

Floating Numeral Quantifiers as an Unaccusative Diagnostic in Native, Heritage and L2

Japanese Speakers

Running head: Unaccusativity in three Japanese grammars

Abstract

This study investigates the knowledge of unaccusativity in Japanese native, heritage, and second/foreign language speakers with respect to licensing of floating numeral quantifiers (FNQs) by unaccusative and unergative subjects (the *FNQ diagnostic*). Two acceptability judgment experiments were conducted to examine (i) whether and how judgments of the three populations differ with respect to the FNQ paradigm and (ii) whether and how manipulations of agentivity of subjects and telicity of events affect their judgments of the FNQ diagnostic. Our findings show that (i) the native and heritage speakers' knowledge about the FNQ diagnostic are largely indistinguishable from each other, (ii) some L2 speakers' judgments show signs of initial development of the knowledge of the FNQ diagnostic, and (iii) that telicity shows clear effects on the FNQ diagnostic with all three groups, while the effects of agentivity are subtle and detectible only with the native and heritage speakers.

1 Introduction

Unaccusativity, or *Split Intransitivity*, refers to the generalization that intransitive verbs divide into two subclasses, *unaccusatives* and *unergatives*. While the core arguments of unaccusatives share common properties with direct objects of transitive verbs, the core arguments of unergatives do so with transitive subjects. The Unaccusative Hypothesis (Perlmutter 1978; Burzio 1986) accounts for the generalization with two underlying structures for intransitive verbs. The unergative structure involves an external argument base-generated outside of VP (1a) while the unaccusative structure involves an internal argument base-generated inside VP (1b).¹

- (1) a. [_{XP} D/NP [_{VP} V]]
 b. [_{XP} [_{VP} V D/NP]]

Unaccusativity has also been characterized semantically. Unaccusatives often denote states or telic events, and their core arguments are undergoers of events or holders of states. In contrast, unergatives typically denote atelic events and their core arguments are usually volitional agents.

¹ More recent analyses of the unaccusative/unergative distinction within the Minimalist Program framework (i.e. Chomsky 1995) commonly postulate a semi-functional verbal head that embeds the traditional VP and introduces external arguments and case-licenses internal arguments (e.g. Bowers 1993, 2002; Kratzer 1993, 1996; Chomsky 1995; Harley 1995; Collins 1997). Individual proposals differ in terms of whether this head is present in both the unaccusative and unergative structures but lacks the ability to introduce external arguments and structurally license internal arguments in the unaccusative structure, or the unaccusative structure lacks a projection of the said head all together. However, the core assumption behind the syntactic accounts of unaccusativity has remained the same: the sole nominal argument of unaccusatives is a base-generated internal argument while that of unergatives is a base-generated external argument.

While the source of the distinction has been debated (Perlmutter 1978; Rosen 1984; Burzio 1986; Levin and Rappaport-Hovav 1989, 1995; van Valin 1990; Dowty 1991; Sorace 1993, 1995, 2000, 2004, among others), the predominant view within generative approaches appears to be that unaccusativity is semantically determined and syntactically encoded. Under this view, unaccusativity is a prime example of a syntax-semantics interface phenomenon.

Speakers' knowledge about unaccusativity can be made explicit only through their behavior with respect to *unaccusative diagnostics*, or syntactic phenomena that are sensitive to the unaccusative-unergative distinction. Consider the following contrast with licensing of numeral quantifiers (NQs) from Japanese.

- (2) a. **Gakusee-ga** (✓**san-nin**) ofisu-ni (✓**san-nin**) ki-ta²
 student-NOM (three-CL) office-LOC (three-CL) come-PST
 ‘Three students came to the office.’ [UNACCUSATIVE]
- b. **Gakusee-ga** (✓**san-nin**) geragera-to (#**san-nin**) warat-ta
 student-NOM (three-CL) loudly (three-CL) laugh-PST
 ‘Three students laughed loudly.’ [UNERGATIVE]

NQs consist of a numeral such as *san* ‘three’ and a classifier such as *-nin*, which agrees with a certain semantic feature of the modified NP (*the associate*), e.g. [+human] with *-nin*. It has been observed that Japanese intransitive subjects’ ability to license NQs that are “floating” inside VP, i.e. the second NQ in each of the examples, is sensitive to the unaccusative/unergative distinction.

While unaccusative subjects readily license floating NQs (FNQs) (2a), sentences in which

¹Abbreviations: ACC = accusative, CL = classifier, DEC = declarative, GEN = genitive, GER = gerundive, LOC = locative, NEG = negative, NMNL = nominalizer, NOM = nominative, NPST = non-past, PL = plural, POL = polite, PST = past, TOP = topic.

unergative subjects are associated with FNQs are degraded (2b) (Miyagawa 1989). A similar contrast has also been attested in Korean (e.g. Gerts 1987; Lee 1989; Ahn 1990; O’Grady 1991; Kang 2002; Miyagawa 2006; Ko 2005, 2007).³

- (3) a. **Koyangi-ka** i pyeng-ulo **sey-mali** cwuk-ess-ta.
 cat-NOM this disease-by three-CL die-PST-DEC
 ‘Three cats died from this disease.’ (Ko 2007: 68; (39)) [UNACCUSATIVE]
- b. ?***Haksayng-tul-i** caki-uy ton-ulo **twu-myeng** cenhwaha-yess-ta.
 student-PL-NOM self-GEN money-by two-CL telephone- PST-DEC
 (‘Two students telephoned with their own money.’) (Ko 2007: 68; (41)) [UNERGATIVE]

If the licensing of FNQs by intransitive subjects is a valid unaccusative diagnostic for Japanese (and Korean), as will be argued below, for speakers of these languages to exhibit the expected judgments concerning the contrast in (2) and (3), they must possess the knowledge about the alleged syntactic difference between unaccusatives and unergatives in (1) as well as relevant constraints that govern the distribution of FNQs (to be discussed below). In addition, semantic factors such as animacy (and therefore potential agentivity) of subjects and telicity of events that intransitive verbs denote have been argued to affect native speakers’ judgments on the licensing of FNQs (Tsuji-mura 1994, 1996; Mihara 1998; Nakanishi 2008; Miyagawa 2012). Thus, an emerging picture of the licensing of FNQs as an unaccusative diagnostic (henceforth *the FNQ diagnostic*) is that it involves at least three interacting factors: (i) the unaccusative-unergative

³ One important difference between Japanese and Korean with respect to the licensing of FNQs is that FNQs can be case-marked only in Korean. It has been claimed that the contrast shown in (3) is observed in Korean only with case-less NQs (e.g. Ahn 1990; Ko and Oh 2010, 2012).

distinction in (1), (ii) the constraints that are assumed to govern the distribution of FNQs, and (iii) the effects of semantic factors such as agentivity and telicity on the licensing of FNQs.

This study experimentally examines the knowledge of the FNQ diagnostic in three different populations of Japanese speakers: (i) native speakers, who were exposed only to Japanese as children, (ii) heritage speakers, who were exposed to Japanese since their birth or very early in their life but also learned a second language as the dominant language in their community (e.g. Polinsky 1995; Montrul 2002, 2004, 2005; Polinsky and Kagan 2007; Benmamoun, Montrul and Polinsky 2013; Scontras et al. 2015), and (iii) second/foreign language (L2) speakers, who learned the language as a foreign or second language as adults. Their knowledge of the FNQ diagnostic is examined in two sentence acceptability judgment experiments. To the best of our knowledge, no previous study experimentally examined Japanese heritage speakers' knowledge of unaccusativity or the effects of agentivity and telicity on the FNQ diagnostic with any type of Japanese speakers.

The rest of this paper is structured as follows. Section 2 reviews theoretical literature on the FNQ diagnostic and introduces a particular theoretical approach to it, the stranding analysis, which allows us to establish a direct link between unaccusativity and the FNQ diagnostic. Section 3 reviews previous experimental studies with native, heritage and L2 Japanese speakers that involved use of the FNQ diagnostic and related studies with Korean and shows that the contrast in (2) has been reliably established in experimental settings especially in experiments that used a small number of 'known' unaccusative/unergative verbs, i.e. intransitive verbs whose unaccusative/unergative status had been independently motivated in previous studies. This section also briefly reviews previous experimental studies on unaccusativity in Japanese that used other unaccusative diagnostics, with the goal of establishing the FNQ diagnostic as the most

reliable unaccusative diagnostic currently available for Japanese. Section 4 identifies three research questions to be investigated with the FNQ diagnostic. Section 5 and 6 discuss and analyze the results of two acceptability judgment experiments: Experiment 1 and 2. Experiment 1 serves as a preliminary study for Experiment 2. It examines whether judgments elicited from the three populations replicate the contrast with the FNQ diagnostic in (2) with a small number of participants. Experiment 2 is a larger scale study that was designed to probe whether and how manipulations of animacy (thus the potential agentivity) of subjects and telicity of events affect judgments of the three groups of Japanese speakers with respect to the FNQ diagnostic. Taken together, the findings from the two experiments show (i) that the native speakers' and heritage speakers' knowledge about the FNQ diagnostic are largely indistinguishable from each other, (ii) that the knowledge of the FNQ diagnostic may be achievable in L2 speakers, and (iii) that telicity of events show clear effects on the FNQ diagnostic with all three groups of speakers while the effects of agentivity are subtle and detectible only with the native and heritage speakers. Section 7 concludes the paper with a discussion of the findings from the two experiments and their implications.

2 The 'Stranding' Analysis of FNQs

The goal of this study is to examine the knowledge of the contrast between unaccusative and unergative verbs with the FNQ diagnostic in (2) (repeated below as (4)) among native, heritage and L2 Japanese speakers.

- (4) a. **Gakusee-ga** ofisu-ni **san-nin** ki-ta
 student-NOM office-LOC three-CL come-PST
 'Three students came to the office.' [UNACCUSATIVE]
- b. #**Gakusee-ga** geragera-to **san-nin** waraw-ta

student-NOM loudly three-CL laugh-PST

(‘Three students laughed loudly.’) [UNERGATIVE]

Miyagawa (1989) accounts for the contrast in (4) by incorporating two assumptions. First, he adopts the Unaccusative Hypothesis in (1). Second, he assumes that an FNQ and its associate must be in a syntactically local configuration in their base-generated positions, but the associate can ‘strand’ the FNQ by undergoing syntactic movement, as originally proposed for floating quantifiers in French and English by Sportiche (1988). Under these assumptions, the FNQ in (4a) is licensed despite the presence of the intervening PP because *ku-ru* ‘come’ is an unaccusative verb and its subject is base-generated as an internal argument inside VP, where it was in the required local configuration with the FNQ. In contrast, (4b) is degraded because *waraw-u* ‘laugh’ is an unergative verb and its subject was base-generated outside VP as an external argument. Thus, it was never in the required local configuration with the FNQ. Subsequent studies on the distribution of FNQs put forward additional arguments for the standing analysis of FNQs from various phenomena, including anaphor binding, quantifier scope, weak crossover and prosody (e.g. Terada 1990; Kitahara 1993; Kawashima 1998; Yamashita 2001, 2002, 2006; Fitzpatrick 2006; Ko 2007; Miyagawa 2006; Miyagawa and Arikawa 2007). What is important for our purposes is that the FNQ diagnostic is directly linked to the assumed unaccusative/unergative distinction under the stranding analysis. It is the base-generated position of intransitive subjects that determines the acceptability of FNQs that are associated with them.

One long-standing issue within the literature on FNQs in Japanese is that the licensing of FNQs appears to be sensitive to certain semantic factors. In particular, it has been observed that the acceptability of unergative sentences with a subject-oriented FNQ, such as (4b), improves

with an adverb that facilitates a telic interpretation of the event, as in (5b) and (6b) below (Tsujimura 1994, 1996; Mihara 1998; Nakanishi 2008; Miyagawa 2012).

- (5) a. ?***Kodomo-ga** inu-to awatete **san-nin** hashit-ta.
 child-NOM dog-with hurriedly three-CL run-PST
 ('Three children ran hurriedly with a dog.')
- b. **Kodomo-ga** inu-to awatete kooen-made **san-nin** hashit-ta.
 child-NOM dog-with hurriedly park-till three-CL run-PST
 'Three children ran hurriedly to the park with a dog.' (Tsujimura 1994: 342; (16ta-b))
- (6) a. ***Tomodachi-ga** jup-pun **futa-ri** odot-ta.
 friend-NOM ten-minutes two-CL dance-PST
 ('Two friends danced for ten minutes.')
- b. **Tomodachi-ga** jup-pun-no uchini **futa-ri** odot-ta.
 friend-NOM ten-minutes-GEN within two-CL dance-PST
 'Two friends danced in ten minutes.' (Miyagawa 2012:88; (9a-b))

There are competing accounts of the contrast in (5) and (6). Ishii (1999) argues that instances of FNQs like (6b) should be analyzed as VP-modifying adverbs, unlike the cases of FNQs that result from syntactic movement of their associates, which are ad-nominals. The main motivation for Ishii's proposal comes from the observation that instances of FNQs like (6b) obligatorily have a distributive (or multiple-event) reading, in which the event that the verb denotes is interpreted as occurring multiple times with different subjects. For instance, the most natural interpretation of (6b) is that there were two separate events of dancing with two different subjects. In contrast, a collective reading is available with FNQs that are compatible with the stranding analysis, such as (7).

the acceptability of FNQs licensed by subjects of intransitive verbs that are commonly classified as unergative verbs, such as *hashir-u* ‘run’ and *odor-u* ‘dance’, as in (5b) and (6b), indicate that these verbs are mapped onto the unaccusative structure in these particular cases because these sentences denote telic events. In fact, it is cross-linguistically common for intransitive verbs that denote motion events such ‘running’ and ‘dancing’ to show ambivalent behaviors with respect to unaccusative diagnostics both language-internally and cross-linguistically (e.g. Rosen 1984; Levin and Rappaport 1992, 1995; Sorace 1993, 1995, 2000, 2004; Keller 2000; Keller and Sorace 2003; Borer 1994, 2005). The best known example of language-internal variable behaviors of intransitive verbs that denote motion events with respect to unaccusative diagnostics comes from the verb *correre* ‘run’ in Italian (Rosen 1994).

- (9) a. Ugo ha corso meglio ieri
 U has run better yesterday
 ‘Ugo ran better yesterday.’
- b. Ugo è corso a case
 U is run to home
 ‘Ugo ran home.’ (Rosen 1984: 66-67; (86b), (86a))

When the verb *correre* ‘run’ appears with its sole NP argument, as in (9a), it is interpreted as denoting an atelic event and takes the auxiliary for unergatives (the HAVE auxiliary), *avere*. However, when the verb is accompanied by a directional phrase such as *a case* ‘to home’ in (9b), it is interpreted as denoting a telic event and selects for the auxiliary for unaccusatives (the BE auxiliary), *essere*. An example of cross-linguistic variability in unaccusative-unergative behaviors of motion verbs comes from Italian, Dutch and French, in which motion verbs tend to behave as unergatives and select for the HAVE auxiliary (10a-c), and German, in which similar

motion verbs tend to behave as unaccusatives and select for the BE auxiliary (11a-c), in the absence of a directional phrase (Keller 2000; Sorace 2000; Keller and Sorace 2003).

(10) a. Gli atleti svedesi hanno corso/?sono corsi alle Olimpiadi
the athletes Swedish have run/ are run at_the Olympics

‘The Swedish athletes ran at the Olympic Games.’ (Italian)

b. De zwerver heft/?is overall gelopen
the vagabond has/is overall run

‘The vagabond ran all over the place.’ (Dutch)

c. Marie a nagee/?est nagee tout l’apres-midi
M has swum/is swum all the afternoon

‘Marie swam the whole afternoon.’ (French) (Sorace 2000: 875; (37a-c))

(11) a. Die Frau ist/?hat schnell geschwommen
the woman is/has rapidly swum

‘The woman swam rapidly.’

b. Die Tänzerin ist/?hat langsam getanzt
the dancer is/has slowly danced

‘The dancer danced slowly.’ (German) (Keller and Sorace 2003: 70; (23a), (23c))

Importantly, the variable mapping approach allows us to maintain the stranding analysis of FNQs, as the apparent unergative verbs in (5b) and (6b) are arguably unaccusative verbs in these examples.

Thus, this study adopts the stranding analysis of FNQs in Japanese (and Korean), following Miyagawa (1989) and the subsequent studies, and the hypothesis that intransitive

verbs can be mapped onto either the unaccusative or unergative syntax depending on compositionally derived interpretations of events.

3 Previous Experimental Studies on FNQs

In this section, we review previous experimental studies with native, heritage and L2 Japanese speakers that involved the FNQ diagnostic as well as several studies on the FNQ diagnostic in Korean. We also discuss Randal et al. (2004), the only experimental study that we know of that investigated effects of agentivity of subjects and telicity of events on an unaccusative diagnostic.

