

CHAPTER 4

DISTRIBUTIVITY AND DIFFERENTIATION: THE UNIVERSAL QUANTIFIERS *EACH* AND *EVERY*

Each and *every* are both universal quantifiers, in contrast to *most*, *some*, *a few*, etc. Sentences containing QPs headed by *each* and *every* make a claim about all the members of the set which is quantified over. *Each* and *every* are also distributive, while *all*– the other universal quantifier– and *most*, *some*, etc. are not. In many cases, *each* and *every* are interchangeable, but there are also a number of ways in which they differ. In particular, *each* seems to be more strongly distributive than *every*. In this chapter I present a linguistic analysis of the differences between *each* and *every* with respect to distributivity. The aim is to offer a level of discussion which is between a description of intuitions and a true formalization of the phenomena– an outline of what a semantic theory of *each* and *every* should capture.

4.1 Distributivity

Each and *every* are distributive in two ways. For one, they pick out the individual members of their restrictor set. When a quantified phrase headed by *each* or *every* is combined with a predicate, the predicate is understood as applying to each individual member in the quantified set rather than to the set as a whole. The primary evidence for this comes from investigating the types of predicates they can and cannot occur with.

The second way in which *each* and *every* are distributive is that they require multiple, or distributive, event structures, where the members of their restrictor set are associated with a number of different subevents. For instance, the basic meaning for a sentence like (1) is as follows: there is an event *e* and for each individual girl *g* in the set of girls there is a subevent *e'*

which is part of e such that in e' g sang. In a distributive event structure there are at least two different subevents.

(1) *Each/Every girl sang.*

Both *each* and *every* are distributive in the first sense of predicating subevents of individuals. The difference between *each* and *every* will be argued to be whether the event structure must be totally distributive or not; that is, whether all the subevents e' must be entirely distinct on some dimension. I will demonstrate that *each* requires total distributivity, while *every* merely requires partial distributivity.

I begin by showing that *each* and *every* distribute down to individuals. In section 4.1.2 I provide initial evidence for the claim that *each* and *every* require event distributivity. Sections 4.1.3 and 4.1.4 expand on event distributivity notion, presenting a continuum of distributive event structures. How *each* and *every* differ is the topic of §4.2.

4.1.1 Distributing Down to Individuals

Each and *every* can occur with distributive predicates but not with collective predicates. Purely collective predicates are predicates which can only be applied to groups or sums, with the interpretation of a collective action or collective state. Collective predicates cannot apply to single individuals. If *each* and *every* are analyzed as obligatorily distributing down to individuals, then the fact that they are not licensed with collective predicates follows straightforwardly.

Dowty (1987), in accounting for the distribution of *all* distinguished a number of predicate types, including collective 'cardinality' predicates like those in (2). (2c) is understood to mean that there is a situation containing a group of students and this group is large. Versions (a) and (b), which require applying the predicate to individual students, make no sense.¹

¹Both Roberts (1987a:5-6) and Lasersohn (1995:142-3) noted that these predicates do not completely lack distributive construals. The examples in (i) are ambiguous. In (i-a), it is possible for the group of students to be numerous on its own and the group of teachers to be numerous on its own, as well as the combined group of students and teachers to be numerous. In (b), from Roberts, there may have been numerous members in each species or many different kinds of species.

- (2) a. *Each/every student is numerous/is a large group.
 b. *One student is numerous/is a large group.
 c. The students are numerous/are a large group.

(Dowty 1987:100,102)

A second set of predicates which Dowty identified is collective predicates which have distributive ‘subentailments’ as part of their meaning, as in (3) and (4), based on examples from Dowty (1987:98,110).

- (3) a. *Each/every student is alike/gathered in the hall/met for lunch.
 b. *One student is alike/gathered in the hall/met for lunch.
 c. The students are alike/gathered in the hall/met for lunch.
 (4) a. *Each/every student dispersed/scattered in all directions.
 b. *One student dispersed/scattered in all directions.
 c. The students dispersed/scattered in all directions.

