

The Role of Prototypical Transitivity in the Selection of Accusative Case Particle *wo* by Persian Learners of L2 Japanese

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Abstract

This study attempts to account for Japanese language learners' selection pattern of case particle *wo* by taking a prototype-based approach to language learning. A cross-sectional study of Persian-speaking learners was conducted to examine whether the degree of predicate transitivity influences case particle selection, and whether proficiency level and L1 play a role in such a selection pattern. The results reveal that learners were sensitive to the degree of predicate transitivity. However, the test scores were significantly higher for verbs of contact ('throw', 'use') which express object manipulation compared to those for the linguistic prototype which involves a change in the object's state ('cut', 'reduce'). This suggests that learners may consider contact verbs as the more 'typical' or basic transitive construction. The results also show that lower proficiency learners were more likely to select particles based on L1 surface marking, suggesting that learners' particle selection strategy is influenced by proficiency level.

Keywords: transitivity, prototype theory, L2 Japanese, accusative case particle *wo*, Persian learners

Povzetek

Študija pojasnjuje izbirni vzorec členka *wo* pri učencih japonskega jezika s pomočjo prototipske teorije. Izvedena je bila presečna študija, v kateri so sodelovali naravni govorci perzijščine. Študija je preverila, ali stopnja prehodnosti glagola vpliva na izbiro tožilniškega členka *wo* ter ali raven znanja japonskega jezika ter materni jezik igrata vlogo pri izbiri. Rezultati kažejo, da so bili učenci občutljivi na stopnjo prehodnosti glagola. Vendar pa so bili rezultati testa bistveno boljši pri glagolih stika ('vreči', 'uporabiti'), ki izražajo ravnanje s predmetom, v primerjavi s tistimi za jezikovni prototip, ki vključuje spremembo stanja predmeta ('rezati', 'zmanjšati'). To nakazuje, da lahko učenci obravnavajo glagole stika kot bolj "tipični" ali osnovni ustroj prehodnosti. Rezultati poleg tega kažejo, da učenci z nižjo ravnijo poznavanja japonskega jezika z večjo verjetnostjo izbirajo členke s pomočjo informacij iz maternega jezika, kar kaže na to, da na učenčevu strategijo izbire členka vpliva raven njegovega znanja tega jezika.

Ključne besede: prehodnost, prototipska teorija, japonščina kot tuji jezik, členek *wo*, učenci, naravni govorci perzijščine



1 Introduction

1.1 Prototype effect in language acquisition

In recent years, usage-based approaches to language acquisition have received increasing attention. According to these approaches, linguistic categories should display prototype effects the same as natural categories (see Baybee, 2010). The notion of prototype has been applied to linguistic categories in both L1 and L2 acquisition studies since its conception by Rosch and her colleagues; one of which is the transitive construction. Transitive constructions are found in all languages in one form or another and are used consistently from an early stage of acquisition. Furthermore, since the seminal study by Hopper and Thompson (1980), researchers like Tsunoda (1981, 1985, 1991), Malchukov (2005), Næss (2007), and Kittilä (2009) have strongly argued for a prototype-based approach to defining linguist transitivity.

Studies that adopt a prototype view to acquisition assume that an internal structure exists within the transitive construction, with some verbs being more central or prototypical than others. Since prototypical verbs are the most salient category members, they are acquired earlier than non-prototypical verbs (see Ninio, 1999; Goldberg et al., 2004; and Ibbotson et al., 2012 for L1; Ellis & Ferriera Junior, 2009; Ellis & Römer, 2014; and Chauhan, 2015, 2017a, 2017b for L2). These studies not only show that linguistic categories can behave in similar ways to natural categories, but they also add psychological validity to the evidence for prototypical transitivity.

However, these studies have left a few questions unexplored. The first is whether a definition of prototype based on linguistic observations, such as the ones proposed by Hopper and Thompson (1980) and Tsunoda (1981, 1985, 1999), can account for the selection patterns of learners. Among studies that report observing prototype effects some, such as Ibbotson et.al (2012) and Chauhan (2015, 2017a, 2017b), adopt a linguistic definition of prototypes. In this approach, high transitivity or prototypical transitivity is associated with dynamic action involving a volitional actor acting on a highly affected object. Contrary to this view, Ninio (1999) reports that the VO structures first produced by children do not include high transitivity verbs as defined by Hopper and Thompson (1980). Instead, the concept underlying prototypical transitivity is the most fundamental type of transaction a person can have with autonomous objects, that is, “making contact with”, “relinquishing contact with”, or else “keeping an object in their possession” (Ninio, 1999, p. 644). This makes it important to explore whether ‘high transitivity’, linguistically prototypical verbs (examples include verbs like, ‘kill’ and ‘break’) are more salient than verbs that are placed high in the transitivity hierarchy but are not considered linguistic prototypes (examples include verbs like ‘take’, ‘put in order’, ‘give’, ‘throw’, ‘keep’, ‘hold’).

Secondly, it is important to explore the relationship between proficiency level and prototype effect. Few studies targeting L2 learners have taken proficiency level into

consideration. Chauhan (2015, 2017a) reports that though learner errors concentrated in non-prototypical transitive verbs irrespective of proficiency level, a U-shaped learning curve was also observed in certain test categories. Chauhan also notes that lower proficiency learners were more likely to select particles based on L1 case markings. This suggests that while prototype effects may be observed in all proficiency levels, there may be variations in case selection patterns.

1.2 Linguistic transitivity and verb hierarchy

Linguistic approaches to transitivity pay special attention to case markings. Canonical transitive constructions involve a controlling agent which is either marked with nominative (NOM) or ergative case (ERG), and a completely affected patient which is marked with the accusative (ACC) or absolute case (ABS). Any deviation from this semantic prototype leads to other case-frames like DAT–NOM or NOM–INST being used to code the event.