3.1 Previous Studies with Native Speakers

To the best of our knowledge, the very first study that experimentally examined the FNQ diagnostic in Japanese was Sorace and Shomura (2001). The aim of the study is to test predictions of the *Split-Intransitive Hierarchy* (SIH) hypothesis against Japanese intransitive verbs. Sorace and her colleagues have argued that the mapping of intransitive verbs onto the unaccusative/unergative syntax is mediated by a hierarchical organization of intransitive verbs based on their lexical semantic features (e.g. Sorace 1993, 1995, 2000, 2004; Keller 2000; Keller and Sorace 2003). Sorace (1995) argues that intransitive verbs that denote inherently dynamic and telic events, such as change of location verbs like ‘arrive’, are ranked at the top of the hierarchy as “core” unaccusatives, while intransitive verbs that denote inherently static and atelic events, such as non-motional controlled process verbs like ‘play’, are ranked at the bottom of the hierarchy as “core” unergatives. Core unaccusatives are expected to exhibit clear and stable unaccusative behaviors with respect to unaccusative diagnostics, while core unergatives are expected to show clear and stable unergative behaviors. In contrast, intermediate verbs, i.e. verbs that are found in the midrange of the hierarchy, are expected to show more indeterminate behaviors with respect to the same diagnostics. The Auxiliary Selection Hierarchy (ASH), a

hierarchy of intransitive verbs based on the auxiliary selection phenomena in West European languages, is an example of a specific implementation of SIH.

(12) The ASH (Sorace 2000)

CHANGE OF LOCATION ('come', 'fall', 'drop' etc.) (CORE UNACCUSATIVE)

CHANGE OF STATE ('die', 'be born', 'appear' etc.)

CONTINUATION OF A PRE-EXISTING STATE ('remain', 'stay', 'survive' etc.)

EXISTENCE OF STATE ('be', 'exist', 'belong', etc.).

UNCONTROLLED PROCESS ('tremble', 'sweat', 'shiver' etc.)

CONTROLLED MOTIONAL PROCESS ('walk', 'swim', 'dance', etc.)

CONTROLLED NON-MOTIONAL PROCESS ('talk', 'work', 'play', etc.) (CORE UNERGATIVES)

The ASH predicts that core unaccusatives would categorically select for the auxiliary for unaccusatives (the BE auxiliary) and core unergatives for the auxiliary for unergatives (the HAVE auxiliary), while intermediate verbs show indeterminate behaviors and more cross-linguistic and language-internal variability (e.g. alternate between the two auxiliaries).

Sorace and Shomura (2001) examined whether acceptability judgments provided by Japanese native and L2 speakers concerning two known unaccusative diagnostics in the language, one of which is the FNQ diagnostic, show their sensitivity to the hierarchy. For the FNQ diagnostic, the SIH predicts that there should be a clear contrast between sentences with the NQ adjacent to the associated (henceforth [-FNQ]) and sentences with a FNQ (henceforth [+FNQ]), with the latter being significantly better than the former while the same contrast is predicted to be absent from core unaccusatives. With intransitive verbs that are in the middle of the hierarchy, the SIH predicts contrasts that are weaker than those with core unergatives but more pronounced than these with core unaccusatives. In order to test these predictions, Sorace and

Shomura (2001) selected three verbs from thirteen classes of intransitive verbs (a total of thirty nine verbs) ranging from the most core unergative classes to the most core unaccusative classes, and sentences with these verbs were presented to both native and L2 speakers in the [-FNQ] and [+FNQ] conditions. Their predictions were nicely born out with the native speakers' judgments on the unergatives, with core unergatives such as verbs of controlled non-motional processes (e.g. *utaw-u* 'sing') and relatively high ranked peripheral unergatives such as controlled motional processes (e.g. *oyog-u* 'swim') showing clearer contrasts between the [-FNQ] and [+FNQ] conditions, while relatively lower-ranked peripheral unergatives such as verbs of uncontrolled process (e.g. *hikar-u* 'flash') showing contrasts that are less pronounced. However, the results with unaccusatives were less clear. Most problematically, their native speakers judged sentences with verbs of change of location such as *tsuk-u* 'arrive', the most core unaccusative class in the hierarchy, as if they are unergatives, with a significant difference between the [-FNQ] and [+FNQ] conditions. Sorace and Shomura speculate that this unexpected result might have been due to the effects of potential agentivity (animacy) of subjects, which they did not control for.

One may speculate that the pattern arises because Japanese ranks agentivity higher than telicity across the board, as Kishimoto (1996) suggested. If it is the case that [\pm] agentivity is a crucial determinant of split intransitivity, one consequence might be that syntactic diagnostic such as QF (quantifier float) are particularly sensitive to agentivity (p. 271).

More recently, Fukuda (2009) experimentally examined Japanese native speaker's judgments concerning the FNQ diagnostic. Unlike Sorace and Shomura (2001), Fukuda (2009) used a small number of Japanese intransitive verbs that had been independently identified in previous studies as unaccusatives (*tsuk-u* 'arrive', *ku-ru* 'come', and *shin-u* 'die') and

unergatives (*waraw-u* ‘laugh’, *odor-u* ‘dance’ and *oyog-u* ‘swim’).⁴ Let us call these intransitive verbs ‘known’ unaccusatives/unergatives. The results of Fukuda’s experiment replicated the contrast in the FNQ diagnostic in (2), with the means of the [-FNQ] and [+FNQ] conditions significantly different only with the unergatives. Similarly, Ko and Oh (2010, 2012) examined the FNQ diagnostic both transitive and intransitive verbs in Korean with an online reading time experiment and an off-line acceptability judgment experiment. In both experiments, the participants were presented with transitive and intransitive sentences with subject-oriented FNQs. Like Fukuda (2009), Ko and Oh (2010, 2012) used a small number of mostly ‘known’ unaccusatives (*tuleka-ta* ‘enter into’, *tochakha-ta* ‘arrive’, *cwuk-ta* ‘die’ and *nemeci-ta* ‘fall down’) and unergatives (*wus-ta* ‘laugh’, *wul-ta* ‘cry’, *cenhwaha-ta* ‘make a phone call’ and *nol-ta* ‘play’).⁵ Their results show that unaccusative sentences with a FNQ were processed faster and

⁴ The verb *tsuk-u* ‘arrive’ has been identified as unaccusative with the FNQ diagnostic, Nominative-Genitive case conversion (NGC), and the Verb-Verb compound formation (Fujii 1988, Miyagawa 1989, Kageyama 1993), *ku-ru* ‘come’ with NGC and the FNQ diagnostic (Fujii 1988 and Miyagawa 1989), and *shin-u* ‘die’ with the formation of *-kake* (‘half-way’) de-verbal nominalization (Kishimoto 1996). All four diagnostics mentioned above had been used to identify *odor-u* ‘dance’ as unergative, while two of them, the FNQ diagnostic and NGC, identified *wara-u* ‘laugh’ as unergative (Fujii 1988, Miyagawa 1989, Kageyama 1993). Finally, *oyog-u* ‘swim’ had been identified as unergative by the formation of *-kake* de-verbal nominalization and the Noun-Verb compound formation (Kishimoto 1996 and Kageyama 1996).

⁵ Except for *tuleka-ta* ‘enter into’, each of the Korean intransitive verbs listed above has been identified as unaccusative/unergative in different studies based on different diagnostics: *tochakha-ta* ‘arrive’ (Lee 1989, Ahn 1990), *cwuk-ta* ‘die’ (Yang 1991, Ko 2007), *nemeci-ta* ‘fall

rated better than their unergative counterparts, with the difference being marginally significant in the reading time experiment and significant in the acceptability judgment experiment.⁶

One thing that makes Sorace and Shomura (2001) different from Fukuda (2009) and Ko and Oh (2010, 2012) is the number of verbs examined in these studies. Sorace and Shomura (2001) used a large number of verbs from different lexical semantic classes, i.e. thirty-nine intransitive verbs from thirteen different lexical semantic classes, many of which had never been examined in the context of unaccusativity, while Fukuda (2009) and Ko and Oh (2010, 2012) used a small number of ‘known’ unaccusative/unergative verbs. While what Sorace and Shomura (2001) did - testing a large number of intransitive verbs that are selected systematically from different lexical semantic groups - is what one needs to do to obtain results that would allow for a generalization based on a large number of verbs while taking into consideration the effects of different lexical semantics of verbs, the unexpected results that Sorace and Shomura (2001) obtained raise some concerns. A specific concern with Sorace and Shomura (2001) is the possibility that the large number of verbs from different lexical semantic classes that they examined might have increased chances of introducing confounding factors into their experiment. In particular, the list of thirty-nine Japanese verbs that Sorace and Shomura (2001) tested includes verbs whose assumed status as unaccusative/unergative verbs seems problematic. First, some of the core and peripheral unaccusatives that were used in their experiment can be used as transitive, i.e. they can co-occur with an accusative-marked phrase: *sar-u* ‘leave’ (change down’ (Yang 1991), *wus-ta* ‘laugh’ (Lee 1989), *wul-ta* ‘cry’ (Yang 1991), and *cenhwaha-ta* ‘make a phone call’ (Ahn 1990, Ko 2007), and *nol-ta* ‘play’ (Kim to appear).

⁶ Unlike those in Sorace and Shomura (2001) and Fukuda (2009), Ko and Oh’s experiments did not involve a [-FNQ] condition.

of location), *nobor-u* ‘ascend’, *susum-u* ‘advance’, *agar-u* ‘rise’ (change of condition) and *yorokob-u* ‘rejoice’ (existence of a condition). Relevant examples obtained through on-line searches are listed below.

- (13) a. **gurando-o** sar-u Chiben Wakayama-no senshu-tachi
field-ACC leave-NPST Chiben Wakayama-GEN player-PL
 ‘the players of the Chiben Wakayama (high school) team who leave the baseball field’⁷
- b. saijookai-made hitasura **too-o** nobor-u akushon geemu
 top_floor-till solely **tower-ACC** ascend-NPST action game
 ‘an action game in which (you) solely go up a tower to its top floor.’⁸
- c. **suroopu-o** agar-u-to mie-ru shiisaa
 slope-ACC rise-NPST-CONJ be_visible-NPST guardian_dog
 ‘the guardian dogs that become visible once you go up the slope’⁹
- d. **Benteke-no hatsu gooru-o** yorokob-u rojaasu
B-GEN first goal-ACC rejoice-NPST R
 ‘Rogers, who rejoices over Benteke’s first goal.’¹⁰

While it is cross-linguistically common for unergatives to optionally co-occur with an accusative-marked phrase, unaccusatives do not. Thus, the fact that these alleged unaccusative verbs can co-occur with an accusative-marked phrase casts doubt on their assumed classification. Second, some of the unergatives used in the experiment, such as *hak-u* ‘vomit’ (bodily function)

⁷ <http://www.asahi.com/>

⁸ <http://blog.livedoor.jp/>

⁹ <http://www.tripadvisor.jp/>

¹⁰ <http://www.goal.com/jp/>

and *mats-u* ‘wait’ (non-motional controlled process), are better characterized as transitive, as they require a direct object (which can be null in Japanese). In fact, two major monolingual Japanese dictionaries, *Koojien* and *Nihongo Daijiten*, list these two verbs as transitive.

Thus, use of a large number of verbs that have not been previously discussed in the literature in the context of unaccusativity potentially runs the risk of introducing confounding factors. Therefore, a more conservative approach appears to be using a small number of “known” unaccusative and unergative verbs in experiments, at least at initial stages of an investigation.

3.2 Previous Studies with Heritage Speakers

Research on heritage speakers is relatively new, and there are only a handful of studies that investigated heritage speakers’ knowledge of unaccusativity. In her seminal study, Polinsky (1995) described a number of characteristics of heritage Russian speakers in the U.S. One of the characteristics discussed was that the heritage Russian speakers produce genitive of negation, a well-known unaccusative diagnostic, with significantly lower frequencies in the required contexts than the native speakers do (see Modyanova 2006 for similar observations). Montrul (2005) examined native, heritage and L2 Spanish speakers’ knowledge of unaccusativity and she reports that advanced and intermediate heritage and L2 speakers exhibited robust sensitivity to unaccusative diagnostics, although with less deterministic judgments than the native speakers.

A previous study on unaccusativity with heritage speakers that is most directly relevant to the present study is Lee (2011). Lee (2011) examined Korean heritage speakers’ judgements concerning the FNQ diagnostic in Korean. To the best of our knowledge, it is the only study that examined heritage speakers’ knowledge of the licensing of FNQs experimentally in Korean or Japanese. The heritage Korean speakers examined in Lee’s study consisted of two groups: *early bilinguals*, who were born in the U.S and exposed to English early in their childhood, and *late*

bilinguals, who were born in Korea and moved to the U.S. before they were fourteen years old. The study employed an acceptability judgment task, and the experimental sentences included transitive and intransitive sentences with FNQs, just like Ko and Oh (2010, 2012).¹¹ Like Fukuda (2009) and Ko and Oh (2010, 2012), Lee's experiment used a small number of mostly 'known' unaccusatives (*tochakha-ta* 'arrive', *tteleci-ta* 'fall', *thayena-ta* 'be born', *cwuk-ta* 'die', *o-ta* 'come', *salaci-ta* 'disappear') and unergatives (*ttwui-ta* 'run', *wus-ta* 'laugh', *nol-ta* 'play', *ca-ta* 'sleep', *wul-ta* 'cry', *swuyengha-ta* 'swim').¹² The study reports that the native speakers and the Korea-born late bilingual speakers rated the unaccusative sentences with FNQs significantly better than their unergative counterparts. With the US-born early bilingual speakers, however, the difference between the two means was not significant, suggesting that they do not have the knowledge relevant to the FNQ diagnostic.

3.3 Previous Studies with L2 Speakers

Previous findings about L2 speakers' knowledge of unaccusativity paint a rather mixed picture. While English-speaking L2 learners of Spanish have been shown to make the unaccusative-unergative distinction early and reliably (Montrul 2005), the same distinction in Chinese has been shown to be learned late by English-speaking Chinese L2 speakers (Yuen 1999).

¹¹ Lee's experiment did not involve a [-FNQ] condition.

¹² In addition to the verbs that were also used in Ko and Oh (2010, 2012) (*tochakha-ta* 'arrive', *cwuk-ta* 'die', *wus-ta* 'laugh', *nol-ta* 'play' and *wul-ta* 'cry'), the following verbs that were used in Lee (2011) had been identified as unaccusative/unergative in previous studies: *tteleci-ta* 'fall' (Yang 1991), *o-ta* 'come' (Kim to appear), *ca-ta* 'sleep' (Yang 1991), *swuyengha-ta* 'swim' (Yang 1991). No reference to *thayena-ta* 'be born' or *ttwui-ta* 'run' was found. Finally, Yang (1991) describes *salaci-ta* 'disappear' as volitional and classifies it as unergative.

To date, Sorace and Shomura (2001) is the only study that examined L2 Japanese speakers' knowledge of the FNQ diagnostic. They divided their L2 speakers into two groups based on their proficiency: *post beginner* and *intermediate*. The judgments of the intermediate L2 speakers for the unergative sentences were similar to these of the native speakers described in Section 3.1, with the two highly-ranked unergative classes (controlled non-motional processes and controlled motional process) showing clearer contrasts between the [-FNQ] and [+FNQ] conditions and the other relatively lower-ranked unergative classes showing weaker contrasts. Their judgments with the unaccusative verbs were also similar to the native speakers', with a weaker preference for the [-FNQ] condition with verbs of change of location. The judgments of the post beginner L2 speakers were overall indeterminate. A clear contrast between the [-FNQ] and [+FNQ] condition was observed only with one subclass of unergative verbs, verbs of controlled motion processes, and their judgments with unaccusative verbs did not show contrasts between the [-FNQ] and [+FNQ] conditions with any of the verb classes. Based on these results, Sorace and Shomura concluded that their post-beginner L2 speakers lack the knowledge of the FNQ diagnostic, while the intermediate speakers had partial representation of the grammar of the licensing of FNQs only with unergatives.

3.4 Effects of Agentivity and Telicity on Unaccusative Diagnostics

Cross-linguistically, agentivity and telicity have been argued to play crucial roles in unaccusativity (Perlmutter 1978; Rosen 1984; van Valin 1990; Hoekstra and Mulder 1990; Dowty 1991; Hoekstra 1992; Tenny 1992; Sorace 1993, 1995, 2000, 2004; Borer 1994, 2005; Kishimoto 1996; Lieber and Baayan 1997; Randall et al. 2004 among others), and Japanese is no exception. As discussed in Section 2.1, the FNQ diagnostic has been argued to be sensitive to telicity of events that intransitive verbs denote as the acceptability of unergative sentences with a

subject-oriented FNQ improves with an adverb that facilitates a telic interpretation of the event (Tsujimura 1994, 1996; Mihara 1998; Nakanishi 2008; Miyagawa 2012). Kishimoto (1996), on the other hand, argues that agentivity is the determining factor for unaccusativity in Japanese, based on his analysis of the *-kake* ('half-way') de-verbal nominalization. He argues that the *-kake* nominalization is sensitive to unaccusativity, and the well-formedness of this particular nominalization is determined by the presence/absence of agentivity (cf. Tsujimura and Iida 1999).