As with the other sentences containing collective predicates, *The students gathered in the hall* in (3c) does not entail that each student gathered individually. Yet it does place a requirement on each individual student, that s/he “must come to the hall and remain long enough that they are all there at a common time. Thus *gather* distributively entails some property of members of its group subject ... but *gathering* itself can only be true of the group *qua* group” (p. 101). Dowty suggested that distributive subentailments in a predicate are not enough to license *each* and *every*. They cannot appear with collective predicates **of any kind**– it is impossible for *each N* or *every N* to be interpreted as denoting a group in the way these predicates require. The examples in (3a) and (4a) support Dowty’s claim.²

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- (i) a. *The students and the teachers are numerous.*
 b. *The species were numerous.*

This does not affect the main point here: because *each* and *every* distribute down to individuals, and not to subgroups, they do not occur with these predicates.

²In contrast to *each* and *every*, *all* is licensed by a distributive subentailment. Dowty argued that in fact it requires one. Other quantifiers such as *several* and *many* pattern similarly, though there are some differences:

Gather seems to collectivize its object in a way similar to the way it collectivizes its subject:

- (5) a. *?*Vic gathered each/every towel from the bathroom.*
b. **Vic gathered one towel from the bathroom.*
c. *Vic gathered a bunch of towels from the bathroom.*

It has been difficult to find additional predicates which are obligatorily collective on their direct objects.

In contrast to the previous cases, QPs headed by *each* and *every* can occur with lexically distributive predicates, as in (6) through (8). These predicates only apply to individuals. When predicated of groups, they require distribution– the predicate applies to each individual member of the group. (6c), for example, can not be understood as saying that the group of girls fell asleep while the individual girls comprising the group did not.

- (6) a. *Each/every little girl fell asleep.*
b. *One little girl fell asleep.*
c. *The little girls fell asleep.*
- (7) *Each/every table in the showroom had a walnut finish.*
- (8) *Kim sharpened each/every pencil.*

That *each* and *every* are compatible with these predicates is expected: the predicates require individuals and that is exactly what phrases headed by *each* and *every* provide. In the next section predicates which are not lexically collective or distributive are considered.

A note on predicate types before moving on: I assume, following Roberts (1987a), that whether a predicate is distributive or collective or ambiguous follows from world knowledge and the sense of the predicate itself, rather being built into the lexical semantics as a feature. Predicates that are composed of multiple lexical items, such as *make a good team*, arguably do not

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- (i) a. **All the students/*many students are numerous/are a large group.*
b. *All the students/many students are alike/gathered in the hall/met for lunch.*
c. *All the students/*many students dispersed/scattered in all directions.*

(Dowty 1987:110)

See Dowty §6 for discussion.

have lexical entries, since their meanings can be obtained compositionally from their parts. Yet their distributive nature is clear. A group is required to make a team, so *make a good team* applies only to groups. The same is true of *win a relay race* but not of *win a 100 meter dash*, the latter being a distributive predicate (examples attributed to Barbara Partee).

4.1.2 Distributive Event Structures

With predicates which are not strictly collective or distributive, an *each N* or *every N* subject or object forces a distributive event structure. (9a) can be uttered truthfully about an event which is broken down into multiple events in which each girl lifted the package by herself, but it cannot be asserted truthfully about an event in which all the girls did the lifting collectively. When the subject or object denotes a group, as in (9c), the sentence can be true of a single event or of a distributive event. Adverbials such as *together* and *individually* can be used to draw out a one kind of event or the other.

- (9) a. *Each/every woman lifted the package up (*together/individually).*
b. *One woman lifted the package up.*
c. *The women lifted the package up (together/individually).*
- (10) a. *The Pope looked at each/every member of his flock (*at once).*
b. *The Pope looked at all the members of his flock (at once).*

((10) based on Beghelli & Stowell 1997:88)

Each and *every* are incompatible with predicates that describe once-only events, such as *tear down the sand castle* in (11). Since tearing down a particular sand castle can only happen once, an event structure involving multiple tearing-down events, as *each* and *every* require, is not available.

