Situation partition and shifted evaluation of distributivity[1]

Takanobu Nakamura — *The University of Edinburgh*

Abstract. In this paper, I discuss what I call *group distributive readings*. Japanese has a distributor "zutsu," which can occur at the prenominal position or at the floating position. When it occurs at the prenominal position, distributivity is evaluated in a situation other than the situation in which the rest of the clause is evaluated. To account for this shifted evaluation of distributivity, I propose that "zutsu" partitions a situation and the shifted evaluation of distributivity comes from the presence of a situation pronoun. The syntactic distribution of group distributive readings follows from an independently motivated generalisation on situation pronoun binding. In addition, this situation-based account makes better predictions for the semantics of canonical distributive readings than previous analyses do.

Keywords: Distributivity, Overt distributors, Situation semantics, Situation pronoun, Japanese

1. Introduction

A language usually has an overt distributor, which forces a distributive construal of the sentence in which it appears. Zimmermann (2002) points out that those distributors are classified into two: those which only distribute over individuals and those which can also distribute over contextually salient occasions. For example, (1) and (2) show a contrast between "each" in English and "jeweils" in German. "each" only distributes over individuals and thus is incompatible with a singular subject as shown in (1b), whereas "jeweils" in German can distribute over contextually salient occasions and is compatible with a singular subject as shown in (2b). I call (2a-i) an *individual distributive reading* and (2a-ii) an *occasion distributive reading*.

(1) a. Ann and Belle **each** carried three suitcases.
b. *Ann **each** carried three suitcases.

(2) a. Ann und Belle haben **jeweils** drei Koffer getragen.
Ann and Belle have DIST three suitcases carried
i. "Ann and Belle have carried three suitcases each."
ii. "Ann and Belle have carried three suitcases each time."
b. Ann hat **jeweils** drei Koffer getragen.
Ann have DIST three suitcases carried
"Ann has carried three suitcases each time."

In this paper, I propose a situation-based analysis of JEWEILS-type distributors. To support this, I discuss a distributor "zutsu" in Japanese and show that it has the third type of distributive reading which I call *group distributive readings*. The main idea is that different readings are tied with difference in the ways to resolve a situation pronoun encoded in "zutsu." The gist of the analysis is summarised in (3).

[1]I would like to thank to Wataru Uegaki and Rob Truswell for discussing this topic with me from the earliest stage of this work. Also, I would like to thank to the organisers of Sinn und Bedeutung 25 for organising such an exciting conference despite the unusual occasion. Lastly, I would like to thank to Kenta Mizutani and Hiromune Oda for helpful comments with insightful suggestions. All remaining errors are, of course, mine.

 In: P. G. Grosz, L. Martí, H. Pearson, Y. Sudo, and S. Zobel (eds.) *Proceedings of Sinn und Bedeutung 25*, pp. 684–701. University College London and Queen Mary University of London.

(3) The idea in a nutshell
   a. "zutsu" partitions the value of a situation pronoun s_τ into smaller sub-situations s'.
   b. Partition of a situation is uniquely determined in a given context.
   c. In the verbal domain, s_τ takes the same situation as the clausal denotation, but in the nominal domain, it can take a contextually salient situation.
   d. Individual / occasion distributive readings are derived in the former case and group distributive readings are derived in the latter case.

An advantage of this analysis is that the important properties of "zutsu" come from independently motivated principles in situation semantics. Thus, it reduces construction-specific mechanisms to more general mechanisms. At the same time, it suggests that overt distributors can offer a new playground for situation semantics.

2. Distributor "zutsu" and group distributive readings

Japanese has a distributor "zutsu." It allows both an individual distributive reading and an occasion distributive reading.[2]

(4) Karera-ga kaban-o san-ko-**zutsu** hakon-da.
they-NOM suitcase-ACC 3-CL$_{things}$-DIST carry-PAST
   a. "They carried three suitcases each."
   b. "They carried three suitcases each time."

Only an occasion distributive reading is available with a singular argument.

(5) Shun-ga kaban-o san-ko-**zutsu** hakon-da.
Shun-NOM suitcase-ACC 3-CL$_{things}$-DIST carry-PAST
"Shun carried three suitcases each time."

Although "zutsu" behaves in parallel with "jeweils" so far, "zutsu" has yet another reading, which has gathered little attention.[3] Consider (6).

(6) Daiki-ga ni-hon-**zutsu**-no aisu-o tabe-ta.
Daiki-NOM 2-CL$_{bars}$-DIST-GEN ice cream-ACC eat-PAST
"Daiki ate two-bar ice cream."
$\rightsquigarrow$ the kind of ice cream Daiki ate generally comes in two bars.

I call it a *group distributive reading*. This reading is neither an individual distributive reading nor an occasion distributive reading. First, this reading is compatible with a singular argument as shown in (6). Thus, it is not an individual distributive reading. Second, (6) does not entail that Daiki ate two ice cream bars at different occasions. Thus, it is not an occasion distributive reading. Intuitively, this reading evaluates distributivity in a situation other than the one in which the rest of the clause is evaluated. To see this, consider the truth value of (6) under the two scenarios in (7).

[2]In this paper, I focus on "zutsu." However, Japanese has other types of distributors which do not allow an occasion distributive reading. For example "sorezore" only allows an individual distributive reading.
[3]Miyamoto (2009) discusses this kind of readings of "zutsu," but does not put much focus on its semantic aspect.

(7) Daiki went to a supermarket and bought some ice cream. He bought two kinds of ice cream bars: Papico, which comes with two popsicles[4] and Häagen-Dazs ice cream bars, which come with just one bar.

a. Scenario 1: Daiki ate two Häagen-Dazs ice cream bars. ⇒ **(6) is false**

b. Scenario 2: Daiki split one Papico into two and ate one of them. ⇒ **(6) is true**

In (7a), Daiki ate two ice cream bars, but the kind of ice cream Daiki ate, i.e. Häagen-Dazs ice cream bars, does not generally come in two bars. In this scenario, (6) is judged false. On the other hand, in (7b), Daiki ate just one ice cream bar, but the kind of ice cream Daiki ate, i.e., Papico, generally comes in two bars. In this scenario, (6) is judged true. Thus, distributivity is still evaluated in the truth-conditional component, but it is evaluated in a shifted situation.

3. Properties of group distributive readings

3.1. Syntactic distribution

"zutsu" can occur in at least two positions in a clause. Among them, only the prenominal "zutsu" has a group distributive reading.