While there is no previous study that experimentally examined effects of agentivity and telicity with the FNQ diagnostic, Randall et al. (2004) experimentally investigated the effects of agentivity and telicity in the auxiliary selection with nonce intransitive verbs in Dutch and German adults and children. In their experiment, puppets were used to enact various scenes, and nonce verbs were used to describe these scenes. The scenes were designed to depict one of the following types of events: (a) telic and agentive, (b) atelic and agentive, (c) telic and non-agentive, and (d) atelic and non-agentive. Events were described with either verbs alone, which make them inherently telic (e.g. *disappear*) or inherently atelic (e.g. *laugh*) or with combinations of a verb that is underspecified for telicity (e.g. *dance*) and a PP that favors a telic reading (as in *dance into the room*) or an atelic reading (as in *dance in the room*).

Their results with Dutch adults showed that the perfective auxiliary for unergatives, the HAVE auxiliary, was overwhelmingly preferred in all the atelic descriptions, whether they were agentive atelic (e.g. *laugh* and *dance*) or non-agentive atelic (e.g. *sparkle* and *roll*) and whether the atelicity is inherent to the verbs (e.g. *laugh* and *sparkle*) or due to the presence of a PP (e.g. *dance in the room* and *roll in the room*). The perfective auxiliary for unaccusative, the BE auxiliary, on the other hand, was selected most frequently with the telic descriptions with a PP, in 100% of non-agentive telic cases (as in '*roll into the room*') and 88% of agentive telic cases

(as in ‘*dance into the room*’). Interestingly, the BE auxiliary was selected only 59% of the cases with inherently telic non-agentive cases (e.g. *disappear*), which are considered the prototypical unaccusative events. While (a)telicity appear to determine the auxiliary selection in most of the cases, agentivity was found to matter only when telicity was inherent. When descriptions are inherently telic, the implication of agentivity favored the unergative analysis (97%), whereas lack of agentivity favored the unaccusative analysis, but only slightly so (59%). Based on these findings, Randall et al. 2004 concluded that telicity is the primary semantic factor that determines the auxiliary selection in Dutch (a similar conclusion is reached for German as well).

The most interesting aspect of this study, as far as the present study is concerned, is the finding that the nonce verbs were overwhelmingly analyzed as unaccusatives only when telicity was overtly encoded with a PP. According to Randall et al. (2004), this is because telic points that are overtly encoded with PPs are easier to recognize than telic points that are parts of the lexical meaning of the verb. What do we predict about possible effects of agentivity and telicity in unaccusativity in Japanese given the results of Randall et al. (2004)? If, unlike Dutch and German, agentivity outranks telicity in Japanese, as claimed in Kishimoto (1996) and suggested in Sorace and Shomura (2001), strong effects of animacy of subjects (therefore potential agentivity of subjects) are predicted with the FNQ diagnostic. Thus, intransitive verbs that are otherwise analyzed as unaccusatives are predicted to be analyzed as unergative verbs with animate subjects even with core unaccuatives that denote inherently telic events. On the other hand, if telicity is more prominent than agentivity in Japanese, just like in Dutch and German, intransitive verbs that are otherwise analyzed as unergatives would be analyzed as unaccusatives with the presence of telic points explicitly added with adjuncts even if they involve agentivity.

3.5 Section Summary

Previous experimental studies have shown that the contrast in the FNQ diagnostic can be reliably established with native speakers in experimental settings, especially with a small number of ‘known’ unaccusative/unergative verbs. However, the results of previous studies on heritage and L2 Japanese speakers’ knowledge of the FNQ diagnostic have been mixed. While the judgments provided by the intermediate L2 speakers in Sorace and Shomura (2001) were largely consistent with the judgments provided by the native speakers in the same experiment, the Korean heritage (early bilingual) speakers examined in Lee (2011) exhibited judgments that are substantially different from their native speaker counterparts. Finally, Randall et al. (2004), the only study we know of that examined effect of agentivity and telicity on an unaccusative diagnostic, found that telicity is the primary semantic factor that determines the auxiliary selection in Dutch in an experiment with nonce verbs with both adult and children, while agentivity had effect on the auxiliary selection only with verbs that were presented as denoting inherently telic events.

Before we present our research questions to be examined in two experiments, we will briefly review previous experimental studies on unaccusativity in Japanese that use unaccusative diagnostics other than the FNQ diagnostic.

4 Other Unaccusative Diagnostics in Japanese in Experimental Settings

Many linguistic phenomena in Japanese have been argued to be sensitive to unaccusativity and at least three unaccusative diagnostics other than the FNQ diagnostic have been used in previous experimental studies: (i) the interpretation of the aspectual marker *teiru*, (ii) omission of case markers, and (iii) modification by a quantifier *takusan* ‘a lot’. In this section, we briefly discuss these three diagnostics and review the studies in which they were used and argue that the FNQ diagnostic is the most reliable unaccusative diagnostic currently available in Japanese.

4.1 The aspectual marker *teiru*

The grammatical aspect marker *teiru* has been extensively studied because it can function as different aspect markers depending on the predicate it co-occurs with (Kindaichi 1976; Jacobsen 1992; McClure 1996; Ogiwara 1998; Shirai 1998, 2000; Nakatani 2003, 2004, 2013 among others). When it co-occurs with an atelic predicate such as *asob-u* ‘play’, its most salient interpretation is a progressive one (14a), whereas when it co-occurs with a telic predicate such as *tsuk-u* ‘arrive’, its most natural reading is that it expresses a result state (14b).¹³

- (14) a. Kodomo-tachi-wa soto-de ason-**de** i-**ta**
 Child-PL-TOP outside-LOC play-GER be-PST
 ‘The children were playing outside.’
 (#The children had played outside.)
- b. Kodomo-tachi-wa basu_tee-ni tsui-**te** i-**ta**
 Child-PL-TOP bus_stop-LOC arrive-GER be-PST
 ‘The children had already arrived at the bus stop.’
 (#The children were arriving at the bus stop.)

As discussed earlier, unaccusatives typically denote telic events while unergatives typically denote atelic events. Taking advantage of this generalization, Hirakawa (2001) and Shimada and Sano (2007) used the interpretation of *teiru* as an unaccusative diagnostic. Hirakawa (2001) showed that L2 Japanese speakers correctly assigned resultative interpretations to unaccusatives with *teiru* and progressive interpretations to unergatives with *teiru*. Similarly, Shimada and Sano (2007) demonstrated that Japanese children as young as three years old can do the same.

¹³ *Teiru* consists of a verb in the gerundive form (as in *ason-de* ‘play-GER’ or *tsui-te* ‘arrive-GER’) followed by an existential verb *i* ‘be, exist’.

There are at least two potential issues with using the interpretation of *teiru* as an unaccusative diagnostic. First, the interpretation of *teiru* as an unaccusative diagnostic would erroneously identify unaccusative verbs that denote atelic events as unergatives, as *teiru* would have a progressive interpretation with such unaccusative verbs. A case in point is intransitive verbs of substance emission, such as *more-ru* ‘leak’, *niow-u* ‘smell’, and *nagare-ru* ‘flow’, which have been identified as potential unaccusative verbs in Japanese that denote atelic events (Tsujimura 2014: fn. 9; Fukuda and Polinsky 2014). While Tsujimura (2014) notes that the interpretation of *teiru* is ambiguous between resultative and progressive interpretations with these verbs, a progressive interpretation seems to be the only available interpretation of *teiru* with some of these verbs, such as *niow-u* ‘smell’ (15a), and it is more salient than a resultative interpretation with others, such as *nagare-ru* ‘flow’ (15b).

(15) a. Gomibako-ga hidoku niot-te **i-ta**
 garbage_can-NOM terribly smell-GER be-PST
 ‘The garbage can was smelling badly/??had smelled badly.’

b. Osui-ga sono koojoo-kara nagare-te **i-ta**
 contaminated_water-NOM that factory-from flow-GER be-PST
 ‘Contaminated water was flowing out of the factory/?had flowed out of the factory.’

Second, studies have shown that the argument structure of the verb is only one of the factors that determine the interpretation of *teiru* (e.g. Jacobsen 1992; Ogihara 1998; Shirai 1998, 2000). Thus, *teiru* can have either a resultative or progressive interpretation with some intransitive verbs, with one reading being more salient than the other due to different factors, such as presence of certain adjuncts, as in (16) below.

(16) Sakura-ga kanzen’ni/harahaarato chit-te **i-ta**

cherry_blossum-NOM completely/flutteringly fall-GER be-PST

‘The cherry blossoms had fallen completely.’ (resultative)

‘The cherry blossoms were falling flutteringly.’ (progressive)

With the adjunct *kanzen’ni* ‘completely’, the salient reading of (16) is that it expresses a result state, i.e. a result state of a completed event of cherry blossoms falling (i.e. resultative). With the other adjunct, *haraharato* ‘flutteringly’, however, the salient interpretation of (16) is progressive, i.e. an event of cherry blossom falling was on-going. What this observation shows is that the progressive and resultative interpretations of *teiru* are not directly associated with the unaccusative/unergative distinction. Thus, we conclude that the interpretation of *teiru* is not a reliable unaccusative diagnostic.

4.2 Case drop

Case drop has been argued to be sensitive to the subject-object asymmetry in Japanese (Kageyama 1993, 1996). The example in (13) shows that, while accusative case on direct object NPs can be readily omitted, the same cannot be said about nominative case on subjects NPs.

(17) Kodomo-tachi*(-ga) hon(-o) yom-u-no(-o) mi-ta koto na-i
 Children-PL*(-NOM) book(-ACC) read-NPST-NMNL(-ACC) see-PST fact NEG-NPST
 ‘I have never seen the children reading books.’

This observation has been extended to unergative subjects and unaccusative subjects, as in (18).

(18) a. Kodomo-tachi*(-ga) asob-u-no(-o) mi-ta koto na-i
 Children-PL*(-NOM) play-NPST-NMNL(-ACC) see-PSTfact NEG-NPST
 ‘I have never seen the children playing.’(UNERGATIVE)

b. Kootsuu-jiko(-ga) okor-u-no(-o) mi-ta koto na-i
 traffic_accident(-NOM) happen-NPST-NMNL(-ACC) see-PSTfact NEG-NPST

‘I have never seen traffic accidents happening.’(UNACCUSATIVE)

Under the assumption that subjects of unergatives such as *asob-u* ‘play’ are base-generated external arguments and subjects of unaccusatives like *okor-u* ‘happen’ are base-generated internal arguments, the parallel between transitive and unergative subjects on one hand and transitive objects and unaccusative subjects on the other with respect to Case drop can be taken as evidence for the syntactic unaccusativity in Japanese. As such, Case drop emerges as an unaccusative diagnostic that is directly linked with the presumed syntactic difference between unaccusatives and unergatives.

However, the putative contrast between external and internal arguments with Case drop turns out to be difficult to establish in experimental settings. Both Hirakawa (1999) and Sorace and Shomura (2001) used Case drop as an unaccusative diagnostic to test L2 Japanese speakers’ knowledge of unaccusativity. In Hirakawa’s (1999) experiment, acceptability judgments provided by the native speakers did show a contrast between transitive subjects and transitive objects in the predicted direction, i.e. sentences with transitive subjects without a case marker were rated less acceptable than sentences with transitive objects without a case marker.¹⁴ However, the same native speakers also rated sentences with unaccusative subjects without a case marker poorly, contrary to the prediction. Sorace and Shomura (2001) report that their native speaker participants did not accept Case drop regardless of verb types and the status of NPs. While these results do not mean that the contrast cannot be established in an experiment, they suggest that there are factors that affect omissibility of case markers that might be difficult

¹⁴ The same contrast had previously been replicated in an acceptability judgment experiment in Kanno (1996).

to control in experimental settings, in particular with acceptability judgment tasks. Therefore, we consider Case drop is not an ideal diagnostic for the purposes of this study.

4.3 Modification by *takusan* ‘a lot’

Kageyama (1993) claims that a quantifier *takusan* ‘a lot’ is restricted to modifying a VP-internal element. This claim is based on a contrast illustrated by the examples in (19), in which *takusan* appears with different types of verbs with their arguments not overtly expressed.

- (19) a. *takusan* yon-da
 a_lot read-PST
 ‘(x) read a lot of (y).’
- b. *takusan* ason-da
 a_lot play-PST
 ‘(x) played a lot.’
- c. *takusan* tsui-ta
 a_lot arrive-PST
 ‘Many (x) arrived’

As the English translations indicate, *takusan* is interpreted as modifying a different argument in each case. In (19a), *takusan* appears with a transitive verb *yom-u* ‘read’ and the most natural interpretation in this case is that it modifies the unexpressed direct object, and not the unexpressed subject. In (19b), *takusan* appears with an unergative verb *asob-u* ‘play’, and in this case, the most natural interpretation is that it modifies the event, i.e. how much ‘playing’ took place, and not the unexpressed subject. Finally, in (19c), *takusan* appears with an unaccusative verb *tsuk-u* ‘arrive’ and its preferred interpretation is that it modifies the unexpressed subject. The analysis of *takusan* ‘a lot’ as a modifier of VP-internal elements nicely accounts for the

contrast in (19). Under this analysis, *takusan* cannot modify the transitive subject in (19a) and the unergative subject in (19b) because they are external arguments located outside of VP. Instead, *takusan* modifies the direct object in (19a) and the VP itself in (19b). On the other hand, *takusan* is interpreted as modifying the unaccusative subject in (19c) because unaccusative subjects are base-generated inside VP. Thus, modification by *takusan* ‘a lot’ is directly linked with the presumed syntactic difference between unaccusatives and unergatives.

To date, the only experimental studies that used modification by *takusan* ‘a lot’ as an unaccusative diagnostic are Hirakawa (1999, 2001). These studies examined the native and L2 Japanese speakers’ interpretation of *takusan* ‘a lot’ with truth value judgment tasks involving picture selections. The results reported in Hirakawa (1999) were generally consistent with the generalization discussed above, with sentences in which *takusan* modifying transitive subjects and unergative subjects were rejected, while sentences in which *takusan* modifying transitive objects and unaccusative subjects were accepted. However, when the consistency of judgments within individual speakers was examined, it was revealed that eleven out of twenty six L2 speaker and three out of twenty native speakers failed to make the expected judgments consistently.¹⁵ In Hirakawa (2001), advanced L2 speakers consistently allowed *takusan* ‘a lot’ to modify unergative subjects, unlike the native and intermediate L2 speakers who disallowed it. These results seem to suggest that the contrast in (19) may not be as clear as it was originally described. Thus, while future experiments might prove that *takusan* modification can produce more reliable results, the currently available experimental results seem to favor the FNQ

¹⁵ Consistency was defined in these studies as accepting at least four out of five true sentences and rejecting at least four out of five false sentences (Hirakawa 1999: 103).

diagnostic over *takusan* medication in terms of their reliability (see Kishimoto 2005 and Takami and Kuno 2006 for further discussion of *takusan* and similar quantificational modifiers).

4.4 Section Summary

In this section, we discussed three Japanese unaccusative diagnostics other than the FNQ diagnostic that have been used in previous experimental studies: (i) the interpretation of the aspectual marker *teiru*, (ii) omission of case markers, and (iii) modification by a quantifier *takusan* ‘a lot’, and critically review the studies that use these diagnostics. Our review indicate that these three diagnostics are not as reliable as the FNQ diagnostic because they are either (i) not directly linked to the unaccusative/unergative distinction, as with the aspect marker *teiru*, or (ii) the results of experiments that used them as unaccusative diagnostics failed to clearly establish their status as unaccusative diagnostics, as with case-marker omission and *takusan* modification.

5 Research Questions

We are now ready to set out our three research questions in our investigation of the knowledge of the FNQ diagnostic in the native, heritage and L2 Japanese speakers.

The first two questions concern the status of the knowledge of the FNQ diagnostic in heritage and L2 Japanese speakers compared to that of native speakers.

Research Question 1: *Do heritage Japanese speakers exhibit the knowledge of the FNQ diagnostic? If they do, how is their grammar of the FNQ diagnostic different from that of native and L2 speakers?*

Research Question 2: *Do L2 Japanese speakers exhibit the knowledge of the FNQ diagnostic? If they do, how is their grammar of the FNQ diagnostic different from that of native and heritage speakers?*

The third question concerns possible effects of two semantic factors, agentivity of subjects and telicity of events, on speakers' judgments on the FNQ diagnostic.

