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Abstract

It has been reported that Japanese distributive numeral "zutsu" induces two types of distributive readings, namely an individual distributive reading and an occasion distributive reading. However, there is another reading, which evaluates distributivity in a different situation from a situation in which the rest of the clause is evaluated. I call it a group distributive reading. In this paper, I aim for a unified account of these readings. I propose that "Num-CL-zutsu" partitions a situation along with a presupposed function so that each sub-situation contains a unique/maximal individual which satisfies the measure phrase "Num-CL." The distribution of the three readings follows from an independently motivated constraint on situation pronoun binding. The semantic difference among the three readings comes from different ways to identify the presupposed function from situations to individuals.

Distribution over Situations

Takanobu Nakamura

1 Introduction

“-zutsu” is a *distributive numeral* marker in Japanese.

- (1) Karera-ga kaban-o san-ko-**zutsu** hakon-da.
they-NOM suitcase-ACC 3-CL_{thing}-DIST carry-PAST
- a. ‘They carried three suitcases each.’ (INDIVIDUAL DISTRIBUTIVE)
b. ‘They carried three suitcases at each salient occasion.’ (OCCASION DISTRIBUTIVE)

In (1a), “-zutsu” distributes over atomic individuals which are part of what “karera” (they) denotes. I call it an *individual distributive reading*. On the other hand, in (1b), “-zutsu” distributes over contextually salient occasions. For example, (1b) is true if they together brought three suitcases per time and repeated it until they finish carrying every suitcase. I call it an *occasion distributive reading*. This reading becomes easier to observe if one replaces “they” with a singular term.

- (2) Shun-ga kaban-o san-ko-**zutsu** hakon-da.
Shun-NOM suitcase-ACC 3-CL_{Things}-DIST carry-PAST
‘Shun carried three suitcases at each salient occasion.’

In (2), the subject is a proper name and thus blocks individual distributive readings. Thus, (2) only has an occasional reading.

Although Zimmermann (2002) has extensively worked on these two readings from a cross-linguistic perspective, “-zutsu” has another reading, which has gathered little attention. “-zutsu” at the prenominal position has a reading in which its distributivity is evaluated in a situation other than the situation in which the rest of the clause is evaluated.

- (3) Daiki-ga ni-hon-**zutsu**-no aisu-o tabe-ta.
Daiki-NOM 2-CL_{long object}-DIST-GEN ice cream-ACC eat-PAST
‘Daiki ate two-bar ice cream.’
↪ the kind of ice cream Daiki ate generally comes in two bars.

(3) means that Daiki ate an ice cream bar, which generally comes in two bars. Most importantly, it is not necessary that Daiki ate both of the two ice cream bars. In other words, (3) does not entail that Daiki ate two ice cream bars at different occasions and vice versa. Instead, it involves some genericity across different instances of the same kind of ice cream so that each instance comes in two bars.¹ On the other hand, (3) is false if Daiki ate ice cream which does not come in two bars. For example, if Daiki ate a Häagen-Dazs ice cream bar, (3) is false because it does not come in two bars in general. I call it a *group distributive reading*. Note that this difference between group distributive readings and cardinal modification is truth-conditional.

In this paper, I aim for a unified account of these three types of distributive readings. For this, I propose that “zutsu” partitions a situation so that each sub-situation is mapped to a unique individual which satisfy the measure phrase “Num-CL.” Different ways to pick up a situation explains the syntactic distribution of different readings and different ways to identify a mapping from situations to individuals explains the semantic difference between individual distributive readings and occasion distributive readings on one hand and group distributive readings on the other hand.

¹For example, Papico and Chupet if you are familiar with Japanese ice cream.

2 Distribution of group distributive readings

I start with describing the distribution of group distributive readings. Syntactically, it can be attested only at the prenominal position. Semantically, it requires certain types of group membership which comes from either the lexical semantics of a noun or the context.