(8) a. Floating "zutsu":

Wataru-ga aisu-o (kinoo) ni-hon-**zutsu** tabe-ta.
Wataru-NOM ice cream-ACC (yesterday) 2-CL$_{bars}$-DIST eat-PAST

i. "Wataru ate two bars of ice cream each time (yesterday)."

ii. *"Wataru ate a two-bar ice cream (yesterday)."
⇝ the kind of ice cream Wataru ate generally comes in two bars.

b. Prenominal "zutsu":

Wataru-ga ni-hon-**zutsu**-no (*kinoo) aisu-o tabe-ta.
Wataru-NOM 2-CL$_{bars}$-DIST-GEN (yesterday) ice cream-ACC eat-PAST

i. *"Wataru ate two bars of ice cream each time (yesterday)."

ii. "Wataru ate a two-bar ice cream (yesterday)."
⇝ the kind of ice cream Wataru ate generally comes in two bars.

The prenominal "zutsu" can co-occur with a floating numeral quantifier. (9) has a consistent reading despite the co-occurrence of two different cardinals.

(9) Wataru-ga ni-hon-**zutsu**-no aisu-o i-ppon tabe-ta.
Wataru-NOM 2-CL$_{bars}$-DIST-GEN ice cream-ACC 1-CL$_{bars}$ eat-PAST
lit"Wataru ate one bar of a two-bar ice cream."

On the other hand, the floating "zutsu" only has an inconsistent reading when it co-occurs with another floating numeral quantifier as shown in (10). It suggests that the floating "zutsu" lacks group distributive readings.

(10) * Wataru-ga aisu-o ni-hon-**zutsu** san-bon tabe-ta.
Wataru-NOM ice cream-ACC 2-CL$_{bars}$-DIST 3-CL$_{bars}$ buy-PAST
lit"Wataru ate two each and three bars of ice cream."

[4]This is sold only in Japan. A papico consists of a pair of popsicles which are connected to each other.

3.2. Semantic restriction

Group distributive readings require a certain kind of grouping. For example, in (6), it does not suffices that the ice cream bar Daiki ate comes in twos, but (6) 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, group nouns lexically provide such knowledge of group membership. In (11), distributivity is over such groups of police teams. Again, this distribution over sub-teams is not necessarily evaluated in the current situation and (11) can be true even if the thug assaulted just one of a three-member police team.

(11) 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-member police team."
$\rightsquigarrow$ the police officers formed three-member sub-teams.

The floating "zutsu" in the same environment does not have the inference in (11) and (12) is false if the thug assaulted just one of the police team.

(12) 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."
$\not\rightsquigarrow$ the police officers formed three-member sub-teams.

It is harder for a non-group noun to induce a group distributive reading out of the blue. For example, a group distributive reading is degraded with "keikan" (police), the non-group counterpart of "keikantai" (police team).[5]

(13) ? 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 nouns can have a group distributive reading if the context supports an *ad hoc* group membership. In (14), a certain portioning of tablets creates a context for a group membership among units of three tablets and it licenses a group distributive reading.

(14) a. Context: I take three tablets every 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?"

[5]Wataru Uegaki (p.c.) judged it grammatical with contexts. For example, if police officers are patrolling in threes, (13) is fine for him. This is a context which provides an *ad hoc* membership and is in parallel with (14).

4. Situation semantics

4.1. Domain restriction and minimality

I adopt the possibilistic version of situation semantics (Kratzer, 1989; Elbourne, 2005: *et seq*).

(15) a. a proposition p is a set of situations: $p = \{s_1, s_2, ...\}$
b. the part-whole relation $\sqsubseteq$ is defined for situations.
c. individuals are part of situations.

Situation semantics provides partiality to the evaluation of a proposition so that it is relative to a particular part of a world, instead of the entirety of a world. This partiality provides a way to restrict the domain of quantification to evaluate the uniqueness requirement of definite descriptions.

(16) a. **The earth** is round. ⇒ unique in a world
b. **The prime minister** visits a hospital. ⇒ unique in a country
c. **The bathroom** is currently out of use. ⇒ unique in a house

In the examples in (16), the uniqueness presupposition of the definite description is satisfied relative to a particular situation. For example, there are plenty of bathrooms in a world, but if (16c) is uttered in a house with one bathroom, the definite description "the bathroom" can felicitously refer to it. This uniqueness relativised to a situation plays a crucial role in the situation semantic analyses of *donkey sentences*.

(17) Every farmer who owns a donkey cherishes **the donkey**.

(17) talks about multiple farmer-donkey pairs and thus one cannot determine a unique donkey in this situation. And yet, one can find a unique donkey if one restricts attention to the *minimal* situations each of which just contains a farmer and a donkey. Thus, the restrictor of "every' introduces minimal situations and the uniqueness presupposition of "the donkey" is satisfied relative to these minimal situations. The minimality of a situation is defined with the notion of *exemplification*. I use $\textsc{exem}(p)(s)$ to notate it.[6]

(18) **Exemplification** (Kratzer, 1989, 2007b; Schwarz, 2009):
A situation s exemplifies a proposition p, iff p is true in s, and (i) there is no s' such that p is true in s' and s' is part of s, or (ii) for all s' which is part of s, p is true in s'.

Now, the denotation of (17) is given as in (19).

(19) $\lambda s \forall s' \forall x [[s' \sqsubseteq s \,\&\, \textsc{exem}(\lambda s \exists y [\text{farmer}(x)(s) \,\&\, \text{donkey}(y)(s) \,\&\, \text{own}(x)(y)(s)])(s')]$
$\rightarrow \exists s'' [s' \sqsubseteq s'' \sqsubseteq s \,\&\, \text{cherish}(x)(\iota_y.[\text{donkey}(s'')(y)])(s'')]]$

[6] If situations s' all exemplify p, then the sum of these situations s' *broadly exemplifies* p (Kratzer, 2007b). I do not distinguish exemplification and broad exemplification in this paper and use the same notation.

In this way, uniqueness relativised to minimal situations can correctly predict the availability of definite descriptions in donkey sentences.[7]

4.2. Situation pronoun and matching function

I adopt two common mechanisms in situation semantics, namely *situation pronoun* and *matching function*. The notion of *situation pronouns* plays a crucial role in situation semantics to analyse evaluation of quantificational DPs in a shifted world or time (Percus, 2000; Keshet, 2008, 2010; Schwarz, 2009, 2012: a.o.). For example, "every" can evaluate its restrictor in a situation other than the rest of the clause, whereas it is not possible with existential constructions.

(20) a. Every fugitive is in jail. (Enç, 1986)
b. # There is a fugitive in jail. (Musan, 1995).

Under the situation semantic framework, it is due to a situation pronoun s_τ. Just like an ordinal pronoun, situation pronouns can either be bound by a syntactic binder or take a contextual value via an assignment function. In (20a), s_τ takes a contextual value to avoid contradiction as represented in (21).