***Research Question 3:** Do manipulations of animacy (and therefore potential agentivity) of subjects and telicity of events affect judgments of the FNQ diagnostic by the three different groups of Japanese speakers? If they do, how different/similar are the effect of these two factors among the three different populations? Which of the two semantic factors has stronger effects on the FNQ diagnostic in which group?*

In what follows, we present the results of two sentence acceptability judgment experiments that were designed to address these three questions.

6 Experiment 1: A Preliminary Study

Experiment 1 is a small-scaled study that serves as a preliminary study for Experiment 2. It was designed to examine whether judgments provided by the three groups of Japanese speakers establish the contrast in the FNQ diagnostic discussed in the literature. Neither animacy of subjects nor telicity of events was manipulated. Following Sorace and Shomura (2001) and Fukuda (2009), unaccusative and unergative sentences were presented in two conditions: with NQs being adjacent to their subject associates (the [-FNQ] condition) and with NQs floating away from the associates with an intervening VP-internal element (the [+FNQ] condition).

6.1 Predictions

Given the results reported in previous studies, we expected the native speakers' judgments to replicate the contrast in the licensing of FNQs by intransitive subjects in (2). In other words, we predicted their judgments to be consistent with the following predictions.

Table 1: Predicted interactions between the two verb types and the licensing of NQs

unaccusatives → ① no significant difference is predicted between the means of sentences in the [-FNQ] and [+FNQ] condition.

unergatives → ② the mean of sentences in the [+FNQ] condition is predicted to be significantly lower than that of the sentences in the [-FNQ] condition .

These predictions are graphically illustrated as in Figure 1.

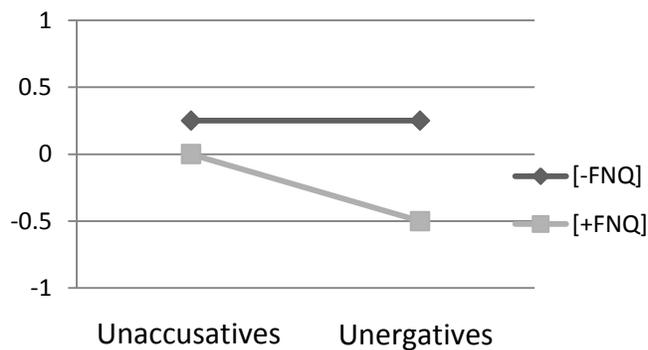


Figure 1: A hypothetical modal of the predicted interactions

If heritage and L2 Japanese speakers have the knowledge of the FNQ diagnostic that is comparable to that of native speakers, their results should also be similar to Figure 1.

6.2 Methods

6.2.1 Participants

Twenty five undergraduates and graduates of University of Hawai‘i at Mānoa (UHM) who were enrolled in a Japanese linguistics course participated. The results of two participants were removed prior to analysis because their surveys were incomplete or failed to follow the instructions. The remaining twenty three participants were separated into the three groups based on their answers in a language background questionnaire (Appendix I). As a result, we had seven native, six heritage, and ten L2 speakers. All seven native speakers were born and grew up in Japan and did not have significant exposure to English until at least they started a high school

(Three of them went to an English-speaking high school). All six heritage speakers identified Japanese as their first language. Five out of them were born in the US and one was born in Japan. They all received K-12 education in English. Four of them identified English as the language with which they feel most comfortable, while two stated that they are equally comfortable with English and Japanese. All ten L2 speakers were native speakers of English. They had either completed two or three years of Japanese courses at the UHM or taken a placement test and were placed in a third or fourth year level Japanese linguistics course. Their average length of studying Japanese was 5.75 years.

6.2.2 Materials

Experiment 1 had a 2 x 2 design crossing VERBTYPE (unaccusative vs. unergative) and FLOATING ([-FNQ] vs. [+FNQ]). In Section 2.2, we reviewed the previous studies that experimentally tested the FNQ diagnostic in Japanese and Korean and concluded that it is desirable to use a smaller number of “known” unaccusative/unergative verbs for exploratory studies such as this one. Thus, the six intransitive verbs used in Fukuda (2009) (*ku-ru* ‘come’, *tsuk-u* ‘arrive’ and *shin-u* ‘die’; *waraw-u* ‘laugh’, *odor-u* ‘dance’ and *oyog-u* ‘swim’) were used in this experiment. Five lexicalizations of each verb were constructed for each of the two conditions and distributed among five lists using a Latin Square design. The resulting twelve sentences in each list were mixed with forty eight fillers with different acceptability, and their order was pseudo-randomized. Thus, each subject rated sixty sentences. Examples of the critical items are listed below.

(20) a. Unaccusative + [-FNQ]:

Atarashii	kookanryuugakusee _i -ga	juugo-nin _i	kanada-kara	ki-ta
new	exchange_students-NOM	15-CL	Canada-from	come-PST

b. Unaccusative + [+FNQ]:

<u>Atarashii</u>	<u>kookanryuugakusee_i-ga</u>	kanada-kara	<u>juugo-nin_i</u>	ki-ta
new	exchange_students-NOM	Canada-from	15-CL	come-PST

‘Fifteen new exchange students came from Canada.’

c. Unergative + [-FNQ]:

<u>Supein-no</u>	<u>ryuugakusee_i-ga</u>	<u>go-nin_i</u>	bunkasai-de	odot-ta
Spanish-GEN	exchange_students-NOM	5-CL	cultural_festival-LOC	dance-PST

d. Unergative + [+FNQ]:

<u>Supein-no</u>	<u>ryuugakusee_i-ga</u>	bunkasai-de	<u>go-nin_i</u>	odor-ta
Spanish-GEN	exchange_students-NOM	cultural_festival-LOC	5-CL	dance-PST

‘Five exchange students from Spain danced at a cultural festival.’

6.2.3 Procedure

The task was magnitude estimation (ME: Stevens 1957; Bard et al. 1996; Sorace and Shomura 2001; Sprouse 2011). The participants were asked to rate experimental sentences in comparison to a ‘modulus’ sentence, which had a predetermined value of 100. The modulus, given in (21), was identical for all five lists, and was assumed to be in the middle range of acceptability (Gunji and Hasida 1998).

(21)	Shinnyuushain-ga	sake-o	imanotokoro	yo-nin	non-da
	incoming-employee-NOM	sake-ACC	so_far	4-CL	drink-PST

‘Four of the new employees drank sake so far.’

The experiment began with a practice phase with a nonlinguistic task, during which participants estimated the lengths of seven lines using another line as a modulus set to a value of 100. This practice phase ensured that participants understood the task. During the main phase of the experiment, ten items were presented per page, with the modulus appearing at the top of every

page with a square around it to remind participants that each experimental sentence is to be compared with the modulus. Participants were instructed to assign a value to each experimental sentence in terms of ratio with respect to the modulus. For instance, if a given sentence sounds twice as good as the modulus sentence, participants are to multiply the value given to the modulus by two. If it sounds half as good, they should divide it in half. The task was presented as a paper survey and took place in a university classroom.

6.3 Results

Each participant's raw judgments were transformed into z-scores prior to analysis. The results were analyzed using linear mixed-effects models using VERBTYPE (unaccusatives vs. unergatives) and FLOATING ([-FNQ] vs. [+FNQ]) as fixed factors and participants and items as random factors. Two planned pairwise comparisons were also conducted to isolate the effect of FLOATING on each of the verb types. All *p*-values were estimated using the MCMC method in the languageR package for R (Baayen 2007; Baayen et al 2008).

The results of the experiment show that the judgments of both native speakers and heritage speakers replicated the contrast in the FNQs diagnostic in (2), while those of L2 speakers did not. Figures 2, 3 and 4 summarize the results with the native, heritage, and L2 speakers, respectively.

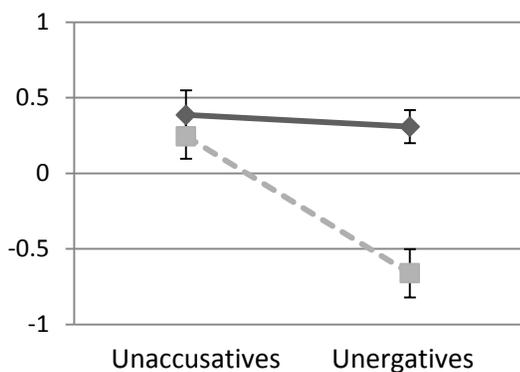


Figure 2: The native speakers (n=7)

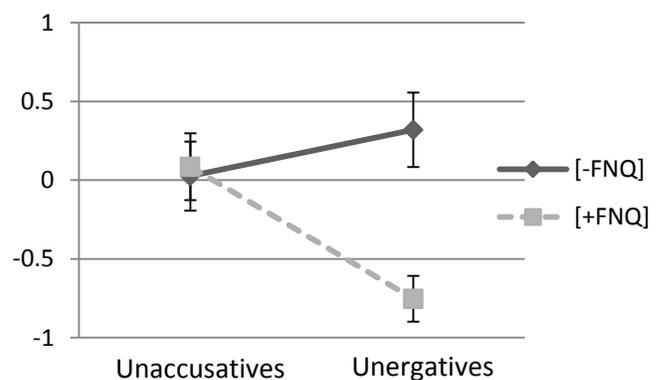


Figure 3: The heritage speakers (n=6)

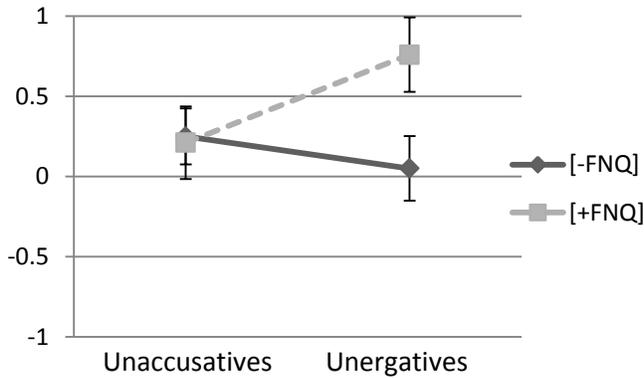


Figure 4: The L2 speakers (n=10)

As can be seen in the figures, the results with the native and heritage speakers are very similar and consistent with the predictions ① and ② in Table 1 and the hypothetical model in Figure 1. With both groups, the interaction between VERBTYPE and FLOATING was significant (Native: $p = .0064$; Heritage: $p = .0038$) and the planned pair-wise comparisons revealed that FLOATING was significant in the unergative condition (Native: $p = .0001$; Heritage: $p = .0002$) but not in the unaccusative condition (Native: $p = .5042$; Heritage: $p = .8764$). Similarly, VERBTYPE was significant in the [+FNQ] condition (Native: $p = .0004$; Heritage: $p = .0022$) but not in the [-FNQ] condition (Native: $p = .6380$; Heritage: $p = .3196$).

The results with L2 speakers were quite different, however. First, the interaction between VERBTYPE and FLOATING was not significant ($p = .0876$). While the results of the planned pair-wise comparisons showed that FLOATING was significant only in the unergative condition (unergatives: $p = .0258$; unaccusatives: $p = .8878$), this difference was due to the mean acceptability of the [+FNQ] condition being significantly higher than that of the [-FNQ] condition with the unergative verbs, i.e. opposite of what we observed with the native and heritage speakers. This is consistent with neither the unergative analysis, according to which the means for the [-FNQ] condition should be significantly higher, nor the unaccusative analysis,

according to which the difference should not be significant. As such, the judgments of the L2 speakers show no evidence of the knowledge of the FNQ diagnostic.

6.4 Discussion

The results of Experiment 1 suggest that the heritage speakers had the knowledge of the FNQ diagnostic that is comparable to the native speakers'. This finding is consistent with the findings in Montrul (2005), in which advanced and high intermediate Spanish heritage speakers showed robust knowledge of unaccusativity in Spanish, but it is different from the results reported in Lee (2011), in which only the Korea-born late bilingual heritage speakers, and not the US-born early bilingual heritage speakers, demonstrated their knowledge in the FNQ diagnostic.

Unlike the heritage speakers, the L2 speakers failed to show their knowledge of the FNQ diagnostic. While their judgments with unaccusative sentences superficially resembled those of the native and heritage speakers, the L2 speakers rated the unergative sentences in the [+FNQ] condition significantly better than their the [-FNQ] condition counterparts. This is different from the results reported in Sorace and Shomura (2001), in which their intermediate speakers' judgments showed some indication of their knowledge in the FNQ diagnostic with their unergatives. Nonetheless, since their judgments offer no evidence for their awareness of the FNQ diagnostic, we conclude that the L2 speakers in Experiment 1 did not have knowledge of the FNQ diagnostic that is comparable to the native speakers'.

7 Experiment 2: Testing the Effects of Agentivity and Telicity

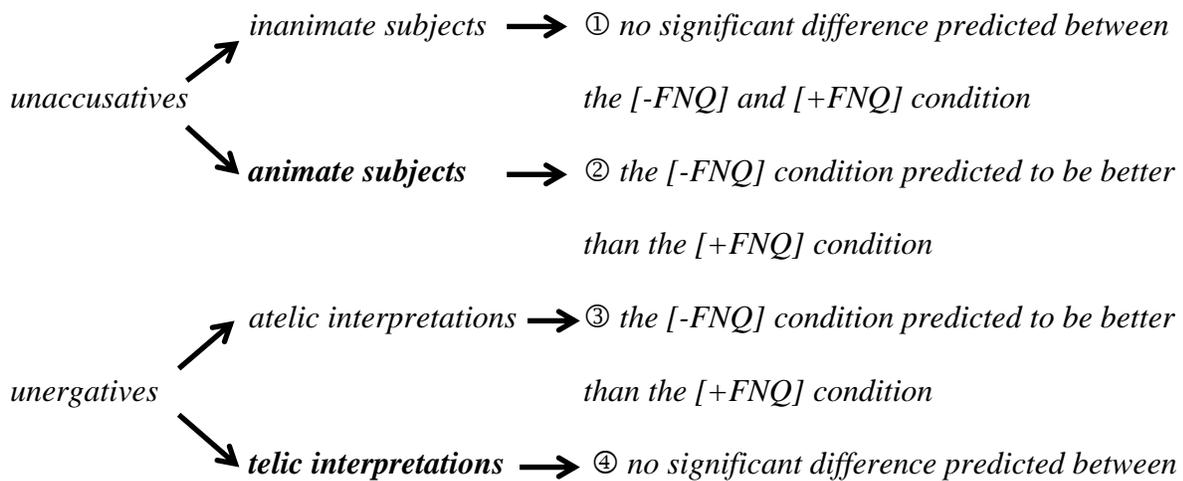
To examine possible effects of agentivity of subjects and telicity of events on the FNQ diagnostic, Experiment 2 manipulated these two semantic factors.

7.1 Predictions

As discussed in Section 3.4, Randall et al. (2004) found that Dutch and German speakers classify nonce intransitive verbs that denote telic events as unaccusative overwhelmingly when telic points were overtly marked with PPs, whether subjects are non-agentive (100%) or agentive (88%). The study argues that this is because the telic points that are overtly encoded with PPs are easier to recognize than ones that are parts of the lexical meaning of the verb. They also found that agentivity matters only when telicity was inherent. When descriptions are inherently telic, the implication of agentivity favored the unergative analysis (97%), whereas lack of agentivity favored the unaccusative analysis, but only slightly so (59%). This suggests that agentivity of subject can motivate an unergative analysis of even ‘core’ unaccusatives, i.e. intransitive verbs that denote inherently telic events, as long as the telicity is not overtly encoded by an adjunct.

If we directly extend Randall et al.’s findings from Dutch and German to Japanese, we would predict strong effects of both telicity and agentivity, as telicity is overtly encoded by adjuncts and animate subjects are presented without an adjunct that overtly encode telicity in our experiment. Therefore, the following interactions between these two semantic factors and the FNQ diagnostic are predicted.

Table 2: Predicted interactions between the two semantic factors and the FNQ diagnostic



the [-FNQ] and [+FNQ] condition

Figures 5 and 6 visually represent the predictions above.