2.1 Syntactic distribution

“-zutsu” can occur at least two positions in a sentence.²

- (4) a. Floating “-zutsu”:
 Wataru-ga hon-o (kinoo) ni-satsu-**zutsu** ka-tta.
 Wataru-NOM book-ACC (yesterday) 2-CL_{Volumes}-DIST buy-PAST
- b. Prenominal “-zutsu”:
 Wataru-ga ni-satsu-**zutsu**-no (*kinoo) hon-o ka-tta.
 Wataru-NOM 2-CL_{Volumes}-DIST-GEN (yesterday) book-ACC buy-PAST

Only the prenominal “-zutsu” has a group distributive reading: the prenominal “-zutsu” can co-occur with another floating numeral quantifier.

- (5) Wataru-ga ni-satsu-**zutsu**-no hon-o i-ssatsu ka-tta.
 Wataru-NOM 2-CL_{Volumes}-DIST-GEN book-ACC 1-CL_{Volumes} buy-PAST
 lit. ‘Wataru bought one copy of a two-volume book.’

In (5), only a group distributive reading arises. Otherwise, the reading is inconsistent, e.g., Wataru bought one and two books. Since a group distributive reading does not necessarily contribute to the cardinality of individuals in the current situation, it does not conflict with the semantics of another floating numeral quantifier. On the other hand, the floating “-zutsu” induces an inconsistent reading when it co-occurs with another floating numeral quantifier.³ It shows that the floating “-zutsu” lacks group distributive readings.

- (6) * Wataru-ga hon-o ni-satsu-**zutsu** san-satsu ka-tta.
 Wataru-NOM book-ACC 2-CL_{Volumes}-DIST 3-CL_{Volumes} buy-PAST
 lit. ‘Wataru each bought two and three books.’

2.2 Semantic restriction

Group distributive readings requires a certain kind of grouping. For example, in (3), it is not only the ice cream bar Daiki ate that comes in twos, but (3) requires us to know that the kind of ice cream Daiki ate generally comes in twos. A similar observation applies to group nouns. For example, the group noun “keikantai” (police team) does not necessarily mean that members of a police team are always constant, but the members of each occasion share the membership as a police team. So,

²Miyamoto (2009) reports that the prenominal and the floating “-zutsu” have the same readings, but several Japanese speakers including me report that (4b) only has a group distributive reading. Also, he reports that the postnominal “-zutsu” is grammatical, but several Japanese native speakers including me find it ungrammatical. So, if it has a group distributive reading is unclear. I leave these variation issues for future work.

³This combination, however, seems possible if the floating numeral quantifier express the total amount of books. For example, if Wataru bought two books every week and bought eight books in a month, the following sentence sounds better.

- (i) Wataru-ga hon-o ni-satsu-**zutsu** ??(goukei) ha-ssatsu ka-tta.
 Wataru-NOM book-ACC 2-CL_{Volumes}-DIST (in total) 8-CL_{Volumes} buy-PAST
 lit. ‘Wataru each bought two books and he bought eight books in total.’

Still, this is different from group distributive readings.

group nouns lexically provide such knowledge of group membership. In (7), distributivity is over such groups of police teams. Again, this distribution over sub-teams is not necessarily evaluated in the current situation and (7) can be true even if the thug assaulted just one of a three-member police team.

- (7) Bookan-ga san-nin-**zutsu**-no keikantai-o oso-tta.
 Thug-NOM 3-CL_{Persons}-DIST-GEN police force-ACC assault-PAST
 ‘A thug assaulted a three-person police team.’
 ~> the police team has three-member sub-teams.

The floating “-zutsu” in the same environment does not have the inference in (7) and (8) is false of the thug assaulted just one of the police team.

- (8) Bookan-ga keikantai-o san-nin-**zutsu** oso-tta.
 Thug-NOM police force-ACC 3-CL_{Persons}-DIST assault-PAST
 ‘A thug assaulted three members of a police team each time.’
 ↯ the police team has three-member sub-teams.