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

Matching function is originally proposed in Rothstein (1995) to capture co-variance between two events in cases of adverbial quantification. Later, Kratzer (2004) and Schwarz (2009) utilise it to capture covariance between situations and individuals, too. For example, in the most natural reading of (22a), everyone has a different set of jobs.

(22) a. Everyone finished every job.
b. $\mathrm{M}(s) = x \Leftrightarrow s$ is a situation that contains every job assigned to x as well as x, but no other relevant individual y. (Schwarz, 2009)
c. $\lambda s \forall x[\text{person}(x)(s) \rightarrow \exists s'[s' \sqsubseteq s \,\&\, \mathbf{M(s')} = \boldsymbol{x} \,\&\, \forall y[\text{job}(y)(s') \rightarrow \text{finished}(y)(x)(s')]]]$ (Kratzer, 2004)

The matching function M makes sure that there is one-to-one correspondence between individuals and sub-situations s' of s. For example, (22b) is the relevant matching function in (22a). This function is defined for sub-situations s' of s, which restrict the domain of quantification for the second "every." Thus, it guarantees co-variation between people and sets of jobs.

Looking ahead a bit, these situation semantic devises are crucial to a situation-based analysis of "zutsu" in the way summarised in (23).

(23) a. An independently motivated binding constraint on a situation pronoun explains the syntactic distribution of group distributive readings.
b. Different ways to identify a matching function in contexts correspond to different types of distributive readings.

[7] I do not discuss more precise details of situation semantic analyses on donkey sentences. The main point in this section is that the notion of minimal situations is a standard tool in situation semantics.

4.3. Types and composition

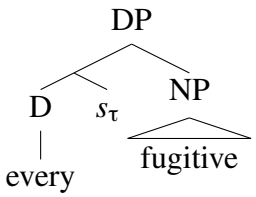
Schwarz (2009) assumes that denotations of nominal predicates are of type $\langle e, st\rangle$. More generally, denotations of lexical items have the type $\langle \alpha, st\rangle$, whereas strong determiners are of type $\langle s, \langle\langle e, st\rangle, \langle\langle e, st\rangle, st\rangle\rangle\rangle$.[8]

(24) a. $[\![fugitive]\!] = \lambda x \lambda s\,[\text{fugitive}(x)(s)]$

b. $[\![every]\!] = \lambda s_\tau \lambda \mathrm{P} \lambda \mathrm{Q} \lambda s \forall x \forall s' [[s' \sqsubseteq s_\tau \,\&\, \textsc{exem}(\mathrm{P}(x))(s')]] \rightarrow \exists s'' [s' \sqsubseteq s'' \sqsubseteq s_\tau \,\&\, \mathrm{Q}(x)(s'')]]$ (Schwarz, 2009, 2012)

As a result, the situation pronoun s_τ always occurs as the sister of a strong determiner, D^0.

(25)



This contrasts with Percus (2000) and Keshet (2008, 2010). They assume that denotations of nominal predicates are of type $\langle s, et\rangle$. More generally, they assume that lexical items have the type $\langle s, \alpha\rangle$. As a result, situation pronouns are freely inserted in syntax and their distribution is governed by an independent principle.[9]

Although both type systems would work for my purpose, I adopt Schwarz's type system in this paper. The main reason is that Schwarz's type system makes it easy to translate event semantic notions to situation semantics as shown in §6.[10]

5. Proposal

5.1. Partitioning situations

I propose partitions (Schwarzschild, 1996) of situations. "$\oplus$" stands for the *generalised sum*, i.e. the sum of all the members of a given set.

(26) Part(s) is partition of a situation s iff

a. $\text{Part}(s) \subseteq \{s' : s' \sqsubseteq s\}$,

b. $\oplus\text{Part}(s) = s$ (COLLECTIVE EXHAUSTIVITY),

c. $\forall s' [s' \in \text{Part}(s) \rightarrow \neg\exists s'' [s'' \sqsubseteq s' \,\&\, s'' \in \text{Part}(s)]]$ (MUTUAL EXCLUSIVITY), and

d. $\exists!\mathrm{M} \forall s' [s' \in \text{Part}(s) \rightarrow \exists! x [\mathrm{M}(s') = x]]$ (FUNCTIONAL UNIQUENESS)

[8] I would like to thank Kenta Mizutani (p.c) for pointing out the issues of type systems in situation semantics and helpful discussions on this point.

[9] See Keshet (2008, 2010) for the principle of *Situation Economy*, which rules out a structure whenever there is a grammatical alternative with fewer situation pronouns.

[10] That being said, the proposed account is not perfectly harmonic with Schwarz's idea that situation pronouns always occur as the sister of a strong determiner as discussed in §7. Ultimately, a synthesised analysis of Schwarz's system and Keshet's system would serve as an ideal mechanism for the proposed account, though I leave it for future work.

(26d) is the requirement unique to partitions of a situation. It requires a **uniquely identifiable** matching function M, which relates situations with individuals. In other words, Part(s) specifies a unique individual in each of its members via a contextually given matching function. I assume that these three defining properties of Part(s) are presupposed as shown in (27). I call it the *distributivity presupposition*, DIST. "|DOM(M)| > 1" makes sure that partition is not vacuous.

(27) $\text{DIST(P)}(s) \Leftrightarrow$
$\exists!\text{M}[\text{DOM(M)} \subseteq \{s' : s' \sqsubseteq s\} \,\&\, \text{RAN(M)} = \{x : \text{P}(x)(s)\} \,\&\, \oplus\text{DOM(M)} = s \,\&\, |\text{DOM(M)}| > 1$
$\&\, \forall s''[s'' \in \text{DOM(M)} \rightarrow \neg\exists s'''[s''' \sqsubseteq s'' \,\&\, s''' \in \text{DOM(M)}] \,\&\, \exists! y[\text{M}(s'') = y]]]$

The idea is that this distributivity presupposition defines a uniquely identifiable matching function M from s to P and Part(s) utilises it.