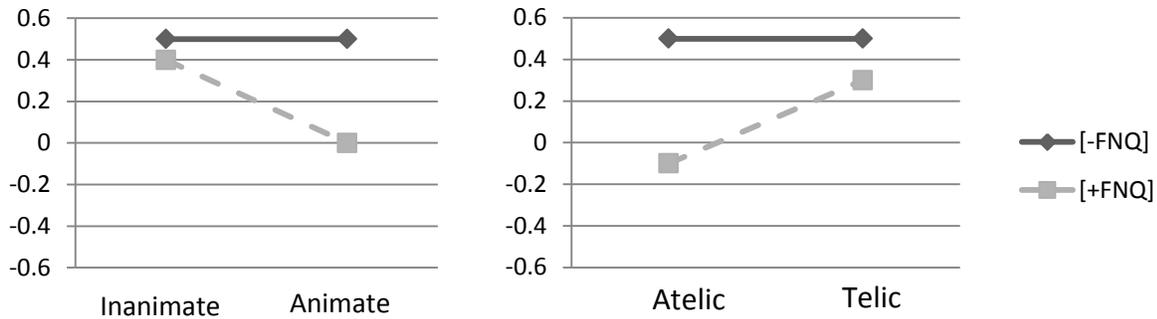


Figure 5: A model for unaccusatives

Figure 6: A model for unergatives

Figure 5 models the predicted interaction of animacy of unaccusative subjects and the positions of NQs. While inanimate subjects are predicted to have no effects on the FNQ diagnostic, animate subjects are predicted to make FNQs less acceptable, since they motivate the unergative analysis. Thus, the means of the [-FNQ] and [+FNQ] conditions should not be significantly different with inanimate subjects, as indicated by the horizontal solid line, while the mean of the [-FNQ] condition is predicted to be significantly lower than the mean of the [+FNQ] condition with animate subjects, as indicated by the dotted line slanted toward the right. Figure 6 models the predictions for the interaction between the telicity of events and the licensing of FNQs by unergative subjects. Atelic interpretations of events are predicted to not improve acceptability of unergative sentences in the [+FNQ] condition, while telic interpretations of events are expected to do just that. Thus, the means of the [-FNQ] and [+FNQ] conditions would be significantly different with the atelic condition, while the gap between the two means is expected to be narrower with the telic condition, as in Figure 6.

One important difference between Randall et al. (2004) and the present study, however, is that Randall et al. (2004) used nonce verbs, whose unaccusative/unergative classification was to

be determined by the participants, while the present study uses existing intransitive verbs, which presumably have predetermined unaccusative/unergative status. Therefore, the two semantic factors under question are expected to interact with, and possibly interfere with, the predetermined unaccusative/unergative status of intransitive verbs, rather than serving as clues in determining their classifications as in Randall et al. (2004). Thus, these semantic factors might play a more restricted role in our experiment than they did in Randall et al (2004). Thus, the predetermined knowledge about unaccusative/unergative status of intransitive verbs might possibly prevent telicity and agentivity from having significant effects or at least weaken their effects, especially with native speakers. With the heritage and L2 learners, the predetermined syntactic and semantic representation of the intransitive verbs may be less stable (a possibility with the heritage speakers) or even absent (a possibility with the L2 speakers). If so, these semantic factors might have larger effects on these speakers' judgments.

7.2 Methods

7.2.1 Participants

Forty undergraduates and graduates of UHM who were enrolled in a fourth-year Japanese linguistics course participated. The result of one participant was removed prior to analysis because it was incomplete. The rest of thirty nine participants were grouped into eleven native, fifteen heritage, and twelve L2 speakers, based on the same language background questionnaire used in Experiment 1 (Appendix 1). All eleven native speakers were born in Japan and did not have significant exposure to English until at least they started a high school (three of them went to an English-speaking high school). Ten of the fifteen heritage speakers were born in the U.S. while the rest were born in Japan. Fourteen of them were exposed to both Japanese and English in the first year of their life and one was introduced to Japanese when he entered a preschool.

Nine of them identified both Japanese and English as their first languages, while three identified Japanese, two identified English, and one identified Pohnpeian, an Austronesian language, as their first language. Fourteen of them indicated that they are most comfortable English, while one indicated that s/he is most comfortable with Japanese. All twelve L2 speakers were English native speakers. Their average length of studying Japanese was 8 years.

7.2.2 Materials

In addition to the two basic factors, VERBTYPE (unaccusative vs. unergative) and FLOATING ([+FNQ] vs. [-FNQ]), animacy of subjects was manipulated with unaccusative sentences (ANIMACY) with human and inanimate subjects, while telicity of events was manipulated with unergative sentences (TELICITY) using adjuncts that indicate that events took place in a particular time interval (e.g. *gozenchuu-ni* ‘in the morning’) for the telic condition, and adjuncts without such an indication, whether they are temporal (e.g. *kinoo* ‘yesterday’), locative (e.g. *suteeji-de* ‘on the stage’) or others (e.g. *hadaka-de* ‘naked’) for the atelic condition. Four ‘known’ unaccusative verbs that are compatible with both human and inanimate subjects (*ku-ru* ‘come’, *hair-u* ‘enter’, *ochi-ru* ‘fall’ and *a/i-ru* ‘be’) and four ‘known’ unergative verbs that are compatible with telic adverbs (*asob-u* ‘play’, *odor-u* ‘dance’, *oyog-u* ‘swim’, *hashir-u* ‘run’) were used.¹⁶ Four lexicalizations of each verb were constructed for each of the four conditions and distributed among four lists using a Latin Square design. The resulting thirty two sentences

¹⁶ In addition to the verbs that were also used in Experiment 1 (*ku-ru* ‘come’, *odor-u* ‘dance’ and *oyog-u* ‘swim’), the following verbs had been identified as unaccusative/unergative in previous studies based on different diagnostics: *hair-u* ‘enter’ (Miyagawa 1989), *ochi-ru* ‘fall’ (Kageyama 1993, 1996), *a/i-ru* ‘be’ (Kageyama 1993), *asob-u* ‘play’ (Kageyama 1993; Kishimoto 1996) and *hashir-u* ‘run’ (Kageyama 1993, 1996; Kishimoto 1996).

in each list were mixed with twenty four fillers, and their order was pseudo-randomized. Thus, each subject rated fifty six sentences. Examples of the experimental sentences are listed below.

(22) a. Unaccusative + [-FNQ] + animate subject:

Chiisana	otokonoko_i-ga	futa-ri_j	chikaku-no	kooen-ni	ki-ta
small	boy -NOM	2-CL	near-GEN	park-LOC	come-PST

b. Unaccusative + [+FNQ] + animate subject:

Chiisana	otokonoko_i-ga	chikaku-no	kooen-ni	futa-ri_j	ki-ta
small	boy -NOM	near-GEN	park-LOC	2-CL	come-PST

‘Two small boys came to the near-by park.’

c. Unaccusative + [-FNQ] + inanimate subject:

Ookina	kozutsumi_i-ga	futa-tsu_j	Taroo-no	ruumu_meeto-ni	ki-ta
large	package -NOM	2-CL	T-GEN	roommate-LOC	come-PST

d. Unaccusative + [+FNQ] + inanimate subject:

Ookina	kozutsumi_i-ga	Taroo-no	ruumu_meeto-ni	futa-tsu_j	ki-ta
large	package -NOM	T-GEN	roommate-LOC	2-CL	come-PST

‘Two large packages came to Taro’s roommate.’

(19) a. Unergative + [-FNQ] + telic adverbial:

Shoogakusee-no	kodomo-tachi_i-ga	go-nin_i	ni-jikan-de	odot-ta
Elementary school-GEN	child-PL-NOM	5-CL	two-hours-in	dance-PST

b. Unergative + [+FNQ] + telic adverbial:

Shoogakusee-no	kodomo-tachi_i-ga	ni-jikan-de	go-nin_i	odot-ta
Elementary school-GEN	child-PL-NOM	two-hours-in	5-CL	dance-PST

‘Five elementary school children danced in two hours.’

c. Unergative + [-FNQ] + atelic adverbial:

Shoogakusee-no kodomo-tachi-ga	go-nin_i	suteeji-de	odot-ta
Elementary school-GEN child-PL-NOM	5-CL	stage-LOC	dance-PST

d. Unergative + [+FNQ] + atelic adverbial:

Shoogakusee-no kodomo-tachi-ga	suteeji-de	go-nin_i	odot-ta
Elementary school-GEN child-PL-NOM	stage-LOC	5-CL	dance-PST

‘Five elementary school children danced on the stage.’

7.2.3 Procedure

Experiment 2 was also an acceptability judgment task. Unlike Experiment 1, the participants were instructed to use a 7-point scale with 7 being “completely natural” and 1 being “completely unnatural”. The method has been changed from the magnitude estimation (ME) in Experiment 1 to a 7-point scale because of several criticisms that have been raised against ME. First, while one of the crucial assumptions behind the alleged superiority of ME is that it produces ratio-based judgments, Sprouse (2011) argues that participants in ME experiments of sentence acceptability are unlikely to be making ratio-based judgments based on experimental evidence. Second, studies that compared experimental results obtained with ME against experimental results obtained with other methods, forced choice and a numeral scale, argue that the results of ME experiments are no more informative than the results of forced choice tasks or numerical scale tasks (Wescott and Fanselow 2008, 2011; Bader and Häussler 2010; Fukuda et al. 2011). Wescott and Fanselow in particular argue that ME results contain a greater amount of spurious variance. Adding these concerns to the disadvantage of ME being an unfamiliar task that requires some mathematical sophistication in participants, we decided to use a 7 point scale instead, which is presumably easier and more familiar to participants.

7.3 Results

As with Experiment 1, each participant's raw ratings were transformed into z-scores prior to analysis and analyzed using linear mixed-effects models with VERBTYPE and FLOATING as fixed factors and participants and items as random factors. Two planned pairwise comparisons were also conducted to examine the interaction between FLOATING and the third condition within each of the verb types, ANIMACY for the unaccusatives and TELICITY for the unergatives.

7.3.1 Overall

Before discussing the effects of animacy of subjects and telicity of events within unaccusatives and unergatives, let us first discuss the results of the overall analyses. Despite the manipulations, the contrast with the FNQ diagnostic was still maintained with the native and heritage speakers.

Figures 8, 9 and 10 summarize the results.

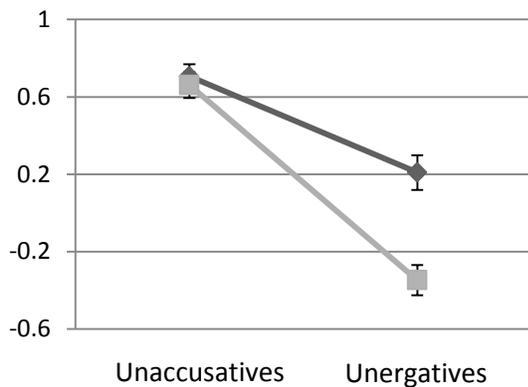


Figure 8: The native speakers (n = 11)

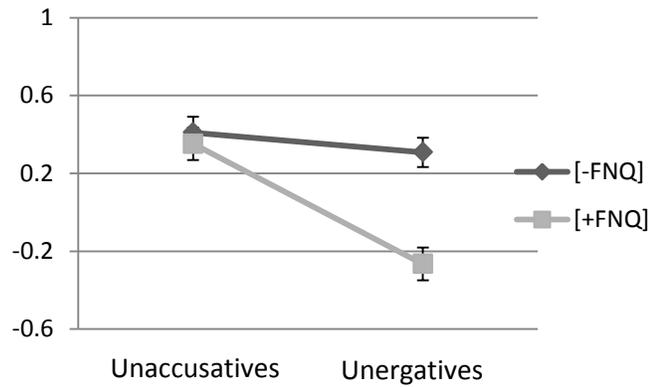


Figure 9: The heritage speakers (n = 15)

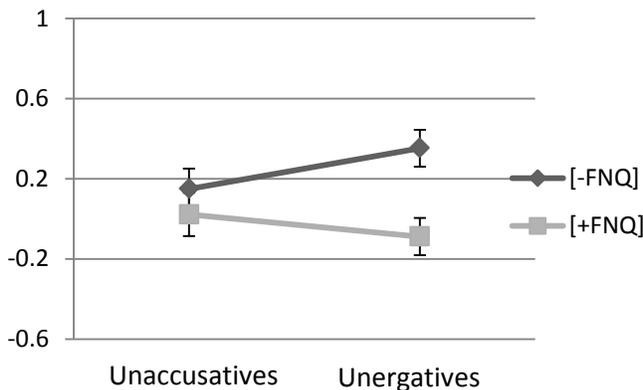


Figure 10: The L2 speakers (n = 12)

The results with both the native and heritage speakers showed that the interaction between VERBTYPE and FLOATING was significant (Native: $p = .0016$; Heritage: $p = .0022$). The results of the planned pair-wise comparisons were also similar between the two groups, with FLOATING being a significant factor with the unergative condition (Native: $p = .0001$; Heritage: $p = .0001$) but not with the unaccusative condition (Native: $p = .6352$; Heritage: $p = .6292$). The only difference between the two groups is that VERBTYPE was significant both in the [+FNQ] ($p = .0001$) and the [-FNQ] condition ($p = .001$) with the native speakers while it was significant only in the [+FNQ] condition ([+FNQ]: $p = .0001$; [-FNQ]: $p = .3894$) with the heritage speakers. These results seem to reinforce the similarity between the native and heritage speakers that we found with Experiment 1 with a smaller number of participants. The results with the L2 speakers show that the interaction between VERBTYPE and FLOATING was not significant ($p = .1124$). However, the planned pair-wise comparisons revealed that FLOATING was significant only in the unergative condition (unergative: $p = .0008$; unaccusative: $p = .3998$). VERBTYPE was not significant ([+FNQ]: $p = .4272$; [-FNQ]: $p = .1474$). Therefore, the L2 speakers' judgments are still different from the other two groups', but they seem to have developed some level of sensitivity to the FNQ diagnostic, as the distribution of the four means is numerically consistent with that of the native and heritage speakers.

7.3.2 Effects of Animacy (agentivity) of Subjects with Unaccusatives

Let us now look at the effects of the manipulation of animacy of subjects with unaccusatives. The results with all three groups showed that the means with the [-FNQ] condition are numerically higher with animate subjects than with inanimate subjects, suggesting a general preference toward animate subjects when the position of NQs is not at issue. However, the means with the [+FNQ] condition were numerically lower with animate subjects than with

inanimate subjects with the native and heritage speakers. Although this is only a numerical tendency, it is consistent with the predictions ① and ② in Table 2 and Figure 6, and suggests weak effects of animacy of subjects. This tendency was absent with the L2 speakers, as the two means with the [+FNQ] condition remain virtually the same. This suggests that the L2 speakers were insensitive to the effect of animacy of subjects with respect to the licensing of FNQs. Figures 11, 12 and 13 show the native, heritage and L2 speakers' results, respectively.

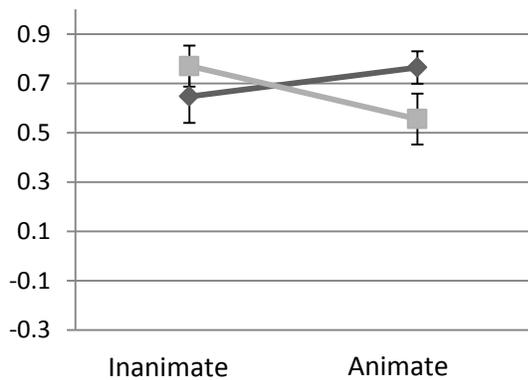


Figure 11: The native speakers (n = 11)

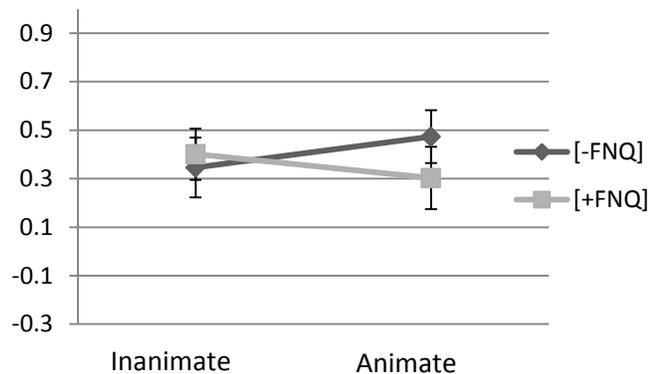


Figure 12: The heritage speakers (n=15)

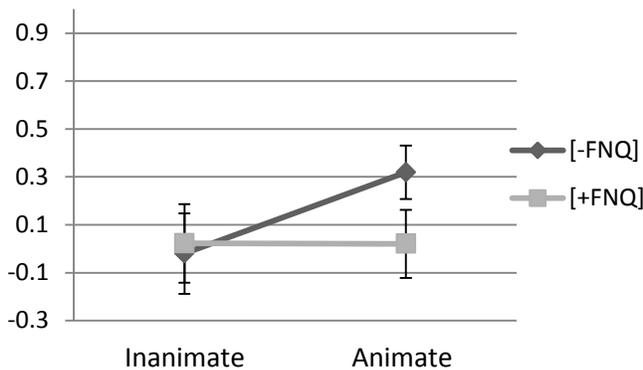


Figure 13: The L2 speakers (n=12)

With the native speakers, the interaction of ANIMACY and FLOATING was marginally significant ($p = .0674$). However, FLOATING was not significant with both the inanimate ($p = .3904$) and animate ($p = .0942$) conditions. With the heritage speakers, the interaction of ANIMACY and FLOATING was clearly not significant ($p = .3382$) and FLOATING was not significant with both

conditions (inanimate: $p = .7258$; animate: $p = .3034$). With the L2 speakers, the interaction of ANIMACY and FLOATING was not significant ($p = .2596$), and nor was FLOATING in the inanimate ($p = .8542$) and animate ($p = .1124$) conditions.