Non-group nouns cannot induce a group distributive reading in an out-of-blue context. For example, “keikan” (police), the non-group counterpart of “keikantai” (police team) does not.⁴

- (9) ?? Bookan-ga san-nin-**zutsu**-no keikan-o oso-tta.
 Thug-NOM 3-CL_{Persons}-DIST-GEN police-ACC assault-PAST
 lit. ‘A thug assaulted a three-person police.’

Non-group noun can have a group distributive reading if the context supports *ad hoc* group membership. In (10), a certain portioning of tablets creates a context for a group membership among units of three tablets and it licenses a group distributive reading.

- (10) a. Context: I have to take three different tablets per day: antibiotic, mucoprotective and painkiller. Today, I forgot them and asked my flatmate to bring them to my office.
 b. Teeburu-ni san-joo-**zutsu**-no kusuri-ga ar-u kara, sore-o
 table-at, 3-CL_{Tablets}-DIST-GEN medicine-NOM exist-PRES as, it-ACC
 mo-tte-ki-te-kure-nai?
 bring-CONJ-come-CONJ-REQUEST-NEG
 ‘As there are sets of three tablets on the table, could you bring them?’

3 Situation semantics

In this paper, I argue for a situation-based analysis of distributivity and propose that “zutsu” utilises it. To set up a enough background to make sense of it, I briefly introduce situation semantics and two important situation semantic machineries in this section.

In situation semantics, a proposition is defined as a set of situations, not a set of possible world.⁵ Worlds are just special type of situations: if a situation is maximal in the sense that it is not part of

⁴Wataru Uegaki (p.c.) judged it grammatical with contexts. For example, if police officers are patrolling in threes, (9) is fine for him. This is a context which provides an *ad hoc* membership and parallel with (10).

⁵The ontological nature of situations is still a matter of debate. For example, the original version of situation semantics by Barwise and Perry (1983) takes a situation as a structured object consisting of individuals and relations among them. On the other hand, the possibilistic version of situation semantics (Kratzer 1989, 2002, 2012; Elbourne 2005, 2013) takes a situation as a particular object which is part of a possible world. Throughout the article, I adopt the latter approach due to its compatibility with Montagovian and/or Heim and Kratzer style compositional semantics, but both views share the insight that the evaluation of an utterance does not always refer to the entire world, but just a particular segment of it.

any other situations, it is a world.⁶

- (11) a. a proposition p is a set of situations: $p = \{s_1, s_2, \dots\}$
 b. the part-whole relation \sqsubseteq is defined for situations.
 c. individuals are part of situations.
 d. s is a possible world iff $\forall s' [s \sqsubseteq s' \rightarrow s = s']$

Based on this situation semantic framework, I adopt two mechanisms, namely *situation pronoun* and *matching function*. Situation pronoun is crucial to account for the syntactic distribution of different readings and matching function is crucial to account for the semantic difference between group distributive readings and the other two readings.

First, the notion of situation pronoun is crucial to capture the shifted evaluation of distributivity in group distributive readings. In (12), “every fugitive” is evaluated in a different time from the one for the rest of clause. Otherwise, it has an inconsistent reading.

- (12) Every fugitive is in jail. (Enç 1986)

On the other hand, (13) does not have a consistent reading (Musan 1995).

- (13) # There is a fugitive in jail.

Musan (1995) proposes that, in her terminology, strong and presuppositional determiners can have this shifted reading and cardinal determiners cannot. Under the situation semantic framework, for example, this is due to the a situation pronoun (or *resource situation* s_τ) next to a determiner (Schwarz 2009). (14) is a simplified LF of (12).

- (14) $\forall x [x \text{ is a fugitive in } s_\tau \rightarrow x \text{ is in jail in } s]$

s_τ can take its value from the current topic situation or some contextually salient situation via assignment function. The shifted reading (12) can be found in the latter cases.