- (11) a. **Each/every boy tore down the sand castle.*
b. *One boy tore down the sand castle.*
c. *The boys tore down the sand castle (together/*separately).*

(based on Szabolcsi 1995:128-9)

Because *tear down* is once-only rather than collective like *gather* and *meet for lunch* in the preceding section, it can take a single individual as its subject. However, when the subject is a group the sentence can only be true of single events in which the group acted collectively. (See Szabolcsi & Zwarts (1993) for further discussion of this type of predicate).

The availability of a distributive event structure may depend on the common noun in the quantified phrase. *Surround* is often considered to be a purely collective predicate. For example, Beghelli & Stowell (1997:88), citing (12a) (which they rate as '?'), claimed that it requires an event with a semantically plural agent. But Szabolcsi (1997) noted this is not the case, offering example (13). She stated that "*surround* differs from *gather* ... in that... a single entity may surround something by forming a full circle on its own" (p. 129). (13a) is only acceptable on the concentric circles interpretation, where each estate individually surrounds the castle by forming a circle by itself.

(12) a. **Each/every boy surrounded the fort.*

b. **The boy surrounded the fort.*

c. *All the boys surrounded the fort.*

(13) a. *Each/every estate surrounds the castle.*

b. *The estate surrounds the castle.*

(both OK on concentric circles reading)

Since boys cannot form circles around forts individually (unless the fort in question a toy fort or the boy is a giant), (12a) and (b) are ruled out. Thus it is not always solely the predicate which determines whether *each* or *every* is licensed. I will return to this point below in §4.3.2.

I will now go on to sharpen the event distributivity concept. I begin by laying out my semantic assumptions.

4.1.3 Semantic Assumptions

Following Lasnik (1995) I assume that sentences denote sets of events and, as Bach (1986) proposed, the semantic domain of events has a part/whole structure much like the one ascribed

to the domain of individuals by Link (1983). For convenience, I use the term 'event' as a shorthand to refer to events, processes, and states.

Just as two individuals can combine to form a group, two events e_1 and e_2 can combine to form a third e_3 . If Ken paints a wall in e_1 and paints a door in e_2 , for example, then the combination of e_1 and e_2 is an event e_3 in which Ken paints both the wall and the door. The smaller events e_1 and e_2 are parts (or subevents) of the larger event e_3 .

Distributive and collective events have different part/whole. Consider a sentence with a predicate which is not purely collective or distributive, such as (14):

(14) *The girls pushed the wagon.*

Suppose there are two girls, g_1 and g_2 . An event e_3 in which g_1+g_2 push the wagon **distributively** must have as parts a smaller event e_1 in which g_1 pushes the wagon by herself and an event e_2 in which g_2 pushes the wagon by herself. On the other hand, an event e_4 in which g_1+g_2 push the wagon **collectively** does not have such subparts. Lasersohn (1988; 1995) provides one approach to how sentences are compositionally interpreted to make specific claims about such event structures.

4.1.4 A Distributive Event Continuum

Collective-distributive event structures form a continuous scale, with purely collective, non-distributive events at one end and completely distributive events at the other, and partially collective-partially distributive events in between. I borrow the term 'partial distributive' from Lasersohn (1995) to describe the latter, though he used it in a slightly different manner.³

³Lasersohn (1995:104-9) used the term for examples like (i). This sentence can be understood as saying that only part of the group of students asked questions, but those that did did so individually.

(i) *After the lecture the students asked questions.*

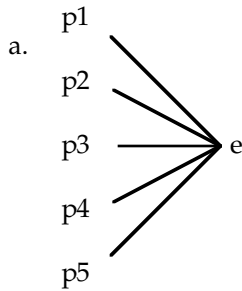
As I employ the term, partial distributivity is a level of distribution. It refers to the event being broken down into multiple parts, each of which may include one or more individuals.

Gillon (1987) and Schwarzschild (1991; 1996) have used the term 'intermediate' to describe the event structures which I call partially distributive. I use the latter phrase because I find it more descriptive. Gillon's and Schwarzschild's work are discussed in Tunstall (1998).