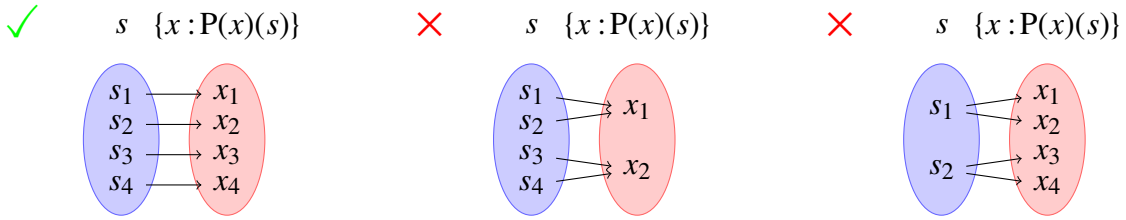


Figure 1: Bijective Figure 2: Overlapping Figure 3: Non-functional

Among the three types of mapping, only the bijective one meets the distributivity presupposition. On the other hand, the overlapping one violates mutual exclusivity and the non-functional one violates the functional uniqueness.[11]

I propose that the semantics of "zutsu" utilises situation partition. [[zutsu]] takes a situation pronoun s_τ, a measure predicate Q[12] and a predicate P to be distribute over. Then, it returns a predicate of the same type as P.

(28) $[[\text{zutsu}]] = \lambda s_\tau \lambda \text{Q}_{\langle et\rangle} \lambda \text{P}_{\langle e\langle st\rangle\rangle} : \text{DIST(P)}(s_\tau).$
$\lambda x \lambda s[\text{P}(x)(s) \,\&\, x \sqsubseteq s_\tau \,\&\, \forall s'[s' \in \text{Part}(s_\tau) \rightarrow [\text{P}(\text{M}(s'))(s') \,\&\, \text{Q}(\text{M}(s'))]]]$

Let's see how it works with (6). As a background assumption, I assume that some predicates are inherently *cumulative* (Krifka, 1989: *et seq*). I use * to indicate that a predicate P is cumulative.

(29) **Cumulativity**: For any entities $x_1, ..., x_n, y_1, ..., y_n$, if $\text{P}(x_1)...(x_n)$ and $\text{P}(y_1)...(y_n)$, then $*\text{P}(x_1 + y_1)...(x_n + y_n)$.

For example, the denotation of lexical verbs are inherently cumulative (Krifka, 1989; Landman, 1996; Kratzer, 2007a: a.o.). In addition, I assume that Japanese common nouns are inherently cumulative (Chierchia, 1998: a.o.).

[11] Note that if M uniquely maps s_1 to a plural individual $x_1 + x_2$ and s_2 to a plural individual $x_3 + x_4$, it does not violate the functional uniqueness.

[12] Any analysis of measure predicates is compatible with the proposed account as long as it takes an individual and returns a truth value. For example, one can alternatively assume that there is a covert mapping operator $\langle ed\rangle$ and measure predicates denote a set of degrees $\langle dt\rangle$.

The distributivity presupposition takes a nominal predicate "aisu" (ice cream) and the situation pronoun s_τ.

(30) $\textsc{dist}(*\text{ice cream})(s_\tau) \Leftrightarrow$
$\exists!\mathrm{M}[\textsc{Dom}(\mathrm{M}) \subseteq \{s' : s' \sqsubseteq s_\tau\} \& \textsc{Ran}(\mathrm{M}) = \{x : *\text{ice cream}(x)(s_\tau)\} \& \oplus\textsc{Dom}(\mathrm{M}) = s_\tau$
$\& |\textsc{Dom}(\mathrm{M})| > 1 \& \forall s''[s'' \in \textsc{Dom}(\mathrm{M}) \rightarrow \neg\exists s'''[s''' \sqsubseteq s'' \& s''' \in \textsc{Dom}(\mathrm{M})] \&$
$\exists!x[\mathrm{M}(s'') = x]]]$

It presupposes a uniquely identifiable matching function M from a set of some sub-parts of s_τ to ice cream that maps each sub-situation s' to a different unique unit of ice cream. The value of s_τ has to meet this requirement and it restricts the possible values of s_τ.

(31) $[[\text{zutsu}]](s_\tau)(\text{two bars})(\text{ice cream}) =$
$\lambda x \lambda s[*\text{ice cream}(x)(s) \& x \sqsubseteq s_\tau \& \forall s'[s' \in \text{Part}(s_\tau) \rightarrow [*\text{ice cream}(\mathrm{M}(s'))(s') \&$
$\textsc{bar}(\mathrm{M}(s')) = 2]]]$

The assertion makes three claims: first one is cumulative predication. 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 or a part of a member of the range of M. Third, for each sub-situation s', the unique individual which is P in s' satisfies the measure predicate Q. The denotation of the full clause is given in (32).[13]

(32) $[[(6)]] = \lambda s \exists x[*\text{eat(Daiki)}(x)(s) \& *\text{ice cream}(x)(s) \& x \sqsubseteq s_\tau \& \forall s'[s' \in \text{Part}(s_\tau) \rightarrow$
$[*\text{ice cream}(\mathrm{M}(s'))(s') \& \textsc{bar}(\mathrm{M}(s')) = 2]]]$

The distributivity presupposition forces s_τ to pick up a situation in which a uniquely identifiable matching function M from s_τ to ice cream can be defined. The situation in which Daiki ate ice cream is independent of s_τ, but "$x \sqsubseteq s_\tau$" makes sure that the ice cream Daiki ate is part of s_τ. The situation which s_τ takes as its value is partitioned based on the function M and the truth conditional component of "zutsu" checks if M returns a two-bar ice cream for each partitioned sub-situation. As a result, "tabe-ta" (ate) is evaluated with respect to s, but distribution over ice cream bars is evaluated with respect to s_τ. At the same time, the inference that the kind of ice cream Daiki ate generally comes in twos is derived from universal quantification over sub-situations of s_τ. This result of situation partition in (32) is visualised in Table 1.

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

Suppose that the blue part corresponds to s. The ice cream Daiki ate, i.e. ice cream $\text{bar}_{1,2,4}$, is part of s_τ. s_τ is partitioned so that each row contains two unique ice cream bars. This scenario satisfies the distributive presupposition and makes (32) true.

[13] Although I adopt Neo-Davidsonian event semantics under situation semantics in §6, I do not reflect that in (32) because it does not affect the discussion on group distributive readings.

5.2. Syntactic distribution and situation pronoun binding

The distribution of group distributive readings follows from an independently motivated generalisation on situation pronoun binding. λ is a situation pronoun binder in Percus (2000).[14]

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

This can be seen in the contrast between a quantifier in the nominal domain and a quantifier in the verbal domain. Quantificational DPs allow a shifted reading as shown in (34a), whereas adverbial quantifiers do not as shown in (34b).