Second, the notion of matching function is originally proposed in Rothstein (1995) to map an event to another event to capture covariance between two events. Kratzer (2004) and Schwarz (2009) extend it to situations to capture covariance between situations and individuals. A relevant observation can be seen in the co-variance between individuals and their jobs in (15a). In a natural reading of (15a), people have different sets of jobs and each of them finished each of the jobs they are assigned.

- (15) a. Everyone finished every job.
 b. $\lambda s \forall x [\text{person}(x)(s) \rightarrow \exists s' [s' \sqsubseteq s \ \& \ \mathbf{M}(s') = x \ \& \ \forall y [\text{job}(y)(s') \rightarrow \text{finished}(y)(x)(s')]]]$
 (Kratzer 2004)

Here, covert domain restriction applies differently to the two occurrences of “every.” Specifically, the first “every” takes a situation s , but the second “every” takes a sub-situation s' . This sub-situation s' contains a set of jobs, which should co-vary with individuals. The matching function \mathbf{M} expresses this covariance between individuals and sets of job: it takes sub-situations s' and returns a unique individual x in s' , which is a set of jobs in s' . So, when the s' restricts the domain of quantification for the second “every”, it guarantees that each person has their own set of jobs and finished them.

⁶Note that part-whole relation is restricted to world-mate individuals and situations, i.e. if a situation s is part of a world w_1 , it cannot be part of another world w_2 . One often adopts counterpart relation “ \approx ” (Lewis 1986) to talk about the counterparts of an individual or a situation in different worlds. This relation is crucially used when one connects the s -term of a clause to the *Austinian topic situation*. However, as both notions are not crucial to my analysis in this paper, I do not go into further detail.

4 Partitioning situations

In this section, I propose that the semantics of “zutsu” utilises partition of a situation. First of all, I introduce the notion of partition (Schwarzschild 1996). Partition is a set of sub-parts of an entity which is collectively exhaustive and mutually exclusive.

- (16) A subset of $\ast\{y : y \sqsubseteq x\}$ is $\text{Part}(x)$ iff
 $\text{Max}(\text{Part}(x)) = x$ and $\forall y, z [y, z \in \text{Part}(x) \rightarrow \neg \exists u [u \sqsubseteq y \ \& \ u \sqsubseteq z]]$

I use a notation which uses algebraic closure \ast (Link 1983) and maximality (Sharvy 1980).

- (17) a. $\ast P \Leftrightarrow \forall x, y [[P(x) \ \& \ P(y)] \rightarrow \ast P(x + y)]$
 b. $\text{Max}(P) = x \Leftrightarrow \forall y [P(y) \rightarrow y \sqsubseteq x]$

I define partition for situations as in (18).

- (18) A subset of $\ast\{s' : s' \sqsubseteq s\}$ is $\text{Part}(s)$ iff
 a. $\text{Max}(\text{Part}(s)) = s$ (COLLECTIVE EXHAUSTIVITY),
 b. $\forall s', s'' [s', s'' \in \text{Part}(s) \rightarrow \neg \exists s''' [s''' \sqsubseteq s' \ \& \ s''' \sqsubseteq s'']]$ (MUTUAL EXCLUSIVITY), and
 c. $\exists M \forall s' [s' \in \text{Part}(s) \rightarrow \exists !x [M(s') = x]]$ (FUNCTIONAL UNIQUENESS)

(18c) is the novel part in situation partition. This makes sure that there is a uniquely identifiable matching function whose range is a subset of subparts of s . Partition of the situation s is performed along with this function. I assume that these defining characteristics of a situation partition are presupposed. I call it *distributivity presupposition*, DIST.

- (19) $\text{DIST}(P)(s) \Leftrightarrow \exists !M [\text{DOM}(M) \subseteq \ast\{s' : s' \sqsubseteq s\} \ \& \ \text{RAN}(M) = P(s) \ \& \ \text{MAX}(\text{DOM}(M)) = s$ (COLLECTIVE EXHAUSTIVITY) $\ \& \ \forall s'', s''' [s'', s''' \in \text{DOM}(M) \rightarrow \neg \exists s'''' [s'''' \sqsubseteq s'' \ \& \ s'''' \sqsubseteq s''']]$ (MUTUAL EXCLUSIVITY) $\ \& \ \forall s'''' [s'''' \in \text{DOM}(M) \rightarrow \exists !x [M(s''') = x]]$ (FUNCTIONAL UNIQUENESS)

The idea is that this distributivity presupposition defines a uniquely identifiable function M from s to P and $\text{Part}(s)$ utilises this function.

