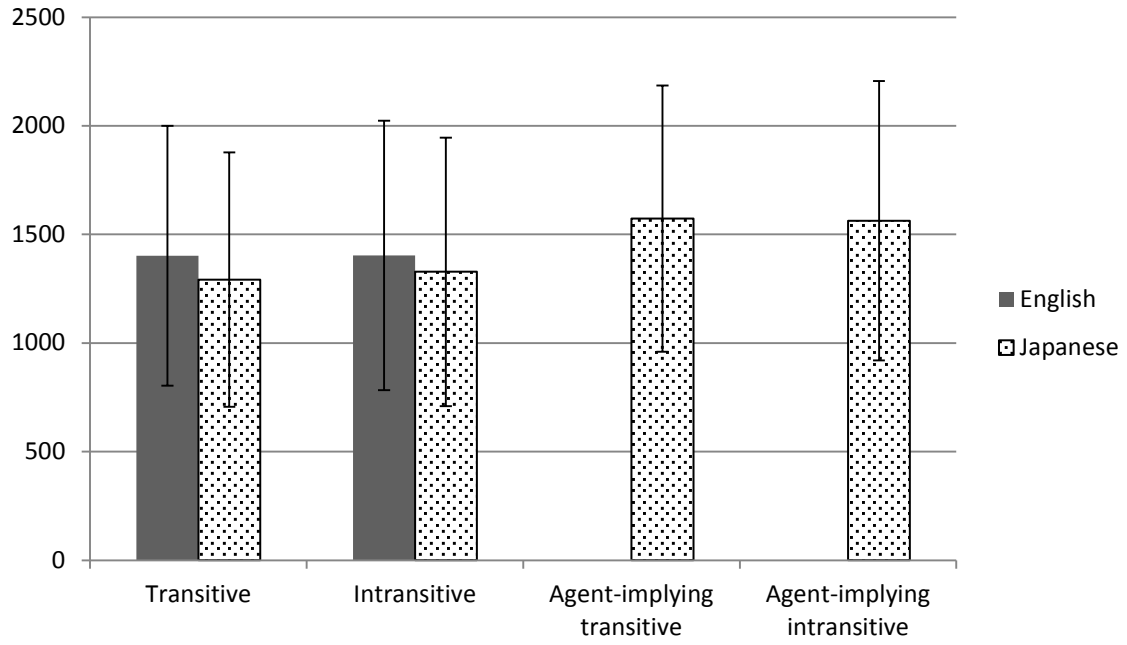


Figure 6. Mean response times in English and Japanese (error bar = 1SD)

Again, an ANCOVA test was used, with participant as a random effect and the length of sentences (measured in number of characters) and type of construction as the fixed effects. The model suggests main effects for both the length of sentences and the type of construction. Post-hoc pairwise comparisons showed that participants responded faster (1) in the intransitive condition than in the agent-implying intransitive, (2) in the transitive condition than in the agent-implying intransitive condition, (3) in the intransitive than in the agent-implying transitive condition, and (4) in the transitive condition than in the agent-implying transitive. The results are summarized in Table 9.

Table 9. Pairwise comparison of response times in Japanese

	Transitive	Intransitive	Agent-implying transitive	Agent-implying intransitive
Transitive	--	n.s.	$p < 0.001$	$p < 0.001$
Intransitive	--	--	$p < 0.001$	$p < 0.001$
Agent-implying transitive	--	--	--	n.s.

The results show that participants responded significantly more slowly to agent-implying verb pairs than to the non-agent-implying verb pairs. To explain this finding, we will look at this issue from a broader perspective, which will be discussed in Chapter 4.

3.5.6 Discussion

Revisiting our hypotheses, we obtained the following generalizations:

Hypothesis 1 is <u>not</u> confirmed. The native English-speaking participants did not respond faster in the transitive condition than in non-agent-implying intransitive condition.

Hypothesis 2 is also not confirmed. The native Japanese-speaking participants did not respond faster in the transitive condition than in the non-agent-implying intransitive condition.

Hypothesis 3 is not confirmed. The native Japanese-speaking participants did not respond faster in the agent-implying intransitive condition than in the non-agent-implying intransitive condition. On the contrary, they responded faster in the non-agent-implying intransitive condition than the agent-implying intransitive condition.

Hypothesis 4 is not confirmed. The native Japanese-speaking participants did not respond faster in the agent-implying transitive condition than in the non-agent-implying intransitive condition.

Hypotheses 5 and **6** are not verified, because fair cross-linguistic comparisons were not possible due to the difference in the way the lengths of questions are measured; that is, the length of the questions in Japanese was measured in terms of the hiragana syllabary and Chinese characters, whereas the length of the questions in English was measured in terms of the number of letters.

The results of the transitive and intransitive conditions in both English and Japanese are inconsistent with our hypotheses, in that the transitive condition is not significantly faster than the intransitive condition. There is one reason that this may be the case. If we look at the results of the questionnaires, we can see that the mean ratings for the intransitive questions in both English and Japanese are very close to 4 (i.e., neutral), which means that the participants think that both possibilities are plausible – that is, the event may or may not be brought about by the person mentioned in the sentence. To illustrate, when the participants read the intransitive item *John was playing basketball inside his house. While he was playing, the clock broke*, they may still interpret this as John breaking the clock. In other words, the participants in the priming task may have somehow created a situation in which the person in the sentence performs an action that causes the event to happen, even when reading the intransitive sentences.

This speculation was tested using Spearman correlation tests between the ratings and the response times. Instead of using the actual ratings, the average ratings were transformed to 1, 0, and -1 according to the value of the ratings. Ratings larger than 4 were coded as 1, those less than 4 were coded as -1, and those equal to 4 were coded as zero. The ratings were transformed in this way because we were interested in whether the evoking of an agent will cause the participants to react faster to a question that implies an agent. In a sense, an agent is either evoked or not. In other words, a rating of 7 is similar to a rating of 6 because both of them would mean that an agent is evoked. A similar method was adopted by Zwaan, Langson, and Graesser (1995), who also argued that some factors (e.g., whether two events are causally related or not) are dichotomous. Thus, this is believed to be a reasonable method of transformation.

The response times were also transformed to eliminate the effect of the length of the questions. The response times were divided by the natural log of the lengths of the number of letters in English and the number of characters (hiragana syllabary and Chinese characters in Japanese) of the questions.

It was found that the correlations between the transformed mean ratings and the transformed mean response times were significant in both English ($\rho(79) = -0.24$, $p < 0.05$) and in Japanese ($\rho(119) = -0.25$, $p < 0.05$). The results therefore suggest that the response times and the ratings are negatively correlated, and the claim that the lack of significant differences between the transitive and the intransitive conditions in both English and Japanese may be due to the rather neutral mean ratings for the intransitive condition is supported.

It is also surprising that response times for the agent-implying verbs (both transitive and intransitive) were significantly longer than the transitive and the intransitive condition in Japanese. This suggests either (1) that the Japanese participants created a situation model from

reading the sentences without evoking an agent or instrument, or (2) that there is some other source of processing difficulties for these verbs, or both. How are agent-implying verbs different from non-agent-implying ones? In fact, little is said about agent-implying verb pairs in the literature. At this point, we can only speculate on what is so special about these verbs. The next chapter will discuss the possible explanations of the results obtained. I argue that both are possible causes for longer response times of the participants.

3.6 SUMMARY

Chapter 3 describes the two experiments conducted for the present dissertation, their results, and the discussions of the results. Experiment 1 involved a rating test in which participants were presented with sentences in their native language and were asked to rate how likely the events described in the sentences were caused by the animate entity also mentioned in the sentence pairs. The sentence pairs contained either a transitive or an intransitive sentence (i.e., the transitive and intransitive conditions). Results show that the native English-speaking participants rated the transitive condition significantly higher than the intransitive condition, which means that English-speaking participants think it is more likely that the events were brought about by an animate agent when reading the transitive sentences than when reading the intransitive sentences.

Similarly, Japanese-speaking participants rated the transitive condition significantly higher than the intransitive condition. What is interesting is that the Japanese participants also rated the agent-implying intransitive condition significantly higher than the (non-agent-implying) intransitive condition, meaning that the Japanese participants were more likely to infer the

presence of an agent when reading the agent-implying intransitive condition than when reading the non-agent-implying intransitive condition. This appears to contradict with the claim that the intransitive construction is understood to have no (implied) agent, which is often suggested in previous research (e.g., Guerssel et al., 1985; Haspelmath, 1993; Langacker, 2008; Levin, 1993).

Experiment 2 involves a priming experiment designed based on Singer et al. (1992), in which the participants were asked to read the same sentence pairs as in the rating test, and respond as quickly as possible to a question regarding whether the potential instruments mentioned in the sentence pairs have the potential to cause the event to happen. It was hypothesized that participants would respond faster to the question if they had read a sentence that would lead them to create a situation model of a causative event (i.e., transitive, agent-implying transitive, and agent-implying intransitive). However, for both English and Japanese, the participants did not respond faster in the transitive condition than in the intransitive condition. In the case of Japanese, the agent-implying verb pairs (both transitive and intransitive) were responded to more slowly than the non-agent-implying verb pairs.

The lack of a significant difference between the transitive and intransitive conditions in both English and Japanese is explained in relation to the results of the rating test in Experiment 1. The mean ratings for the intransitive conditions in both English and Japanese were close to 4, which is in the middle of the scale. In other words, participants may have created a causal event while reading the intransitive sentences. The significant correlations between the mean ratings and the mean response times in both English and Japanese support this explanation.

It has been confirmed that the Japanese participants required more time for sentences with agent-implying verb pairs. Because agent-implying verbs are rather new in the field and no

extensive research has been done on them, the next chapter will discuss the possible explanations for the results.

4.0 GENERAL DISCUSSION

In the literature review, we have seen that there seems to be a different category of intransitive verbs in some languages, namely “agent-implying intransitive verbs” (Pardeshi, 2008). To our knowledge, these verbs exist in Marathi, Hindi, and also Japanese. In the rating experiment, we have seen that the agent-implying intransitive verbs indeed behave differently from the non-agent-implying intransitive verbs in the sense that Japanese native speakers see the agent-implying intransitive to imply an agent, making it closer to the transitive and less similar to the non-agent-implying intransitive.

However, the priming experiment did not yield consistent results. First, the transitive and intransitive conditions did not show a significant difference in either English or Japanese. This may be due to the fact that some of the participants also came up with a situation where causality is involved when reading an intransitive sentence, as shown by the mean rating of 4 for the intransitive conditions in both languages. The participants, however, responded to the agent-implying verb pairs, both the transitive and the intransitive, significantly more slowly than to the non-agent-implying verb pairs. The question we need to address here is why this is the case.

4.1 FOCUSING ON SUB-EVENT IN JAPANESE

Because agent-implying intransitive verbs are not widely discussed in the literature, we can only make some speculations based on the results we obtained. One possibility is that these verbs have a stronger tendency than other verbs to force the readers to focus on the results, or at the change of state of the patient, rather than the causation. Kageyama (1996), for example, discussed a super-event (x ACT on y) and a sub-event (y BECOME STATE z), and claims that English views an event from the perspective of a causer, taking the super-event as the basic and extending it to the resultative state of the patient, as illustrated in Figure 6. Japanese, in contrast, views the event from the perspective of the patient that undergoes changes, taking the sub-event as the basic and gradually extending attention to result and the causation, as shown in Figure 7.

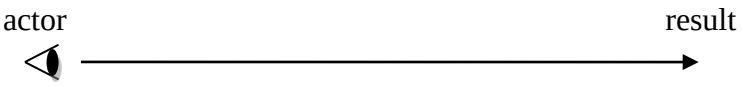


Figure 7. Action-type perspective in English (adapted from Kageyama, 1996, p. 276)

Figure 8. Become-type perspective in Japanese (adapted from Kageyama, 1996, p. 284)

This claim that Japanese focuses on the sub-event rather than super-event helps explain our results. When Japanese participants read the agent-implying verbs, they may focus more on the patient and its end state and pay less attention to the process that caused the change of the state of the patient. Thus, when they read sentences in the priming experiment, even though the sentences have verbs that are agent-implying, their attention was on the patient/theme

undergoing changes (i.e., the sub-event), rather than the action the caused the sub-event (i.e, the super-event).

This idea coincides with Ikegami's (1981) claim that Japanese is a BECOME-language, and develops it further by providing an explanation of the difference between English and Japanese in terms of their event conceptualization. Ikegami (1981, 1991) claimed that Japanese prefers to describe an event as if it happens spontaneously. This means that Japanese prefers not to focus on the external cause of an event. Similarly, Kageyama (1996) suggested that Japanese focuses on the sub-event, which describes the change of state. Causation or the causer, even if it exists, does not receive attention of the speaker. In other words, Kageyama gave a more concrete cognitive difference between English and Japanese by elucidating the issue in terms of the conceptual structure.

However, we will still have to explain why agent-implying verb pairs are different from non-agent-implying verb pairs, since participants took significantly longer to respond to the agent-implying verb pairs than to the non-agent-implying verb pairs. Recall that agent-implying intransitive verbs are non-prototypical intransitive verbs across languages. They are so uncommon that Guerssel et al. (1985) claim that verbs that involve an instrument (e.g., *cut*) cannot be intransitive because the word *cut* implies an instrument such as a knife or a pair of scissors, an instrument further implies an animate agent who is able to make use of the instrument, and an action that involves an agent cannot be described intransitively.[9] In other words, although a prototypical intransitive construction is often not as defined as a prototypical transitive construction, one might at least conclude that a prototypical intransitive construction is not understood to involve external causation. Therefore, agent-implying intransitive verbs in

[9] It is noted by Gruerssl et al (1985) that middle constructions such as *the meat doesn't cut easily* is possible.

Japanese, and also in other languages, are non-prototypical, in the sense that they imply an agent, yet are intransitive verbs.

On the other hand, they are not prototypical transitive events, either. Recall that a prototypical transitive event involves an entity A exerting a force intentionally onto another entity B, causing entity B to undergo changes. However, 18 out of the 20 agent-implying verb pairs (exceptions are *someru/somaru* 'dye/be dyed' and *tateru/tatsu* 'build/be built') do not involve internal changes in the patient/theme. The change involved is at most a change in location. For example, *todokeru/todoku* 'deliver/arrive' only involves a change in location or possession of an object, but does not involve in any internal changes to the object (e.g., the object changes from being solid to liquid). Thus, these events are also not prototypical transitive events. In fact, it is probably because of their non-prototypical transitive nature that their intransitive counterparts exist. That is, agent-implying (in)transitive events are neither prototypical transitive or prototypical intransitive; they belong to an intermediate category between the transitive and intransitive poles.

Why, then, do these non-prototypical verbs exist in Japanese? From a usage-based perspective, they must have emerged from the needs of the language users. As discussed above, Japanese has a tendency to pay less attention to causation and prefers to describe events as if they happen spontaneously (e.g., Ikegami, 1981, 1991; Kageyama, 1996). In fact, if we look at the morphological complexity of the verb pairs used in the two tasks, they were mainly either "causative alternations" (5 out of 20) or "equipollent alternations" (13 out of 20) in Haspelmath's (1993, p. 91) terms, where causative alternations refer to verb pairs of which the inchoative is more basic and the causative counterpart is derived, and equipollent alternations refer to verb pairs of which neither the inchoative is derived from the causative, nor the causative from the

inchoative. The non-agent-implying verb pairs, on the other hand, appear to have a more even distribution between the two types of alternation plus the anticausative type of alternation (i.e., the transitive counterpart is more basic). The agent-implying and non-agent-implying verb pairs, as well as their alternation types, are shown in Table 10. In other words, the existence of these non-prototypical intransitive verbs in Japanese may signify native Japanese-speakers' preference to focus on the change of state for these events, regardless of whether the verb is transitive or intransitive.