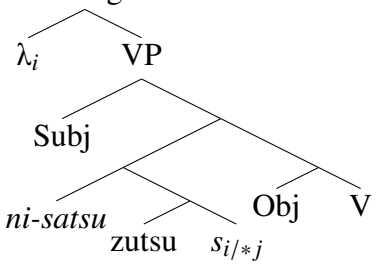
(34) a. **Many professors** were in kindergarten in the 80's.
= Many professors now were in kindergarten in the 80's. (Musan, 1995)

b. In 1984, my syntax professor was **always** picked first for kickball.
≠ My current syntax professor was always picked up first for kickball in 1984.
(Keshet, 2008)

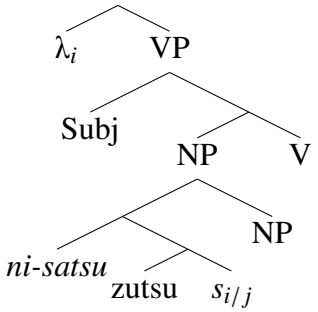
This difference in situation pronoun binding in the nominal domain and in the verbal domain is also observed in cases of "zutsu." s_τ that "zutsu" selects can take a contextual value in the nominal domain, but not in the verbal domain. This explains the availability of a group distributive reading at the prenominal position and the unavailability of it at the floating position.

At the floating position, the Generalisation Y requires s_τ be bound by the same λ as that of verbal predicate. Thus, s_τ cannot take a contextual value and has to be identical to s as in (35a).[15] On the other hand, "zutsu" does not obey the Generalisation Y at the prenominal position. Thus, s_τ can take a contextual value. The internal structure of an argument nominal is the same when the prenominal "zutsu" occurs in the subject position.

(35) a. Floating "zutsu"



b. Prenominal "zutsu"



When s_τ that the prenominal "zutsu" selects is bound by λ-binder, it induces a group distributive reading whose distributivity is evaluated in the same situation as the one in which the rest of

[14]Schwarz (2009, 2012) dispenses with λ binder. In his framework, clause-internally bound s_τ is bound by Σ operator (Büring, 2004). Changing λ to Σ does not affect the discussion here. Schwarz (2009, 2012) also dispenses with the generalisations on situation pronoun binding proposed in Percus (2000), but see §7 for the discussion.
[15]I omitted the nodes above VP and below λ binder in (35) because these are irrelevant to the discussion here.

the clause is evaluated.[16] For example, (36) is true if one rescue team formed three-member temporal sub-teams when they searched for victims. In this scenario, the team division is not inherent to the rescue team and is evaluated in a situation in which searching is evaluated.

(36) San-nin-**zutsu**-no kyuujotai-ga sounansya-tachi-o sousaku-sita.
3-CL$_{persons}$-DIST-GEN rescue team-NOM victim-PL-ACC search-PAST
"A rescue team searched for victims."
⇝ the rescue team formed three-member sub-teams when they search for victims.

Note that this reading is different from an individual / occasion distributive reading. Non-group distributive readings allow a co-varying reading as shown in (37), whereas such group distributive readings do not as shown in (38).[17]

(37) Kyuujotai-ga san-nin-**zutsu** chigau sounansya-o sousaku-sita.
rescue team-NOM 3-CL$_{persons}$-DIST different victim-ACC search-PAST
"A rescue team searched for different victims in threes."
a. Covariation: victims are different from each other.
b. No covariation: the victim is different from the one mentioned before.

(38) San-nin-**zutsu**-no kyuujotai-ga chigau sounansya-o sousaku-sita.
3-CL$_{persons}$-DIST-GEN rescue team-NOM different victim-ACC search-PAST
"A rescue team searched for a different victim."
⇝ the rescue team formed three-member sub-teams when they search for victims.
a. *Covariation: victims are different from each other.
b. No covariation: the victim is different from the one mentioned before.

Thus, the Generalisation Y correctly predicts the distribution of group distributive readings.

5.3. Semantic restriction and distributivity presupposition

There are several ways to provide a uniquely identifiable situation-individual pairing. The first one is the lexical semantics of group nouns. Pearson (2011) claims that group nouns have an additional intensional argument, which pairs different time-space to members of the group in it. In (39b), quantification with "always" is successful, even though the predicate "has big feet"

[16] I would like to thank Kenta Mizutani (p.c.) for pointing out that the Generalisation Y potentially leads to over-generation, but suggesting that there are actually two sub-cases of group distributive readings, which correspond to two possible ways to put an index to s_τ.

[17] They differ in which constituent "zutsu" attaches to. (37) partitions the denotation of an NP based on the team division given in the situation, whereas (38) partitions the denotation of a VP based on the agent relation. This leads to the contrast in availability of co-varying reading. Co-varying readings (*NP-internal readings* in the previous literature) of "different" require distributivity/plural predication (Carlson, 1987; Beck, 2000; Brasoveanu, 2011: a.o.). As the object "chigau sounansya" (different victim) is involved in plural predication only in (37), a co-varying reading is only available in (37). I do not work out the semantics of "chigau" (different) in this paper, but Beck's (2000) cover-based analysis of plural "different" can easily be implemented under the proposed account. For example, "chigau" (different) in (37) requires the value of M to be distinct for each members of Part(s).

is an individual level predicate. This is puzzling because individual level predicates constantly apply to an individual and are thus incompatible with adverbial quantification.

(39) a. # **John** always has big feet. (INDIVIDUAL)
b. **The Pearson family** always have big feet. (GROUP) (Pearson, 2011)

However, the well-formedness of (39b) naturally follows if the subject can have different extensions in different times. In the proposed account, every noun has the type $\langle e, st\rangle$, but I suggest that group nouns inherently come with a certain paring of situations and individuals. For example in (11), the group noun "keikantai" (police team) provides the relevant situation-individual pairing, which can satisfy the distributivity presupposition.

The second one is contextually given grouping. For example, (6) utilises the common knowledge of different kinds of ice cream, e.g., Papico generally comes in two popsicles. Also, the context in (14) specifies that every relevant tablet taking situation for the speaker must contain a set of three tablets. This provides a uniquely identifiable function from situations to tablets.

These two ways derive a group distributive reading. On the other hand, situation-individual pairs can also be provided by a thematic relation. In this case, individual distributive readings or occasion distributive readings arises.

6. "Classical" distributive readings

6.1. A unified analysis

At the floating position, situation partition derives a weak truth condition which covers both an individual distributive reading and an occasion distributive reading. To show this, I assume that events are situations which exemplify a proposition (Kratzer, 1998, 2007b). Accordingly, eventive predicates denotes sets of situations which obligatorily exemplify a proposition.

(40) a. Eventive predicates V: $\lambda s\,[\textsc{exem}(\mathrm{V})(s)]$
b. Thematic roles θ: $\lambda p \lambda x \lambda s : \textsc{exem}(p)(s).\,[\theta(s) = x \,\&\, p(s)]$

Now, both readings are derived from situation partition without additional mechanism. (41) has an individual distributive reading and an occasion distributive reading.