Now, I'm ready to spell out a situation-based semantics of “zutsu.” I propose (20).

- (20) $[[\text{zutsu}]] = \lambda s_\tau \lambda Q_{\langle ed \rangle} \lambda P_{\langle e \langle st \rangle \rangle} : \text{DIST}(P)(s_\tau).$
 $\lambda x \lambda s [P(x)(s) \ \& \ x \sqsubseteq s_\tau \ \& \ \forall s'' [s'' \in \text{Part}(s_\tau) \rightarrow Q(M(s''))]]$

$[[\text{zutsu}]]$ takes a situation pronoun s_τ , a measure predicate Q and a predicate P to be distribute over. Then, it returns a predicate of the same type as P . Note that it has two s -terms: s_τ is saturated by a situation pronoun and s remains until the end of composition, being combined with the clausal denotation. (21) is the LF for “ni-hon-zutsu no aisu” (two-bar each ice cream). Here, I assume that Japanese common nouns are inherently cumulative (Chierchia 1998, a.o.). $\ast P$ stands for a cumulative predicate.

- (21) a. ni-hon-**zutsu**-no aisu
 2-CL_{long object}-DIST-GEN ice cream
 ‘a two-bar ice cream’
 b. PRESUPPOSITION: $\text{DIST}(\ast \text{ice cream})(s_\tau)$
 c. ASSERTION: $\lambda x \lambda s [\ast \text{ice cream}(x)(s) \ \& \ x \sqsubseteq s_\tau \ \& \ \forall s'' [s'' \in \text{Part}(s_\tau) \rightarrow \text{BAR}(M(s'')) = 2]$

The assertion makes three claims: first one is *cumulative* predication.

- (22) **Cumulativity** (Krifka 1992; Landman 1996; Kratzer 2007a, a.o.): For any entities $x_1, \dots, x_n, y_1, \dots, y_n$, if $P(x_1) \dots (x_n) = 1$ and $P(y_1) \dots (y_n) = 1$, then $P(x_1 + y_1) \dots (x_n + y_n) = 1$.

“*ice cream(x)(s)” talk about a cumulative portion of ice cream x in s . At this point, its internal mereological structure is underspecified. Second, an individual x which is P in s , i.e. ice cream, is also part of s_τ . So, s and s_τ overlap with respect to x . This makes sure that x is a member of the range of M or its subset. Third, for each sub-situation s' , the unique individual which is P in s' satisfies the measure predicate Q.

With a verb and its other arguments, e.g., (3), it has the following LF.⁷

- (23) a. Daiki-ga ni-hon-zutsu-no aisu-o tabe-ta.
 Daiki-NOM 2-CL_{long object}-DIST-GEN ice cream-ACC eat-PAST
 “Daiki ate two-bar ice cream.”
 b. PRESUPPOSITION: DIST(*ice cream)(s_τ)
 c. ASSERTION: $\lambda s \exists x$ [*eat(Daiki)(x)(s) & *ice cream(x)(s)] & $x \sqsubseteq s_\tau$ &
 $\forall s'' [s'' \in \text{Part}(s_\tau) \rightarrow \text{BAR}(M(s'')) = 2]$

Its presupposition is expanded as in (24).