Table 10. Verb pairs used in the present study and their types of alternation

Transitive	**Intransitive**	**Alternation type**	**Agent-implying transitive**	**Non-agent-implying intransitive**	**Alternation type**
kowasu 'break'	*kowareru* 'break'	anticausative	*mitsukeru* 'find'	*mitsukaru*	equipollent
okosu 'wake'	*okiru* 'wake up'	equipollent	*tsukamaeru* 'catch'	*tsukamaru*	causative
narasu 'ring'	*naru* 'ring'	causative	*tasukeru* 'help'	*tasukaru*	equipollent
kudaku 'shatter'	*kudakeru* 'shatter'	anticausative	*turu* 'fish'	*tureru*	anticausative
tomeru 'stop'	*tomaru* 'stop'	equipollent	*soroeru* 'collect'	*sorou*	causative
hiyasu 'cool'	*hieru* 'cool'	equipollent	*sadameru* 'decide'	*sadamaru*	equipollent
kogasu 'burn'	*kogeru* 'burn'	equipollent	*sonaeru* 'provide'	*sonaeru*	equipollent
kobosu 'spill'	*koboreru* 'spill'	causative	*tsunagu* 'connect'	*tsunageru*	equipollent
ugokasu 'move'	*ugoku* 'move'	causative	*kimeru* 'decide'	*kimaru*	equipollent
korogasu 'roll'	*korogaru* 'roll'	equipollent	*mazeru* 'mix'	*mazaru*	equipollent
taosu 'collapse'	*taoreru* 'collapse'	anticausative	*ueru* 'plant'	*uwaru*	equipollent
mawasu 'turn'	*mawaru* 'turn'	equipollent	*chirakasu* 'spread'	*chirakaru*	equipollent
nejiru 'twist'	*nejireru* 'twist'	anticausative	*tsutaeru* 'inform'	*tsutawaru*	equipollent
fuyasu 'increase'	*fueru* 'increase'	equipollent	*todokeru* 'send'	*todoku*	causative
tokasu 'melt'	*tokeru* 'melt'	equipollent	*umeru* 'bury'	*umaru*	equipollent
akeru 'open'	*aku* 'open'	causative	*someru* 'dye'	*somaru*	equipollent
waru 'pop'	*wareru* 'pop'	anticausative	*hameru* 'fit in'	*hamaru*	equipollent
muku 'peel'	*mukeru* 'peel'	anticausative	*tsukeru* 'switch'	*tsuku*	causative
sodateru 'grow'	*sodatu* 'grow'	causative	*nuku* 'remove'	*nukeru*	anticausative
katamukeru 'tilt'	*katamuku* 'tilt'	causative	*tateru* 'build'	*tatu*	causative
Total N of anticausative		6			2
Total N of causative		6			5
Total N of equipollent		8			13

The longer processing time is thus probably due to the non-prototypicality of the types of events: they are neither prototypical transitive events nor prototypical intransitive events. Prototypically, events with an agent should be described transitively. Therefore, we see that in the majority of languages, there is no problem in lexicalizing these events with transitive verbs (e.g., *kill*, *find*). However, the nature of these events seems to cause the sub-event to be more salient. For example, in the criminal-got-caught example, based on our world knowledge and experience, we know that it is almost always a police officer who catches a criminal. What we often care about most is whether the criminal is caught or not. This might have forced the language to 'create' an intransitive verb for the situation. In fact, the large number of equipollent alternations in the agent-implying verb pairs supports this claim, in the sense that, whereas it is more 'normal' for these events to be described by transitive verbs, the intransitive counterparts have come to be equally important, and thus morphologically more basic.

Therefore, the non-prototypicality of these verbs may be the source of slower processing times. In fact, we have seen that in many linguistic domains, non-prototypical cases are usually more 'difficult.' For example, children are reported to learn past tense morphology with telic verbs earlier than atelic verbs, because atelic verbs with past tense morphology are non-prototypical (e.g., Andersen & Shirai, 1994).

This explanation gives us an interesting perspective on the intransitive construction across languages. As discussed in the literature review, it has been generally believed that actions that must involve an animate agent cannot be described intransitively (e.g., Guerssel et al., 1985; Levin, 1993). However, we have shown that Japanese, together with some other languages, have agent-implying intransitive verbs. Contrary to our hypotheses, Japanese native speakers do not seem to evoke an agent immediately while reading these intransitive verbs. Instead, they

appeared to focus more on the change of the patient/theme. That means the form (i.e., transitive or intransitive) of a verb is not limited by the objective viewing of the action described by the verb. Rather, it can be determined by the subjective viewing of the action. In other words, regardless of whether an action involves an agent or not from an objective perspective, if the speaker chooses to focus only on certain parts of the entire causation event, the event can still described intransitively. This claim contradicts the approach to verb semantics adopted by Levin (1993) and Guerssel et al. (1985), who suggest that verb forms are based on our universal conception of an event. The present study seems to suggest that, although our universal conceptualization of an event might be a major factor jn whether a verb is transitive or intransitive, subjective preferences may alter this general constraint in some languages.

4.2 TELICITY AND PUNCTUALITY OF AGENT-IMPLYING INTRANSITIVE VERBS

The second possible explanation is concerned with the punctuality and telicity of these verbs. In Japanese, *-te i-* has either a progressive or resultative meaning, depending on the lexical aspect of the verb to which it attaches. For a verb with duration (e.g., *hashiru* 'run'), attachment of the *-te i-* marker results in progressive reading (i.e., *hashit-tei-ru* 'running'). For a punctual verb (e.g., *shinu* 'die'), attachment of the marker would result in resultative meaning (i.e., *shin-dei-ru* 'being dead') (e.g., Shirai, 2000). Using this test, we can see that eight out of 20 of the non-agent-implying intransitive verbs are durative (e.g., *tokeru* 'melt'), and that some of these

verbs are even atelic (e.g., *mawaru* 'turn')[10]. On the other hand, all 20 agent-implying intransitive verbs used in this study have a resultative meaning when the *–te i-* is attached, meaning that all the intransitive verbs have a punctual property (see Table 10 for the list of verbs).

In fact, a similar observation was also made by Shirai (1998). He claimed that intransitive change-of-state verbs are almost always punctual (i.e. achievements) while their transitive counterparts are often durative (i.e. accomplishments). We have seen that all 20 agent-implying intransitive verbs in this study are punctual, and that there are some non-agent-implying change-of-state verbs that are potentially interpreted as durative (e.g., *mawaru* 'turn').

If the meanings of these agent-implying intransitive verbs are not durative, they probably do not linguistically refer to a process. For example, when the participants read the sentence '*hannin-ga tsukamatta* 'the criminal was arrested,' the situation model that they would create in their mind might be a criminal in jail or in a police car, but they may not have the situation in which a policeman put a handcuff on the criminal's hand or other events that happened before the criminal was under the control of the police. Therefore, even though these verbs imply an agent, the lack of linguistic focus on the process may have caused the participants to neglect the external cause and only focus on the result of the event. In other words, there is a distinction between linguistic meaning and real-world denotata: only part of what happens in real world is expressed linguistically.

[10] These verbs are potentially interpreted as durative: *naru* 'ring,' *hieru* 'cool,' *ugoku* 'move,' *korogaru* 'roll,' *mawaru* 'turn,' *fueru* 'increase,' *tokeru* 'melt,' *sodatu* 'grow'.

4.3 TOWARDS A PROTOTYPICAL INTRANSITIVE CONSTRUCTION

The non-prototypical use of the intransitive construction leads us into thinking about what a prototypical intransitive construction is. As mentioned above, Malchukov (2005) pointed out that a prototypical intransitive construction is defined in negative terms, as something that is not transitive. However, this characterization seems to be inconsistent with Hopper and Thompson (1980). As discussed in the Chapter 3, one of Hopper and Thompson's parameters is punctuality: punctual events such as 'breaking a bone' are considered to have higher transitivity than non-punctual events such as 'building a house.' If a prototypical intransitive construction is what is NOT a prototypical transitive construction, one should expect a typical intransitive construction to be non-punctual.

However, many unaccusative intransitive verbs that are often considered to be prototypical intransitive verbs (e.g., *break*, *fall*) are in fact punctual. The present study has also presented some non-prototypical intransitive verbs (i.e., agent-implying intransitive verbs), and claimed that many of them are in fact punctual. Therefore, it seems that the claim that 'intransitive' equals 'not transitive' is not totally accurate.

We have also discussed in Chapter 2 that a split in transitivity, namely unergative and unaccusative, is often seen in languages. In fact, we can also see a 'split' in terms of the lexical aspect of these two kinds of verbs. As mentioned above, many unaccusative verbs such as *die* and *fall* are punctual and telic. On the other hand, many unergative verbs such as *walk* and *run* are durative and atelic.

While split intransitivity was often explained in syntactic terms by generative linguists (e.g., Burzio, 1986), there are also discussions on the issue from a semantic perspective. Van Valin (1990), for example, argued that split intransitivity is better explained in semantic terms.

Using Vendler's verb classification, he claimed the following for verbs that take one macrorole: "[I]f the verb has an activity predicate in its LS (logical structure)…the macrorole will be actor; otherwise it will be undergoer." (van Valin, 1990, p. 227)

To illustrate, the verb *run* has a logical structure **run'** (x), where the predicate **run'** meets the requirement of an activity based on Dowty's (1979) test. Because it has only one argument in the LS, the argument will be an actor. In the case of *broke*, for example, it has the logical structure BECOME **broken'** (x). Because it does not have an activity predicate based on Vendler's test, the argument will be an undergoer.

This is interesting, because it matches with our observations regarding the correlation between split intransitivity and lexical aspect. Van Valin's claim is that a verb with an activity will have an agent as the macrorole or subject. Since an activity by definition is durative, verbs that take the agent as the subject should then be durative. This is indeed the case. We have seen that unergative verbs, which by definition are verbs with an external argument (and thus agent), are often duratives, which take an agent/actor as their subject. The unaccusative verbs, on the other hand, contain a non-activity predicate, and thus they could be durative (e.g., *the wheel is turning*) or punctual (e.g., *the man disappeared*), although based on our observations it seems that punctual unaccusative verbs are more common.

Despite the split-view on intransitivity being dominant in the field, Shibatani (2006) seems to suggest that there is no need to distinguish between unergative and unaccusative, claiming that the only difference between causative and non-causative events is whether the action originates "with an agent heading the action chain distinct from the agent or patient of the main action" (p. 230). If there are two distinct agents, then it is a causative; if not, it is a noncausative. This is illustrated in Figure 8.

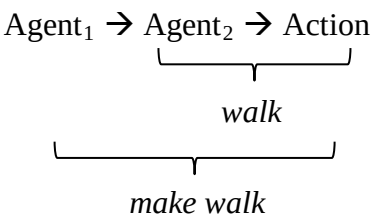


Figure 9. Causative action chain (adapted from Shibatani, 2006)

He explains that *John made Bill walk* has two distinct agents, and thus is a causative sentence. It contrasts with *Bill walked*, which only has one agent, and thus is a non-causative sentence. He also explained that *John killed Bill* is also causative because there are two distinct entities. Thus it seems that he does not distinguish between *Bill walked* and *Bill died*, which would be the non-causative version of *John killed Bill*, in the sense that both types of events (i.e., unergative and unaccusative) lie on the same action chain.

Comparing the split-view and Shibatani's view on intransitivity semantically, it appears that the major difference is the degree of control: unergative verbs such as *run* and *walk* involve the subject's control over the event (e.g., the subject has the power to start and stop the running), whereas unaccusative verbs such as *break* and *melt* do not (e.g., the subject does not have the power to decide when to break). On the other hand, the two types of intransitive verbs are similar, as characterized by Shibatani, in the sense that the subject in both cases could be argued to be an undergoer. In the case of *run* or *walk*, the subject is the one that undergoes movement and the activity of running/walking; in the case of *break* or *melt*, the subject is the thing that undergoes changes of state.

In fact, Sorace (2000) suggested that unaccusative and unergative verbs are on a continuum. She proposed a hierarchy of intransitive verbs based on auxiliary selection in

Western European languages such as Italian and French, and argued that the hierarchy is sensitive to telicity and agentivity. The hierarchy is shown in Table 11.

Table 11. Sorace's (2000) Auxiliary Selection Hierarchy

CHANGE OF LOCATION (e.g., 'arrive')	selects BE (least variation)
CHANGE OF STATE (e.g., 'decay')	
CONTINUATION OF A PRE-EXISTING STATE (e.g., 'remain')	
EXISTENCE OF STATE (e.g., 'sit')	
UNCONTROLLED PROCESS (e.g., 'tremble')	
CONTROLLED PROCESS (MOTIONAL) (e.g., run)	
CONTROLLED PROCESS (NONMOTIONAL) (e.g., 'chat')	selects HAVE (least variation)

Looking at Italian, French, German, and Dutch, she demonstrated that unaccusative and unergative verbs are not two distinct categories, but lie on the two extremes of a continuum, in the sense that, while verbs on the unaccusative end (i.e., change-of-location, change-of-state verbs) usually only select 'be' as the auxiliary, and verbs on the unergative end (i.e., verbs denoting controlled processes) often only select 'have' as the auxiliary, there are intermediate verb classes (i.e., classes in the middle of the hierarchy) that can select either. She also showed that verbs on the 'be' end tend to be telic and those on the 'have' end tend to be agentive. These observations coincide with van Valin's (1990) characterizations discussed above.

Although the present study does not focus on prototypical intransitive verbs, by looking at the non-prototypical use of intransitive verbs (i.e., agent-implying intransitive), we at least have a better idea of what a prototypical intransitive construction should be: a case frame that is used to describe either an uncontrolled change-of-state event, or a controlled agentive event.[11]It also expands our current understanding that intransitive verbs are not limited to (perceived-) agent-less events.

[11] Active languages may be an exception, because different verb types (e.g., run vs. arrive) may appear in different case frames.

To conclude, although the priming task did not give results consistent with our hypotheses, both the rating experiment and the priming experiment have shown that agent-implying intransitive verbs do have a special status: (1) The rating experiment shows that agent-implying intransitive verbs are different from non-agent-implying intransitive verbs in the sense that native speakers understand the presence of an agent for the former and not for the latter, and (2) the priming experiment illustrates the non-prototypical nature of agent-implying verb pairs, such that longer processing time was needed for the participants to comprehend them.

The inconsistency in the results of the two experiments may be due to the differences in the nature of the two experiments. First, the rating experiment is an offline task, whereas the priming experiment is an online task that requires a speedy response. The rating experiment may allow more time than the online priming experiment does for the participants to connect their real world knowledge with the linguistic meanings of the sentences when trying to comprehend them. Therefore, in the rating experiment, they may be able to understand that actions such as finding and arresting need to be done by human agents, which is something they may not be able to do in the priming task. Second, the rating experiment asked about the agent directly, whereas the priming experiment asked about the instrument, assuming that the instrument would imply the agent. However, the connection between agent and instrument may not be as strong as previously assumed. Therefore, the priming experiment produced different results than the rating experiment.