Tsunoda (1981, 1985) conducted a crosslinguistic study of the case frame of 'two-placed predicates', that is, predicates that take two arguments. Based on this, he proposed a hierarchy of semantic verb classes that display graded membership - prototypical transitive verbs take a transitive case frame ((NOM–ACC or ERG–ABS)) and are placed at the left end of the hierarchy; however, we observe a relative gradation in acceptability of a transitive case-frame pattern as we move down the hierarchy. Tsunoda categorizes verbs into six semantic types¹ based on both semantic factors like the degree of impingement of the patient and syntactic factors like case marking. The prototype, Direct effect (+result), represents actions directed towards an object where the object undergoes a change. On the other hand, verbs belonging to Direct effect (–result) are impinged but do not undergo a physical change. Examples of the former include 'break' and 'bend' which involve a physical change in the object whereas the latter include 'kick' and 'shoot' which may involve a change in location. Perception verbs like 'see', 'find', and 'hear' are neither altered nor impinged but are 'obtained' in an abstract sense, which is absent in Pursuit verbs ('search', 'wait'). The placement of the remaining semantic classes – Knowledge ('understand', 'forget'), Emotion ('want', 'fear'), and Relation ('have', 'lack') – is mainly based on syntactic factors. The last two categories constitute low agency as well as low kinesis verbs which are often states. Tsunoda further states that the languages of the world differ in how far down the hierarchy they allow a transitive case frame. Languages like Japanese and English extend the transitive case frame to Relation. On the other hand, languages such as Avar only extend it to Pursuit.

¹ The hierarchy also includes non-verbal predicates grouped under 7. Ability, which do not take the NOM-ACC case frame and are therefore not addressed in this study.

Though Tsunoda's two-place predicate hierarchy is seen as a major contribution to the field of cross-linguistic research, Malchukov (2005, pp. 75-77) summarizes some fundamental issues with the hierarchy as it currently stands. Notably, 1) the hierarchy conflates several semantic dimensions such as properties associated with agenthood and patienthood and 2) it is evident only at the two extremes with some of the intermediate verb types not being strictly ordered. Malchukov, therefore, re-analyzes Tsunoda's hierarchy by dividing it into two independent sub-hierarchies. The upper sub-hierarchy represents decreasing patient-related properties, and the lower sub-hierarchy represents decreasing agent-related properties. Another key point of departure is that Malchukov collapses Perception and Cognition (labelled 'Knowledge' in Tsunoda, 1985) into one category based on observing languages such as Daghestanian that do not distinguish between the two verb types.

Malchukov (2005) expands the hierarchy to include other verb types like Interaction, proposing a semantic map for transitivity. Interaction includes verbs of social interaction such as 'follow', 'speak', 'help', and 'obey'. They are placed in neither sub-hierarchy due to their affinity with inherent reciprocals and based on the observation that inherent reciprocals are coded as middle verbs in Kartvelian languages. Malchukov (2005) further notes that the map is incomplete in that other semantic types such as Tsunoda's Relation verbs can be included. These verbs express states such as possession and cannot be incorporated into either of the sub-hierarchies. For this reason, they are treated like Interaction verbs and placed in between the two sub-hierarchies in this study. Being states, they are placed lower than Interaction verbs.

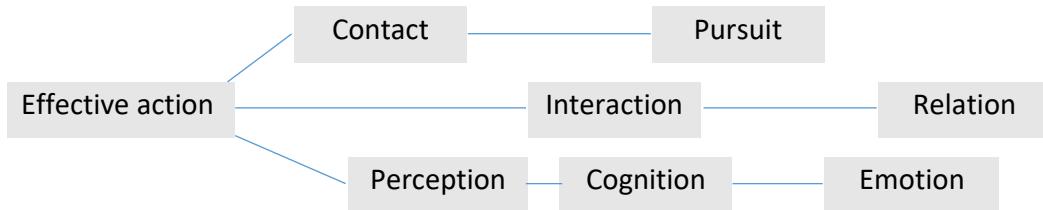


Figure 1: Verb categories based on Malchukov's semantic map (2005, p. 113)²

1.3 Studies on L2 usage of case particle *wo*

Japanese is an SOV language that uses post-position markers called particles to show the relationship between nouns and the predicate of a clause. The particles are referred to as 'case particles' when they mark case relations. Case particle *wo* primarily

² Effected action corresponds with Tsunoda's Direct effect (+result), Contact with Direct effect (-result) and Cognition with Knowledge.

marks the direct object (below, object) of a transitive construction in Japanese and has limited usages beyond this function.³ As such, learners assign *wo* to a noun if they identify it as an object and the predicate as a transitive verb. Non-assignment of *wo* conversely implies that learners do not identify the predicate as a transitive verb. The acquisition pattern of *wo*, therefore, shows learners' assessment of predicate transitivity.

Despite being introduced at an early stage of acquisition, *wo* is frequently cited as difficult to master by L2 learners of Japanese irrespective of their L1 or proficiency level (see Ikuda & Kubota, 1997; Sugimoto, 1998; Imai, 2000; Sakaguchi, 2004; Ichikawa, 2010; Sugimura, 2010; Nagai, 2015; Chauhan, 2015, 2017a, 2017b). These studies provide insights into the usage and error patterns of *wo*. Among these, Chauhan (2015, 2017a, 2017b) attempts to systematically explain the errors related to *wo* by making testable predictions about its learnability.

Chauhan (2017b) tested whether Hindi-speaking learners of Japanese exhibited a prototype effect when selecting particles in a grammar test. Verbs were grouped into semantic categories (Direct effect (\pm result) >> Perception >> Pursuit >> Knowledge >> Interaction >> Emotion >> Relationship) based on the two-place predicate hierarchy proposed by Tsunoda (1991). The overall results show that there was a gradation in the test scores with learners averaging higher scores as we move up the transitivity scale. In other words, learners selected *wo* significantly more frequently for categories at the upper end of the transitivity scale (Direct effect, Perception, Knowledge) than for categories at the lower end (Emotion, Relationship) indicating that learners are sensitive to verb transitivity. However, the results did not strictly reflect Tsunoda's hierarchy as it stands as the test score for Knowledge was higher than Pursuit and Perception. Chauhan (2017b) explains this deviation by referring to Malchukov's (2005) two-dimensional verb type hierarchy. In this hierarchy, Knowledge (labelled 'Cognition') and Pursuit no longer form a hierarchical relationship as they belong to separate sub-hierarchies. Perception and Knowledge belong to the same sub-hierarchy but are positioned together.

However, Chauhan (2017b) conflates the prototype, Direct effect (+result), with verbs that have a low impact on the object, that is, Direct effect ($-$ result). Direct effect ($-$ result) includes verbs that describe "inclusion in and exclusion of objects from the personal domain", that is, verbs that Ninio (1999, p. 647) calls basic transitivity constructions. Distinguishing between these verb types is necessary to assess whether the prototype effect observed in Chauhan (2017b) was due to the high transitivity of linguistic prototypes or verbs of contact.