(41) Wataru-to-Yasu-ga hon-o ni-satsu-**zutsu** ka-tta.
Wataru-and-Yasu-NOM book-ACC 2-$\mathrm{CL}_{volumes}$-DIST buy-PAST
a. "Wataru and Yasu bought two books each."
b. "Wataru and Yasu bought two books each time."

Its denotation is given in (42).

(42) a. $[\![41]\!] = \lambda s \exists x [{}^{*}\textsc{agent}(s) = \mathrm{W}+\mathrm{Y} \,\&\, {}^{*}\mathrm{book}(x)(s) \,\&\, {}^{*}\textsc{theme}(s) = x \,\&\, \textsc{exem}({}^{*}\mathrm{buy})(s)$
$\&\, \forall s' [s' \in \mathrm{Part}(s) \rightarrow [{}^{*}\textsc{theme}(s) = \mathrm{M}(s') \,\&\, \textsc{exem}({}^{*}\mathrm{buy})(s') \,\&\, \textsc{volume}(\mathrm{M}(s')) = 2]]]$
b. $\textsc{dist}(\lambda x \lambda s [{}^{*}\textsc{theme}(s) = x \,\&\, \textsc{exem}({}^{*}\mathrm{buy})(s)])(s) \Leftrightarrow \exists!\mathrm{M} [\textsc{Dom}(\mathrm{M}) \subseteq \{s' : s' \sqsubseteq s\}$
$\&\, \textsc{Ran}(\mathrm{M}) = \{x : \lambda s [{}^{*}\textsc{theme}(s) = x \,\&\, \textsc{exem}({}^{*}\mathrm{buy})(s)]\} \,\&\, \oplus \textsc{Dom}(\mathrm{M}) = s \,\&\, |\textsc{Dom}(\mathrm{M})|$
$> 1 \,\&\, \forall s'' [s'' \in \textsc{Dom}(\mathrm{M}) \rightarrow \neg \exists s''' [s''' \sqsubseteq s'' \,\&\, s''' \in \textsc{Dom}(\mathrm{M})] \,\&\, \exists! x [\mathrm{M}(s'') = x]]]$

The Generalisation Y forces s_τ to be co-indexed with s. Accordingly, I replace s_τ with s and $x \sqsubseteq s$ is omitted because it is trivially true. The distributivity presupposition here is understood as a requirement that the theme relation maps a different unique participant to each situation. This is amount to the *Unique Role Requirement* (Carlson, 1984; Parsons, 1990; Landman, 2000).

(43) **The Unique Role Requirement**:
if a thematic role is specified for an event, it is uniquely specified.

Thus, the distributivity presupposition is trivially satisfied with the floating "zutsu."[18]

(42) is true iff Wataru and Yasu bought books and this situation can be partitioned into sub-situation each of which contains a unique set of two books. Table 2 and Table 3 show two possible scenarios in which (42) is true. Table 2 corresponds to an individual distributive reading and table 3 corresponds to an occasion distributive reading.

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

Table 2: An individual distributive scenario

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 distributive scenario

Thus, the proposed situation-based analysis derives a group distributive reading, an individual distributive reading and an occasion distributive reading in a unified manner.

6.2. Comparison with previous analyses

In this section, I review two types of analyses of JEWEILS-type distributors and compare the proposed account with them. Zimmermann (2002) and Champollion (2017) make crucial use of free variables whose values are contextually given. For example, Champollion (2017) defines "jeweils" as in (44). θ is resolved with a function from events, e.g., thematic relations, the runtime function τ and so on. C takes a contextually salient cumulative property.

[18]It is not uncontroversial if this is really a requirement. Krifka (1992) claims that the uniqueness of participants is not always guaranteed. For example, one "can see a zebra and, with the same event of seeing, see the mane of the zebra as well" (Krifka, 1992: p. 44). Interestingly, the floating "zutsu" is degraded with the verb of seeing. Note that readings which coerce seeing into other types of actions, e.g., appreciation, are not relevant here.

i. ?? Goro-ga shimauma-o ni-hiki-**zutsu** mi-ta.
Goro-NOM zebra-ACC 2-CL$_{animals}$-DIST see-PAST
"Goro saw two zebras each time."

This suggests that it is sometimes hard for some verbs to satisfy the distributivity presupposition. If this is the case, the uniqueness of participant is not always met and it supports Krifka's (1992) position.

(44) $[\![\textit{jeweils}]\!]^{\theta,C} = \lambda V_{\langle vt\rangle}\lambda e[e \in {}^*\lambda e'[V(e') \& C(\theta(e')] \& [C \neq \textsc{Atom} \rightarrow \oplus C = \theta(e)]]$

(Champollion, 2017)

With (44), (2a) denotes (45). When θ is resolved with the theme relation and C is resolved with Atom, an individual distributive reading arises. On the other hand, when θ is resolved with a relation other than the theme relation and C is resolved with some contextually salient property, an occasion distributive reading arises.

(45) $[\![(2a)]\!] = \exists e[{}^*\text{agent}(e) = \text{Ann+Belle} \& e \in {}^*\lambda e'[\exists x[{}^*\text{theme} = x \& 3 \text{ suitcases}(x) \& {}^*\text{carry}(e)] \& C(\theta(e')] \& [C \neq \textsc{Atom} \rightarrow \oplus C = \theta(e)]]$

Note that their analyses treat individual distributive readings and occasion distributive readings as distinct readings. On the other hand, Cable (2014) discusses distributive numerals in Tlingit and proposes that these readings are just sub-cases of a weak truth condition. His analysis uses two ingredients. First, a participant relation holds between an event and some thematic participant of it. Second, the *binary maximality operator* offers the maximal sum of pairs.

(46) a. **Binary maximality operator**: $\sigma\langle x,y\rangle.\text{R}(x)(y) = \langle\alpha,\beta\rangle$ such that $\langle\alpha,\beta\rangle \in {}^*\{\langle x,y\rangle : \text{R}(x)(y)\}$ if $\langle\gamma,\delta\rangle \in {}^*\{\langle x,y\rangle : \text{R}(x)(y)\}$, then $\gamma \sqsubseteq \alpha \& \gamma \sqsubseteq \beta$.

b. **Pair addition**: $\langle x_1,x_2\rangle + \langle y_1,y_2\rangle = \langle x_1+y_1, x_2+y_2\rangle$

With the notions of a participant relation and the binary maximality, the semantics of Cable (2014) gives (2a) the denotation (47). If there are two events e_1 and e_2 each of which has three suitcases as its theme, (47) is true. The scenario for an individual distributive reading (47b) and the scenario for an occasion distributive reading (47c) are two possible situations which make (47) true, but these are not distinguished in the semantic representation.