4.4 SUMMARY

In this chapter, I discussed two possible explanations for the results obtained from the rating and the priming experiment. First, as argued by Kageyama (1996), Japanese is a language that prefers to focus on the sub-event (i.e., y BECOME z). This preferred-focus on sub-event in Japanese may have caused the native Japanese participants to focus more on the change of state, and less on the causation process (i.e., the super-event). Moreover, the existence of non-prototypical agent-implying intransitive verbs may indicate the preference or the importance in conceptualization in Japanese to focus on the sub-event for these particular events that can be described with agent-implying intransitive verbs. Therefore, the Japanese participants might not have created a situation model with a super-event involving agent (e.g. police) for these events and responded more slowly, regardless of whether they had read a transitive sentence or not. The atypical (neither transitive nor intransitive) nature of agent-implying verbs is also argued to be a source of longer processing time.

The second explanation goes hand in hand with the first one. It concerns the lexical aspect of the agent-implying intransitive verbs. It has been shown that whereas some of the non-agent-implying intransitive verbs are durative, all 20 agent-implying intransitive verbs in this study are punctual. That means none of the agent-implying intransitive verbs refer to a process. Participants, therefore, may have responded more slowly because of a lack of priming by a process described by the verbs. Of course, the results of the present study could be an outcome of both explanations.

The chapter continues with a discussion on what a prototypical intransitive construction is. It is suggested that the current characterization of a prototypical intransitive construction as a non-transitive construction contradicts Hopper and Thompson (1980). On the other hand, the

observation that unergative verbs are often durative, while unaccusative verbs are not necessarily so, matches Van Valin's (1990) claims about split intransitivity from a semantic point of view. It also discusses an alternative view by Shibatani (2006) and Sorace (2000), who suggested that a split may not be necessary. We argued that it can be reconciled with Van Valin's position.

5.0 CONCLUSION

5.1 SUMMARY

The present study involving two experiments investigates the transitive and intransitive constructions with regard to the evoking of an agent. The results and explanations are summarized as follows:

1. The results of the rating task suggest that native Japanese speakers do see agent-implying intransitive verbs as being closer to transitive verbs in the sense that the former must also involve an agent, and as less similar to the non-agent-implying intransitive verbs. This is consistent with our hypotheses.
2. The priming task did not give consistent results. Neither the native English- nor Japanese-speakers responded significantly faster in the transitive condition than in the intransitive condition. Given the neutral ratings for the intransitive condition in the rating task, it is suggested that both causative and non-causative readings were plausible, and participants may have interpreted the animate entity as the cause of the event even when reading in the intransitive condition.
3. The native Japanese speakers responded significantly more slowsly in the agent-implying conditions (both transitive and intransitive) than in the non-agent-implying

conditions. This is explained by the Japanese participants' focus on change and results rather than on the process of causation when reading in the agent-implying conditions. The punctual nature of the agent-implying intransitive verbs is also discussed.

5.2 THEORETICAL IMPLICATIONS

The present study has a few important theoretical implications. First, it points out that events with agents can also be described using an intransitive frame. This is inconsistent with some of the works in the literature which claim that only agentless events can be intransitive (e.g., Guerssel et al., 1985; Levin, 1993). This raises the issue of differences in conceptualization and semantics: speakers of different languages may perceive an event the same way, but may not choose to express it the same way. In this study, we showed that Japanese speakers interpret the presence of an agent with agent-implying intransitive verbs, as shown in the rating experiment. This implies that a conceptualized agent may not be expressed linguistically in some languages such as Japanese, and thus that there is a distinction between what is perceived and what is expressed. Therefore Guerssel et al.'s (1985) proposal is at best adequate only for prototypical intransitive cases.

Second, it contributes to creating a clearer picture of the distribution of the transitive and intransitive constructions across languages. In Construction Grammar, for example, Croft (2001) proposed that the transitive and intransitive constructions, together with other constructions such as the passive, lie on a semantic map with the saliency of the agent and the patient as the determining factors for their locations, as shown in Figure 2 (on p. 15). The present study, by looking at agent-implying intransitive verbs in Japanese, broadens our understanding of the non-

prototypical use of the intransitive construction in Japanese. As mentioned before, it has been generally believed that intransitive verbs must be agentless (e.g. Guerssel et al., 1985; Levin, 1993). This study provides empirical evidence showing that agent-implying intransitive verbs are different from the non-agent-implying ones, and that they are less prototypical than the non-agent-implying ones. We can thus add more details to Croft's semantic map. For example, rather than accepting only "more salient" and "less salient," we can add intermediate categories such as "perceived, but not focused" and "not perceived." Moreover, by comparing Japanese with English, we have a better idea of crosslinguistic differences in the use of the intransitive constructions. This study shows that Japanese allows broader use of the intransitive construction to be a means of defocusing the agent. The intransitive constructions in the two languages, as shown in Figure 2, will thus occupy different areas on the semantic map. We can further develop a typology of transitivity by examining the areas occupied by the intransitive construction in different languages. For example, we may find that some languages may allow the intransitive construction to be used for a perceived but defocused agent, while others do not. We can then create types of languages based on the commonalities bewteen the intransitive constructions in different languages.

Third, this is the first study that utilizes the situation model to investigate how language users understand the transitive and intransitive constructions, and it contributes to both the fields of psycholinguistics and linguistics. As we have seen previously, there are only a few studies that examine the role of linguistic knowledge in the construction of a situation model. From a psycholinguistic perspective, this study thus informs us of the role of the transitive and intransitive constructions in the construction of an event with or without an agent. In particular, we saw that agent-implying verb pairs are processed differently from the non-agent-implying

ones. From a linguistic perspective, the differences in the response times in the priming experiment provide psycholinguistic evidence for the semantic differences between agent-implying verb pairs and non-agent-implying ones. This study thus provides a psycholinguistic method to tap into the comprehension of these constructions regarding agentivity.

5.3 FUTURE RESEARCH

(1) Agent-implying verbs in other languages and language typology

Pardeshi (2008) has suggested Marathi, Hindi, Tamil, and Telugu also have agent-implying verbs. We have shown the agent-implying verb pairs do behave differently from non-agent-implying ones in both rating and priming experiments, though in different directions. It would be interesting to test with a survey whether other languages, such as German, Chinese, and Korean, which are also argued to lie on Ikegami's (1981, 1991) human prominence continuum, also have this kind of agent-implying verb, and if so, how native speakers of these languages comprehend these verbs in psycholinguistic experiments. If we find that native speakers of those languages also respond differently to the agent-implying intransitive verbs, it would support our claim that agent-implying intransitive verbs are different from non-agent-implying ones cross-linguistically. If this is in fact a new category of intransitive verb along the transitive-intransitive continuum, we might be able to propose a typology of transitivity: languages that have them, and languages that do not. This would further help us understand the universality and diversity in the mapping of event conceptualization and grammar across languages.

(2) A prototypical intransitive construction

We have discussed that a prototypical intransitive is often defined in negative terms (Malchukov, 2005) – that is, as something that is NOT transitive. However, this characterization seems to be inconsistent with the punctuality parameter in Hopper and Thompson (1980), as there are in fact many unaccusative intransitive verbs that are considered to be rather prototypical (e.g., *break*, *fall*) but are punctual. Therefore, more research is needed for a more satisfying characterization of a prototypical intransitive construction. A prototypical intransitive construction, in addition to a prototypical transitive construction, would further deepen our understanding of a typology of transitivity in human languages.

(3) A baseline for testing the effect of priming

In the priming experiment, no real baseline was included to compare any priming effect. It was hypothesized that participants would respond faster to the transitive condition than the intransitive condition. However, we did not find significant differences between these conditions in either language. That raised the question of whether the participants were primed in both conditions or in neither condition. A possible baseline would be having the participants read the same first sentence, and then a completely unrelated second sentence, and answer the same question. For example, the participants may read "John was playing basketball inside his house. While he was playing, he fell," and then would have to answer the same question "Can a basketball break a clock?" In this task, we would expect a slower response time, which may serve as the baseline without any priming.

(4) Processing of agent-implying transitive counterparts in English

In this dissertation, I only examined agent-implying verb pairs in Japanese (e.g., the transitive and intransitive versions of ‘catch’ in Japanese). To our surprise, these verb pairs in Japanese, even the transitive version, were processed more slowly than the ‘regular’ verb pairs. I posit that the slower processing time is due to the non-prototypical nature of these events: they are neither typical transitive events nor typical intransitive events. It would therefore be interesting to test whether this explanation is valid by including the corresponding English verbs (e.g., *catch*, *find*, etc.). If the agent-implying transitive verbs in English are also processed more slowly than the non-agent-implying transitive verbs, then we can confirm that the non-prototypical nature of these verbs is the cause of the longer response times seen in the present study.

APPENDIX A

ENGLISH RATING TASK – LIST A & LIST B

A.1 LIST A

Instructions:
In the following, you will read 40 pairs of sentences, followed by a statement. Based on the information given in the two sentences, your task is to rate how likely the situation described by **the statement in bold fonts** is by **circling the number** on a 7-point scale, 7 being very likely, 4 being neutral, and 1 being very unlikely.

Example:

	Very unlikely			**Neutral**		**Very likely**
Peter graduated from college two years ago. Right after he graduated, he married his girlfriend Mary.						
Statement: Peter is over 20 years old.	**1**	**2**	**3**	**4**	**5**	**(6)** **7**

IMPORTANT:
There are no right or wrong answers. Just rate it based on your experience.

Do NOT think too hard. Just rate it based on your own general knowledge.

Please **work on your own**. Do NOT discuss it with other people.

		Very unlikely			Neutral			Very likely
1.	John was playing with a basketball inside his house. While he was playing, a clock broke. **John was responsible for causing the clock to break.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2.	Mary was playing the piano at home. While she was playing, she woke her baby brother up. **Mary was responsible for causing her baby brother to wake up.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3.	John arrived at the door of his friend's house, and he saw a pushbutton beside the door. He waited, and he rang the doorbell. **John was responsible for causing the bell to ring.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4.	Mary wanted to cool some beverages, so she took out some ice and an ice pick. Then the ice shattered. **Mary was responsible for causing the ice to shatter.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5.	Peter heard strange sounds after switching on the washing machine. While he was examining it, he stopped the machine. **Peter was responsible for causing the machine to stop.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
6.	Susan was going to have a party, and she was putting beverages into the fridge. As she was making preparation, she cooled the beer. **Susan was responsible for causing the beer to cool.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7.	John was smoking beside the fireplace, and he fell asleep. While he was sleeping, he burned the carpet. **John was responsible for causing the carpet to burn.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8.	Peter ordered a glass of wine in the restaurant. As soon as it came, he spilt the wine. **Peter was responsible for causing the wine to spill.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9.	Susan saw a car outside her house. She got into it, and she moved the car. **Susan was responsible for causing the car to move.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
10.	Peter was practicing golf with a golf club. As soon as he walked to the ball, he rolled it. **Peter was responsible for causing the golf ball to**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

move.

11.	The construction company prepared some explosives to destroy a very old building. A few moments after they arrived there, the building collapsed. **The construction company was responsible for causing the wall to collapse.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
12.	David was fixing his bike. While he was lifting the bike, the wheel rotated. **David was responsible for causing the wheel to rotate.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
13.	David was fixing the power supply cable of the computer and was holding a pair of pliers. While he was fixing it, he twisted the wire. **David was responsible for causing the wire to twist.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
14.	Joe was a chairman of the tennis club at his school, and he introduced some new policies. During that time, the number of members increased. **Joe was responsible for causing the number of members to increase.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
15.	Sally was going to make a chocolate cake, and she took out some chocolate and hot water. While she was making it, the chocolate melted. **Sally was responsible for causing the chocolate to melt.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
16.	Joe was looking for his key while in front of his house. As soon as he picked up his key, he opened the door. **Joe was responsible for causing the door to open.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
17.	Sally was playing with soap bubbles. While she was catching one, it popped. **Sally was responsible for causing the bubble to burst.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
18.	Betty went to the beach, and she had a bad sunburn. She felt itchy, and her skin peeled. **Betty was responsible for causing the skin to peel.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
19.	Betty went to the oldest high school in town. While she was a student there, a sunflower grew and it became the biggest sunflower in the school. **Betty was responsible for causing the sunflower to**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

grow.

20.	Joe was looking at a picture when an earthquake occurred. After the earthquake, the picture tilted a bit to the left. **Joe was responsible for causing the picture to tilt.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
21.	Peter was playing football in the front yard. While he was playing, he broke the wooden fence. **Peter was responsible for causing the wooden fence to break.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
22.	Mary was chatting with her friend on the phone. While she was chatting, her father woke up. **Mary was responsible for causing her father to wake up.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
23.	Peter came to his aunt's apartment building, and he saw a buzzer. While he arrived at the door, the buzzer rang. **Peter was responsible for causing the buzzer to ring.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
24.	Joe was playing with an air gun. While he was playing, he shattered a light bulb. **Joe was responsible for causing the light bulb to shatter.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
25.	Mary was making a cake, and she turned on the blender. After a while, the blender stopped. **Mary was responsible for causing the blender to stop.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
26.	Susan was making iced coffee, and she was taking out some ice cubes. After a while, the coffee cooled. **Susan was responsible for causing the coffee to cool.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
27.	Susan was cooking a fish on a stove. When she was cooking it, the fish burned. **Susan was responsible for causing the fish to burn.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
28.	Joe was a mischievous boy. While he was having breakfast, the milk spilled. **Joe was responsible for causing the milk to spill.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
29.	Sally was shopping at the grocery store.							

	While she was trying to pick some apples, the cart moved into the aisle. **Sally was responsible for causing the cart to move.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
30.	Sally was playing soccer with her friends. When she was playing, the ball rolled. **Sally was responsible for causing the ball to roll.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
31.	David was going to renovate a house that was damaged by a fire, and he brought a lot of tools with him. When he got into the house, he collapsed one of the walls. **David was responsible for causing the wall to collapse.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
32.	David noticed that the radio reception was not very good. When he picked up the radio, he rotated the antenna. **David was responsible for causing the antenna to rotate.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
33.	John and David were in a professional wrestling match. During the match, David's wrist twisted. **John was responsible for causing David's wrist to twist.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
34.	Betty thought she was too skinny because she had not been eating much. A few months later, she increased her weight. **Betty was responsible for causing her weight to increase.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
35.	Betty was cooking dinner, and she took out some butter. A few minutes later, she melted the butter. **Betty was responsible for causing the butter to melt.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
36.	John gave Mary a present for her birthday. When she was given the present, the box opened. **Mary was responsible for causing the box to open.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
37.	A puppy was running after a balloon. Then the puppy popped the balloon. **The puppy was responsible for causing the balloon to pop.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

38. Susan was going to use a knife to cut an apple.
She grabbed the apple, and she peeled it.
Susan was responsible for causing the apple to peel. **1 2 3 4 5 6 7**

39. John moved to a house with a bare front yard, and he bought some seeds.
A few months later, he grew some flowers.
John was responsible for causing the flower to grow. **1 2 3 4 5 6 7**

40. John was trying to take a picture of a clock on the wall.
When he was about the take the picture, he tilted the clock.
John was responsible for causing the clock to tilt. **1 2 3 4 5 6 7**

A.2 LIST B

Instructions:
In the following, you will read 40 pairs of sentences, followed by a statement. Based on the information given in the two sentences, your task is to rate how likely the situation described by **the statement in bold fonts** is by **circling the number** on a 7-point scale, 7 being very likely, 4 being neutral, and 1 being very unlikely.