³ Other usages of *o* are limited to location markers for motion where it marks the path (verbs like *wataru* ('cross')), a point in space that the agent passes through (*tooru* ('pass through')) or a point of departure (*deru* ('move out'/'leave')).

The present study splits Chauhan's (2017b) Direct effect into Effective action and Contact. This allows us to investigate whether learners acquire linguistic prototypes (Effective action verbs) first as compared to verbs belonging to Contact, which consist of verbs Nino (1999, pp. 619-620) describes as expressing "fundamental 'object relation' of object incorporation into, and ejection from the personal". It also places Perception and Cognition next to each other but maintains the distinction to investigate whether the results observed in Chauhan (2017b) are specific to Hindi speakers. Interaction is placed before Pursuit because even though they belong to separate tiers, the object of Interaction verbs is often attained unlike those of Pursuit.

1.4 Overview of transitive constructions in Persian

Persian⁴ is structurally similar to Japanese in that both use the SOV pattern for simple sentences and are Nominative-Accusative languages that mark the subject and object with postpositions. The subject of a canonically transitive structure takes the null-marked nominative case, and the object takes the accusative case which is marked by the postposition *râ*. However, unlike Japanese, this postposition is licensed only when certain semantic features, like specificity or animacy, are met.⁵ Non-specific/inanimate objects are typically null-marked and receive a kind-referring interpretation, as in (1b).

(1a) سارا را کتاب داد امیر به
Sârâ ketâb-râ be Amir dâd-Ø.
Sara-Ø book-ACC to Amir give-PST-3SG
'Sara gave the book to Amir'

(1b) سارا کتاب به امیر
Sârâ ketâb be Amir dâd-Ø.
Sara-Ø book to Amir give-PST-3SG
'Sara gave books/*the book to Amir'

Furthermore, as pointed out in Hooshmand et al. (2015, p. 10), deviations from the canonical transitive structure are often motivated by the degrees of affectedness of

⁴ Persian is an Iranian language belonging to the Indo-Iranian branch of the Eastern Indo-European languages. It is classified as an SOV language because the verb phrase appears at the end of the sentence in simple sentences with unmarked order (see Greenberg, 1963; Dabir-Moghaddam, 1982; Karimi 1989).

⁵ In Persian, *râ* obligatorily marks proper nouns, personal and demonstrative pronouns, reflexive pronouns, reciprocal pronouns, demonstrative nouns, superlatives, question-words 'which' and 'who', certain quantifiers such as 'each', 'all', 'most', 'both' etc., and plurals with the definite plural marker *hâ* (Jasbi, 2015, p. 13).

the patient. As a result, cases where Japanese uses a canonically transitive construction and Persian uses non-canonical constructions also exist. For examples (5b) and (6b) below mark the internal arguments 'outside' and 'failure' with the prepositions *be* ('at') and *az* ('from') respectively. Such deviations can be a source of errors in Persian-speaking learners of Japanese (PJL) necessitating an investigation of the surface case markings in Persian when analyzing errors concerning *wo*.

(5a) 子供たちは 外を 眺めた。

Kodomotachi-wa soto-wo Nagame-ta
children-TOP outside-ACC gaze-PST

'The children gazed outside.'

(5b) بچه‌ها بیرون خیره شدند

bache-hâ be birun xire šodan
child-PL-Ø at outside gaze-PST-3PL

'The children gazed outside.'

(6a) 人は 失敗を 恐れる。

hito-wa shippai-wo osore-ru
people-TOP failure-ACC fear-PRT

'People fear failure.'

(6b) مردم از شکست می‌ترسند

mardom az šhekast mi-tars-and.
people-Ø from failure IMP-fear-3PL

'People fear failure.'

2 Aim

The present study extends the approach in Chauhan (2017b) by including a wider range of verb types. It also lends psychological validity to prototypical transitivity from a novel data point by testing Persian-speaking learners of Japanese. The aim is to explore the role of verb transitivity, L2 proficiency and L1 case marking in the acquisition of L2 Japanese accusative case marking. The following research questions were investigated.

1. Does verb transitivity influence the selection of the accusative case particle *wo* in PJL?

2. Are PJL more likely to identify verbs of Effective action (linguistic prototypes) as canonically transitive than verbs of Contact?
3. What roles do L2 proficiency and L1 surface case markings play?

3 Method

3.1 Survey categories

A list of verbs that take the canonically transitive case frame [NP-*ga* NP-*wo* VP] and [NP-*ga* NP-*ni* NP-*wo* VP] was drawn from beginner to upper intermediate level vocabulary textbooks (N5 to N2 level) of the Japanese Language Proficiency Test (JLPT)⁶. Verbs were not treated in isolation but as [NP-*wo* VP] collocations.

The list consists of 593 verbs. Each item included information about the vocabulary level (N2<<N3<<N4<<N5) and an example of the NP-*wo* collocate as listed in the textbook. These verbs were grouped into eight semantic categories based on the transitivity hierarchy proposed by Tsunoda (1985) and Malchukov (2005). For the purpose of this study, the categories are labelled and defined as follows.⁷

Table 1: Predicate categories

Category	Characteristics [examples]
1. Effective action	The action is directed towards an object and causes a change in said object. [<i>mado wo kowasu</i> ('break a window'), <i>keeki wo tsukuru</i> ('make a cake')]
2. Contact	The action is directed towards an object which may cause a change in the location but does not change the said object. [<i>doa wo shimeru</i> ('close a door'), <i>mado wo tataku</i> ('hit/knock on a window')]
3. Perception	The action employs sensory organs to gain information about an object. [<i>eiga wo miru</i> ('watch a film'), <i>hanashi wo kiku</i> ('hear/listen to a story')]
4. Cognition	The mental action of processing, understanding, storing, and retrieving information as well as making decisions. [<i>kagi wo wasureru</i> ('forget a key'), <i>imi wo rikai suru</i> ('understand the meaning')]

⁶ The Japanese language Proficiency test (JLPT) is jointly organized by the Japan Foundation and Japan Educational Exchanges and Services. It measures and certifies the Japanese language proficiency of non-native speakers of Japanese and is the largest Japanese language test in the world. For details see <https://www.jlpt.jp/e/about/index.html>.