7.3.2 Effects of Telicity of Events with Unergatives

Let us now look at the effects of the manipulation of telicity of events with unergatives. Unlike agentivity, whose effects were barely detectible only with native speakers (and to a lesser extent with heritage speakers), telicity of events seems to have effects on all three groups of speakers' judgments on the FNQ diagnostics, but the results also revealed interesting differences among the three groups of Japanese speakers.

Figure 14, 15 and 16 summarize the results with the native, heritage and L2 speakers, respectively, within the unergative conditions.

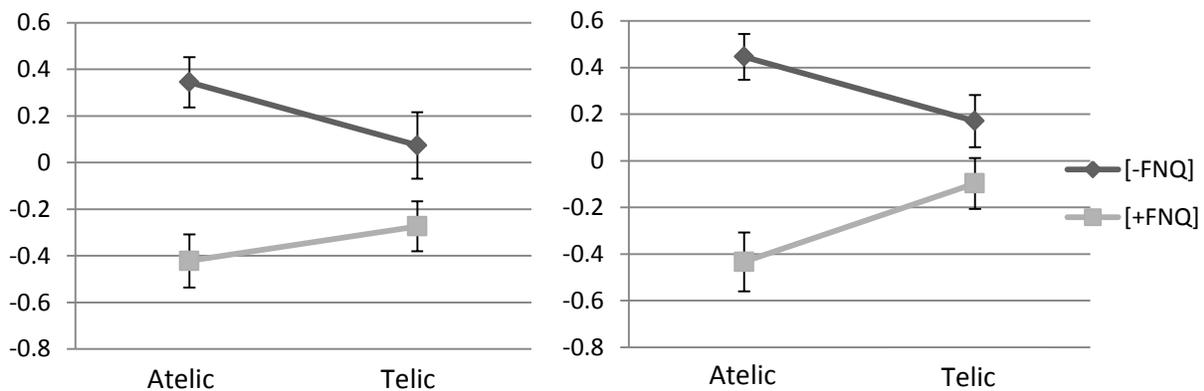


Figure 14: The native speakers (n=11) Figure 15: The heritage speakers (n=15)

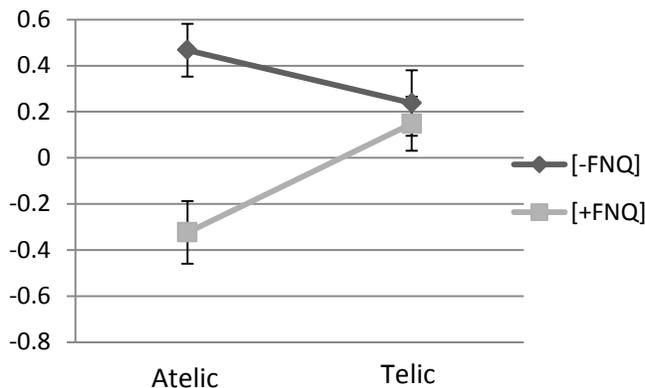


Figure 16: The L2 speakers (n=12)

With the native speakers, the interaction between TELICITY and FLOATING was not quite significant ($p = .0924$). FLOATING remained significant within the atelic condition ($p = .0001$); however, it is only marginally significant within the telic condition ($p = .0612$). The results with the heritage and L2 speakers are more consistent with ③ and ④ in Table 2 and Figure 7. With the heritage speakers, the interaction between TELICITY and FLOATING was significant ($p = .0146$). FLOATING is significant within the atelic condition ($p = .0001$) but not within the telic condition ($p = .129$). The effects of telicity were most pronounced with the L2 speakers. The interaction between TELICITY and FLOATING was highly significant ($p = .0068$). FLOATING was significant within the atelic condition ($p = .0001$) but not significant within the telic condition ($p = .619$).

Our results suggest that the effects of telicity were two fold. First, with all three populations, the mean of the [+FNQ] condition was lower with the telic condition than with the atelic condition. This suggests that some unergative sentences in the telic condition were rated less acceptable, probably due to the compatibility between some of the unergative verbs and their co-occurring adjunct. Second, the means of the [+FNQ] condition were numerically higher with the telic condition than the atelic condition with all three groups. Here, it is important to point out that the intended effect of telic adjuncts was the latter, i.e. improved acceptability of unergative sentences in the [+FNQ] condition. Although this effect was seen with all the populations, the effect was least pronounced with the native speakers, and the most pronounced with the L2 speakers, with the heritage speakers coming in between the two.

7.4 Discussion

The findings from Experiment 2 are summarized below.

- (i) Despite the manipulations of the animacy of unaccusative subjects and telicity of unergative events, the native and heritage speakers' judgments replicated the contrast with the FNQ diagnostic. While the L2 speakers' judgments still failed to show a significant interaction between VERBTYPE and FLOATING, their judgments show a tendency consistent with the native and heritage speakers, unlike Experiment 1.
- (ii) Weak effects of animacy of subjects were detected with the native speakers and the heritage speakers' judgments showed a numerical tendency that is consistent with the native speakers' judgments. The results of the L2 speakers suggest that they are not sensitive to the effect of animacy of subjects in the FNQ diagnostic.
- (iii) Clear effects of telicity of events were seen in the judgments of all three speakers, yet they were particularly pronounced with the heritage and the L2 speakers. The effects were less pronounced with the native speakers.

In sum, the findings in Experiment 2 provide further evidence for the similarity of the grammar of the FNQ diagnostic in the heritage and native speakers. Unlike the results of Experiment 1, the judgments of the L2 speakers in Experiment 2 overall showed the right numerical tendencies. In addition, their judgments exhibited remarkably clear effects of telicity of events on the FNQ diagnostic. Thus, the L2 speakers in Experiment 2 seem to have developed a form of a grammar of the FNQ diagnostic that is consistent with the native and heritage speakers'.

8 Conclusions

Let us summarize our findings with respect to the three research questions.

Research Question 1: Do heritage Japanese speakers exhibit the knowledge of the FNQ diagnostic? If they do, how is their grammar of the FNQ diagnostic different from that of native and L2 speakers?

Our answer to the research question 1 is affirmative, as the heritage speakers who participated in our two experiments demonstrated clear knowledge of the FNQ diagnostic. While this finding is at odds with the finding in Lee (2011), which suggested that heritage Korean speakers who were exposed to English early lack knowledge of the FNQ diagnostic in Korean, it is consistent with the findings in Montrul (2005) with Spanish heritage speakers, who demonstrated robust knowledge of unaccusative phenomena in Spanish.

***Research Question 2:** Do L2 Japanese speakers exhibit the knowledge of the FNQ diagnostic? If they do, how is their grammar of the FNQ diagnostic different from that of native and heritage speakers?*

While the L2 speakers participated in Experiment 1 and 2 both failed to clearly show the knowledge of the FNQ diagnostic, as their judgments did not show an interaction between VERBTYPE (unaccusatives vs. unergatives) and FLOATING ([-FNQ] vs. [+FNQ]), the results of Experiment 2 indicate that the relevant knowledge may be developing in the L2 speakers who participate in this experiment as (i) their judgments show the numerical tendencies that are consistent with the judgments of the native and heritage speakers and (ii) they appear to be sensitive to the effects of telicity in a way that is consistent with the judgments given by the native speakers. However, when compared with the results with the L2 Spanish speakers reported in Montrul (2005), which suggest that even low intermediate L2 speakers demonstrated robust knowledge of unaccusativity in Spanish, our results suggest that the L2 acquisition of unaccusativity requires a greater amount of time and exposure with Japanese than with Spanish.

***Research Question 3:** Do manipulations of animacy (and therefore potential agentivity) of subjects and telicity of events affect judgments of the FNQ diagnostic by the three different groups of Japanese speakers? If they do, how different/similar are the effect of*

these two factors among the three different populations? Which of the two semantic factors has stronger effects on the FNQ diagnostic in which group?

The results of Experiment 2 suggest that the two semantic factors affect the FNQ diagnostic differently in the three groups of speakers. The effects of both animacy of unaccusative subjects and telicity of unergative events were subtle with the native speakers. In contrast, the effects of telicity were robust with both the heritage and L2 speakers, while the effects of agentivity were weak to non-existent with the heritage and L2 speakers. Overall, our results fail to support Kishimoto's (1996) claim that "Japanese ranks agentivity higher than telicity across the board" as it was not the case that the effects of agentivity were more prominent than the effects of telicity. However, our findings are compatible with the findings in Randall et al. (2004), which argue that telicity is the primary semantic factor that determines the auxiliary selection with Dutch and German speakers, with agentivity of subjects playing a much more restricted role.

Our findings with respect to the effects of agentivity and telicity raise the following two questions. First, why were the effects of telicity of events overall more prominent and highly pronounced in the judgments of the heritage and L2 speakers? Second, why were the effects of agentivity of subjects overall less prominent and only detectable with the native and heritage speakers? The fact that the effects of telicity of events were more pronounced in the judgments of the heritage speakers than those of the native speakers may seem surprising, especially because the judgments of the heritage and native speakers in the two experiments were otherwise very similar. However, recent studies with heritage speakers with different languages have shown that heritage speakers' grammar tends to amplify trends that already exist in native speakers' grammar. In a study that examined the subject-object asymmetries in comprehension of relative clauses in adult and child native and heritage speakers of Russian, Polinsky (2011)

found that heritage adult speakers performed significantly worse with object relatives than subject relatives, while all the other populations (heritage children, native children and adults) performed equally well with subject and object relatives. Polinsky argues that this finding constitutes evidence for attrition in the adult heritage Russian speakers, whose grammar seemed to have amplified the known privileged status of subject relatives to the extent that their grammar only allows for subject relatives. More recently, Montrul and Sanchez-Walker (2013) studied differential object marking (DOM) in Spanish with child and adult native speakers in Mexico, adult native speakers who were the first generation immigrants in the US, and English-dominant child and adult heritage speakers in the US. The study reveals that, while the child and adult native speakers in Mexico showed very low rates of DOM omissions, both the first generation immigrants and the English-dominant heritage speakers omitted DOM. Importantly, while Spanish DOM already had a vulnerable status in the grammar of the first generation immigrants, this tendency was amplified in the heritage speakers' grammar (see Scontras et al. 2015 for a review of the relevant literature). Given this tendency, the more pronounced effects of telicity of events in the judgments of the heritage speakers with the FNQ diagnostics compared to these of the native speakers may be seen as another example of a trend in a native grammar amplified in a heritage grammar.

However, this tendency alone does not account for the fact that the effects of telicity were even more pronounced in the judgments of the L2 speakers. It also fails to account for the second question: why were the effects of agentivity of subjects overall less prominent and only detectable with the native and heritage speakers? If a heritage grammar simply amplifies any trend in a native grammar, why do the results of Experiment 2 indicate that only the effects of telicity of events were amplified in the heritage grammar, and not those of agentivity? An

additional explanation can be sought along the line of Randall et al.'s (2004) explanation of the prominent role of telicity-encoding PPs in their experiment with Dutch and German speakers. It may be that the manipulation of telicity with adjuncts is very visible and easy to perceive, as it involves an extra element, an adjunct, which must be integrated into the compositional process of the sentence. In contrast, animacy of subjects, one might argue, is less visible and harder to identify because the subject, being an argument, is more intimately connected to the lexical semantics of the verb. Under this line of explanation, the grammar of the heritage speakers in Experiment 2 arguably amplified a trend in the native grammar that is more visible. In fact, the telicizing effects of adjuncts are so prominent that even the L2 speakers seemed to have picked them up. On the other hand, the effects of agentivity on the FNQ diagnostic seem to be below the threshold at which a trend becomes visible enough to be amplified in a heritage grammar, and they seem to have escaped notice of the L2 speakers as well.

In sum, the findings from the two experiments suggest that grammatical knowledge as complicated as what the FNQ diagnostic requires seems to be acquired remarkably well by heritage speakers and resists attrition even under conditions of significantly reduced exposure to the language. They also suggest that L2 speakers are able to acquire the same complex grammatical knowledge to a certain degree. Interesting differences between the native speakers on one hand and the heritage and L2 speakers on the other emerged with the effects of two semantic factors, agentivity and telicity. Especially with the manipulation of telicity of events, the native speakers' judgments showed more modest, subdued effects, while the heritage and L2 speakers' judgments showed more drastic effects. We have suggested that the more pronounced effects of telicity of events with the heritage speakers compared to the native speakers is an instance of a heritage grammar amplifying a trend that already exists in the native grammar

(Polinsky 2011, Montrul and Sanchez-Walker 2013, Scontras et al. 2015). In addition, the fact that only the effects of telicity, and not the effects of agentivity, seem to have been amplified in the heritage grammar suggests that a trend in a native grammar must be visible enough to trigger its amplification in a heritage grammar. While the effects of telicity is highly visible, to the extent it seems to have been also amplified in the L2 grammar, the effects of agentivity seems not visible enough. This alleged difference in ‘visibility’ between telicity of events and agentivity of subjects also receives support from the findings in Randall et al. (2004), which examined the effects of these two semantic factors with auxiliary selection in Dutch and German. The question remains as to whether the different visibility of these two semantic factors would hold beyond these two particular unaccusative diagnostics.

References

- Ahn, S.-H. 1990. *Korean quantification and Universal Grammar*. Doctoral dissertation, University of Connecticut.
- Baayen, H., 2007. *Analyzing Linguistic Data: A Practical Introduction to Statistics using R*. Cambridge: Cambridge University Press.
- Baayen, H., Davidson, D. J., Bates, D. M., 2008. Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language* 59: 390-412.
- Bader, M., and Häussler, J. 2010. Toward a model of grammatical judgments. *Journal of Linguistics* 46: 273-330.
- Bard, E. G., Robertson, D., and Sorace, A., 1996. Magnitude estimation of linguistic acceptability. *Language* 72: 32-68.
- Benmamoun, E., Montrul, S., and Polinsky, M., 2013. Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics* 39: 129-181.
- Borer, H., 1994. The projection of arguments. In Benedicto, E., Runner, J., (eds.), *Functional Projections: University of Massachusetts Occasional Papers* 17, 19-48.
- Borer, H., 2005. *Structuring Sense Volume 2: The Normal Course of Events*. Oxford: Oxford University Press.
- Bowers, J. 1993. The syntax of predication. *Linguistic Inquiry* 24: 591-656
- Bowers, J. 2002. Transitivity. *Linguistic Inquiry* 33:183-224
- Burzio, L., 1986. *Italian Syntax: A Government and Binding Approach*. Dordrecht: Reidel.
- Chomsky, N. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.
- Collins, C. 1997. *Local Economy*. Cambridge, MA: MIT Press.
- Dowty, D., 1991. Thematic proto-roles and argument selection. *Language* 67.547-619.

- Fitzpatrick, J. M., 2006. *The Syntactic and Semantic Roots of Floating Quantification*. Doctoral dissertation. MIT.
- Fujita, N. 1988. *Genitive Subjects in Japanese and Universal Grammar*. Master's Thesis. Ohio State University.
- Fukuda, S., 2009. *From Words to Structure: How Syntax Can Affect the Distribution and Interpretation of Verbs and Their Arguments. Three Case Studies from Japanese*. Doctoral dissertation. UCSD.
- Fukuda, S., Goodall, G., Michel, D., and Beecher, H., 2012. Is Magnitude Estimation Worth the Trouble? *Proceedings of West Coast Conference on Formal Linguistics* 29: 328-336.
- Fukuda, S., and Polinsky, M., 2014. Licensing of floating nominal modifiers and Unaccusativity in Japanese. *Proceedings of West Coast Conference on Formal Linguistics* 31: 189-198.
- Gerts, D. B., 1987. Surface case and grammatical relations in Korean: The evidence from quantifier float. *Studies in Language* 11:181-197.
- Gunji, T., and Hasida, K., 1998. Measurement and quantification. In Gunji, T. and Hasida, K. (eds.), *Topics in Constraint-Based Grammar of Japanese*, 39-79, Dordrecht: Kluwer.
- Harley, H. 1995. *Subjects, events and licensing*. Doctoral dissertation, MIT.
- Hirakawa, M., 1999. L2 acquisition of Japanese unaccusative verbs by speakers of English and Chinese. In Kanno, K., (ed.), *The Acquisition of Japanese as a Second Language*, 89-113, Amsterdam: John Benjamin.
- Hirakawa, M., 2001. L2 acquisition of Japanese unaccusative verbs. *Studies in Second Language Acquisition* 23: 221-245.
- Hoekstra, T., 1992. Aspect and theta theory. In Roca, I.M. (ed.), *Thematic Structure: Its Role in Grammar*. Dordrecht: Foris.