Example:

	Very unlikely			Neutral		Very likely
Peter graduated from college two years ago. Right after he graduated, he married his girlfriend Mary. ***Statement: Peter is over 20 years old.***	**1**	**2**	**3**	**4**	**5**	**(6)**	**7**

IMPORTANT:
There are no right or wrong answers. Just rate it based on your experience.

Do NOT think too hard. Just rate it based on your own general knowledge.

Please **work on your own**. Do NOT discuss it with other people.

		Very unlikely			Neutral			Very likely
1.	John was playing with a basketball inside his house. While he was playing, he broke a clock. **John was responsible for causing the clock to break.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2.	Mary was playing the piano at home. While she was playing, her baby brother woke up. **Mary was responsible for causing her baby brother to wake up.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3.	John arrived at the door of his friend's house, and he saw a pushbutton beside the door. He waited, and the doorbell rang. **John was responsible for causing the bell to ring.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4.	Mary wanted to cool some beverages, so she took out some ice and an ice pick. Then she shattered the ice. **Mary was responsible for causing the ice to shatter.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

5.	Peter heard strange sounds after switching on the washing machine. While he was examining it, the machine stopped. **Peter was responsible for causing the machine to stop.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
6.	Susan was going to have a party, and she was putting beverages into the fridge. As she was making preparation, the beer cooled. **Susan was responsible for causing the beer to cool.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7.	John was smoking beside the fireplace, and he fell asleep. While he was sleeping, the carpet burned. **John was responsible for causing the carpet to burn.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8.	Peter ordered a glass of wine in the restaurant. As soon as it came, the wine spilt. **Peter was responsible for causing the wine to spill.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9.	Susan saw a car outside her house. She got into it, and the car moved. **Susan was responsible for causing the car to move.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
10.	Peter was practicing golf with a golf club. As soon as he walked to the ball, it rolled. **Peter was responsible for causing the golf ball to move.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
11.	The construction company prepared some explosives to destroy a very old building. A few moments after they arrived there, they collapsed the building. **The construction company was responsible for causing the wall to collapse.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
12.	David was fixing his bike. While he was lifting the bike, he rotated the wheel. **David was responsible for causing the wheel to rotate.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
13.	David was fixing the power supply cable of the computer and was holding a pair of pliers. While he was fixing it, the wire twisted. **David was responsible for causing the wire to twist.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

14.	Joe was a chairman of the tennis club at his school, and he introduced some new policies. During that time, he increased the number of members. **Joe was responsible for causing the number of members to increase.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
15.	Sally was going to make a chocolate cake, and she took out some chocolate and hot water. While she was making it, she melted the chocolate. **Sally was responsible for causing the chocolate to melt.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
16.	Joe was looking for his key while in front of his house. As soon as he picked up his key, the door opened. **Joe was responsible for causing the door to open.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
17.	Sally was playing with soap bubbles. While she was catching one, she popped it. **Sally was responsible for causing the bubble to burst.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
18.	Betty went to the beach, and she had a bad sunburn. She felt itchy, and she peeled her skin. **Betty was responsible for causing the skin to peel.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
19.	Betty went to the oldest high school in town. While she was a student there, she grew a sunflower and it became the biggest sunflower in the school. **Betty was responsible for causing the sunflower to grow.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
20.	Joe was looking at a picture when an earthquake occurred. After the earthquake, he tilted the picture a bit to the left. **Joe was responsible for causing the picture to tilt.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
21.	Peter was playing football in the front yard. While he was playing, the wooden fence broke. **Peter was responsible for causing the wooden fence to break.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
22.	Mary was chatting with her friend on the phone. While she was chatting, she woke her father up. **Mary was responsible for causing her father to wake up.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

23.	Peter came to his aunt's apartment building, and he saw a buzzer. When he arrived at the door, he rang the buzzer. **Peter was responsible for causing the buzzer to ring.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
24.	Joe was playing with an air gun. While he was playing, a light bulb shattered. **Joe was responsible for causing the light bulb to shatter.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
25.	Mary was making a cake, and she turned on the blender. After a while, she stopped the blender. **Mary was responsible for causing the blender to stop.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
26.	Susan was making iced coffee, and she was taking out some ice cubes. After a while, she cooled the coffee. **Susan was responsible for causing the coffee to cool.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
27.	Susan was cooking a fish on a stove. When she was cooking it, she burned the fish. **Susan was responsible for causing the fish to burn.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
28.	Joe was a mischievous boy. While he was having breakfast, he spilled the milk. **Joe was responsible for causing the milk to spill.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
29.	Sally was shopping at the grocery store. While she was trying to pick some apples, she moved the cart to the aisle. **Sally was responsible for causing the cart to move.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
30.	Sally was playing soccer with her friends. When she was playing, she rolled the ball. **Sally was responsible for causing the ball to roll.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
31.	David was going to renovate a house that was damaged by a fire, and he brought a lot of tools with him. When he got into the house, one of the walls collapsed. **David was responsible for causing the wall to collapse.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

32.	David noticed that the radio reception was not very good. When he picked up the radio, the antenna rotated. **David was responsible for causing the antenna to rotate.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
33.	John and David were in a professional wrestling match. During the match, John twisted David's wrist. **John was responsible for causing David's wrist to twist.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
34.	Betty thought she was too skinny because she had not been eating much. A few months later, her weight increased. **Betty was responsible for causing her weight to increase.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
35.	Betty was cooking dinner, and she took out some butter. A few minutes later, the butter melted. **Betty was responsible for causing the butter to melt.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
36.	John gave Mary a present for her birthday. When she was given the present, she opened the box. **Mary was responsible for causing the box to open.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
37.	A puppy was running after a balloon. Then the balloon popped. **The puppy was responsible for causing the balloon to pop.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
38.	Susan was going to use a knife to cut an apple. She grabbed the apple, and it peeled. **Susan was responsible for causing the apple to peel.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
39.	John moved to a house with a bare front yard, and he bought some seeds. A few months later, some flowers grew. **John was responsible for causing the flower to grow.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
40.	John was trying to take a picture of a clock on the wall. When he was about to take the picture, the clock tilted. **John was responsible for causing the clock to tilt.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

APPENDIX B

JAPANESE RATING TASK – LIST A & LIST B

B.1 LIST A

指示:
これから、二つの文が出てきます。その二つの文の内容に基づいて、その次の文(三つ目の文、太字)がどれぐらいありそうなことかを決めてください。とてもありそうなことなら7に、どちらでもないなら4に、全くありそうもないことなら1に、〇をつけてください。質問は全部で60個あります。

例)

	全く不正確			どちらでもない		とても正確	
正雄は二年前に大学を卒業した。 卒業してすぐに、正雄はガールフレンドの京子と結婚した。 **正雄は二十歳以上です。**	1	2	3	4	5	⑥	7

注)
1. 質問に対する答えに正解・不正解はありません。経験・知識・直感でお答えください。

2. 深く考えずにご自分なりの常識でお答えください。

3. 他の人と相談せずに、ご自分でお考えください。

		全く不正確			どちらでもない			とても正確
1.	健二は家の中でバスケットボールをしていた。 バスケットをしている時、時計が壊れた。 **時計がこわれたのは健二の責任だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2.	恵子は家でピアノを弾いていた。 ピアノをひいている時、恵子は弟を起こした。 **弟が起きたのは恵子が原因だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3.	健二は友達のうちの玄関まで来て、ドアの横のボタンを見つけた。 健二は少し待ち、そしてベルを鳴らした。 **ベルが鳴ったのは健二が原因だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4.	恵子は飲み物を冷やすのに、氷とアイスピックを持ってきた。 そして、氷が砕けた。 **氷が砕けたのは恵子がやったからだ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5.	雅人は洗濯機に電源を入れたら、洗濯機から変な音がしているのに気づいた。 洗濯機を調べている時、雅人は洗濯機を止めた。 **洗濯機が止まったのは雅人が原因だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
6.	洋子はパーティーの準備をしていて、飲み物を冷蔵庫に入れていた。 準備中に、洋子はビールを冷やした。 **ビールが冷えたのは洋子のおかげだ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7.	ジョンは暖炉のそばでタバコを吸っていて、寝てしまった。 寝ている間に、ジョンはカーペットを焦がした。 **カーペットが焦げたのはジョンが原因だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8.	雅人はレストランでワインを注文した。 ワインが来たが、すぐに雅人はワインをこぼした。 **ワインがこぼれたのは雅人が原因だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9.	洋子は家の外に車を見た。 洋子はその車に乗り、そして車を動かした。 **車が動いたのは洋子がやったからだ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
10.	雅人はゴルフクラブを使ってゴルフの練習をしていた。							

雅人はボールに近づき、ボールを転がした。
ボールが転がったのは雅人が原因だ。 **1 2 3 4 5 6 7**

11. 建築会社の社員はとても古い建物を壊すために、ダイナマイトを用意した。
彼らがそこに到着するとすぐに建物が倒れた。
建物が倒れたのは建築会社の社員がやったからだ。 **1 2 3 4 5 6 7**

12. 智也は自分の自転車を直そうとしていた。
自転車を持ち上げると、自転車の車輪がくるくる回った。
自転車の車輪がくるくる回るのは智也がやったからだ。 **1 2 3 4 5 6 7**

13. 智也はペンチを持っていて、パソコンのケーブルを直していた。
直している時に、智也はワイヤーをねじった。
ワイヤーがねじれたのは智也の責任だ。 **1 2 3 4 5 6 7**

14. 直人はテニスサークルの部長をしていて、新しい方針を提案した。
部長の任期中に、部員の数が増えた。
部員の数が増えたのは直人の成果だ。 **1 2 3 4 5 6 7**

15. 裕子はチョコレートケーキを作ろうとしていて、チョコレートとお湯を取り出した。
ケーキを作っている時に、チョコレートが溶けた。
チョコレートが溶けたのは裕子がやったからだ。 **1 2 3 4 5 6 7**

16. 直人は家の前で鍵を探していた。
鍵を拾うと、直人はドアを開けた。
ドアが開いたのは直人が原因だ。 **1 2 3 4 5 6 7**

17. 裕子はシャボン玉で遊んでいた。
裕子はシャボン玉を捕まえようとしている時に、シャボン玉が割れた。
シャボン玉が割れたのは裕子が原因だ。 **1 2 3 4 5 6 7**

18. 京子は海に行って、日焼けした。
かゆくなって、皮がむけた。
皮がむけたのは京子が原因だ。 **1 2 3 4 5 6 7**

19. 京子は都内で一番古い高校に通っていた。
その頃、ひまわりが育っていて、そのひまわりが一番おおきいひまわりになった。

ひまわりが育ったのは京子のおかげだ。 **1 2 3 4 5 6 7**

20. 直人は絵をながめていたら、地震が起きた。
地震が起きた後、絵が左に傾いた。
絵が傾いたのは直人のせいだ。 **1 2 3 4 5 6 7**

21. 雅人は庭でボールを蹴っていた。
ボールを蹴っている時、雅人は木の柵を壊した。
柵が壊れたのは雅人のせいだ。 **1 2 3 4 5 6 7**

22. 恵子は友達と電話で話していた。
電話で話している時、父が起きた。
父が起きたのは恵子が原因だ。 **1 2 3 4 5 6 7**

23. 雅人は親戚のおばさんの家に来て、インターホンを見た。
雅人は玄関に着いたとたん、インターホンが鳴った。
インターホンが鳴ったのは雅人が原因だ。 **1 2 3 4 5 6 7**

24. 直人はエアーガンで遊んでいた。
遊んでいる時、直人は電球をこなごなに砕いた。
電球がこなごなに砕けたのは直人のせいだ。 **1 2 3 4 5 6 7**

25. 恵子はケーキを作るため、ミキサーをかけた。
その後、ミキサーが止まった。
ミキサーがとまったのは恵子の責任だ。 **1 2 3 4 5 6 7**

26. 洋子はアイスコーヒーを作るのに、氷を取り出した。
そして、コーヒーが冷えた。
コーヒーが冷えたのは洋子が原因だ。 **1 2 3 4 5 6 7**

27. 洋子はコンロで魚を焼いていた。
焼いている時に、魚が焦げた。
魚を焦がしたのは洋子のせいだ。 **1 2 3 4 5 6 7**

28. 直人はわんぱくな男の子だ。
直人は朝ごはんを食べている時、ミルクがこぼれた。
ミルクがこぼれたのは直人の責任だ。 **1 2 3 4 5 6 7**

29. 裕子はスーパーで買い物をしていた。
りんごを選ぼうとしているとき、カートが動いた。
カートが動いたのは裕子が原因だ。 **1 2 3 4 5 6 7**

30. 裕子は友達とサッカーをしていた。
遊んでいる時、ボールが転がった。

ボールが転がったのは裕子がやったからだ。 **1 2 3 4 5 6 7**

31. 智也は火事で壊れた家を修理しようとして、いろいろな工具を持ち出した。
家に入った時、智也は壁を倒した。
壁が倒れたのは智也が原因だ。 **1 2 3 4 5 6 7**

32. 智也はラジオの調子が悪いことに気がついた。
ラジオをいじっている時に、智也はアンテナを回した。
アンテナが回ったのは智也がやったからだ。 **1 2 3 4 5 6 7**

33. 格闘技の試合で田中選手と鈴木選手が対戦した。
その時、鈴木選手の手首がねじれた。
鈴木選手の手首がねじれたのは田中選手がやったからだ。 **1 2 3 4 5 6 7**

34. 京子はあまり食べないので、自分が痩せていると思っていた。
数ヶ月後、京子は体重を増やした。
体重を増やしたのは京子の努力だ。 **1 2 3 4 5 6 7**

35. 京子はご飯を作っていて、冷蔵庫からバターを出した。
数分後、京子はバターを溶かした。
バターが溶けたのは京子が原因だ。 **1 2 3 4 5 6 7**

36. 健二は恵子に誕生日のプレゼントをあげた。
恵子はプレゼントをもらった時に、箱が開いた。
箱が開いたのは恵子が原因だ。 **1 2 3 4 5 6 7**

37. 小犬は風船を追いかけていた。
すると、小犬は風船を割った。
風船が割れたのは小犬が原因だ。 **1 2 3 4 5 6 7**

38. 洋子は包丁でりんごを切ろうとした。
りんごを手にすると、洋子はりんごの皮をむいた。
皮がむけたのは洋子が原因だ。 **1 2 3 4 5 6 7**

39. 健二は草木の生えていない庭のある家に引っ越してきて、花の種を買ってきた。
数ヵ月後、健二は花を育てた。
花が育ったのは健二のおかげだ。 **1 2 3 4 5 6 7**

40. 健二は壁にある時計を写真にとろうとした。

その瞬間、健二は時計を傾けた。
時計が傾いたのは健二が原因だ。 **1 2 3 4 5 6 7**

41. 恵子は試験を受けていて、早く終わったので、答えを見直した。
答えを見直している時、間違いが見つかった。
間違いが見つかったのは恵子のおかげだ。 **1 2 3 4 5 6 7**