⁷ To ensure that only those predicates that could be grouped with relative certainty were included, a judgment task was administered to four native speakers of Japanese. Items where the judgment of all four native speakers and the authors did not match were excluded.

Category	Characteristics [examples]
5. Interaction	The action is directed towards people and involves some form of exchange: verbal content, physical item or an act. [<i>joudan wo iu</i> ('tell a joke'), <i>okane wo ageru</i> ('give money'), <i>hito wo ogoru</i> ('treat a person')]
6. Pursuit	The action is directed towards an object, but the object is never realized. [<i>hito wo matsu</i> ('wait for a person'), <i>kuruma wo ou</i> ('chase a car')]
7. Emotion	The predicate involves sensations or feelings directed towards an object. [<i>hito wo ai suru</i> ('love a person'), <i>paatii wo tanoshimu</i> ('enjoy a party')]
8. Relation	The predicate shows how an entity is related to the subject. [<i>bitamin wo fukumu</i> ('contain vitamins'), <i>mondai wo daku</i> ('have a problem')]

Next, the 593 predicates along with their NP-*wo* collocates were translated into Persian in order to investigate the corresponding Persian surface case markings to *wo*. Persian predicates that can mark their internal argument with *râ* were treated as canonically transitive.

3.2 Participants

The participants were fifty-one L1 speakers of Persian majoring in Japanese language (PJL). They were recruited by advertising through Telegram channels commonly used to contact students and compensated 1.5 million Rial (approximately five USD) for their time.

3.3 Tests

The following two tests were administered – a grammar test designed to measure participants' knowledge of case particle *wo*, and an online test to measure their overall Japanese language proficiency.

3.3.1 Particle test

A fill-in-the-blank style task consisting of thirty-two test items based on the verb category (see Appendix 1) and twenty-three distractors⁸ involving particles other than *wo* was constructed. All fifty-five sentences were in active voice and followed the canonical word order with the subject/topic positioned at the head of the sentence and

⁸ The result of the distractor sentences is not discussed in this study. However, it should be noted that *wo* was not the most frequently selected particle in any of the twenty-three items.

the object placed immediately before the verb. Test items also contained an adjunct in order to provide contextually relevant situations.⁹ The thirty-two test items were created by selecting four predicates of different vocabulary levels (N5 to N2) from each category. Besides vocabulary level, corresponding case markings in Persian were also taken into consideration. Care was taken to ensure that half the predicates used canonical transitive markings and the other half non-canonical markings in Persian whenever possible. These were distributed evenly over the four vocabulary levels (see appendix). Sentences were based on pre-existing sentences in JLPT vocabulary textbooks and checked by a native speaker for naturalness.

The particle test was conducted online through Google Forms. The readings and translations of all vocabulary items were provided under each question to ensure that errors related to particle selection were not influenced by the participants' lack of vocabulary knowledge.

3.3.2 Level determination test

Two online tests – SPOT90 and Grammar90 – from the Tsukuba Test-Battery of Japanese (TTBJ) were administered.

SPOT, short for Simple Performance-Oriented Test¹⁰, is widely used for measuring overall Japanese language ability and grouping examinees into different proficiency levels. It is a dictation test composed of ninety unrelated questions where examinees are required to select a hiragana character to fill in a blank space while listening to a sentence recorded at native speed while also reading the same sentence. In doing so, the test measures their ability to automatically process the language used in the question.

Grammar90 measures overall grammar knowledge and was administered to corroborate the findings of the particle test. It comprises three sections (Beginner to Advance) with a total of ninety unrelated questions. It is a multiple-choice test where examinees are required to select appropriate words to insert into blank spaces within sentences.

⁹ Adjuncts were usually single-word expressions of time, location or quantity. However, some N2 vocabulary level items required multiword expressions. For example, *sensei ga nyūsu wo atsukatta* ('the teacher used news report') sounds unnatural without adding context such as *jyugyō de* (in class) and *robotto ni kansuru* ('about robots'). The test item therefore read, *sensei ga jyugyō de robotto ni kansuru nyūsu o atsukatta* ('The teacher used news reports on robots in the class').

¹⁰ For details, please visit <https://ttbj.cegloc.tsukuba.ac.jp/en/index.html>

3.4 Procedure

Learners who showed interest in participating in the study were sent individual identification numbers to take the online level determination test, written instructions on how to take the online test, and the Google form link. The Google form consisted of three parts – a consent form, a face sheet, and the particle test.¹¹ All participants took the level determination test first and completed all the tests on the same day. Participants were requested to take a break between the tests but were free to pace the tests according to their convenience.

Responses to the face sheet showed that Persian was the dominant language (L1) of all fifty-one participants, and many were learning other languages such as Korean and English. Over half the participants had never taken the Japanese language proficiency test, making the level determination test the only reliable means to measure overall language level. Two participants had studied Japanese in Japan for less than one year; all other participants had never visited or studied in Japan.

3.5 Survey groups

The participants were divided into three groups by using quantiles of the aggregate percentages of the SPOT90 and Grammar90 scores (below, level determination test score). The quantiles divide the data into three groups with each group including the same number of participants. The participants whose level determination test score is greater than the second quantile constitute the upper group (UG). Participants whose level determination test score is between the first and second quantile constitute the intermediate group (IG). Finally, the participants whose level determination test score is below the first quantile constitute the lower group (LG).

According to the official guidelines on how to interpret the TTBJ test result, UG consisted of advanced to upper intermediate level learners, IG consisted of intermediate level learners and LG consisted of beginner level learners. Kruskal-Wallis test showed that there was a statistically significant difference in test scores between the different groups, $H(2) = 44.005, p <.001$. We may therefore treat the three groups as three significantly different proficiency levels.