- (24) $\text{DIST}(*\text{ice cream})(s_\tau) \Leftrightarrow \exists ! M [\text{DOM}(M) \subseteq \{s' : s' \sqsubseteq s_\tau\} \& \text{RAN}(M) = *\text{ice cream}(s) \&$
 $\text{MAX}(\text{DOM}(M)) = s_\tau \& \forall s'', s''' [s'', s''' \in \text{DOM}(M) \rightarrow \neg \exists s'''' [s'''' \sqsubseteq s'' \& s'''' \sqsubseteq s'''] \&$
 $\forall s'''' [s'''' \in \text{DOM}(M) \rightarrow \exists ! x [M(s''') = x]]]$

It presupposes a uniquely identifiable function M from s_τ to ice cream that maps each sub-situation s' to a different unique ice cream. The distributivity presupposition restricts the possible value of the situation pronoun. It is analogous to pronouns with gender presupposition. For example, “she” takes a salient individual in the discourse as its value, but its presupposition require it to be female.

Table 1 shows an example of situation partition.

s_τ	y s.t. ice cream(y)	
s'_1	ice cream bar ₁	ice cream bar ₂
s'_2	ice cream bar ₃	ice cream bar ₄
s'_3	ice cream bar ₅	ice cream bar ₆
...

Table 1: Situation partition.

s_τ is partitioned into s'_n cells so that each s'_n has its unique / maximal ice cream bars. The situation of Daiki eating ice cream is independent of s_τ , but the requirement “ $x \sqsubseteq s_\tau$ ” requires the ice cream bar Daiki ate to be part of s_τ . Note that s and s_τ overlap, but otherwise are independent of each other.

Shifted evaluation of distributivity comes in this way. In (23c), “tabe-ta” (ate) is evaluated with respect to s , but distribution over ice cream bars is evaluated with respect to s_τ , which is illustrated in Table 1. Thus, it is not necessarily the case that the cardinality of the ice cream bars Daiki ate is two in s . Rather, the unique ice cream in each s' cells has to satisfy it.

In the following two sections, I illustrate how the syntactic distribution and the semantic requirement of a group distributive reading follow from the semantics of situation partition.

4.1 Syntactic distribution: situation pronoun binding

Under this account, the fact that group distributive readings only appear with the prenominal “-zutsu” means that s_τ can get a value different from s only in the prenominal position. This falls under an independently motivated generalisation on situation pronoun binding, namely the *generalisation Y*.

- (25) **Generalization Y** (Percus 2000): The situation pronoun that an adverbial quantifier selects for must be co-indexed with the nearest λ above it.

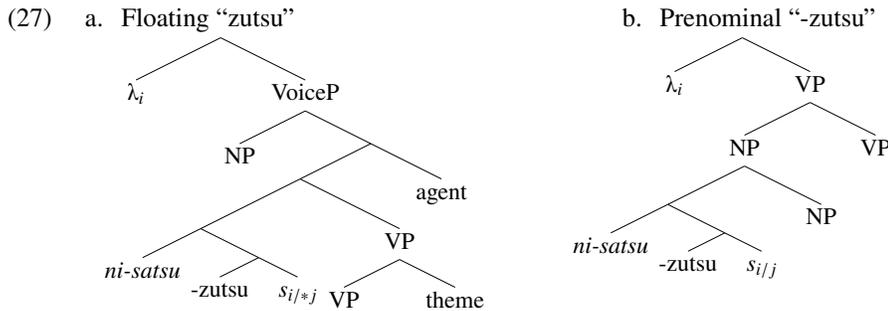
⁷I tentatively adopt Davidsonian n -ary event predicate, but I will later adopt Neo-Davidsonian event predicates. This difference does not matter as far as only group distributive readings concern.

This can be seen in the contrast between a quantifier in the nominal domain and a quantifier in the verbal domain.

- (26) a. **Many professors** were in kindergarten in the 80's.
 = Many professors now were in kindergarten in the 80's. (Musan 1995)
- b. In 1984, my syntax professor was **always** picked first for kickball.
 ≠ My syntax professor in 1984 is now always picked up first for kickball. (Keshet 2008)

(26a) has a reading analogous to (12): the predicate “being a professor” is evaluated in a different situation as the one described in the clause, namely a situation in the 80’s. If a situation pronoun can behave the same in the verbal domain, we expect a similar shifted reading for (26b). However, this is not the case. what “always” quantifies over should be part of the situation described in the clause, namely a situation in 1984, but cannot be part of situations other than this.