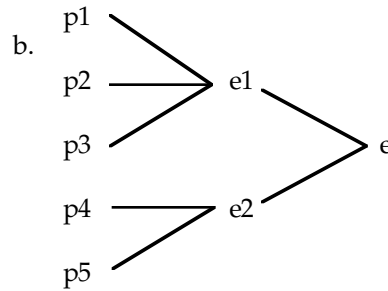
Consider the example in (15) and imagine that there are five relevant packages. The diagrams in (16) illustrate a number of events which (15) could be true of, which have different part-whole structures.

(15) *Mary lifted all the packages.*

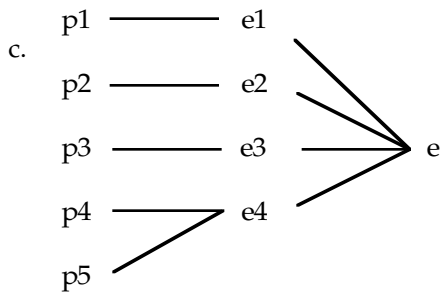
(16)



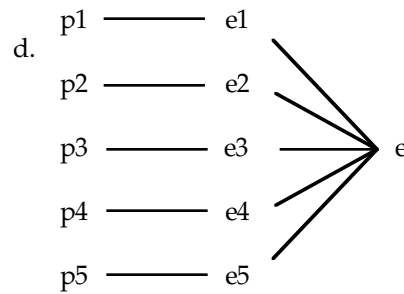
COLLECTIVE



PARTIALLY DISTRIBUTIVE



PARTIALLY DISTRIBUTIVE



COMPLETELY DISTRIBUTIVE

In the purely collective event in (16a), all of the packages are lifted together in one lifting event e , with Mary as agent. In the completely distributive event in (d), each package is mapped onto its own lifting subevent, indicating that Mary lifted the packages one at a time. These subevents are combined to form one larger event. The diagrams in (16b) and (c) show two different partially distributive events: all packages are associated with lifting subevents with Mary as agent, but the mapping is neither all-to-one nor one-to-one. In both instances there is some amount of distributivity, but in (c) there are some subevents of individual packages being lifted, while in (b)

distributivity is only down to subgroups of the packages.⁴ If *together* were added to (15)– *Mary lifted all the packages together*– the sentence could only be true of the collective event in (16a). If *individually* were added, the sentence could only be true of the completely distributive event in (16d).

Now that a range of distributive event structures has been identified, the obvious question is whether *each* and *every* require the same kinds of distributive event structures. I take up this issue in the following section.

4.2 *Each vs. Every*

It has long been claimed that *each* is more distributive than *every*. I will argue that this observation arises because *each* requires a completely distributive event structure while *every* only requires a partially distributive event structure.

4.2.1 *Each and Every on the Distributive Event Continuum*

Consider (17a) under the following scenario: if there are five apples and Ricky weighed each of a1, a2, and a3 by itself but weighed a4 and a5 together, *every* can be used felicitously to describe the situation but *each* cannot be. That is, *each* in (17a) requires a completely distributive event– no two apples can have been weighed in the same subevent. Similarly, *each* is appropriate in (18a) only if no two students were photographed together. The (b) versions, which deny total distributivity with the addition of *but not individually/separately*, sound quite odd with *each*. (Examples which are odd or infelicitous are marked with the symbol #.)

⁴I have simplified matters by not sketching scenarios where a given package is lifted more than once, but (16b) would still be a partial distributive scenario even if p3 were picked up in e2 as well as in e1.

- (17) a. Ricky weighed $\left. \begin{array}{l} \text{each apple} \\ \text{every apple} \\ \text{all the apples} \end{array} \right\}$ from the basket.
- b. Ricky weighed $\left. \begin{array}{l} \text{?# each apple} \\ \text{every apple} \\ \text{all the apples} \end{array} \right\}$ from the basket, but not individually.
- (18) a. Jake photographed $\left. \begin{array}{l} \text{each student} \\ \text{every student} \\ \text{all the students} \end{array} \right\}$ in the class.
- b. Jake photographed $\left. \begin{array}{l} \text{?# each student} \\ \text{every student} \\ \text{all the students} \end{array} \right\}$ in the class, but not separately.