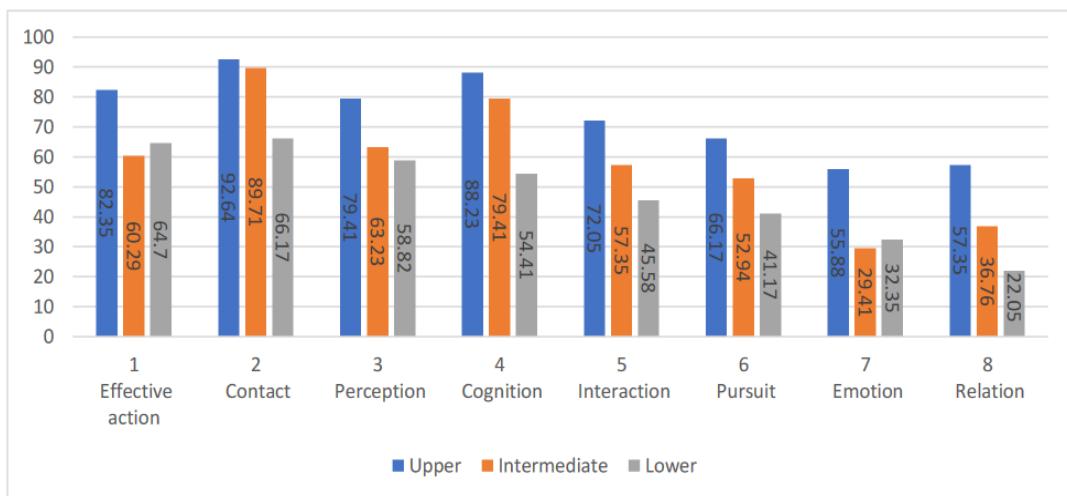
¹¹ The explanation about the study, instructions on how to take the online tests, consent form, and face sheet were prepared in Persian.

Table 2: Descriptives of the level determination test

Group	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		
UG	17	78.43	8.57	74.02	82.84	68.3	92.2
IG	17	61.85	4.11	59.74	63.97	56.1	66.6
LG	17	48.97	6.77	45.48	52.45	31.1	55.5

4 Results

This section analyzes the particle test result by comparing the results between categories (1. Effective action >> 2. Contact >> 3. Perception >> 4. Cognition >> 5. Interaction >> 6. Pursuit >> 7. Emotion >> 8. Relation) and between groups (UG >> IG >> LG). The test result is presented in figure 2.

**Figure 2:** Particle test results (in %)

4.1 Comparison between categories: The role of verb transitivity (RQ1 & RQ2)

As seen in Figure 2, a gradation can be observed between categories in that errors exhibit a downward trend along the hierarchy. However, 1. Effective action registered more errors than 2. Contact and 4. Cognition thereby deviating from the hierarchy proposed by Tsunoda (1985) and Malchukov (2005). Other deviations from Tsunoda's hierarchy were also observed. 3. Perception averaged lower than 4. Cognition and errors concerning 7. Emotion were higher than 8. Relation in IG. Kruskal Wallis tests

were conducted for each group to verify these differences and to determine whether there is an effect of verb transitivity on the accuracy of particle selection.

The result for UG indicates that there is a statistically significant difference between the eight categories, $H(7) = 33.185, p < .001$. A pairwise comparison of categories shows that 2. Contact was significantly different from the three lowest categories of 6. Pursuit ($p = .043$), 7. Emotion ($p = .003$), and 8. Relation ($p = .001$). 4. Cognition too was significantly different from the two lowest categories of 7. Emotion ($p = .023$) and 8. Relation ($p = .012$).

A statistically significant difference between the eight categories was also observed for IG, $H(7) = 55.502, p < .001$. A pairwise comparison of categories shows that 2. Contact was significantly different not only from the lowest four categories of 5. Interaction ($p = .016$), 6. Pursuit ($p = .006$), 7. Emotion ($p = .00$), and 8. Relation ($p = .000$) but also from 1. Effective action ($p = .044$). Furthermore, 4. Cognition was significantly different from 7. Emotion ($p = .000$) and 8. Relation ($p = .001$). Finally, 3. Perception was significantly different from 7. Emotion ($p = .029$).

The test for LG also indicated a statistically significant difference, $H(7) = 30.568, p < .001$. A pairwise comparison of categories shows that 8. Relation was significantly different from the highest four categories, namely from 1. Effective action ($p = .002$), 2. Contact ($p = .001$), 3. Perception ($p = .007$), and 4. Cognition ($p = .050$).

The trend within each group was different in that UG tended to distinguish 2. Contact from other categories and LG tended to distinguish 8. Relation from other categories with IG displaying a greater number of significant pairs than the other two groups. However, statistical tests for all three groups show a significant difference between categories 2. Contact and 8. Relation. We may therefore conclude that PJL's particle selection is significantly different at the two ends of the hierarchy. The results also show that learners were not particularly sensitive to the linguistic prototype as can be observed from the fact that 1. Effective action in LG was significantly different only from 8. Relation. In fact, IG was significantly more likely to select *wo* for 2. Contact than the prototypical 1. Effective action.

To summarize, the first research question asks whether learners are sensitive to verb transitivity when selecting the object case particle. It was predicted that learners will select *wo* more readily for verbs higher in the transitivity hierarchy. The results show that this was indeed the case. Though the exact categories differed between groups, the aggregate score of categories at the upper end of the hierarchy (1. Effective action, 2. Contact, 3. Perception, and 4. Cognition) was significantly higher than categories at the lower end of the hierarchy (5. Interaction, 6. Pursuit, 7. Emotion, and 8. Relation); lending support to the argument that learners tend to display sensitivity to verb transitivity.

The second research question addresses whether 1. Effective action (the linguistic prototype) was treated by PJL as the most salient transitive construction. The results suggest that this was not the case. Though the prototype scored significantly higher than the lowest category in LG, not only was the score of 2. Contact significantly higher than many more categories across the groups but also the score of 2. Contact was significantly higher than even 1. Effective action in IG.

4.2 Comparison between groups: The role of proficiency and L1 (RQ3)

As can be seen from Figure 2 above, UG outperformed IG, who in turn outperformed LG. This observation is corroborated by statistical analysis of the particle test which measures knowledge of Japanese particle *wo* and the level placement test which measures overall proficiency. The Pearson correlation coefficient was computed to assess the linear relationship between the two tests. The result shows a strong positive correlation, $r (51) = .732, p < .001$. In other words, learners with higher proficiency were significantly more likely to score higher on the particle test. This indicates that knowledge of Japanese case particles was closely related to overall language proficiency.

Though gradation in selection accuracy was observed within categories, not all categories registered a consistent improvement. LG marginally outperformed IG in 1. Effective action and 7. Emotion, indicating a U-shaped accusation pattern. Furthermore, the pattern in 2. Contact and 4. Perception resembles a plateau where UG only narrowly outperformed IG in the former and IG performed marginally better than LG in the latter category. The three groups also differed in that only LG's results reflect Tsunoda's hierarchy; with the exception that 1. Effective action was marginally lower than 2. Contact. These differences reflect the evolving interlanguage of learners belonging to different proficiency levels.