42. 警察は犯人を追っていた。
その後、犯人が捕まった。
犯人が捕まったのは警察のおかげだ。 **1 2 3 4 5 6 7**

43. 健二は子供が溺れているのを見た。
そして、健二は子供を助けた。
子供が助かったのは健二のおかげだ。 **1 2 3 4 5 6 7**

44. 直人は釣り竿を持って、湖に行った。
そして、直人は魚を釣った。
魚がつれたのは直人のおかげだ。 **1 2 3 4 5 6 7**

45. 洋子はケーキを作ることにしたので、スーパーに行った。
そして、材料がそろった。
材料が揃ったのは洋子のおかげだ。 **1 2 3 4 5 6 7**

46. 直人は散弾銃を持って、山へ狩りに行った。
まもなく、直人は獲物の狙いを定めた。
獲物の狙いが定まったのは直人がやったからだ。 **1 2 3 4 5 6 7**

47. 洋子は新しい家に引っ越すことにして、家具屋さんに行った。
引っ越した後、家具が備わった。
家具が備わったのは洋子のおかげだ。 **1 2 3 4 5 6 7**

48. 智也は馬を飼っていた。
馬の体を洗う時、ひもが柵につながった。
ひもが柵につながったのは智也がやったからだ。 **1 2 3 4 5 6 7**

49. 社員が集まって会議をした。
会議で、新製品の発売日が決まった。
発売日が決まったのは社員のおかげだ。 **1 2 3 4 5 6 7**

50. 裕子はケーキを作ることにして、砂糖や小麦粉やスプーンなどテーブルに置いた。
ケーキを作っている時、裕子は砂糖と小麦粉を混ぜ

た。
砂糖と小麦粉が混ざったのは裕子がやったからだ。 **1 2 3 4 5 6 7**

51. 裕子は花が好きで、友達から花の種をもらった。
二ヵ月後、庭に花がたくさん植わった。
花がたくさん植わったのは裕子のおかげだ。 **1 2 3 4 5 6 7**

52. 子供はおもちゃで遊んでいた。
遊んでいる時、おもちゃが散らかった。
おもちゃが散らかったのは子供のせいだ。 **1 2 3 4 5 6 7**

53. 智也は光一に秘密を話した。
その後、光一は裕子に秘密を伝えた。
裕子が秘密を知ったのは光一のせいだ。 **1 2 3 4 5 6 7**

54. 雅人は郵便局に行って、恵子に荷物を送った。
三日後、郵便局が荷物を届けた。
荷物が届いたのは郵便局のおかげだ。 **1 2 3 4 5 6 7**

55. 雅人はシャベルを使って、宝を隠そうとしていた。
そして、雅人は庭に宝を埋めた。
宝が埋まったのは雅人がやったからだ。 **1 2 3 4 5 6 7**

56. 川の隣に工場ができた。
その後、工場が川を黒く染めた。
川が黒くなったのは工場の責任だ。 **1 2 3 4 5 6 7**

57. 京子は友達と指輪を買いに行った。
試そうとして、京子は指輪をはめた。
指輪がはまったのは京子がやったからだ。 **1 2 3 4 5 6 7**

58. 健二は真っ暗な部屋にいて、スイッチを探していた。
そして、電気がついた。
電気がついたのは健二の責任だ。 **1 2 3 4 5 6 7**

59. 京子は歯医者さんに行った。
その後、歯医者さんが歯を抜いた。
歯が抜けたのは歯医者さんがやったからだ。 **1 2 3 4 5 6 7**

60. ある会社が土地を買い、建築会社にホテル建設を依頼した。
その後、ホテルが建った。
ホテルが建てたのは建築会社がやったからだ。 **1 2 3 4 5 6 7**

ご協力ありがとうございました。

B.2 LIST B

指示:
これから、二つの文が出てきます。その二つの文の内容に基づいて、その次の文(三つ目の文、太字)がどれぐらいありそうなことかを決めてください。とてもありそうなことなら7に、どちらでもないなら4に、全くありそうもないことなら1に、〇をつけてください。質問は全部で60個あります。

例)

	全く不正確			どちらでもない			とても正確
正雄は二年前に大学を卒業した。 卒業してすぐに、正雄はガールフレンドの京子と結婚した。 **正雄は二十歳以上です。**	1	2	3	4	5	⑥	7

注)
1. 質問に対する答えに正解・不正解はありません。経験・知識・直感でお答えください。

2. 深く考えずにご自分なりの常識でお答えください。

3. 他の人と相談せずに、ご自分でお考えください。

		全く不正確			どちらでもない			とても正確
1.	健二は家の中でバスケットボールをしていた。 バスケットをしている時、健二は時計を壊した。 **時計がこわれたのは健二の責任だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2.	恵子は家でピアノを弾いていた。 ピアノをひいている時、弟が起きた。 **弟が起きたのは恵子が原因だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3.	健二は友達のうちの玄関まで来て、ドアの横のボタンを見つけた。 健二は少し待ち、そしてベルが鳴った。 **ベルが鳴ったのは健二が原因だ。**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

4. 恵子は飲み物を冷やすのに、氷とアイスピックを持ってきた。
そして、恵子は氷を砕いた。
氷が砕けたのは恵子がやったからだ。 **1 2 3 4 5 6 7**

5. 雅人は洗濯機に電源を入れたら、洗濯機から変な音がしているのに気づいた。
洗濯機を調べている時、洗濯機が止まった。
洗濯機が止まったのは雅人が原因だ。 **1 2 3 4 5 6 7**

6. 洋子はパーティーの準備をしていて、飲み物を冷蔵庫に入れていた。
準備中に、ビールが冷えた。
ビールが冷えたのは洋子のおかげだ。 **1 2 3 4 5 6 7**

7. ジョンは暖炉のそばでタバコを吸っていて、寝てしまった。
寝ている間に、カーペットが焦げた。
カーペットが焦げたのはジョンが原因だ。 **1 2 3 4 5 6 7**

8. 雅人はレストランでワインを注文した。
ワインが来たが、すぐにこぼれた。
ワインがこぼれたのは雅人が原因だ。 **1 2 3 4 5 6 7**

9. 洋子は家の外に車を見た。
洋子はその車に乗り、そして車が動いた。
車が動いたのは洋子がやったからだ。 **1 2 3 4 5 6 7**

10. 雅人はゴルフクラブを使ってゴルフの練習をしていた。
雅人がボールに近づくと、ボールが転がった。
ボールが転がったのは雅人が原因だ。 **1 2 3 4 5 6 7**

11. 建築会社の社員はとても古い建物を壊すために、ダイナマイトを用意した。
彼らはそこに到着するとすぐに建物を倒した。
建物が倒れたのは建築会社の社員がやったからだ。 **1 2 3 4 5 6 7**

12. 智也は自分の自転車を直そうとしていた。
自転車を持ち上げると、智也は自転車の車輪をくるくる回した。
自転車の車輪がくるくる回るのは智也がやったからだ。 **1 2 3 4 5 6 7**

13. 智也はペンチを持っていて、パソコンのケーブルを直

していた。
直している時に、ワイヤーがねじれた。
ワイヤーがねじれたのは智也の責任だ。 **1 2 3 4 5 6 7**

14. 直人はテニスサークルの部長をしていて、新しい方針を提案した。
部長の任期中に、直人は部員の数を増やした。
部員の数が増えたのは直人の成果だ。 **1 2 3 4 5 6 7**

15. 裕子はチョコレートケーキを作ろうとしていて、チョコレートとお湯を取り出した。
ケーキを作っている時に、裕子はチョコレートを溶かした。
チョコレートが溶けたのは裕子がやったからだ。 **1 2 3 4 5 6 7**

16. 直人は家の前で鍵を探していた。
鍵を拾うと、ドアが開いた。
ドアが開いたのは直人が原因だ。 **1 2 3 4 5 6 7**

17. 裕子はシャボン玉で遊んでいた。
裕子はシャボン玉を捕まえようとしている時に、シャボン玉を割った。
シャボン玉が割れたのは裕子が原因だ。 **1 2 3 4 5 6 7**

18. 京子は海に行って、日焼けした。
かゆくなって、京子は皮をむいた。
皮がむけたのは京子が原因だ。 **1 2 3 4 5 6 7**

19. 京子は都内で一番古い高校に通っていた。
その頃、京子はひまわりを育てていて、そのひまわりが学校で一番大きいひまわりになった。
ひまわりが育ったのは京子のおかげだ。 **1 2 3 4 5 6 7**

20. 直人は絵をながめていたら、地震が起きた。
地震が起きた後、直人は絵を左に傾けた。
絵が傾いたのは直人のせいだ。 **1 2 3 4 5 6 7**

21. 雅人は庭でボールを蹴っていた。
ボールを蹴っている時、木の柵が壊れた。
柵が壊れたのは雅人のせいだ。 **1 2 3 4 5 6 7**

22. 恵子は友達と電話で話していた。
電話で話している時、恵子は父を起こした。
父が起きたのは恵子が原因だ。 **1 2 3 4 5 6 7**

23. 雅人は親戚のおばさんの家に来て、インターホンを見た。
雅人は玄関に着いたとたん、インターホンを鳴らした。
インターホンが鳴ったのは雅人が原因だ。 **1 2 3 4 5 6 7**

24. 直人はエアーガンで遊んでいた。
遊んでいる時、電球がこなごなに砕けた。
電球がこなごなに砕けたのは直人のせいだ。 **1 2 3 4 5 6 7**

25. 恵子はケーキを作るため、ミキサーをかけた。
その後、恵子はミキサーを止めた。
ミキサーがとまったのは恵子の責任だ。 **1 2 3 4 5 6 7**

26. 洋子はアイスコーヒーを作るのに、氷を取り出した。
そして、洋子はコーヒーを冷やした。
コーヒーが冷えたのは洋子が原因だ。 **1 2 3 4 5 6 7**

27. 洋子はコンロで魚を焼いていた。
焼いている時に、洋子は魚を焦がした。
魚を焦がしたのは洋子のせいだ。 **1 2 3 4 5 6 7**

28. 直人はわんぱくな男の子だ。
直人は朝ごはんを食べている時、ミルクをこぼした。
ミルクがこぼれたのは直人の責任だ。 **1 2 3 4 5 6 7**

29. 裕子はスーパーで買い物をしていた。
りんごを選ぼうとしているとき、裕子はカートを動かした。
カートが動いたのは裕子が原因だ。 **1 2 3 4 5 6 7**

30. 裕子は友達とサッカーをしていた。
遊んでいる時、裕子はボールを転がした。
ボールが転がったのは裕子がやったからだ。 **1 2 3 4 5 6 7**

31. 智也は火事で壊れた家を修理しようとして、いろいろな工具を持ち出した。
家に入った時、壁が倒れた。
天井が倒れたのは智也が原因だ。 **1 2 3 4 5 6 7**

32. 智也はラジオの調子が悪いことに気がついた。
ラジオをいじっている時に、アンテナが回った。
アンテナが回ったのは智也がやったからだ。 **1 2 3 4 5 6 7**

33. 格闘技の試合で田中選手と鈴木選手が対戦した。
その時、田中選手は鈴木選手の手首をねじった。
鈴木選手の手首がねじれたのは田中選手がやったからだ。 **1 2 3 4 5 6 7**

34. 京子はあまり食べないので、自分が痩せていると思っていた。
数ヶ月後、京子は体重が増えた。
体重を増やしたのは京子の努力だ。 **1 2 3 4 5 6 7**

35. 京子はご飯を作っていて、冷蔵庫からバターを出した。
数分後、バターが溶けた。
バターが溶けたのは京子が原因だ。 **1 2 3 4 5 6 7**

36. 健二は恵子に誕生日のプレゼントをあげた。
恵子はプレゼントをもらった時に、箱を開けた。
箱が開いたのは恵子が原因だ。 **1 2 3 4 5 6 7**

37. 小犬は風船を追いかけていた。
すると、風船が割れた。
風船が割れたのは小犬が原因だ。 **1 2 3 4 5 6 7**

38. 洋子は包丁でりんごを切ろうとした。
りんごを手にすると、りんごの皮がむけた。
皮がむけたのは洋子が原因だ。 **1 2 3 4 5 6 7**

39. 健二は草木の生えていない庭のある家に引っ越してきて、花の種を買ってきた。
数ヶ月後、花が育った。
花が育ったのは健二のおかげだ。 **1 2 3 4 5 6 7**

40. 健二は壁にある時計を写真にとろうとした。
その瞬間、時計が傾いた。
時計が傾いたのは健二が原因だ。 **1 2 3 4 5 6 7**

41. 恵子は試験を受けていて、早く終わったので、答えを見直した。
答えを見直している時、恵子は間違いを見つけた。
間違いが見つかったのは恵子のおかげだ。 **1 2 3 4 5 6 7**

42. 警察は犯人を追っていた。
その後、警察が犯人を捕まえた。
犯人が捕まったのは警察のおかげだ。 **1 2 3 4 5 6 7**

43. 健二は子供が溺れているのを見た。
そして、子供が助かった。
子供が助かったのは健二のおかげだ。 **1 2 3 4 5 6 7**

44. 直人は釣り竿を持って、湖に行った。
そして、魚が釣れた。
魚がつれたのは直人のおかげだ。 **1 2 3 4 5 6 7**

45. 洋子はケーキを作ることにしたので、スーパーに行った。
そして、洋子は材料をそろえた。
材料が揃ったのは洋子のおかげだ。 **1 2 3 4 5 6 7**

46. 直人は散弾銃を持って、山へ狩りに行った。
まもなく、獲物の狙いが定まった。
獲物の狙いが定まったのは直人がやったからだ。 **1 2 3 4 5 6 7**

47. 洋子は新しい家に引っ越すことにして、家具屋さんに行った。
引っ越した後、洋子は家具を備えた。
家具が備わったのは洋子のおかげだ。 **1 2 3 4 5 6 7**

48. 智也は馬を飼っていた。
馬の体を洗う時、智也はひもを柵につないだ。
ひもが柵につながったのは智也がやったからだ。 **1 2 3 4 5 6 7**

49. 社員が集まって会議をした。
会議で、社員は新製品の発売日を決めた。
発売日が決まったのは社員のおかげだ。 **1 2 3 4 5 6 7**

50. 裕子はケーキを作ることにして、砂糖や小麦粉やスプーンなどテーブルに置いた。
ケーキを作っている時、砂糖と小麦粉が混ざった。
砂糖と小麦粉が混ざったのは裕子がやったからだ。 **1 2 3 4 5 6 7**

51. 裕子は花が好きで、友達から花の種をもらった。
二ヵ月後、裕子は庭に花をたくさん植えた。
花がたくさん植わったのは裕子のおかげだ。 **1 2 3 4 5 6 7**

52. 子供はおもちゃで遊んでいた。
遊んでいる時、子供はおもちゃを散らかした。
おもちゃが散らかったのは子供のせいだ。 **1 2 3 4 5 6 7**

53. 智也は光一に秘密を話した。
その後、裕子に秘密が伝わった。
裕子が秘密を知ったのは光一のせいだ。 **1 2 3 4 5 6 7**

54. 雅人は郵便局に行って、恵子に荷物を送った。
三日後、荷物が届いた。
荷物が届いたのは郵便局のおかげだ。 **1 2 3 4 5 6 7**

55. 雅人はシャベルを使って、宝を隠そうとしていた。
そして、庭に宝が埋まった。
宝が埋まったのは雅人がやったからだ。 **1 2 3 4 5 6 7**

56. 川の隣に工場ができた。
その後、川が黒く染まった。
川が黒くなったのは工場の責任だ。 **1 2 3 4 5 6 7**

57. 京子は友達と指輪を買いに行った。
試そうとして、指輪がはまった。
指輪がはまったのは京子がやったからだ。 **1 2 3 4 5 6 7**

58. 健二は真っ暗な部屋にいて、スイッチを探していた。
そして、健二は電気をつけた。
電気がついたのは健二の責任だ。 **1 2 3 4 5 6 7**

59. 京子は歯医者さんに行った。
その後、歯が抜けた。
歯が抜けたのは歯医者さんがやったからだ。 **1 2 3 4 5 6 7**

60. ある会社が土地を買い、建築会社にホテル建設を依頼した。
その後、建築会社がホテルを建てた。
ホテルが建てたのは建築会社がやったからだ。 **1 2 3 4 5 6 7**