(47) $[\![(2a)]\!] = \exists y \exists e[{}^*\text{agent}(e) = \text{Ann+Belle} \& \& {}^*\text{theme} = y \& \text{carry}(e) \& \langle e,y\rangle = \sigma_{\langle e' z\rangle}.[z \sqsubseteq y \& 3 \text{ suitcase}(z) \& e' \sqsubseteq e \& \text{Participant}(e')(z)]]]$

a. $\langle e,y\rangle = \langle e'_1 z_1\rangle + \langle e'_2 z_2\rangle$

b. Individual distributive: agent = $\{\langle e'_1 \text{ Ann}\rangle, \langle e'_2 \text{ Belle}\rangle\}$

c. Occasion distributive: agent = $\{\langle e'_1 \text{ Ann+Belle}\rangle, \langle e'_2 \text{ Ann+Belle}\rangle\}$

Thus, these analyses differ in (i) whether the two readings are ambiguous or underspecified, and (ii) whether occasion distributive readings are context dependent. The proposed account differs from each of the previous analyses in one aspect, as summarised in Table 4.

	Two readings	Context dependency
Zimmermann (2002) Champollion (2017)	Ambiguous	Yes
Cable (2014)	Underspecified	No
The proposed account	**Underspecified**	**Yes**

Table 4: The comparison of the proposed account with the previous analyses

In the next section, I show that these are actually welcoming results.

6.3. Underspecification and context dependency

First, if individual distributive readings and occasion distributive readings are sub-cases of a weak truth condition, "zutsu" should allow a mixed reading between the two. This prediction is borne out.

(48) a. Scenario: Ken and Rika are receptionists in a hotel. Today, too many visitors arrived at the same time. So, they decided to allow at most two visitors to be in the reception. Sometimes, each of them deals with one visitor. Sometimes, they collectively deal with a couple. Sometimes, either Ken or Rika has to leave the reception and the other has to deal with two visitors at the same time.

b. Ken-to-Rika-ga kyaku-o huta-ri-**zutsu** sabai-ta.
Ken-and-Rika-NOM visitor-ACC 2-CL$_{persons}$-DIST deal with-PAST
"Ken and Rika dealt with visitors two by two."

(48a) involves neither pure distribution over individuals nor pure distribution over occasion. And yet, (48b) is judged true in this scenario. This provides another piece of evidence for the underspecification analysis of these two readings.

Second, contextual dependency of occasion distributive readings comes from the distributivity presupposition in the proposed analysis. If it is presuppositional, it should project. This prediction is borne out, too. One cannot felicitously deny an assertion with "zutsu" by negating plurality of situation as shown in (49b).

(49) a. Wataru-ga hon-o ni-satsu-**zutsu** kawa-naka-tta.
Wataru-NOM book-ACC 2-CL$_{Volumes}$-DIST buy-NEG-PAST
"Wataru didn't buy two books at each occasion."

b. # Nazenara, kare-wa ni-satsu-sika kawa-naka-tta kara-da.
Because, he-TOP 2-CL$_{Volumes}$-only buy-NEG-PAST because-COP
"This is because he only bought two (books)."

This is not the case that *zutsu* itself takes scope over negation. (50a) only makes a reading in which negation takes scope over "zutsu." In this scenario, (50b) is infelicitous. Compare it with (50c), which is also true in this scenario. .

(50) a. Scenario: A serial killer always targets a rich family and kills all but two of the family members so that those two will remember him forever.

b. # Sono-satsujinki-wa higaisya-o huta-ri-**zutsu** korosa-na-i.
the-serial killer-TOP victim-ACC 2-CL$_{person}$-DIST kill-NEG-PRES
"The serial killer does not kill two of the victims each time."

c. Sono-satsujinki-wa higaisya-o huta-ri-**zutsu** ikas-u.
the-serial killer-TOP victim-ACC 2-CL$_{person}$-DIST let survive-PRES
"The serial killer makes two of the victims alive each time."

Thus, the proposed account correctly predicts that the two readings are underspecified and that plurality of occasions are presupposed.

7. Remaining issue: the source of situation pronoun

So far, I have argued that "zutsu" relies on binding conditions on situation pronouns. There are two crucial assumptions I adopt in this paper.

(51) a. The semantic type of predicates is $\langle e, \langle st \rangle \rangle$ (Schwarz, 2009, 2012).
b. The generalisation Y (Percus, 2000).

However, these two assumptions are redundant. Once we assume that situation pronouns always occur with a strong determiner, the impossibility of shifted readings for items other than strong determiners naturally follows (Schwarz, 2009, 2012). If the prenominal "zutsu" occurs as a strong determiner, one can dispense with the Generalisation Y. However, there are two issues with this assumption. First, Japanese is a language which does not exhibit overt ϕ-agreement and generally allows bare arguments. Thus, it is quite unclear if "zutsu" should be classified as a determiner. Second, the idea that the prenominal "zutsu" co-occurs as a strong determiner makes "zutsu" an exceptional case for *Zimmermann's generalisation* (Zimmermann, 2002) stated in (52).[19]

(52) **Zimmermann's generalisation** (Zimmermann, 2002): A distributor which can occur as a determiner can only distribute over individuals, whereas a distributor which cannot occur as a determiner can also distribute over salient occasions.

We have seen that English "each" can only distribute over individuals, whereas German "jeweils" can also distribute over salient occasions. Now, we can see that this availability of occasion distributive readings correlates with their syntactic distribution. English "each" can occur as a determiner as shown in (53a), whereas German "jeweils" cannot as shown in (53b). If "jeweils" requires a situation pronoun and the sister of D^0 is the locus of situation pronouns, it is mysterious.

(53) a. **Each** boy carried three suitcases.
b. { Jeder / ***Jeweils** } Junge hat drei Koffer getragen.
{ Each.SG.MASC / DIST } boy has three suitcases carried
"Each boy carried three suitcases."

Thus, if the proposed situation-based analysis of "zutsu" is on the right track, it poses a challenge to Schwarz's reduction of the Generalisation Y. In this paper, I suggest that "zutsu" should be treated as an item which hosts a situation pronoun even though it is not a strong determiner. Although I do not go into the detailed solution in this paper, I tentatively propose that JEWEILS-type distributors lexically encode a situation pronoun in its denotation.[20] As a situation pronoun

[19] See Zimmermann (2002) and Champollion (2017) for languages which are in accordance with this generalisation. For example, Albanian, Dutch, French, Icelandic, Italian, Japanese, Norwegian, Portuguese, Russian, and possibly Latin have a EACH-type distributor, whereas Bulgarian, Czech, Polish, Romanian, and Russian have a JEWEILS-type distributor. Note that it is a variation among distributors, but not necessarily a variation among languages. For example, "jeder" in German is more like 'each" in English.