4.2.1 Particle selection errors concerning L1

The test items for 2. Contact, 4. Cognition, 5. Interaction, 6. Pursuit and 8. Relation¹² were created by selecting Japanese verbs whose Persian counterparts were evenly distributed between canonical constructions (verbs that allow the patient to be marked with *râ*) and non-canonical constructions (verbs that mark the second argument with markers other than *râ*). Given that verb type and vocabulary levels were controlled, a lower score for non-canonical items could be indicative of L1 influence.

¹² The remaining categories lacked sufficient items in the verb list created from JLPT vocabulary textbooks. For this reason, the number of canonical and non-canonical items was not balanced making it difficult to provide systematic observations across categories (See Appendix A).

Table 3: Selection of *wo* (in %) by canonical, non-canonical items in Persian

Category	Upper group		Intermediate group		Lower group	
	non-canonical	canonical	non-canonical	canonical	non-canonical	canonical
2.	88.8	97.2	88.8	91.6	58.8	64.7
4.	83.3	94.4	77.7	83.3	52.9	47.1
5.	52.7	91.6	33.3	86.1	14.7	64.7
6.	75.0	61.1	50.0	58.3	41.1	35.2
8.	75.0	44.4	52.7	22.2	26.4	11.7

Table 3 shows that all three groups scored considerably low for non-canonical items in 5. Interaction. Additionally, erroneous selections often corresponded to the Persian surface marking like *az* for *kara* ('from') and *be* for *ni* ('to') which suggests that Persian surface markings may have influenced particle selection for 5. Interaction.

The evidence for L1 influence was weaker in 2. Contact and 4. Cognition where scores of non-canonical test items were only marginally lower than their canonical counterparts. Furthermore, with the exception of verbs like *kangaeru* ('think'), erroneous selections did not correspond to Persian markings. Furthermore, the evidence for L1 transfer seems unlikely for 8. Relation and 6. Pursuit since non-canonical test items scored higher than canonical ones and erroneous selections that may be attributed to L1 surface marking were infrequent.

For categories that lacked a sufficient number of non-canonical items (1. Effective action, 3. Perception and 7. Emotion), comparisons were made between the available non-canonical item and a canonical item that belonged to the next closest vocabulary level (Table 4). Within these three categories, errors observed in 3. Perception may have been influenced by Persian as non-canonical items in IG and LG scored considerably lower than the canonical items. Furthermore, many of the errors in UG (five out of six), IG (nine out of thirteen), and LG (six out of thirteen) can be attributed to Persian surface marking. In contrast, the likelihood of L1 influence is low for 1. Effective action and 7. Emotion as erroneous selections rarely correspond to the Persian surface case.

Table 4: Selection of *wo* (in %) by canonical, non-canonical items in Persian

Category	Upper group		Intermediate group		Lower group	
	non-canonical	canonical	non-canonical	canonical	non-canonical	canonical
1.	100	77.7	83.3	55.5	52.9	64.7
3.	66.6	66.6	27.7	83.3	23.5	64.7
	44.4		22.2		17.6	
7.	52.7	44.4	72.2	11.1	58.8	11.7
	44.4		16.6		29.4	

The above results suggest that L1 surface marking may have been a factor influencing particle selection in 3. Perception and 5. Interaction. However, this does not appear to be the case for categories at the two ends of the hierarchy.

4.2.2 Particle selection errors concerning non-language specific factors

Erroneous particle selection can also provide insights into how learners perceive the semantic content of a construction. Though the selection of nominative particle *ga* and locative/dative *ni* was by far the most common error type, a pattern was observed when the categories were grouped according to Malchukov's semantic map (Table 5). Learners tended to select *ga* for categories that show declining patienthood and *ni* for categories that show declining agenthood.

Table 5: Errors (in %) in the two sub-hierarchies

Affected patienthood									
Category	Group	<i>ga</i>	<i>ni</i>	<i>de</i>	<i>kara</i>	<i>to</i>	<i>ni tsuite</i>	<i>no tameni</i>	<i>ni taishite</i>
1.	UG	17.6	-	-	-	-	-	-	-
	IG	38.2	-	-	-	1.4	-	-	-
	LG	20.6	2.9	2.9	5.9	2.9	-	-	-
2.	UG	2.9	1.4	1.4	1.4	-	-	-	-
	IG	8.8	1.4	-	-	-	-	-	-
	LG	14.7	4.4	5.9	5.9	-	-	-	-
6.	UG	10.3	16.2	5.9	1.4	-	-	-	-
	IG	17.6	13.2	8.8	4.4	-	2.9	-	-
	LG	16.2	19.1	10.3	5.9	5.9	1.4	2.9	-
Affected agenthood									
Category	Group	<i>ga</i>	<i>ni</i>	<i>de</i>	<i>kara</i>	<i>to</i>	<i>ni taishite</i>	<i>no tameni</i>	<i>ni tsuite</i>
3.	UG	4.4	13.2	1.4	-	1.4	-	-	-
	IG	10.3	19.1	5.9	1.4	-	-	-	-
	LG	10.3	19.1	5.9	1.4	2.9	1.4	0	0
4.	UG	4.4	4.4	2.9	-	-	-	-	-
	IG	11.8	2.9	1.4	-	4.4	-	-	-
	LG	13.2	14.7	10.3	-	5.9	-	-	-
7.	UG	23.5	17.6	-	2.9	-	-	-	-
	IG	41.2	13.2	5.9	8.8	1.4	-	-	-
	LG	33.8	16.2	4.4	13.2	1.4	-	-	-

**ga*: nominative marker; *ni*: source, recipient, patient, location marker; *de*: means, cause, location marker; *kara*: source marker; *to*: quotation and comitative marker; *ni tsuite*: 'about'; *no tameni*: 'for'; *ni taishite*: 'against/ towards'

**Highlights indicate the most frequently selected error type.

The Persian equivalent of the nominative particle *ga* is a null marker. However, the erroneous selection of *ga* in categories of the upper sub-hierarchy (1. Effective action, 2. Contact, and 6. Pursuit) is unlikely to be caused by L1 influence alone as only one out of the four test items in each category null marks the object in Persian. Even for these items, UG did not select *ga* in both 1. Effective action and 2. Contact; and IG and LG selected *ga* more frequently for the canonical items in all three categories. Despite the Persian equivalent marking of the test item being *az* ('from'; *kara* in Japanese) both IG and LG were more likely to select *ga* over *kara* for the second item in 2. Contact. This trend was also observed in all three groups for 6. Pursuit where learners frequently selected *ga* over *kara*. This suggests that learners selected *ga* as the default without referring to their L1.