For *each*, each affected object (apples or students here) must be acted upon individually in its own subevent, differentiated from the other subevents in some way. The apple situation outlined above cannot be described using *each* because there is no obvious way to distinguish the weighing of a4 from the weighing of a5.

Every, on the other hand, is happy with partial event distributivity, whether some of the objects are affected individually or they are only affected in subgroups. What is crucial for *every* is simply that there is some amount of distributivity. When *every* is used, (17) can be truthfully asserted about events in which there are at least two apple-weighing subevents involving two different subgroups of apples. Which apples were weighed together doesn't particularly matter.

4.2.2 Distributivity and Differentiation

The examples above demonstrated that *each* and *every* are only licensed in a sentence which denotes an event with a distributed part/whole structure, where the "main" event is divided into a number of subevents. In the case of *every*, the event must be at least partially distributive. This requirement is stated as the Event Distributivity Condition below (in informal terms):

(19) **The Event Distributivity Condition**

A sentence containing a quantified phrase headed by *every* can only be true of event structures which are at least partially distributive. At least two different subsets of the restrictor set of the quantified phrase must be associated with correspondingly different subevents, in which the predicate applies to that subset of objects.

For *each*, the distributivity requirement is stronger: the event must be completely distributed. In addition it is necessary that the subevents that make up the distributed event be differentiated in some way. These factors are incorporated into the Differentiation Condition, stated informally in (20):

(20) The Differentiation Condition

A sentence containing a quantified phrase headed by *each* can only be true of event structures which are totally distributive. Each individual object in the restrictor set of the quantified phrase must be associated with its own subevent, in which the predicate applies to that object, and which can be differentiated in some way from the other subevents.

The distributive nature of *every* and the differentiating nature of *each* are lexical properties, not shared by other quantifiers such as *all*, *most*, or *many*. I propose building the above conditions into the meanings of *each* and *every*. An initial formalization of these meanings is given in section 4.5.

To see how the conditions apply, first consider (21), which has a lexically distributive predicate:

(21) *Each/every girl is smiling.*

In order to satisfy *each's* Differentiation Condition, a subevent must be found for each girl in which that girl is smiling by itself: such a subevent is different from all other subevents of girls smiling at least in the identity of the girl (e.g. Emma in subevent e', Margaret in subevent e'', and Sara in subevent e'''). Since it is not possible for a group to smile while its individual members are not smiling, any girl that is smiling will be smiling in her own subevent. It might be possible to find a subevent in which three girls are smiling, but such an event can always be broken down into smaller subevents in which each girl is smiling alone. Such is the nature of smiling. Thus, because of the type of predicate in (21), the Differentiation Condition will be satisfied by any event in which all of the girls are smiling. Since *every's* Event Distributivity Condition is weaker than the Differentiation Condition, it will also always be fulfilled in such cases.

Consider now a sentence with a predicate which is in principle compatible with either collective or distributive event structures, such as *lifted*:

(22) *Jamie lifted each/every basket.*

Imagine an event e_1 in which Jamie lifted three baskets, one at a time. In that case, a different subevent e' can be associated with each basket, the number of basket-liftings will be three, and the Differentiation Condition and the Event Distributivity Condition will be satisfied. On the other hand, if Jamie lifted all of the baskets collectively in one lifting event e_2 , then the same subevent e' will be associated with every basket, and the number of basket-liftings will only be one. Since lifting is not obligatorily distributive, it does not follow that if three baskets are picked up together then each of them must have been picked up alone (vs. the case of sleeping). The Differentiation Condition and the Event Distributivity Condition will fail because a subevent e'' that is different from e' cannot be found. Finally, an event e_3 in two baskets are lifted together in one subevent e' and the third is lifted alone in another subevent e'' , will satisfy the Event Distributivity Condition but not the Differentiation Condition, since the lifting of basket₁ cannot be distinguished from the lifting of basket₂ in e' . Note that when the object in (22) is changed to *the baskets* or *three baskets*, the sentence can be truthfully asserted about any of the events just described (e_1 , e_2 , or e_3).⁵

The that *each* requires complete distributivity in (22) was upheld in a small informal survey where I asked six linguists what their understanding of the sentence was: Were the baskets lifted one at a time, a few at a time, or all together? All six informants reported that they understood the sentence to mean the baskets were lifted one at a time.