[20] Hiromune Oda (p.c.) pointed out that there is a correlation between whether a language allows a JEWEILS-type distributor and whether a language has the DP-layer. This correlation opens a possibility for cross-linguistic investigation of situation pronouns in languages without overt D^0, but I will leave it for future work.

is already encoded in the lexical semantics of "zutsu," the proposed account does not require D^0 in Japanese. In addition, Japanese does not pose a counterexample to Zimmermann's generalisation in this approach: "zutsu" occurs at the prenominal position, but not as D^0. It can also account for Zimmermann's generalisation itself. If JEWEILS-type distributors already have an "off-line" situation pronoun in the lexicon, their type does not have an additional slot for a situation pronoun, unlike strong determiners. Thus, they cannot occur at the same position as strong determiners.

8. Conclusion

The empirical contribution of this paper is to show that "zutsu" induces what I call a group distributive reading. Importantly, this reading shifts the evaluation of distributivity to a different situation. The theoretical contribution of this paper is proposal of a situation-based account of distributivity. As an advantage, the proposed situation-based analysis of "zutsu" derives all the three readings with just one lexical entry, interacting with an independently motivated generalisations on situation pronoun binding. In addition to this, it predicts that individual distributive readings and occasion distributive readings are not ambiguous, but just sub-cases of an underspecified reading and that the distributivity presupposition should be observable with a presupposition projection test. These two predictions are borne out, which renders more support for the proposed analysis. Lastly, I discussed a possible source of a situation pronoun for "zutsu." I suggest that JEWEILS-type distributors lexically encode a situation pronoun. It allows Japanese to feed a situation pronoun to "zutsu" without having D^0 and also derives Zimmermann's generalisation: JEWEILS-type distributors already have a situation pronoun and thus cannot co-occur with another situation pronoun at the sister position of D^0. Although it requires much more work, the discussion so far suggests that discussion on JEWEILS-type distributors serves as a new playground for situation semanticists.

References

Beck, S. (2000). The semantics of "different": Comparison operator and relational adjective. *Linguistics and Philosophy 23*(2), 101–139.

Brasoveanu, A. (2011). Sentence-internal different as quantifier-internal anaphora. *Linguistics and Philosophy 34*(2), 93–168.

Büring, D. (2004). Crossover situations. *Natural Language Semantics 12*(1), 23–62.

Cable, S. (2014). Distributive numerals and distance distributivity in Tlingit (and beyond). *Language 90*(3), 562–606.

Carlson, G. (1984). Thematic roles and their role in semantic interpretation. *Linguistics 22*(3), 259–280.

Carlson, G. (1987). Same and different: Some consequences for syntax and semantics. *Linguistics and Philosophy 10*(4), 531–565.

Champollion, L. (2017). *Parts of a whole: Distributivity as a bridge between aspect and measurement*. Oxford University Press, Oxford.

Chierchia, G. (1998). Reference to kinds across languages. *Natural Language Semantics 6*(4), 339–405.

Elbourne, P. (2005). *Situations and individuals*. MIT Press, Cambridge, MA.

Enç, M. (1986). Towards a referential analysis of temporal expressions. *Linguistics and Philosophy 9*(3), 405–426.

Keshet, E. (2008). *Good intensions: Paving two roads to a theory of the de re/de dicto distinction*. Ph. D. thesis, Massachusetts Institute of Technology.

Keshet, E. (2010). Situation economy. *Natural Language Semantics 18*(4), 385–434.

Kratzer, A. (1989). An investigation of the lumps of thought. *Linguistics and philosophy 12*(5), 607–653.

Kratzer, A. (1998). Scope or pseudoscope? Are there wide-scope indefinites? In S. Rothstein (Ed.), *Events and grammar*, pp. 163–196. Springer, Dordrecht.

Kratzer, A. (2004). Covert quantifier restrictions in natural languages. Talk given at Palazzo Feltrenelli, Gargnano, Italy.

Kratzer, A. (2007a). On the plurality of verbs. In J. Dölling, T. Heyde-Zybatow, and M. Schäfer (Eds.), *Event structures in linguistic form and interpretation*, pp. 269–300. Walter de Gruyter, Berlin.

Kratzer, A. (2007b). Situations in natural language semantics. In E. N. Zalta (Ed.), *Stanford Encyclopedia of Philosophy*. CSLI, Stanford.

Krifka, M. (1989). Nominal reference, temporal constitution and quantification in event semantics. In R. Bartsch, J. F. A. K. van Benthem, and P. E. Boas (Eds.), *Semantics and contextual expression*, pp. 75–116. De Gruyter Mouton, Berlin.

Krifka, M. (1992). Thematic relations as links between nominal reference and temporal constitution. In I. Sag and A. Szabolcsi (Eds.), *Lexical matters*, pp. 29–53. CSLI, Stanford.

Landman, F. (1996). Plurality. In S. Lappin (Ed.), *Handbook of Contemporary Semantics*, pp. 425–457. Blackwell, Oxford.

Landman, F. (2000). *Events and Plurality*. Kluwer Academic Publishers, Dordrecht.

Miyamoto, Y. (2009). On the nominal-internal distributive interpretation in Japanese. *Journal of East Asian Linguistics 18*(3), 233–251.

Musan, R. I. (1995). *On the temporal interpretation of noun phrases*. Ph. D. thesis, Massachusetts Institute of Technology.

Parsons, T. (1990). *Events in the Semantics of English*. MIT Press, Cambridge, MA.

Pearson, H. (2011). A new semantics for group nouns. In M.-B. Washburn, K. McKinney-Bock, E. Varis, A. Sawyer, and B. Tomaszewicz (Eds.), *Proceedings of the 28th West Coast Conference on Formal Linguistics*, pp. 160–168.

Percus, O. (2000). Constraints on some other variables in syntax. *Natural language semantics 8*(3), 173–229.

Rothstein, S. (1995). Adverbial quantification over events. *Natural Language Semantics 3*(1), 1–31.

Schwarz, F. (2009). *Two types of definites in natural language*. Ph. D. thesis, University of Massachusetts Amherst.

Schwarz, F. (2012). Situation pronouns in determiner phrases. *Natural Language Semantics 20*(4), 431–475.

Schwarzschild, R. (1996). *Pluralities*. Springer, Dordrecht.

Zimmermann, M. (2002). *Boys buying two sausages each: On the syntax and semantics of distance-distributivity*. Ph. D. thesis, University of Amsterdam.