As long as “zutsu” takes a situation pronoun, a similar difference in binding should arise. This is what we have observed with “zutsu”: s_T that “zutsu” selects can take a contextual value in the nominal domain, but not in the verbal domain. This explains the availability of a group distributive reading at the prenominal position and the unavailability of it at the floating position. I assume that λ binder appear somewhere high in a clause.⁸



In principle, the situation pronoun can take the index i or j . When s takes i , it is bound by λ and thus gives rise to a non-shifted reading. When s takes j , its value is provided via an assignment function and thus gives rise to a shifted reading. In case of the floating “zutsu,” the generalisation Y force it to be bound by λ . Thus, it precludes the possibility of a group distributive reading. On the other hand, in case of the prenominal “zutsu,” the generalisation Y does not apply. So, it has no need to be bound by λ binder and can take a contextual value via an assignment function. This allows the prenominal “zutsu” to induce a group distributive reading.

4.2 Semantic restriction: uniquely identifiable matching function

“zutsu” requires there to be a uniquely identifiable matching function and the requirement for group nouns or contextually given membership comes from it. The semantics of group nouns provide a unique situation-individual pairing and this satisfies the distributivity presupposition. The contextually given membership provides an *ad hoc* mapping from situations to individuals.

I start with the semantics of group nouns. Pearson (2011) proposes that a certain class of groups nouns (*committee nouns* in her term) are predicates of individual concepts. She points out a similarity between group nouns and kind referring nouns.

- (28) a. **The president of US** always has big feet. (COLLECTION)
- b. **Elephants** always have big feet. (KIND)

(Pearson 2011)

⁸As its exact position does not matter in this paper, I do not specify where it occurs. For the same reason, I omit relevant higher projection such as TP or CP.

In (28), “always” successfully quantify over a variable, even though the predicate “has big feet” is an individual level predicate. Although individual level predicates constantly applies to an individual and thus incompatible with adverbial quantification, the well-formedness of (28) naturally follows if the subject can have different extensions in different times. Exactly the same intuition lies behind the contextual membership. The situation term (worlds in Pearson (2011)) in the denotation of these nouns ensures the covariance between situations and individuals. This pairing of situations and individuals provide a uniquely identifiable situation-individual mapping and this satisfies the distributivity presupposition .

If a noun does not have its situation term, it relies on an *ad hoc* situation-individual mapping. In the tablet scenario, the context conveys the way how the speaker takes tablets: whenever the speaker takes medicine these days, the speaker always takes three types of tablet. Again, here one can see that there is a uniquely identifiable function from medicine taking situations to sets of three tablets. This function satisfies the distributivity presupposition.

In the next section, I come back to the “classical” distributive readings, namely individual distributive readings and occasion distributive readings. The gist is that one can also identify a uniquely identifiable matching function with a thematic relation. In that case, situation partition offers a weak truth condition which covers both of an individual distributive reading and an occasion distributive reading.

5 Situation partition with respect to Distribution over individuals or occasions

I have shown that the situation partition gives us a group distributive reading at the prenominal position. On the other hand, I show that situation partition gives us a weak truth condition which covers both an individual distributive reading and an occasion distributive reading⁹ at the floating position. First, I assume Neo-Davidsonian logical form based on the possibilistic version of situation semantics. Kratzer (1998, 2007b) argues that events are situations which *exemplify* a proposition.

(29) **Exemplification** (Kratzer 1989, 2007b; Schwarz 2009):

A situation s exemplifies a proposition p , iff p is true in s , and

- a. there is no s' such that p is true in s' and s' is part of s , or
- b. for all s' which is part of s , p is true in s' .