- Hoekstra, T., and Mulder, R., 1990. Unergatives as copular verbs: Locational and existential prediction. *The Linguistic Review* 7:1-79.
- Ishii, Y., 1999. A note on floating quantifiers in Japanese. In Muraki, M., and Iwamoto, E., (eds.), *Linguistics: In Search of the Human Mind*, 236-267, Tokyo: Kaitakusha.
- Jacobsen, W., 1992. *The Transitive Structure of Events in Japanese*. Tokyo: Kuroshio.
- Kageyama, T., 1993. *Bunpoo to gokeisei* [Grammar and Word Formation]. Tokyo: Hitsuji.
- Kageyama, T., 1996. *Dooshi Imiron* [Verb Semantics], Tokyo: Kuroshio.
- Kang, B.-M., 2002. Categories and meanings of Korean floating quantifiers: With some reference to Japanese. *Journal of East Asian Linguistics* 11: 375-398.
- Kanno, K., 1996. The Status of a non-parameterized principle in the L2 initial state. *Language Acquisition* 5: 317-334.
- Keller, F., 2000. *Gradience in Grammar: Experimental and Computational Aspects of Degrees of Grammaticality*. Doctoral dissertation, University of Edinburgh.
- Keller, F., and Sorace, A. 2003. Gradient auxiliary selection and impersonal passivization in German: An experimental investigation. *Journal of Linguistics* 39: 57-108.
- Kim, J.-B., To appear. *The Linguistic Structures of Korean: A Construction-based Perspective*. Cambridge: Cambridge University Press.
- Kindaichi, H., 1976. *Nihongo Dooshi no Asupekuto* [Aspect in the Japanese Verbs]. Tokyo: Mugi Shobo.
- Kishimoto, H., 1996. Split intransitivity in Japanese and the unaccusative hypothesis. *Language* 72: 248-286.
- Kishimoto, H., 2005. *Toogo Koozoo to Bunpoo Kankei* [Syntactic Structure and Grammatical Relations], Toyo: Kuroshio.
- Ko, H., 2005. *Syntactic edges and linearization*. Doctoral dissertation, MIT, Cambridge, Mass.

- Ko, H., 2007. Asymmetries in scrambling and cyclic linearization. *Linguistic Inquiry* 38:49-83.
- Ko, H., and Oh, E., 2010. A hybrid approach to floating quantifiers: Experimental evidence. In Hohn, S.-M., Cook, H. M., O'Grady, W., Selafim, L. and Cheon, S.-Y., (eds.), *Japanese Korean Linguistics* 19, Stanford, CA: CSLI.
- Ko, H., and Oh, E., 2012. A Hybrid Approach to Floating Quantifiers: Some Experimental Evidence. *Linguistic Research* 29: 69-106.
- Kratzer, A., 1994. On external arguments. In Benedicto E., and Runner, J. (eds.), *Functional Projections: University of Massachusetts Occasional Papers* 17, 103–130, Amherst, MA: GLSA.
- Kratzer, A., 1996. Severing the external argument from the verb. In Rooryck, J., and Zariing, L. (eds.), *Phrase Structure and the Lexicon*, 109–137, Dordrecht: Kluwer.
- Lee, C., 1989. (In)definites, Case markers, classifiers and quantifiers in Korean. In Kuno, S., et al. (eds.), *Harvard Studies in Korean Linguistics* 3, 469-487, Cambridge, Mass.: Harvard University, Department of Linguistics.
- Lee, T., 2011. Grammatical knowledge of Korean heritage speakers. *Linguistic Approaches to Bilingualism* 1: 149-174.
- Levin, B., and Rappaport-Hovav, M., 1989. An approach to unaccusative mismatches. *Proceedings of the North Eastern Linguistics Society* 19: 314-328.
- Levin, B., and Rappaport-Hovav, M. 1992. The lexical semantics of verbs of motion: the perspective from unaccusativity. In Roca I.M. (ed.), *Thematic Structure: Its Role in Grammar*, 247-269, Dordrecht: Foris.
- Levin, B., and Rappaport-Hovav, M., 1995. *Unaccusativity: At the Syntax-Lexical Semantics Interface*. Cambridge, MA: MIT Press

- Lieber, R., and Baayen, H. 1997. A semantic principle of auxiliary selection in Dutch. *Natural Language & Linguistic Theory* 15: 789-845.
- McClure, W., 1996. Japanese aspect and kinds of eventualities. *Language Science* 18:227-293.
- Mihara, K.-I., 1998. Suuryooshi renketsu koobun-to “kekka”-no gan’i [Quantifier linking construction and the implication of “resultative”]. *Gengo [Language]* 6: 86-95, 7: 94-102, 8:104-113.
- Miyagawa, S., 1989. *Structure and Case marking in Japanese*. San Diego, CA: Academic Press.
- Miyagawa, S., 2006. Locality in syntax and floated numeral quantifiers in Japanese and Korean. In Vance, T. J., and Jones, K., (eds.), *Japanese Korean Linguistics 14*: 270-282. Stanford, CA: CSLI.
- Miyagawa, S., 2012. *Case, Argument Structure, and Word Order*. Oxford: Routledge.
- Miyagawa, S., Arikawa, K., 2007. Locality in syntax and floated numeral quantifiers. *Linguistic Inquiry* 38, 645-670.
- Modyanova, N., 2006. The Genitive of Negation Construction in Russian-English Bilinguals. In Bamman, D., Magnitskaia, T., and Zaller, C., (eds.) *An Online Supplement to the Proceedings of the 30th Boston University Conference on Language Development*.
- Montrul, S., 2002. Incomplete acquisition and attrition of Spanish tense/aspect distinctions in adult bilinguals. *Bilingualism: Language and Cognition* 5:39 – 68.
- Montrul, S., 2004. Subject and object expression in Spanish heritage speakers: A case of morphosyntactic convergence. *Bilingualism: Language and Cognition* 7:125 -142.
- Montrul, S., 2005. Second language acquisition and first language loss in adult early bilinguals: exploring some differences and similarities. *Second Language Research* 21:199–249.

- Montrul, S., and Sanchez-Walker, N. 2013. Differential object marking in child and adult Spanish heritage speakers. *Language Acquisition* 20: 109-132.
- Nakanishi, K., 2008. Syntax and semantics of floating numeral quantifiers. In Miyagawa, S. and Saito, M., (eds.), *Oxford Handbook of Japanese Linguistics*, 287-319, Oxford: Oxford University Press.
- Nakatani, K., 2003. Analyzing *-te*. In McClure, W., (ed.), *Japanese Korean Linguistics* 12. Stanford, CA: CSLI.
- Nakatani, K., 2004. Predicate concatenation: a study of V-te-V predicate in Japanese. Doctoral dissertation. Harvard.
- Nakatani, K., 2013. *Predicate concatenation: a study of V-te-V predicate in Japanese*. Tokyo: Kuroshio.
- Ogihara, T., 1998. The ambiguity of the *-te iru* Form in Japanese. *Journal of East Asian Linguistics* 7: 87-120.
- O'Grady, W., 1991. *Categories and Case: The sentence structure of Korean*. Amsterdam: John Benjamins.
- Perlmutter, D. M., 1978. Impersonal passives and the unaccusative hypothesis. *BLS* 4: 157-185.
- Polinsky, M., 1995. American Russian: Language loss meets language acquisition. In *Formal Approaches to Slavic Linguistics. Cornell Meeting*, 370-406, Ann Arbor: Michigan Slavic Publications.
- Polinsky, M. 2011. Reanalysis in adult heritage language: New evidence in support of attrition. *Studies in Second Language Acquisition* 33: 305-328.
- Polinsky, M., and Kagan, O., 2007. Heritage languages: In the 'wild' and in the classroom. *Language and Linguistics Compass* 1/5: 368-395.

- Randall, J., van Hout, A., Weissenborn, J., and Baayen, H., 2004. Acquiring unaccusativity: A cross-linguistic look. In Alexiadou, A., Anagnostopoulou, E., and Everaert, M. (eds.), *The Unaccusative Puzzle: Explorations of the Syntax-Lexicon Interface*, 332-354, Oxford: Oxford University Press.
- Rosen, C., 1984. The interface between semantic roles and initial grammatical relations. In Perlmutter, D. M., and Rosen, C., (eds.), *Studies in Relational Grammar 2*, 38–80, Chicago: University of Chicago Press.
- Scontras, G., Fuchs, Z., and Polinsky, M., 2015. *Heritage language and linguistic theory*. Ms., Stanford University and Harvard University.
- Shimada, H., and Sano, T., 2007. A-chains and unaccusative-unergative distinction in the child grammar: The acquisition of Japanese *te-iru* constructions. *Proceedings of the 2nd Conference on Generative Approaches to Language Acquisition North America*: 386-393.
- Shirai, Y., 1998. Where the progressive and the resultative meet: Imperfective aspect in Japanese, Chinese, Korean and English. *Studies in Language* 22:661-692.
- Shirai, Y., 2000. The semantics of Japanese imperfective *-teiru*: An integrative approach. *Journal of Pragmatics* 32:327-361.
- Sorace, A., 1993. Incomplete vs. divergent representation of unaccusativity in non-native grammars of Italian. *Second Language Research* 9:22-47.
- Sorace, A., 1995. Acquiring linking rules and argument structures in a second language: The unaccusative/unergative distinction. In Eubank, L., Selinker, L., and Sharwood Smith, M., (eds.), *The Current State of Interlanguage: Studies in honor of William E. Rutherford*, 153-175, Dordrecht: John Benjamins.
- Sorace, A., 2000. Gradients in auxiliary selection with intransitive verbs. *Language* 76, 859-890.

- Sorace, A., 2004. Gradience at the lexicon-syntax interface: Evidence from auxiliary selection and implications for unaccusativity. In Alexiadou, A., Anagnostopoulou, E., and Everaert, M. (eds.), *The Unaccusative Puzzle: Explorations of the Syntax-Lexicon Interface*, 243-268, Oxford: Oxford University Press.
- Sorace, A., and Shomura, Y., 2001. Lexical constraints on the acquisition of split intransitivity. *Studies in Second Language Acquisition* 23: 247-278.
- Sportiche, D. 1988. A theory of floating quantifiers and its corollaries for constituent structure. *Linguistic Inquiry* 19: 425-449.
- Sprouse, J., 2011. A test of the cognitive assumptions of magnitude estimation: Commutativity does not hold for acceptability judgments. *Language* 84: 274-288.
- Stevens, S. S., 1957. On the psychophysical law. *Psychological Review* 64: 153–181.
- Takami, K.-I., and Kuno, S., 2006. *Nihongo Kinooteiki Koobun Kenkyuu* [A Functional Approach to Japanese Syntax]. Tokyo: Taishuukan.
- Tenny, C., 1992. The aspectual interface hypothesis. In Sag, I. A., Szabolcsi, A. (eds.), *Lexical Matters*, 1-27, Stanford, CA: CSLI.
- Tsujimura, N., 1994. Unaccusative mismatches and resultatives in Japanese. In: Koizumi, M., Ura, H. (Eds.), *Formal Approaches to Japanese Linguistics 1. MIT Working Papers in Linguistics* 24, 335-354.
- Tsujimura, N., 1996. Another look at unaccusative mismatches in Japanese. *BLS* 22, 406-416.
- Tsujimura, N., 2014. *An Introduction to Japanese Linguistics*. 3rd Edition. Oxford: Wiley Blackwell.
- Tsujimura, N., and Iida, M., 1999. Deverbal nominals and telicity in Japanese. *Journal of East Asian Linguistics* 8: 107-130.

- van Hout, A. 2004. Unaccusativity as telicity checking. In Alexiadou, A., Anagnostopoulou, E., and Everaert, M. (eds.), *The Unaccusative Puzzle: Explorations of the Syntax-Lexicon Interface*, 60-83, Oxford: Oxford University Press.
- van Valin, R. D., Jr., 1990. Semantic parameters of split intransitivity. *Language* 66: 221–60.
- Wescott, T., and Fanselow, G., 2008. Variance and informativity in different measures of linguistic acceptability. *Proceedings of the West Coast Conference on Formal Linguistics* 27: 431-439.
- Wescott, T., and Fanselow, G., 2011. On the informativity of different measures of linguistic acceptability. *Language* 87: 249-73.
- Yamashita, H., 2001. EPP and the ordering effects on interpretation: A preliminary study. *Nanzan Nihongo Kyooiku [Nanzan Studies in Japanese Language Education]* 8: 300-338.
- Yamashita, H., 2006. A-type movement in Japanese and the EPP. In Yim, C. (ed.), *Proceedings of the 8th Seoul International Conference on Generative Grammar (SICOGG 8): Minimalist Views on Language Design*, 333-352, The Korean Generative Grammar Circle, Seoul.
- Yang, B.-S. 1991. *Diagnostics for Unaccusativity in Korean*. Master's Thesis. The State University of New York at Buffalo.
- Yuen, B., 1999. Acquiring the unaccusative/unergative distinction in a second language: Evidence from English-speaking learners of L2 Chinese. *Linguistics* 37: 275-296.

APPENDIX 1: The questions in the language background survey

1. What language(s) did you speak between the time when you were born and when you started preschool?
2. What was the language of instruction in your elementary school?
3. What was the language of instruction in your high school?
4. What language(s) do you speak at home?
5. What language(s) do you speak outside the home (at work, etc.)?
6. In what language do you feel the most comfortable?
7. In what city/cities did you grow up? If you moved between when you were born and when you graduated from your high school, please specify which cities you lived and for how long.

Please answer the following questions if you are a non-native speaker of Japanese:

8. How old were you when you started speaking/studying Japanese?
9. How long have you been speaking/studying Japanese?
10. Have you lived in Japan? If so, how long and what age were you when you lived there?

Yes NO _____

APPENDIX 2: Experimental Sentences

Experiment 1

List 1:

アパートの入居希望者が受け付けに 12 人来た。

‘Twelve applicants for the apartments came.’

新しい交換留學生が 15 人カナダから来た。

‘Fifteen new exchange students came from Canada.’

老人ホームのご一行が時間通りに 4 組着いた。

‘Four groups of elderly arrived on time.’

てるこの學生達が 5 人集合場所に着いた。

‘Five of Teruko’s students arrived at the meeting location.’

捕虜となった兵士が廃墟で 3 人亡くなった。

‘Three POWs died in a deserted building.’

日本人観光客が 5 人バスの事故で亡くなった。

‘Five Japanese tourists died in a tour-bus accident.’

親戚の子供が町内会の盆踊りで 3 人踊った。

‘Three children of relatives danced at a Bon festival dance.’

スペインの留學生が 5 人文化祭で踊った。

‘Five international students from Spain danced at a cultural festival.’

近所の中学生が寒中水泳で 30 人泳いだ。

‘Thirty middle school students from in the neighborhood swam at a winter swimming event.’

障害を持つ選手が 8 人今年の大会で泳いだ。

‘Eight disabled athletes swam at this year’s competition.’

映画を見ていた女性が大声で3人笑った。

‘Three women watching the movie laughed loudly.’

後ろの席の女学生が2人くすくすと笑った。

‘Two female students in a back row laughed quietly.’

List 2:

熱心な保護者が授業参観日に8人来た。

‘Eight enthusiastic parents came to an open house event.’

アパートの入居希望者が12人受付に来た。

‘Twelve applicants for the apartments came.’

東京からの特派員がニューヨークに3人着いた。

‘Three reporters from Tokyo arrived at New York.’

老人ホームのご一行が4組時間通りに着いた。

‘Four groups of elderly arrived on time.’

逃げ遅れたご老人が火事で2人亡くなった。

‘Two elderlies who could not escape died at the fire.’

捕虜となった兵士が3人廃墟で亡くなった。

‘Three POWs died in a deserted building.’

近所の幼稚園生が発表会で10人踊った。

‘Ten children of the kindergarten danced at a dance recital.’

親戚の子供が3人町内会の盆踊りで踊った。

‘Three children of relatives danced at a Bon festival dance.’

団地の子供が公園のプールで5人泳いだ。

‘Five children from the apartment complex swam in the pool in the park.’

近所の中学生が30人寒中水泳で泳いだ。

‘Thirty middle school students from in the neighborhood swam at a winter swimming event.’

最前列の客がタレントの冗談に5人笑った。

‘Five members of the audience at the front row laughed at the celebrity’s joke.’

映画を見ていた女性が3人大声で笑った。

‘Three women watching the movie laughed loudly.’

List 3:

学生のボランティアが献血の会場に5人来た。

‘Five student volunteers came to a blood-drive.’

熱心な保護者が8人授業参観日に来た。

‘Eight enthusiastic parents came to an open house event.’

飛行機が遅れた学生が空港に3人着いた。

‘Three students whose flight was late arrived at the airport.’