Differentiation is often based on time and space. When *each* is used in (18a) from the previous section, for example, it is easy to imagine that the students were photographed one by one, a few minutes apart. The adverbs *individually* and *separately* are generally interpreted with respect to space and time as well. Combining *not individually/separately* with *each*, therefore, frequently results in a contradictory statement: claiming both that there are subevents that differ on the

⁵When (22) is changed slightly to *Jamie managed to lift every basket (at once)*, it be true of a collective event like e_2 . In this case *every* is stressing universality– all the baskets were lifted, not just some of them– and distributivity is backgrounded. The phenomenon is discussed in §4.4.

space/time dimension and that there are no such subevents. But it is sometimes possible to differentiate subevents on other dimensions, keeping space and time the same. In such cases, adding *not individually/separately* does not yield a peculiar sentence. Moreover, the subevents can sometimes be differentiated simply by having a different object in each one, as long as there is enough interest in the individual objects. When (22) is passivized– *Each basket was lifted*– it does not seem necessary to have separate-in-time lifting events for the baskets.⁶

Consider why interest in the individual objects in the quantified set is sometimes necessary for *each*. I have suggested that *each* requires that all the subevents involving the individuals in the restrictor set be distinct from one another, whereas *every* merely calls for **some** of the subevents to be distinct. Depending on how fine-grained one lets the notion of distinctness get, however, *each*'s Differentiation Condition could always be trivially satisfied by having a different object in each subevent. In that case, *each* and *every* would not be making truth-conditionally distinct claims. A sentence with *each* could be truthfully asserted about exactly the same events which a sentence with *every* could be. In order to distinguish *each* and *every* something else is needed. The Differentiation Condition states that the subevents must be differentiated "in some way." If there is a pragmatic condition restricting this claim to interesting or relevant ways of differentiating, the cases of trivial satisfaction will be eliminated.

In other words, a speaker must have a reason for choosing to use *each* rather than *every*: to indicate that differentiation is important, that the individual objects are of interest, etc. There are various similar cases in language. For example, one needs a motive for saying *Paul cut the bread with a knife* rather than simply *Paul cut the bread*, since cutting bread is normally done with a knife. One possible reason for mentioning the knife outright is to be able to refer back to it in a subsequent sentence: *It was very sharp and Paul almost cut himself*. Without such a reason, the sentence which overtly refers to the knife sounds odd.

⁶This observation is due to Lyn Frazier (p.c.).

In section 4.3 I address how interest in differentiation can be raised and how differentiation is accomplished. Before turning to that discussion, I consider in a little more detail the question of why a language user might choose to use *each* rather than *every*, or vice versa.

4.2.3 Employing *Each* vs. *Every*

Although *each* and *every* are both universal distributive quantifiers, they have different shades of meaning, due (at least in part) to the difference between the Event Distributivity and Differentiation Conditions. As with other words, using a particular term implies a particular emphasis or way of looking at the situation described. *Each* is used to stress the distributive nature of the event and to emphasize that each member in the common noun set was affected individually, thus requiring total distributivity. *Every* is used to stress the universality or exhaustive nature of the event, so the distributive conditions are less stringent.

The view that *each* and *every* have different emphases is shared by various researchers. The Oxford English Dictionary, second edition (1989), in the entry for *every* states:

1. Used to express distributively the sense that is expressed collectively by *all*. ... In mod. usage, *every* directs attention chiefly to the totality, *each* chiefly to the individuals comprising it. It may also be observed that *each* usually refers to a numerically definite group, in contrast to the indefinite universality expressed by *every*: thus 'Each theory is open to objection' relates to an understood enumeration of theories, but 'Every theory is open to objection' refers to all theories that may exist. ...