ご協力ありがとうございました。

APPENDIX C

ITEMS IN EXPERIMENT 2 (PRIMING - ENGLISH)

Table 12. English items in Experiment 2

Item	Verb	First sentence	Transitive/ Intransitive sentence	Question 1/ Question2
1	break	John was playing with a basketball inside his house.	While he was playing, he broke a clock./ While he was playing, a clock broke.	Can a basketball break a clock?/ Did John play inside a house?
2	wake	Mary was playing the piano at home.	While she was playing, she woke her baby brother up./While she was playing, her baby brother woke up.	Can the sound of a piano wake a baby?/ Could Mary play the piano?
3	ring	John arrived at the door of his friend's house, and he saw a pushbutton beside the door.	He waited, and he rang the doorbell./ He waited, and the doorbell rang.	Does a pushbutton ring a doorbell?/ Did John go to see his cousin?
4	shatter	Mary wanted to cool some beverages, so she took out some ice and an ice pick.	Then she shattered the ice./ Then the ice shattered.	Can an ice pick shatter ice?/ Did Mary break the ice pick?
5	stop	Peter heard strange sounds after switching on the washing machine.	While he was examining it, he stopped the machine./ While he was examining it, the machine stopped.	Can a power switch stop a washing machine?/ Did the washing machine need to be repaired?
6	cool	Susan was going to have a party, and she was putting beverages into the fridge.	As she was making preparation, she cooled the beer./ As she was making preparation, the beer cooled.	Can a fridge cool beer?/ Did Susan take the beer out?
7	burn	John was smoking beside the fireplace, and he fell asleep.	While he was sleeping, he burned the carpet./ While he was sleeping, the carpet burned.	Can a cigarette burn the carpet?/ Did John burn his trousers?
8	spill	Peter ordered a glass of wine in the restaurant.	As soon as it came, he spilt the wine./ As soon as it came, the wine spilt.	Do you have to touch the glass to spill the wine?/ Was Peter in a restaurant?
9	move	Susan saw a car outside her house.	She got into it, and she moved the car./ She got into it, and the car moved.	Does stepping on the gas cause the car to move?/ Did Susan saw a truck?
10	roll	Peter was practicing golf with a golf club.	As soon as he walked to the ball, he rolled it./ As soon as he walked to the ball, it rolled.	Do you need a golf club to play golf?/ Was Peter holding a golf club?
11	collapse	The construction company prepared some explosives to destroy a very old building.	A few moments after they arrived there, they collapsed the building./ A few moments after they arrived there, the building collapsed.	Can explosives collapse a building?/ Was the building a very old one?
12	rotate	David was fixing his bike.	While he was lifting the bike, he rotated the wheel./ While he was lifting the bike, the wheel rotated.	Can a person's strength rotate a bike's wheel?/ Did David own a bike?
13	twist	David was fixing the power supply cable of the computer and	While he was fixing it, he twisted the wire./ While he was fixing it, the wire	Can pliers twist a wire?/ Was David fixing his cell phone?

		was holding a pair of pliers.	twisted.	
14	increase	Joe was a chairman of the tennis club at his school, and he introduced some new policies.	During that time, he increased the number of members./ During that time, the number of members increased.	Can a policy increase the number of members?/ Was Joe a student?
15	melt	Sally was going to make a chocolate cake, and she took out some chocolate and hot water.	While she was making it, she melted the chocolate./ While she was making it, the chocolate melted.	Can hot water melt chocolate? / Did Sally use a fork?
16	open	Joe was looking for his key while in front of his house.	As soon as he picked up his key, he opened the door./ As soon as he picked up his key, the door opened.	Can a key open a door?/ Did Joe have his key?
17	pop	Sally was playing with soap bubbles.	While she was catching one, she popped it./ While she was catching one, it popped.	Does touching a bubble cause it to burst?/ Was Sally playing with a toy car?
18	peel	Betty went to the beach, and she had a bad sunburn.	She felt itchy, and she peeled her skin./ She felt itchy, and her skin peeled.	Can a hand peel skin?/ Did Betty go to the beach?
19	grow	Betty went to the oldest high school in town.	While she was a student there, she grew a sunflower and it became the biggest sunflower in the school./ While she was a student there, a sunflower grew and it became the biggest sunflower in the school.	Is watering needed to grow a flower?/ Did Betty go to high school?
20	tilt	Joe was looking at a picture when an earthquake occurred.	After the earthquake, he tilted the picture a bit to the left./ After the earthquake, the picture tilted a bit to the left.	Can a hand tilt a picture?/ Was Joe painting a picture?
21	break	Peter was playing football in the front yard.	While he was playing, he broke the wooden fence./ While he was playing, the wooden fence broke.	Can a football break a wooden fence?/ Was Peter playing baseball?
22	wake	Mary was chatting with her friend on the phone.	While she was chatting, she woke her father up./ While she was chatting, her father woke up.	Can a human voice wake a person up?/ Was Mary on the phone?
23	ring	Peter came to his aunt's apartment building, and he saw a buzzer.	When he arrived at the door, he rang the buzzer./ While he arrived at the door, the buzzer rang.	Do you need to push buttons to ring a buzzer?/ Did Peter go to the park?
24	shatter	Joe was playing with an air gun.	While he was playing, he shattered a light bulb./ While he was playing, a light bulb shattered.	Can an air gun shatter a light bulb?/ Was Joe holding an air gun?
25	stop	Mary was making a cake, and she turned on the blender.	After a while, she stopped the blender./ After a while, the blender stopped.	Can a power button stop a blender?/ Was Mary eating a cake?
26	cool	Susan was making iced coffee, and she was taking out some ice	After a while, she cooled the coffee./ After a while, the coffee cooled.	Can ice cubes cool coffee?/ Did Susan make some tea?

		cubes.		
27	burn	Susan was cooking a fish on a stove.	When she was cooking it, she burned the fish./ When she was cooking it, the fish burned.	Can a stove burn a fish?/ Was Susan cooking vegetables?
28	spill	Joe was a mischievous boy.	While he was having breakfast, he spilled the milk./ While he was having breakfast, the milk spilled.	Do you need to touch the container to spill milk?/ Did Joe have orange juice for breakfast?
29	move	Sally was shopping at the grocery store.	While she was trying to pick some apples, she moved the cart to the aisle./ While she was trying to pick some apples, the cart moved into the aisle.	Does pushing cause a cart to move?/ Did Sally want some apples?
30	roll	Sally was playing soccer with her friends.	When she was playing, she rolled the ball./ When she was playing, the ball rolled.	Can a foot roll a ball?/ Did Sally play soccer with some friends?
31	collapse	David was going to renovate a house that was damaged by a fire, and he brought a lot of tools with him.	When he got into the house, he collapsed one of the walls./ When he got into the house, one of the walls collapsed.	Can a hammer collapse a wall?/ Was the house damaged by a hurricane?
32	rotate	David noticed that the radio reception was not very good.	When he picked up the radio, he rotated the antenna./ When he picked up the radio, the antenna rotated.	Can moving the antenna fix radio reception?/ Did the radio require an antenna?
33	twist	John and David were in a professional wrestling match.	During the match, John twisted David's wrist./ During the match, David's wrist twisted.	Can a wrist be twisted by bare hands?/ Was David hurt?
34	increase	Betty thought she was too skinny because she had not been eating much.	A few months later, she increased her weight./ A few months later, her weight increased.	Can eating help increase weight?/ Did Betty weight more than before?
35	melt	Betty was cooking dinner, and she took out some butter.	A few minutes later, she melted the butter./ A few minutes later, the butter melted.	Can a stove melt butter?/ Was Betty going to use some butter?
36	open	John gave Mary a present for her birthday.	When she was given the present, she opened the box./ When she was given the present, the box opened.	Can a hand open a box?/ Did Mary give someone a present?
37	pop	A puppy was running after a balloon.	Then the puppy popped the balloon./ Then the balloon popped.	Can a puppy's paw or teeth pop a balloon?/ Did a kitten cause the balloon to pop?
38	peel	Susan was going to use a knife to cut an apple.	She grabbed the apple, and she peeled it./ She grabbed the apple, and it peeled.	Can a knife peel the skin of an apple?/ Was Susan going to eat an apple?
39	grow	John moved to a house with a bare front yard, and he bought some seeds.	A few months later, he grew some flowers./ A few months later, some flowers grew.	Do seeds grow into flowers?/ Were the seeds given to John?

40	tilt	John was trying to take a picture of a clock on the wall.	When he was about the take the picture, he tilted the clock./ When he was about to take the picture, the clock tilted.	Can a hand tilt a clock?/ Was John holding a camera?

APPENDIX D

ITEMS IN EXPERIMENT 2 (PRIMING - JAPANESE)

D.1 NON-AGENT-IMPLYING TEST ITEMS

Table 13. Japanese items in Experiment 2 (Non-agent-implying)

	Verb	First sentence	Transitive	Intransitive	Question 1 (Target)	Question 2
1	壊す／壊れる	健二は家の中でバスケットボールをしていた。	バスケットをしている時、健二は時計を壊した。	バスケットをしている時、時計が壊れた。	バスケットボールで時計を壊すことができますか？	健二は家の中で遊んでいましたか？
2	起こす／起きる	恵子は家でピアノを弾いていた。	ピアノをひいている時、恵子は弟を起こした。	ピアノをひいている時、弟が起きた。	ピアノの音で人を起こすことができますか？	恵子はピアノを弾けましたか？
3	鳴らす／鳴る	健二は友達のうちの玄関まで来て、ドアの横のボタンを見つけた。	健二は少し待ち、そしてベルを鳴らした。	健二は少し待ち、そしてベルが鳴った。	ボタンでベルを鳴らすことができますか？	健二はいとこに会いに行きましたか？
4	砕く／砕ける	恵子は飲み物を冷やすのに、氷とアイスピックを持ってきた。	そして、恵子は氷を砕いた。	そして、氷が砕けた。	アイスピックで氷を砕くことができますか？	恵子はアイスピックを折りましたか？
5	止める／止まる	雅人は洗濯機に電源を入れたら、洗濯機から変な音がしているのに気づいた。	洗濯機を調べている時、雅人は洗濯機を止めた。	洗濯機を調べている時、洗濯機が止まった。	電源のボタンで洗濯機を止めることができますか？	洗濯機を直す必要がありますか？
6	冷やす／冷える	洋子はパーティーの準備をしていて、飲み物を冷蔵庫に入れていた。	準備中に、洋子はビールを冷やした。	準備中に、ビールが冷えた。	冷蔵庫はビールを冷やすことができますか？	洋子はビールを冷蔵庫から取り出しましたか？
7	焦がす／焦げる	ジョンは暖炉のそばでタバコを吸っていて、寝てしまった。	寝ている間に、ジョンはカーペットを焦がした。	寝ている間に、カーペットが焦げた。	タバコでカーペットを焦がすことができますか？	ジョンはズボンを焦がしましたか？
8	こぼす／こぼれる	雅人はレストランでワインを注文しました。	ワインが来たが、すぐに雅人はワインをこぼした。	ワインが来たが、すぐにこぼれた。	ワインをこぼすにはグラスを触る必要がありますか？	雅人はレストランにいましたか？
9	動かす／動く	洋子は家の外に車を見た。	洋子はその車に乗り、そして車を動かした。	洋子はその車に乗り、そして車が動いた。	車を動かすにはアクセルを踏む必要がありますか？	洋子はトラックを見ましたか？
10	転がす／転がる	雅人はゴルフクラブを使ってゴルフの練習をしていた。	雅人はボールに近づき、ボールを転がした。	雅人がボールに近づくと、ボールが転がった。	ゴルフをする時ゴルフクラブが必要ですか？	雅人はクラブを手に持っていましたか？
11	倒す／倒れる	建築会社の社員はとても古い建物を壊すために、ダイナマイトを用意した。	彼らはそこに到着するとすぐに建物を倒した。	彼らがそこに到着するとすぐに建物が倒れた。	ダイナマイトで建物を倒すことができますか？	建物はとても古かったですか？

12	回す／回る	智也は自分の自転車を直そうとしていた。	自転車を持ち上げると、智也は自転車の車輪をくるくる回した。	自転車を持ち上げると、自転車の車輪がくるくる回った。	人の力で自転車の車輪をくるくる回すことができますか？	智也は自転車を持っていましたか？
13	捻る／捻れる	智也はペンチを持っていて、パソコンのケーブルを直していた。	直している時に、智也はワイヤーをねじった。	直している時に、ワイヤーがねじれた。	ペンチでワイヤーをねじることができますか？	智也は携帯を直していましたか？
14	増やす／増える	直人はテニスサークルの部長をしていて、新しい方針を提案した。	部長の任期中に、直人は部員の数を増やした。	部長の任期中に、部員の数が増えた。	部長の方針によって部員の数を増やすことができますか？	直人は学生ですか？
15	溶かす／溶ける	裕子はチョコレートケーキを作ろうとしていて、チョコレートとお湯を取り出した。	ケーキを作っている時に、裕子はチョコレートを溶かした。	ケーキを作っている時に、チョコレートが溶けた。	お湯でチョコレートを溶かすことができますか？	裕子はフォークを使いましたか？
16	開ける／開く	直人は家の前で鍵を探していた。	鍵を拾うと、直人はドアを開けた。	鍵を拾うと、ドアが開いた。	鍵でドアを開けることができますか？	直人は自分の鍵を持っていましたか？
17	割る／割れる	裕子はシャボン玉で遊んでいた。	裕子はシャボン玉を捕まえようとしている時に、シャボン玉を割った。	裕子はシャボン玉を捕まえようとしている時に、シャボン玉が割れた。	シャボン玉は触ると割れますか？	裕子はおもちゃの車で遊んでいましたか？
18	剥く／剥けた	京子は海に行って、日焼けした。	かゆくなって、京子は皮をむいた。	かゆくなって、皮がむけた。	手で皮をむくことができますか？	京子は海に行きましたか？
19	育てる／育つ	京子は都内で一番古い高校に通っていた。	その頃、京子はひまわりを育てていて、そのひまわりが学校で一番大きいひまわりになった。	その頃、ひまわりが育っていて、そのひまわりが一番おおきいひまわりになった。	ひまわりを育てるには水をあげる必要がありますか？	京子は高校に通っていましたか？
20	傾ける／傾く	直人は絵をながめていたら、地震が起きた。	地震が起きた後、直人は絵を左に傾けた。	地震が起きた後、絵が左に傾いた。	手で絵を傾けることができますか？	直人は絵を描いていましたか？
21	壊す／壊れる	雅人は庭でボールを蹴っていた。	ボールを蹴っている時、雅人は木の柵を壊した。	ボールを蹴っている時、木の柵が壊れた。	ボールで柵を壊すことができますか？	雅人は野球をやっていましたか？
22	起こす／起きる	恵子は友達と電話で話していた。	電話で話している時、恵子は父を起こした。	電話で話している時、父が起きた。	電話の声で人を起こすことができますか？	恵子は電話で話していましたか？
23	鳴らす／鳴る	雅人は親戚のおばさんの家に来て、インターホンを見た。	雅人は玄関に着いたとたん、インターホンを鳴らし	雅人は玄関に着いたとたん、インターホン	インターホンを鳴らすにはボタンを押すことが必要ですか？	雅人は公園に行きましたか？