東京からの特派員が3人ニューヨークに着いた。

‘Three reporters from Tokyo arrived at New York.’

たけしの親戚が炭鉱事故で2人亡くなった。

‘Two of Takeshi’s relatives died in a mining accident.’

逃げ遅れたご老人が2人火事で亡くなった。

‘Two elderlies who could not escape died at the fire.’

隣の団地の子供がお寺の前で5人踊った。

‘Five children from the near-by apartment complex danced in front of the temple.’

近所の幼稚園生が10人発表会で踊った。

‘Ten children of the kindergarten danced at a dance recital.’

たけしの大学の選手が全国大会で2人泳いだ。

‘Two athletes from Takeshi’s university swam at a national-level competition.’

団地の子供が5人公園のプールで泳いだ。

‘Five children from the apartment complex swam in the pool in the park.’

向かいの席の学生がたけしを見て2人笑った。

‘Two students from the opposite row laughed at Takeshi.’

最前列の客が5人タレントの冗談に笑った。

‘Five members of the audience at the front row laughed at the celebrity’s joke.’

List 4:

人気の芸能人がそのイベントに10人来た。

‘Ten popular celebrities came to that event.’

学生のボランティアが5人献血の会場に来た。

‘Five student volunteers came to a blood-drive.’

日本代表のメンバーがホテルに8人着いた。

‘Eight of the Japanese team arrived at the hotel.’

飛行機が遅れた学生が3人空港に着いた。

‘Three students whose flight was late arrived at the airport.’

遭難した登山家が山小屋で4人亡くなった。

‘Four climbers who were lost died in a cabin.’

たけしの親戚が2人炭鉱事故で亡くなった。

‘Two of Takeshi’s relatives died in a mining accident.’

ダンス部の学生が全国大会で2人踊った。

‘Two of the students from the dance team danced at the national-level competition.’

隣の団地の子供が5人お寺の前で踊った。

‘Five children from the near-by apartment complex danced in front of the temple.’

親戚の子供が近くの川で5人泳いだ。

‘Five children of relatives swam in the near-by river.’

たけしの大学の選手が2人全国大会で泳いだ。

‘Two athletes from Takeshi’s university swam at a national-level competition.’

漫画を読んでいた子供がげらげらと4人笑った。

‘Four children who were reading cartoons laughed loudly.’

向かいの席の学生が2人たけしを見て笑った。

‘Two students from the opposite row laughed at Takeshi.’

List 5:

新しい交換留学生在がカナダから15人来た。

‘Fifteen new exchange students came from Canada.’

人気の芸能人が10人そのイベントに来た。

‘Ten popular celebrities came to that event.’

てるこの学生達が集合場所に5人着いた。

‘Five of Teruko’s students arrived at the meeting location.’

日本代表のメンバーが8人ホテルに着いた。

‘Eight of the Japanese team arrived at the hotel.’

日本人観光客がバスの事故で5人亡くなった。

‘Five Japanese tourists died in a tour-bus accident.’

遭難した登山家が4人山小屋で亡くなった。

‘Four climbers who were lost died in a cabin.’

スペインの留学生が文化祭で5人踊った。

‘Five international students from Spain danced at a cultural festival.’

ダンス部の学生が2人全国大会で踊った。

‘Two of the students from the dance team danced at the national-level competition.’

障害を持つ選手が今年の大会で8人泳いだ。

‘Eight disabled athletes swam at this year’s competition.’

親戚の子供が5人近くの川で泳いだ。

‘Five children of relatives swam in the near-by river.’

後ろの席の女学生がくすくすと2人笑った。

‘Two female students in a back row laughed quietly.’

漫画を読んでいた子供が4人げらげらと笑った。

‘Four children who were reading cartoons laughed loudly.’

Experiment 2

List 1:

日本人の学生がクラブのパーティーに3人来た。

‘Three Japanese students came to the club’s party.’

若い女の子が3人けい子の店に来た。

‘Three young girls came to Keiko’s shop.’

長いファックスがオフィスに2枚来た。

‘Two lengthy fax documents came to the office.’

大きなこづつみが2つ太郎のルームメートに来た。

‘Two large packages came to Taro’s roommate.’

中年のお客さんが新しい店に5人入った。

‘Five middle-aged customers came to the new shop.’

高校生のアルバイトが4人駅前のスーパーに入った。

‘Four high-school student part-time workers joined the supermarket in front of the station.’

新しい本棚がオフィスの2階に5つ入った。

‘Five new book shelves were brought into the second floor of the office.’

大きな本が20冊スーツケースに入った。

‘Twenty large books fit into the suitcase.’

近所の子供が近くの池に2人落ちた。

‘Two children from the neighborhood fell in the near-by pond.’

ばかなアルバイトが2人現場の2階から落ちた。

‘Two stupid part-timers fell from the second floor of the construction site.’

トラックが駐車場の2階から2台落ちた。

‘Two tracks fell from the second floor of the parking structure.’

太郎の本が4冊本棚の上から落ちた。

‘Four of Taro’s books fell from the bookshelf.’

男子学生が教室に5人いた。

‘Five male students were in the classroom.’

悪そうな高校生が8人喫茶店にいた。

‘Eight delinquent high-school students were in the coffee shop.’

こわれた自転車が駅の前に10台あった。

‘Ten broken bicycles were in front of the station.’

小さな小包みが3つ一階のオフィスにあった。

‘Three small packages were in the office on the first floor.’

小学生の子供達が二時間で5人おどった。

‘Five elementary school children danced in two hours.’

太郎の生徒が4人前半のシーンでおどった。

‘Four of Taro’s student danced in a scene in the first half of the play.’

プロのダンサーがはげしく2人おどった。

‘Two professional dancers danced passionately.’

ダンス部の学生が3人がんばっておどった。

‘Three students from the dance club danced with all their might.’

近所の子供達が午前中の間2人公園で遊んだ。

‘Two children from the neighborhood played in the morning.’

中学生の男の子が5人午前中にプールで遊んだ。

‘Five middle school boys played in the pool in the morning.’

しんせきの子供達がしばらく4人仲良く遊んだ。

‘Four of a relative’s children played together for a while.’

駅前の小学生が6人数時間ゲームセンターで遊んだ。

‘Six children from the elementary school near the student played in the arcade for few hours.’

水泳部の学生が1時間で2人5キロ泳いだ。

‘Two students from the swimming team swam five kilometers in one hour.’

お年よりが3人午後にプールで泳いだ。

‘Three elderly people swam in the pool in the morning.’

町の若者達のはだかで5人川で泳いだ。

‘Five young people from the town swam in the river naked.’

地元の小学生が4人はしゃいでプールで泳いだ。

‘Four local elementary school students played in the pool happily.’

太郎の友達が10分間で5人走った。

‘Five of Taro’s friend ran in ten minutes.’

ハワイ大学の学生が5人大会中に走った。

‘Five students from University of Hawaii ran during the competition.’

近所のお年よりがゆっくりと2人走った。

‘Two local elderly people ran slowly.’

太郎の生徒達が10人全力で走った。

‘Ten of Taro’s students ran with all their might.’

List 2:

3年生の先生が朝の会議に5人来た。

‘Five of the third-grade teachers came to the morning meeting.’

日本人の学生が3人クラブのパーティーに来た。

‘Three Japanese students came to the club’s party.’

友達からのイーメールが仕事のアドレスに5つ来た。

‘Five e-mail messages came to the work e-mail address.’

長いファックスが2枚オフィスに来た。

‘Two lengthy fax documents came to the office.’

若い社員が角の喫茶店に2人入った。

‘Two young workers entered into the coffee shop at the corner.’

中年のお客さんが5人新しい店に入った。

‘Five middle-aged customers came to the new shop.’

人気のゲームがゲームセンターに3つ入った。

‘Three popular video games were brought in to the arcade.’

新しい本棚が5つオフィスの2階に入った。

‘Five new book shelves were brought into the second floor of the office.’

のら猫が屋根の上から2匹落ちた。

‘Two stray cats fell from the roof.’

近所の子供が2人近くの池に落ちた。

‘Two children from the neighborhood fell in the near-by pond.’

女性の荷物が電車の棚から2つ落ちた。

‘Two of the woman’s bags fell from the baggage rack.’

トラックが2台駐車場の2階から落ちた。

‘Two trucks fell from the second floor of the parking structure.’

いつものお客さんが近くの食堂に2人いた。

‘Two regulars were in the local dinner.’

男子学生が5人教室にいた。

‘Five male students were in the classroom.’

子供のおかしがテーブルの上に2袋あった。

‘Two bags of children’s snack were on the table.’

こわれた自転車が10台駅の前にあった。

‘Ten broken bicycles were in front of the station.’

ダンス部の学生が今までに3人おどった。

‘Three students from the dance club danced so far.’

小学生の子供達が5人二時間でおどった。

‘Five elementary school children danced in two hours.’

太郎の生徒ががんばって4人おどった。

‘Four of Taro’s student danced with all their might.’

プロのダンサーが2人はげしくおどった。

‘Two professional dancers danced passionately.’

駅前の小学生が休み時間に6人ゲームセンターで遊んだ。

‘Six children from the elementary school near the student played in the arcade during a recess.’

近所の子供達が2人午前中の間公園で遊んだ。

‘Two children from the neighborhood played in the morning.’

中学生の男の子が長い間5人プールで遊んだ。

‘Five middle school boys played in the pool for a long time.’

しんせきの子供達が4人しばらく仲良く遊んだ。

‘Four of a relative’s children played together for a while.’

地元の小学生が午前中に4人プールで泳いだ。

‘Four local elementary school students played in the pool in the morning.’

水泳部の学生が2人1時間で5キロ泳いだ。

‘Two students from the swimming team swam five kilometers in one hour.’

お年よりが楽しそうに3人プールで泳いだ。

‘Three elderly people swam in the pool happily.’

町の若者達が5人はだかで川で泳いだ。

‘Five young people from the town swam in the river naked.’

太郎の生徒達が午前中に10人走った。

‘Ten of Taro’s students ran in the morning.’

太郎の友達が5人10分間で走った。

‘Five of Taro’s friend ran in ten minutes.’

ハワイ大学の学生ががんばって5人走った。

‘Five students from University of Hawaii ran with all their might.’

近所のお年よりが2人ゆっくりと走った。

‘Two local elderly people ran slowly.’

List 3:

小さい男の子が近くの公園に2人来た。

‘Two little boys came to the near-by park.’

3年生の先生が5人朝の会議に来た。

‘Five of the third-grade teachers came to the morning meeting.’

日本からの手紙が一階のオフィスに3枚来た。

‘Three letters from Japan came to the office on the first floor.’

友達からのイーメールが5つ仕事のアドレスに来た。

‘Five e-mail messages came to the work e-mail address.’

新しい会員がフィットネスクラブに10人入った。

‘Ten new members joined the fitness club.’

若い社員が2人角の喫茶店に入った。

‘Two young workers entered into the coffee shop at the corner.’

黒い車が近くの駐車場に5台入った。

‘Five black cars entered into the near-by parking lot.’

人気のゲームが3つゲームセンターに入った。

‘Three popular video games were brought in to the arcade.’

よっぱらった男性が古い橋から2人落ちた。

‘Two drunken men fell from the old bridge.’

のら猫が2匹屋根の上から落ちた。

‘Two stray cats fell from the roof.’

大きな箱がトラックの後ろから3つ落ちた。

‘Three large boxes fell from the back of the truck.’

女性の荷物が2つ電車の棚から落ちた。

‘Two of the woman’s bags fell from the baggage rack.’

新しいアルバイトが駅前のスーパーに4人いた。

‘Four new part-time workers were in the supermarket in front of the station.’

いつものお客さんが2人近くの食堂にいた。

‘Two regulars were in the local dinner.’

高そうな車が駐車場に4台あった。

‘Four expensive looking cars were in the parking lot.’

子供のおかしが2袋テーブルの上にあった。

‘Two bags of children’s snack were on the table.’

プロのダンサーが午前中に2人おどった。

‘Two professional dancers danced in the morning.’

ダンス部の学生が3人今までにおどった。

‘Three students from the dance club danced so far.’

小学生の子供達がステージで5人おどった。

‘Five elementary school children danced on the stage.’

太郎の生徒が4人がんばっておどった。

‘Four of Taro’s student danced with all their might.’

しんせきの子供達が夏休み中に4人仲良く遊んだ。

‘Four of relative’s children played together during a summer break.’

駅前の小学生が6人休み時間にゲームセンターで遊んだ。

‘Six children from the elementary school near the student played in the arcade during a recess.’

近所の子供達が一日中2人公園で遊んだ。

‘Two children from the neighborhood played in the park all day.’

中学生の男の子が5人長い間プールで遊んだ。

‘Five middle school boys played in the pool for a long time.’

町の若者達が昼休み中に5人川で泳いだ。

‘Five young people from the town swam in the river during a lunch break.’

地元の小学生が4人午前中にプールで泳いだ。

‘Four local elementary school students played in the pool in the morning.’

水泳部の学生ががんばって2人5キロ泳いだ。

‘Two students from the swimming team swam five kilometers with all their might.’

お年よりが3人楽しそうにプールで泳いだ。

‘Three elderly people swam in the pool happily.’

近所のお年よりが今までに2人走った。

‘Two local elderly people ran so far.’

太郎の生徒達が10人午前中に走った。

‘Ten of Taro’s student ran in the morning.’

太郎の友達がまじめに5人走った。

‘Five of Taro’s friend ran seriously.’

List 4:

若い女の子がけい子の店に3人来た。

‘Three young girls came to Keiko’s shop.’

小さい男の子が2人近くの公園に来た。

‘Two little boys came to the near-by park.’

大きなこづつみが太郎のルームメートに2つ来た。

‘Two large packages came to Taro’s roommate.’

日本からの手紙が3枚一階のオフィスに来た。

‘Three letters from Japan came to the office on the first floor.’

高校生のアルバイトが駅前のスーパーに4人入った。

‘Four high-school student part-time workers joined the supermarket in front of the station.’

新しい会員が10人フィットネスクラブに入った。

‘Ten new members joined the fitness club.’

大きな本がスーツケースに20冊入った。

‘Twenty large books fit into the suitcase.’

黒い車が5台近くの駐車場に入った。

‘Five black cars entered into the near-by parking lot.’

ばかなアルバイトが現場の2階から2人落ちた。

‘Two stupid part-timers fell from the second floor of the construction site.’

よっぱらった男性が2人古い橋から落ちた。

‘Two drunken men fell from the old bridge.’

太郎の本が本棚の上から4冊落ちた。

‘Four of Taro’s books fell from the bookshelf.’

大きな箱が3つトラックの後ろから落ちた。

‘Three large boxes fell from the back of the truck.’

悪そうな高校生が喫茶店に8人いた。

‘Eight delinquent high-school students were in the coffee shop.’

新しいアルバイトが4人駅前のスーパーにいた。

‘Four new part-time workers were in the supermarket in front of the station.’

小さな小包みが一階のオフィスに3つあった。

‘Three small packages were in the office on the first floor.’

高そうな車が4台駐車場にあった。

‘Four expensive looking cars were in the parking lot.’

太郎の生徒が前半のシーンで4人おどった。

‘Four of Taro’s student danced in a scene in the first half of the play.’

プロのダンサーが2人午前中におどった。

‘Two professional dancers danced in the morning.’

ダンス部の学生ががんばって3人おどった。

‘Three students from the dance club danced with all their might.’

小学生の子供達が5人ステージでおどった。

‘Five elementary school children danced on the stage.’

中学生の男の子が午前中に5人プールで遊んだ。

‘Five middle school boys played in the pool in the morning.’

しんせきの子供達が4人夏休み中に仲良く遊んだ。

‘Four of a relative’s children played together during a summer break.’

駅前の小学生が数時間6人ゲームセンターで遊んだ。

‘Six children from the elementary school near the student played in the arcade for few hours.’

近所の子供達が2人一日中公園で遊んだ。

‘Two children from the neighborhood played in the park all day.’

お年よりが午後に3人プールで泳いだ。

‘Three elderly people swam in the pool in the morning.’

町の若者達が5人昼休み中に川で泳いだ。

‘Five young people from the town swam in the river during a lunch break.’

地元の小学生がはしゃいで4人プールで泳いだ。

‘Four local elementary school students played in the pool happily.’

水泳部の学生が2人がんばって5キロ泳いだ。

‘Two students from the swimming team swam five kilometers with all their might.’

ハワイ大学の学生が大会中に5人走った。

‘Five students from University of Hawaii ran during the competition.’

近所のお年よりが2人今までに走った。

‘Two local elderly people ran so far.’

太郎の生徒達が全力で10人走った。

‘Ten of Taro’s students ran with all their might.’

太郎の友達が5人まじめに走った。

‘Five of Taro’s friends ran seriously.’