A situation s exemplifies a proposition p if p is not true in any part of s or p is true in any part of s . I use $\text{EXEM}(s)(p)$ to notate it. She also defines *broad exemplification*. If situations s' all exemplify p , then the sum of these situations s' broadly exemplifies p .¹⁰ Based on this, I assume the following eventive predicates. Events are just situations which are lexically required to exemplify a proposition.

- (30) a. Eventive predicates $V: \lambda s [\text{EXEM}(V)(s)]$
- b. Thematic roles $\theta: \lambda p \lambda x \lambda s : \text{EXEM}(p)(s). [\theta(s) = x \& p(s)]$

Now, I show how individual distributive readings and occasion distributive readings are derived. (31) has an individual distributive reading and an occasion distributive reading.

- (31) Wataru-to-Yasu-ga hon-o ni-satsu-zutsu ka-tta.
Wataru-and-Yasu-NOM book-ACC 2-CL_{Volumes}-DIST buy-PAST
- a. ‘Wataru and Yasu bought two books each.’ (INDIVIDUAL DISTRIBUTIVE)
- b. ‘Wataru and Yasu bought two books at each salient occasion.’ (OCCASION DISTRIBUTIVE)

Recall that the Generalisation Y makes s_τ have the same index as s at the floating position. Accordingly, the resulting LF is equivalent to (32), in which s_τ is replaced with s and $x \sqsubseteq s$ is omitted because it is trivially true. The distributivity presupposition is now understood as requirement that the THEME relation maps each situation to a different unique participant.

⁹It is inspired by Cable (2014), whose proposal derives a weak truth condition which can be true under either scenario.

¹⁰The intuition behind it seems similar to that of lexical cumulativity.

- (32) a. ASSERTION: $\lambda s \exists x [\text{AGENT}(s) = \text{Wataru+Yasu} \ \& \ * \text{book}(x)(s) \ \& \ \text{THEME}(s) = x \ \& \ \text{EXEM}(*\text{buy})(s) \ \& \ \forall s'' [s'' \in \text{Part}(s) \rightarrow \text{VOLUME}(\text{M}(s''))]]$
 b. $\text{DIST}(\lambda x \lambda s [\text{THEME}(s) = x \ \& \ \text{EXEM}(*\text{buy})(s)])(s)$

(32a) involves an existential claim as its first conjunct and a universal claim as its second conjunct. The first conjunct expresses a cumulative reading between the plural individual and the largest situation and the second claim expresses that this large situation is uniformly partitioned into smaller pieces each of which has a unique set of two books, which is specified by the presupposed matching function M. For example, this condition is met in the following scenarios.¹¹

s	Wataru+Yasu	books (x)
s'_1	Wataru	two books (x'_1)
s'_2	Yasu	two books (x'_2)

Table 2: An individual reading.

s	Wataru+Yasu	books (x)
s'_1	Wataru+Yasu	two books (x'_1)
s'_2	Wataru+Yasu	two books (x'_2)

Table 3: An occasion reading.

6 Conclusion

I have introduced the third kind of distributive reading with “-zutsu” in Japanese, which I call group distributive readings. It evaluates distributivity in a situation other than the situation where the rest of a clause evaluated. The proposed situation-based account provide a natural account for this shifted evaluation and also explains its syntactic distribution and semantic restriction. Syntactically, it only appears at the prenominal position because s_τ can only get a contextual value in the nominal domain. Semantically, it requires some contextual membership so that it provides a uniquely identifiable matching function.

This situation-based account is naturally expanded to distributive readings within the verbal domain, namely individual distributive readings and occasion distributive readings. The discrepancy between the two situation variables, namely s_τ and s is not observed in the verbal domain any more due to the Generalisation Y. Also, thematic relation provides a uniquely identifiable function. Accordingly, the universal claim for cardinality is evaluated in the current situation, too. This works as a partition of a large cumulative situation into uniform smaller pieces. In this way, the proposed situation-based analysis provides a unified account for all the three readings.

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¹¹Note that these situation have already required to be minimal in some sense.

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