			た。	が鳴った。		
24	砕く／砕ける	直人はエアーガンで遊んでいた。	遊んでいる時、直人は電球をこなごなに砕いた。	遊んでいる時、電球がこなごなに砕けた。	エアーガンで電球をこなごなに砕くことができますか？	直人はエアーガンを手に持っていましたか？
25	止める／止まる	恵子はケーキを作るため、ミキサーをかけた。	その後、恵子はミキサーを止めた。	その後、ミキサーが止まった。	ボタンでミキサーを止めることができますか？	恵子はケーキを食べていましたか？
26	冷やす／冷える	洋子はアイスコーヒーを作るのに、氷を取り出した。	そして、洋子はコーヒーを冷やした。	そして、コーヒーが冷えた。	氷でコーヒーを冷やすことができますか？	洋子はお茶を作っていましたか？
27	焦がす／焦げる	洋子はコンロで魚を焼いていた。	焼いている時に、洋子は魚を焦がした。	焼いている時に、魚が焦げた。	コンロで魚を焦がすことができますか？	洋子は野菜を調理していましたか？
28	こぼす／こぼれる	直人はわんぱくな男の子だ。	直人は朝ごはんを食べている時、ミルクをこぼした。	直人は朝ごはんを食べている時、ミルクがこぼれた。	飲み物をこぼすには容器を触る必要がありますか？	直人は朝オレンジジュースを飲みましたか？
29	動かす／動く	裕子はスーパーで買い物をしていた。	りんごを選ぼうとしているとき、裕子はカートを動かした。	りんごを選ぼうとしているとき、カートが動いた。	押すことによってカートを動かすことができますか？	裕子はりんごが欲しかったですか？
30	転がす／転がる	裕子は友達とサッカーをしていた。	遊んでいる時、裕子はボールを転がした。	遊んでいる時、ボールが転がった。	足でボールを転がすことができますか？	裕子は友達とサッカーをやっていましたか？
31	倒す／倒れる	智也は火事で壊れた家を修理しようとして、いろいろな工具を持ち出した。	家に入った時、智也は壁を倒した。	家に入った時、壁が倒れた。	ハンマーで壁を倒すことができますか？	その家は台風で壊れましたか？
32	回す／回る	智也はラジオの調子が悪いことに気がついた。	ラジオをいじっている時に、智也はアンテナを回した。	ラジオをいじっている時に、アンテナが回った。	アンテナを回すことによって受信が良くなりますか？	そのラジオにはアンテナがありましたか？
33	捻る／捻れる	格闘技の試合で田中選手と鈴木選手が対戦した。	その時、田中選手は鈴木選手の手首をねじった。	その時、鈴木選手の手首がねじれた。	手で人の手首をねじることができますか？	鈴木選手は痛かったですか？
34	増やす／増える	京子はあまり食べないので、自分が痩せていると思っていた。	数ヶ月後、京子は体重を増やした。	数ヶ月後、京子は体重が増えた。	食べることによって体重を増やすことができますか？	京子は前より重くなりましたか？
35	溶かす	京子はご飯を作っていて、冷	数分後、京子はバターを	数分後、バターが溶	調理でバターを溶かすことがで	京子はバターを

	／溶ける	蔵庫からバターを出した。	溶かした。	けた。	きますか？	使うつもりでしたか？
36	開ける／開く	健二は恵子に誕生日のプレゼントをあげた。	恵子はプレゼントをもらった時に、箱を開けた。	恵子はプレゼントをもらった時に、箱が開いた。	手で箱を開けることができますか？	恵子はプレゼントをあげましたか？
37	割る／割れる	小犬は風船を追いかけていた。	すると、小犬は風船を割った。	すると、風船が割れた。	爪や牙で風船を割ることができますか？	猫がその風船を割りましたか？
38	剥く／剥ける	洋子は包丁でりんごを切ろうとした。	りんごを手にすると、洋子はりんごの皮をむいた。	りんごを手にすると、りんごの皮がむけた。	包丁で皮をむくことができますか？	洋子はりんごを食べようとしていましたか？
39	育てる／育つ	健二は草木の生えていない庭のある家に引っ越してきて、花の種を買ってきた。	数ヵ月後、健二は花を育てた。	数ヶ月後、花が育った。	肥料があると植物は良く育ちますか？	健二は種をもらいましたか？
40	傾ける／傾く	健二は壁にある時計を写真にとろうとした。	その瞬間、健二は時計を傾けた。	その瞬間、時計が傾いた。	手で時計を傾けることができますか？	健二はカメラを持っていましたか？

D.2 AGENT-IMPLYING ITEMS

Table 14. Japanese items in Experiment 2 (agent-implying)

Item	Verb	First sentence	Transitive	Intransitive	Question 1 (Target)	Question 2
1	見つける／見つかる	恵子は試験を受けていて、早く終わったので、答えを見直した。	答えを見直している時、恵子は間違いを見つけた。	答えを見直している時、間違いが見つかった。	間違いを見つけるのに注意が必要ですか？	恵子はご飯を食べていましたか？
2	捕まえる／捕	警察は犯人を追っていた。	その後、警察が犯人を捕まえた。	その後、犯人が捕まった。	警察は犯人を逮捕しますか？	犯人は警察に連れに行かれました

	まる					か？
3	助ける／助かる	健二は子供が溺れているのを見た。	そして、健二は子供を助けた。	そして、子供が助かった。	大人は子供を助けることができますか？	子供は山に登りましたか？
4	釣る／釣れる	直人は釣り竿を持って、湖に行った。	そして、直人は魚を釣った。	そして、魚が釣れた。	釣り竿で魚を釣ることができますか？	直人は湖に行きましたか？
5	揃える／揃う	洋子はケーキを作ることにしたので、スーパーに行った。	そして、洋子は材料をそろえた。	そして、材料がそろった。	材料をそろえるためには買い物をする必要がありますか？	洋子は小麦粉を買いましたか？
6	定める／定まる	直人は散弾銃を持って、山へ狩りに行った。	まもなく、直人は獲物の狙いを定めた。	まもなく、獲物の狙いが定まった。	獲物の狙いを定めるには散弾銃のスコープが要りますか？	直人は川に行きましたか？
7	備える／備わる	洋子は新しい家に引っ越すことにして、家具屋さんに行った。	引っ越した後、洋子は家具を備えた。	引っ越した後、家具が備わった。	家具を備えるために買い物をする必要がありますか？	洋子はソファを買いましたか？
8	つなぐ／つながる	智也は馬を飼っていた。	馬の体を洗う時、智也はひもを柵につないだ。	馬の体を洗う時、ひもが柵につながった。	ひもを柵につなげる時結びますか？	智也は馬に餌をあげていましたか？
9	決める／決まる	社員が集まって会議をした。	会議で、社員は新製品の発売日を決めた。	会議で、新製品の発売日が決まった。	発売日は話し合って決めるものですか？	新製品ができましたか？
10	混ぜる／混ざる	裕子はケーキを作ることにして、砂糖や小麦粉やスプーンなどテーブルに置いた。	ケーキを作っている時、裕子は砂糖と小麦粉を混ぜた。	ケーキを作っている時、砂糖と小麦粉が混ざった。	スプーンで砂糖と小麦粉を混ぜることができますか？	裕子は塩を入れましたか？
11	植える／植わる	裕子は花が好きで、友達から花の種をもらった。	二ヵ月後、裕子は庭に花をたくさん植えた。	二ヵ月後、庭に花がたくさん植わった。	植物を育てるのに種をまくことが必要ですか？	裕子は木を育てましたか？
12	散らかす／散らかる	子供はおもちゃで遊んでいた。	遊んでいる時、子供はおもちゃを散らかした。	遊んでいる時、おもちゃが散らかった。	子供はおもちゃを投げたりしますか？	子供はおもちゃを片付けましたか？
13	伝える／伝わる	智也は光一に秘密を話した。	その後、光一は裕子に秘密を伝えた。	その後、裕子に秘密が伝わった。	秘密を伝えるには言葉が必要ですか？	光一は智也から秘密を聞きましたか？
14	届ける	雅人は郵便局に行って、恵	三日後、郵便局が荷物を	三日後、荷物が届い	郵便局は荷物を配達します	恵子は雅人から

	／届く	子に荷物を送った。	届けた。	た。	か？	荷物をもらいましたか
15	埋まる／埋める	雅人はシャベルを使って、宝を隠そうとしていた。	そして、雅人は庭に宝を埋めた。	そして、庭に宝が埋まった。	物を埋めるにはシャベルで穴を掘りますか？	雅人は宝を盗まれましたか？
16	染める／染まる	川の隣に工場ができた。	その後、工場が川を黒く染めた。	その後、川が黒く染まった。	汚水で川が黒くなりますか？	川は前よりきれいになりましたか？
*17	はめる／はまる	京子は友達と指輪を買いに行った。	試そうとして、京子は指輪をはめた。	試そうとして、指輪がはまった。	手で指輪をはめますか？	京子は指輪が欲しかったですか？
*18	つける／つく	健二は真っ暗な部屋にいて、スイッチを探していた。	そして、健二は電気をつけた。	そして、電気がついた。	スイッチで電気をつけることができますか？	健二は部屋にいましたか？
*19	抜く／抜ける	京子は歯医者さんに行った。	その後、歯医者さんが歯を抜いた。	その後、歯が抜けた。	抜歯用ベンチで歯を抜けることができますか？	京子は図書館に行きましたか？
*20	建てる／建つ	ある会社が土地を買い、建築会社にホテル建設を依頼した。	その後、建築会社がホテルを建てた。	その後、ホテルが建った。	ビルを建てるには人手がたくさん要りますか？	会社は土地を買いましたか？

APPENDIX E

ENGLISH BASELINE AND FILLER ITEMS IN EXPERIMENT 2

Table 15. English baseline and filler items in the priming experiment

Item	Type	Sentence 1	Sentence 2	Question 1	Question 2
1	Baseline	Mary was washing dishes in the kitchen.	While she was rinsing the dishes, the phone rang.	Are dishes breakable?	Was Mary in the kitchen?
2	Baseline	Mary was jogging in the park.	She stopped, and sipped water from the water fountain.	Do parks have trees?	Was Mary sitting on a bench?
3	Baseline	Sally was reading a book in a library.	After she finished reading, she put it back on the shelf.	Is a library usually quiet?	Did Sally borrow the book?
4	Baseline	David was repairing a clock.	All of a sudden, he saw a mouse running across the table.	Does a clock require electricity?	Did David see a cat?
5	Baseline	The manager was having a meeting with his colleagues.	While they were discussing business, his secretary entered.	Do offices have tables?	Did the secretary join the meeting?
6	Baseline	David was riding a bike to school.	While he was on his way, he fell from his bike.	Does a bike have two wheels?	Was David still a student?
7	Baseline	Sally was sleeping on the sofa.	While she was sleeping, a thief broke into her house.	Is a sofa soft?	Was Sally awake when the thief broke in?
8	Baseline	The photographer was taking pictures of the building.	Suddenly, a fire truck came and blocked his view.	Are buildings made of concrete?	Did the photographer want to take some pictures?
9	Baseline	Susan was drawing a duck with crayons.	While she was drawing, her mother baked some cupcakes.	Can ducks swim?	Could Susan draw?
10	Baseline	Peter was growing some tomatoes.	While he was giving water to his plants, he found some new buds.	Are tomatoes perishable?	Would there be more tomatoes?
11	Baseline	Susan was cooking a chicken.	Suddenly, her brother startled her and she cut herself.	Do chickens have legs?	Was Susan cooking a fish?

12	Baseline	Peter was typing a report in his bedroom.	When he was about to finish, he found that it was snowing outside.	Is a report made of paper?	Did David use a pen?
13	Baseline	Joe was talking on the phone.	While he was talking, someone shouted at him from behind.	Do phones have dialing pads?	Was Joe talking to someone?
14	Baseline	Betty was unwrapping her christmas present from her parents.	As soon as she opened the box, she found a pair of shoes.	Is Christmas in the winter?	Did Betty's parent give Betty presents?
15	Baseline	Joe was watching ice hockey on TV.	All of a sudden, the power went out.	Is ice cold?	Did the TV go black?
16	Baseline	Betty was lying on the grass under the sun.	Suddenly a dog rushed to her and she panicked.	Can the sun tan people?	Did the dog frighten Betty?
17	Baseline	Joe was waiting for a bus at the bus stop.	While he was waiting, a girl came to him and asked for directions.	Is a bus bigger than a car?	Did Joe want to take a bus?
18	Baseline	Betty was buying apples at a grocery store.	When she tried to pay, she found that she lost her wallet.	Are apples red?	Was Betty buying some banana?
19	Baseline	John was moving a desk into his bedroom.	As soon as he walked into the room, he found a large rat.	Can desks be made of wood?	Did John see ants in his bedroom?
20	Baseline	John was tidying up his closet.	Suddenly, he had a very bad headache.	Are closets for clothes?	Was John washing his car?
1	Filler	John was watching a movie with a bowl of popcorn.	While he was watching, the popcorn spilled.	Is popcorn made from plastic?	Was John eating dinner?
2	Filler	John was crossing the road.	While he was crossing, a bus hit him.	Can a man lift a bus?	Did John finish crossing the road?
3	Filler	Mary was making a snowman at night.	While she was making it, the snow melted.	Can the moon melt the snow?	Was Mary making a snowman?
4	Filler	John was drinking a beer.	While he was drinking, he made a fire.	Can alcohol extinguish a fire?	Was John having an alcoholic drink?

5	Filler	Mary was reading a magazine in a bookstore.	While she was reading, a dog barked at her.	Can a dog read?	Was Mary at a café?
6	Filler	Susan was getting a haircut.	After she got an haircut, she ate a cupcake.	Does a hair salon sell cupcakes?	Did Susan's hair become shorter?
7	Filler	Susan was walking beside a river.	While she was walking, she saw a fish in the river.	Can a fish walk?	Did Susan swim in the river?
8	Filler	John was brushing his teeth in the bathroom.	While he was brushing his teeth, a person knocked at his door.	Can teeth tear wood?	Did John use a toothbrush?
9	Filler	John was mowing the lawn.	While he was mowing, he killed a frog.	Does a frog eat grass?	Did John kill a squirrel?
10	Filler	Susan was listening to her favorite singer.	While she was listening, she patted her cat.	Can a cat sing?	Did Susan own a cat?
11	Filler	Peter was suffering from a very bad headache.	While he was taking a rest, he took some aspirin.	Does aspirin cause headaches?	Did Peter take some medicine?
12	Filler	Susan was opening a package with a pair of scissors.	While she was opening it, the door opened.	Do scissors open a door?	Did Susan cut herself with the scissors?
13	Filler	David was writing a letter to a friend.	While he was writing, it started snowing.	Can a pen shovel snow?	Did David call his friend?
14	Filler	Susan was taking pictures of penguins at the zoo.	While she was taking pictures, a penguin jumped into the water.	Can a penguin fly?	Were there penguins at the zoo?
15	Filler	Joe was playing with a frisbee with his dog.	After he tossed the frisbee, the dog bit it.	Is a frisbee edible?	Did Joe toss the frisbee?
16	Filler	Joe was assembling a chair with a screwdriver.	While he was assembling it, the plastic cracked.	Can a screw driver cut plastic?	Did Joe make a bookcase?
17	Filler	Sally was cutting meat in the kitchen.	While she was cutting it, she dropped the knife.	Can a knife cut the floor?	Was Sally using a knife?
18	Filler	Sally was polishing her shoes.	While she was polishing them, she cut herself.	Can a brush cut someone?	Did Sally hurt herself?
19	Filler	Sally was baking a cake in the oven.	While she was baking it, she froze the cream.	Can an oven freeze cream?	Did Sally put the cake into the oven?