The Persian equivalent of particle *ni* is the preposition *be*. However, explaining the erroneous selection of *ni* in the lower sub-hierarchy through L1 alone is problematic. While L1 influence may be at play in 3. Perception, it is unlikely in 7. Emotion as the Persian equivalent was not the preposition *be* but *az*. *Kara* was the most frequently selected particle by LG for the non-canonical item *osoreru* 'fear'. The other two groups did not show such a preference, making L1 influence unlikely for them. The results in 4. Cognition were more mixed. UG were more likely to select *ni* for non-canonical than canonical items, suggesting L1 influence may be at play. However, IG were more likely to select *ga* and LG were equally likely to select *ga* as *ni* and selected *ni* just as frequently for items where L1 surface case influence could not be predicted.

Another possible explanation for the frequent selection of *ga* and *ni* may be that these are intralingual errors caused by the overlapping roles played by particles in Japanese. The case particle *ga* not only marks the nominative subject of a sentence, but it also marks the patient of potential or desiderative constructions making the distinction between particles *ga* and *wo* difficult to master. Similarly, the polysemous particle *ni* marks the goal and the cause among other usages. The selection of *ni* instead of *wo* may be indicative of learners perceiving the noun as a cause affecting the agent or a goal the agent works towards instead of a patient. Particle *ni* also marks location which may account for its frequent selection in 6. Pursuit by LG and UG.

5 Discussion

This study suggested strong evidence for the psychological reality of prototype effects of Japanese transitive constructions in Persian-speaking learners of Japanese. A partial gradation was observed in the grammar test results of all proficiency groups, with categories towards the upper end of the hierarchy exhibiting higher average scores than categories towards the lower end. Subsequent ANOVA tests reveal that the difference between 2. Contact and 8. Relation was significant for all three proficiency groups. Other instances where the result of two categories was significantly different

mostly concerned a category from the upper end of the hierarchy with one from the lower end. This indicates that learners are indeed sensitive to the degree of verbal transitivity with differences being particularly pronounced at the two ends of the hierarchy.

However, the study only suggested weak evidence in support of Tsunoda's hierarchy. Firstly, the results of LG alone reflected Tsunoda's hierarchy in that the prototype registered the highest accuracy among the eight verb categories. Furthermore, even in LG, 4. Cognition was higher than both 3. Perception and 6. Pursuit. The evidence in support of Malchukov's hierarchy appears stronger by comparison. Adopting Malchukov's hierarchy resolves the deviation concerning 4. Cognition. We also find that learners make a distinction between the sub-hierarchies by selecting *ga* to show decreasing patienthood and *ni* to show decreasing agenthood. Neither hierarchy, however, can account for why a non-prototype category (= 2. Contact) scored higher than the prototype (= 1. Effective action).

One possible explanation can be that the most fundamental transitive construction for language users is not the linguistic prototype. Ninio (1999) argues that the most natural or prototypical semantic characteristic of transitive construction is not an animate actor bringing about a change in state in an inanimate object through a volitional action, but the manipulation of an autonomous object that causes it to either enter, remain within or move out of the manipulator's personal domain. This is supported by the observation that children acquire verbs that express 'fundamental object relation' before they begin using verbs that can be categorized as a linguistic prototype. In the current study, 1. Effective action corresponds to the linguistic prototype and included *kiru* ('cut'), *sodateru* ('grow'), *akeru* ('make/open (a hole)'), and *sakugen suru* ('reduce'). 2. Contact corresponds to verbs Ninio (1999) considers the most fundamental transitive construction and included *tomeru* ('stop'), *sasu* ('open/put up'), *nuku* ('pull out'), *atsukau* ('use'). The fact that the score of 2. Contact was higher than 1. Effective action shows that this category is easier to acquire for PJL. Therefore, it fits both the semantic profile as well as acquisitional pattern outlined in Ninio (1999). It should be noted, however, that the current study differs from Ninio (1999) in that the verbs of 'fundamental object relation' also include verbs of creation (make, draw), perception (see, hear), and social interaction (give, buy). In the current study, these are grouped under 1. Effective action, 3. Perception, and 5. Interaction respectively. Category 2. Contact therefore only forms a subset within Ninio's verbs of 'fundamental object relation'.

Ninio (1999) also notes the role of frequency. She states that though high frequency in the input is not a sufficient condition for early acquisition, it is a necessary condition as none of the verbs that were acquired early were low frequency. Though the scope of the current study is limited by the lack of input data, the type frequency of 2. Contact verbs far exceed those of 1. Effective action in two data sources. The first

is the verb list composed from the Japanese Language Proficiency Test material for this study. This list consists of one hundred prototypical verbs as against two hundred and thirty 2. Contact verbs. The second is Uchida's (2013) survey of verbs used in the beginner-level textbooks *Minna no Nihongo 1* and *Minna no Nihongo 2*; the primary textbooks used by the participants of this study. Out of the one hundred and fifty-four transitive verbs listed in the textbooks, thirty-seven verbs correspond to 1. Effective action (thirty-four verbs involving an agent causing a change in a patient, and three verbs involving an act of creating something). On the other hand, fifty-nine verbs correspond to 2. Contact (fifty-four verbs involving an agent causing a change in location in an object, and five verbs of object manipulation). This high frequency suggests that learners are more likely to come across NOM-ACC constructions that belong to verbs of contact than the prototype. This in turn may have contributed to the high score in 2. Contact.