20	Filler	John was driving a car up a hill.	While he was driving, the fog increased.	Does fog improve visibility?	Did John walk up a hill?
21	Filler	Betty was shoplifting in a store.	While she was shoplifting, the police arrived.	Is it legal to shoplift?	Did Betty pay?
22	Filler	Betty was working in her office.	While she was working, a car crashed into the building.	Can a car collpase a building?	Did a bus crash into the building?
23	Filler	Joe was painting his house.	While he was painting, a strong wind blew.	Can wind blow away paint?	Did Joe use a paint brush?
24	Filler	Joe was cleaning his ears.	As soon as he finished, he saw a squirrel outside his window.	Do people use ears to see?	Was Joe washing his hands?
25	Filler	Joe was watching a feather flying in the air.	When the feather reached the ground, he heard a loud noise.	Is a feather heavy?	Did Joe catch the feather?
26	Filler	Betty was washing her car.	While she was washing it, her diamond ring slipped off of her finger and fell.	Are diamonds soft?	Did Betty have a diamond ring on her finger?
27	Filler	Joe was studying for the exam.	While he was studying, a hurricane came.	Are hurricanes safe?	Was Joe going to have an exam?
28	Filler	Peter was washing vegetables in a colander.	While he was washing, he poured water into the colander.	Can a colander hold water?	Was Peter washing some apples?
29	Filler	Peter was getting onto a bus, and was holding a bag of donuts.	While he was getting onto the bus, he paid the driver.	Can you pay the bus driver with donuts?	Did Peter pay the driver when he got out of the bus?
30	Filler	Betty was watching some kids play in the park.	While she was watching, an old woman chased after the kids.	Can an old woman run very fast?	Did Betty see some kids in the park?
31	Filler	Peter was making a desk with a saw.	While he was making it, he drilled some holes.	Can a saw drill holes?	Did Peter use a hammer?
32	Filler	Betty was washing her hands.	After she washed her hands, she put on her shoes.	Do people wear shoes on their hands?	Did Betty wash her feet?

33	Filler	Peter was putting on a coat as he was about to leave the restaurant.	While he was putting it on, a lady rushed in.	Are coats for summer?	Did Peter forget his coat?
34	Filler	Mary was hanging some laundry.	After she hung them, the clothes dried.	Can touching clothes cause them to dry?	Did Mary put the laundry into a dryer?
35	Filler	Mary was walking out of the house with a glass of water on a cold winter night.	While she was walking, the water froze.	Can touching water cause it to freeze?	Was it cold outside the house?
36	Filler	Mary was going to make some bread, and she took out some dough from the fridge.	While she was making it, the refrigerator stopped working.	Can a refrigerator make bread?	Was the refrigerator broken?
37	Filler	David was playing with a ball beside a hill.	While he was playing, the ball rolled.	Can a ball roll uphill?	Was David playing with a ball?
38	Filler	David was visiting a corn field.	While he was visiting it, he ate an apple.	Does a corn field grow apples?	Was David visiting a museum?
39	Filler	David was oiling his bike.	While he was oiling it, he spilled his glass of water.	Can oil dissolve in water?	Was David riding on his bike?
40	Filler	David went on a picnic with some food and cutlery.	While he was having a picnic, he caught some fish.	Can you catch fish with a knife?	Did David bring food with him?

APPENDIX F

JAPANESE BASELINE AND FILLER ITEMS IN EXPERIMENT 2

Table 16. Japanese baseline and filler items in the priming experiment

Item	Type	Sentence 1	Sentence 2	Question 1	Question 2
1	Baseline	恵子はキッチンでお皿を洗っていた。	お皿を洗っている時、電話が鳴った。	お皿は割れますか？	恵子はキッチンにいましたか？
2	Baseline	恵子は公園でジョギングをしていた。	恵子は立ち止まって、蛇口で水を飲んだ。	公園には木がありますか？	恵子はベンチに座っていましたか？
3	Baseline	裕子は図書館で本を読んでいた。	裕子は読み終わって、その本を棚に戻した。	図書館は静かなところですか？	裕子は本を借り出しましたか？
4	Baseline	智也は時計を直していた。	突然、智也はねずみがテーブルを通り過ぎるのを見た。	時計は電気が必要ですか？	智也は猫を見ましたか？
5	Baseline	部長は部下と会議をしていた。	会議をしている時、部長の秘書が入ってきた。	オフィスにテーブルがありますか？	秘書は会議に参加しましたか？
6	Baseline	智也は自転車に乗って学校に行った。	智也は途中で転んだ。	自転車は車輪が二つありますか？	智也はまだ学生ですか？
7	Baseline	裕子はソファで寝ていた。	裕子が寝ている時、泥棒が入ってきた。	ソファはやわらかいですか？	泥棒が入ってくるとき、裕子は起きていましたか？
8	Baseline	写真家はビルの写真を撮っていた。	突然、消防車が来て、前をさえぎった。	ビルはコンクリートでできていますか？	写真家は写真を撮りたかったですか？
9	Baseline	洋子はクレヨンでアヒルを書いていた。	洋子が絵を書いている時、母親がケーキを焼いていた。	アヒルは泳げますか？	洋子は絵がかけましたか？
10	Baseline	雅人はトマトを育てていた。	雅人は水をあげている時、新しい芽を発見した。	トマトは腐りますか？	これからはトマトがもっとできますか？
11	Baseline	洋子はチキンを焼いていた。	突然、弟に驚かされて洋子は自分の手を切った。	チキンは足がありますか？	洋子は魚を調理していましたか？
12	Baseline	雅人は部屋でレポートを書いていた。	レポートが終わったころ、雅人は雪が降っているのに気づいた。	レポートは紙でできていますか？	雅人はペンを使っていましたか？
13	Baseline	直人は電話で話していた。	直人が電話している時、誰	電話は音が鳴ります	直人は誰かと話してい

			かが近くで叫んでいた。	か？	ましたか？
14	Baseline	京子は両親からのクリスマスプレゼントを開けようとしていた。	箱を開けたら、靴があった。	クリスマスは冬にありますか？	京子は両親からプレゼントをもらいましたか？
15	Baseline	直人はテレビでアイスホッケーを見ていた	突然、停電になった。	氷は冷たいですか？	テレビの画面が消えましたか？
16	Baseline	京子は太陽の下、芝生で寝転がっていた。	突然、犬が走ってきて、京子は驚いた。	人は日焼けしますか？	その犬は京子を驚かせましたか？
17	Baseline	直人はバス停でバスを待っていた。	直人がバスを待っている時、女の子が直人に道を聞いてきた。	バスは車より大きいですか？	直人はバスに乗りたがっていましたか？
18	Baseline	京子はスーパーでりんごを買っていた。	払おうとした時、財布を落としたことに気がついた。	りんごは赤いですか？	京子はバナナを買っていましたか？
19	Baseline	健二は机を部屋に移動していた。	健二は部屋に入ったとたん、大きなねずみを見つけた。	机は木でできたものもありますか？	健二は部屋で蟻を見ましたか？
20	Baseline	健二はクローゼットの中を片付けていた。	突然、頭が痛くなった。	クローゼットは洋服を入れるための家具ですか？	健二は車を洗っていましたか？
1	Filler	健二はポップコーンを食べながら、映画を見ていた。	映画を見ている時、ポップコーンがこぼれた。	ポップコーンはプラスチックから作られますか？	健二は晩御飯を食べていましたか？
2	Filler	健二は道路を渡っていた。	道路を渡っている時、健二はバスに引かれた。	人間の力でバスを持ち上げることができますか？	健二は道路を渡り終わりましたか？
3	Filler	恵子は夜、雪ダルマを作っていた。	恵子が雪ダルマを作っている時、雪が溶けた。	月は雪を溶かすことができますか？	恵子は雪ダルマを作っていましたか？
4	Filler	健二はビールを飲んでいた。	ビールを飲んでいる時、健二は火をおこした。	アルコールで火を消すことができますか？	健二はお酒を飲んでいましたか？
5	Filler	恵子は本屋で雑誌を読んでいた。	恵子が本を読んでいる時、犬が吠えていた。	犬は本が読めますか？	恵子は喫茶店にいましたか？
6	Filler	洋子は髪を切ってもらって	髪を切った後、洋子はケー	床屋でケーキを売って	洋子は髪が短くなりま

		いた。	キを食べた。	いますか？	したか？
7	Filler	洋子は川に沿って歩いていた。	歩いている時、洋子は川の中に魚を見た。	魚は歩けますか？	洋子は川で泳いでいましたか？
8	Filler	健二はトイレで歯を磨いていた。	健二が歯を磨いている時、誰かがドアをノックした。	歯で木を切ることができますか？	健二は歯ブラシを使いましたか？
9	Filler	健二は草を刈っていた。	草を刈っている時、健二はカエルを殺した。	カエルは草を食べますか？	健二はリスを殺しましたか？
10	Filler	洋子は大好きな歌手の歌を聞いていた。	歌を聞いている時、洋子は猫を撫でた。	猫は歌が歌えますか？	洋子は猫を飼っていましたか？
11	Filler	雅人は頭痛がした。	休んでいる時、雅人はアスピリンを飲んだ。	アスピリンは頭痛の原因になりますか？	雅人は薬を飲みましたか？
12	Filler	洋子ははさみで小包を開けていた。	洋子が小包を開けている時、ドアが開いた。	はさみでドアを開けることができますか？	洋子ははさみで指を切りましたか？
13	Filler	智也は友達に手紙を書いていた。	智也が手紙を書いている時、雪が降り始めた。	ペンで雪を掘ることができますか？	智也は友達に電話しましたか？
14	Filler	洋子は動物園でペンギンの写真を撮っていた。	洋子が写真を撮っている時、ペンギンが水に飛び込んだ。	ペンギンは飛べますか？	動物園にペンギンがいましたか？
15	Filler	直人は犬とフリスビーをしていた。	直人がフリスビーを投げたら、犬がフリスビーに噛み付いた。	フリスビーは食べられますか？	直人はフリスビーを投げましたか？
16	Filler	直人はドライバーで椅子を組み立てていた。	椅子を組み立てている時、椅子のプラスチックの部分にひびが入った。	ドライバーでプラスチックを切ることができますか？	直人は本棚を作っていましたか？
17	Filler	裕子はキッチンで肉を切っていた。	肉を切っている時、裕子は包丁を落とした。	包丁で床を切ることができますか？	裕子は包丁を使っていましたか？
18	Filler	裕子は靴を磨いていた。	靴を磨いている時、裕子は手を切った。	ブラシで手を切ることができますか？	裕子は怪我をしましたか？
19	Filler	裕子はオーブンでケーキを焼いていた。	ケーキを焼いている時、裕子はクリームを凍らせた。	オーブンでクリームを凍らせることができますか？	裕子はケーキをオーブンに入れましたか？
20	Filler	健二は車で山を登ってい	山を登っている時、霧が深	霧は視界を良くします	健二は山を歩いて登り

		た。	くなった。	か？	ましたか？
21	Filler	京子は店で万引きをしようとした。	万引きをしている時、警察が来た。	万引きは合法ですか？	京子はお金を払いましたか？
22	Filler	京子は仕事中だった。	その時、車がビルにぶつかってきた。	車でビルを倒すことができますか？	ビルにぶつかったのはバスでしたか？
23	Filler	直人は家の壁をペンキで塗っていた。	壁を塗っている時、強い風が吹いてきた。	風でペンキを飛ばすことができますか？	直人はペンキのハケを使いましたか？
24	Filler	直人は耳を掃除していた。	耳の掃除が終わったら、直人は外でリスを見た。	人は耳で見ますか？	直人は手を洗っていましたか？
25	Filler	直人は羽根が飛んでいるのを見ていた。	羽根が落ちると、直人は大きな音が聞こえた。	羽は重いですか？	直人は羽根を捕まえましたか？
26	Filler	京子は車を洗っていた。	車を洗っている時、京子はダイヤの指輪を落とした。	ダイヤモンドは柔らかいですか？	京子はダイヤモンドの指輪をしていましたか？
27	Filler	直人は試験のための勉強をしていた。	直人が勉強している時に、台風が来た。	台風は安全ですか？	直人は試験を受けますか？
28	Filler	雅人はざるで野菜を洗っていた。	野菜を洗っている時、雅人はざるに水をかけた。	水はざるにたまりますか？	雅人はりんごを洗っていましたか？
29	Filler	雅人はドーナツを持って、バスに乗った。	バスに乗った時、運転手にバス代を払った。	ドーナツはバス代になりますか？	雅人はバスを降りる時バス代を払いましたか？
30	Filler	京子は子供たちが遊んでいるところを見ていた。	その時、おばあさんが子供たちを追いかけた。	おばあさんは速く走れますか？	京子は公園で子供を見ましたか？
31	Filler	雅人はのこぎりで机を作っていた。	机を作っている時、雅人は板に穴を開けた。	のこぎりで板に穴を開けることができますか？	雅人はハンマーを使いましたか？
32	Filler	京子は手を洗っていた。	手を洗った後、京子は靴を床に履いた。	人は靴を手に履きますか？	京子は足を洗いましたか？
33	Filler	雅人はコートを着て、レストランを出ようとしていた。	その時、女の人が急いで入ってきた。	コートは夏に着ますか？	雅人はコートを忘れましたか？
34	Filler	恵子は洗濯物を干してい	恵子が洗濯物を干した後、	手で触ることによって	恵子は乾燥機に洗濯物

		た。	洗濯物が乾いた。	服が乾きますか？	を入れましたか？
35	Filler	恵子は水を持って、家を出た。	恵子が歩いていたら、水が凍った。	手で触ることによって水が凍りますか？	家の外は寒かったですか？
36	Filler	恵子はパンを焼こうと思って、材料を冷蔵庫から出した。	恵子がパンを焼いている時、冷蔵庫が止まった。	冷蔵庫でパンが焼けますか？	その冷蔵庫は壊れていましたか？
37	Filler	智也は小高い丘でボールで遊んでいた。	智也が遊んでいる時、ボールが転がった。	ボールは坂を上ることができますか？	智也はボールで遊んでいましたか？
38	Filler	智也はトウモロコシ畑を訪れた。	トウモロコシ畑で、智也はりんごを食べた。	トウモロコシ畑はりんごを育てますか？	智也は博物館に行きましたか？
39	Filler	智也は自転車に油を差していた。	油を差している時、智也は水をこぼした。	油は水に溶けますか？	智也は自転車に乗っていましたか？
40	Filler	智也は食べ物と食器を持ってピックニックに行った。	ピクニックで、智也は魚を釣った。	ナイフで魚を釣ることができますか？	智也は食べ物を持っていましたか？

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