Yet another deviation from the hierarchy can be observed in 4. Cognition. Specifically, its relative ease of acquisition cannot be explained through its position in the transitivity hierarchy. Cognition verbs involve knowledge retrieval, comprehension, analysis, and knowledge utilization (Marzano & Kendall, 2007). Being abstract activities, they lack an autonomous object which is volitionally acted upon by an agent. Tsunoda (1981, 1985) places this category below Pursuit based mainly on cross linguistic evidence of case patterns exhibited by verbs of this semantic class, but also because he distinguishes it from the categories which represent physical actions. With regards to the feature of affectedness, however, the object of cognition verbs is often attained in the abstract sense and therefore more affected than that of Pursuit verbs. Furthermore, verbs used in the current study such as *kangaeru* ('think up') or *yosoku suru* ('predict') involve knowledge generation and are arguably semantically close to verbs of Effective action such as *tsukuru* ('make'). The results of this study, therefore, suggest that the high accuracy rate of 4. Cognition can be attested through the high degree of transitivity of cognition verbs and that learners are not biased toward physical activities over abstract volitional ones.

It should also be noted that this result matches the result of Hindi-speaking learners as reported by Chauhan (2017b). Both Hindi and Persian-speaking learners accurately selected *wo* irrespective of the fact that L1 cognition verbs in both languages do not typically mark the argument with the accusative case. This can be attested by the fact that only sixty-three percent of verbs listed under 4. Cognition were transitive in Persian as compared to eighty-three percent in 3. Perception, making it difficult to argue in favor of L1 influence. Furthermore, high accuracy for even N2 and N3 level vocabulary items by LG is surprising in light of the fact that cognitive verbs first introduced to Japanese learners typically appear in constructions that mark the non-agent argument with the quotation particle *to* and beginner-level textbooks like *Minna no Nihongo* do not use cognition verbs when introducing case particle *wo*. The high rate of accuracy may therefore be due to language-independent factors.

6 Conclusion

The current study investigated whether Persian learners of Japanese exhibit prototype effects when selecting particles to mark direct objects of transitive verbs in Japanese. The result of the grammar test shows that learners were sensitive to verb transitivity as there was a significant difference between categories at the two ends of the hierarchy. The study also suggests evidence that learners may not consider linguistically prototypical verbs as the most salient transitive construction. Instead, verbs that involve object manipulation either towards or away from the agent may be what learners first acquire. The results also reveal that verbs of cognition are more likely to be identified as canonically transitive regardless of their relatively low position in the verb hierarchy.

The third research question explored the role of proficiency and L1. Performance in the particle test reflected proficiency level, with lower groups not only producing more errors but also displaying more error types. Comparison between categories revealed that the acquisition pattern of the three proficiency groups did not always match. LG scored significantly lower in 8. Relation from categories in the upper half of the hierarchy whereas UG scored significantly higher in 2. Contact than categories in the lower half of the hierarchy. IG results were significant at both ends of the hierarchy. This indicates that acquisition pattern shifts from learners struggling to identify low transitivity verbs in 8. Relation as transitive in the early stage of acquisition to learners clearly distinguishing between high transitivity verbs in 2. Contact from other verb types in the later stage of acquisition. The study also found that LG was more likely to produce errors that may be attributed to L1. However, with the exception of 5. Interaction, error types in most categories could not be primarily attributed to the learners' L1.

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Abbreviations

ABS	Absolutive
ACC	Accusative
DAT	Dative
ERG	Ergative
IG	Intermediate group
INST	Instrumental
JLPT	Japanese Language Proficiency Test
LG	Lower group
NOM	Nominative
N2	Level 2 of the JLPT
N3	Level 3 of the JLPT
N4	Level 4 of the JLPT
N5	Level 5 of the JLPT
PJL	Persian speaking Japanese Language learners
PL	Plural
PRT	Present
PST	Past
SG	Singular
TOP	Topic particle
TTBJ	Tsukuba Test-battery of Japanese
UG	Upper group

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Appendix: Particle test items by category, vocabulary level, L1 Persian marking

level	N5		N4		N3		N2	
category	canonical	non-canonical	canonical	non-canonical	canonical	non-canonical	canonical	non-canonical
1.	kiru [kēki] cut [cake]		sodateru [ki] grow [tree]			akeru [ana] open [hole]	sakugensuru [kosuto] Cut [cost]	
	<i>râ=wo</i>		<i>râ=wo</i>			<i>Ø=ga</i>	<i>râ=wo</i>	
2.	tomeru [kuruma] stop [car]			sasu [kasa] hold [umbrella]	nuku [ha] pull out [tooth]			atsukau [nyūsu] use [news]
	<i>râ=wo</i>			<i>Ø=ga</i>	<i>râ=wo</i>			<i>a=kara</i>
3.	kiku [hanashi] listen [story]		mitsukeru [resutoran] find [restaurant]		mikakeru [Yamada] spot [Yamada]			nagameru [soto] gaze [outside]
	<i>râ=wo</i>		<i>râ=wo</i>		<i>râ=wo</i>			<i>be=ni</i>
4.		kangaeru [yarijata] think [method]	machigaeru [kanji] mistake [kanji]		Yosoku suru [kakuritsu] predict [probability]			handansuru [kanōsei] assess [possibility]
		<i>be=ni</i>	<i>râ=wo</i>		<i>râ=wo</i>			<i>dar</i> <i>bâreye=ni</i> <i>tsuite</i>
5.	okuru [okane] send [money]			hōmonsuru [betonamu] visit [Vietnam]		inoru [gōkaku] pray [success]	odokasu [tenin] threaten [clerk]	
	<i>râ=wo</i>			<i>az=kara</i>		<i>barâye =</i> <i>tame ni</i>	<i>râ=wo</i>	
6.		matsu [tegami] wait [letter]	sagasu [purezento] search [present]			enryōsuru [amaimono] refrain [sweets]	[tsuma no ato] ou chase [behind one's wife]	
		<i>Ø=ga</i>	<i>râ=wo</i>			<i>az=kara</i>	<i>râ=wo</i>	
7.		shinpaisuru [anzen] worry [safety]		shinjiru [otogibanashi] believe [fairytales]		osoreru [hi] fear [fire]	konomu [wagyu] like [beef]	
		<i>az=kara</i>		<i>dar</i> <i>bâreye=ni</i> <i>tsuite</i>		<i>az=kara</i>	<i>râ=wo</i>	
8.	motsu [kyōdai] have [sibling]				fukumu [bitamin] contain [vitamin]	motsu [sekinin] have [duty]		kakasu [chōshoku] miss [breakfast]
	<i>Ø=ga</i>				<i>Ø=ga</i>	<i>Ø=ga</i>		<i>Ø=ga</i>