3. With loss of distributive sense: = 'All possible,' 'the utmost degree of.' [E.g. the modern:] They showed him every consideration. There is every prospect of success.

Using *every* non-distributively (meaning 3) amounts to putting even more emphasis than usual on the universal part of its meaning. Examples of this usage are discussed in section 4.4 (see also fn. 5). The "numerical definiteness" of *each* and *every* refers to whether the set that they quantify over has been established in the discourse or not, i.e. whether the domain of quantification has been restricted by context or not. This issue is addressed briefly in section 4.7.

Vendler (1967:78) observes:

[There is] a marked difference in emphasis: *every* stresses completeness or, rather, exhaustiveness...; *each* on the other hand, directs one's attention to the individuals as they appear, in some succession or other, one by one. Such an individual attention is not required in vain: you have to *do* something with each of them, one after the other.

I take Vendler's last point to mean that there must always be a pragmatic reason for using *each*, as I suggested above. If not, employing *each* sounds odd. I would argue that the same is true when using *every* non-distributively.

4.2.4 Summary

I have argued that *each* and *every* differ with respect to the conditions they place on the subevents which are associated with the members of the sets they quantify over. *Every* requires there to be some amount of distributivity in the event structure, so that there at least two different subevents (the Event Distributivity Condition). *Each* imposes the stronger requirement that all the subevents be distinct on some dimension (the Differentiation Condition). Furthermore, there is a pragmatic condition on *each* that the subevents be differentiated in a meaningful or interesting way.

4.3 Differentiation

In this section differentiation is investigated in more detail. Various dimensions on which differentiation can be achieved are discussed. I also consider a series of pairs of sentences where *each* sounds odd in one case but not the other. I argue that the examples which produce oddness are those in which the pragmatic condition requiring interest in differentiation is not satisfied and therefore the Differentiation Condition fails because a relevant way cannot be found to differentiate the subevents.

4.3.1 How Differentiation Is Accomplished

Delimiting events, defining their dimensions is a vague affair, compared to delimiting individuals. Since the dimensions of events are not well-defined, we should not expect the differentiation of events to be completely well-defined either. Various factors should play a role in differentiating events, and speakers may have different intuitions on particular examples.

There is a similar vagueness in the meanings of *together* and *separately*. The togetherness or separateness is often conceived to be on the dimensions of time and space. But it is also possible for *together* just to mean “at the same time” and for *separately* to mean at a different time or in a different space but not both.

The best differentiation of subevents, i.e. the one most readily obtained, is usually with respect to time. Sentences (17a), (18a), and (22) discussed earlier are easily differentiated on the dimension of time. Space, manner, instrument and participants are other dimensions which are sometimes relevant. For instance, while sentence (23) is freely taken to mean that each potato was mashed at a different time (though you might wonder why it was done that way, an (admittedly odd) situation can be imagined in which differentiation is accomplished on the dimension of space. Suppose the potatoes are lined up on the counter, with space in between them, and a board is pressed on top of them, mashing them all at the same time. (Perhaps the mashing was done this way as an experiment to see how different kinds of potatoes fare when mashed.) Under these circumstances, (24) is not a contradiction.

(23) *Carol mashed each potato.*

(24) *Carol mashed each potato; in fact, she was able to mash them all at the same time.*

Each's Differentiation Condition is satisfied by the different positions of the potatoes. What the Differentiation Condition rules **out** is employing (23) to describe an event in which Carol put some of the potatoes in the food processor together and puréed them— since in that case there is no way to distinguish the mashing of any one of those potatoes from another.

Which dimension(s) differentiation is achieved on depends on the context. Differentiation on space was supported in (24) in the context of an experiment where it was important to see the

effect of mashing on different individual potatoes. That it was space alone and not also time would make sense if Carol was trying to finish the experiment quickly. Not only does context determine how subevents are differentiated, but also whether differentiation of any kind is supported in the first place. If Carol's goal was simply to make a big bowl of mashed potatoes out of all the potatoes she had, it would not make sense to differentiate the mashing of individual potatoes based on space **or** time. In that case both (23) and (24) would be odd.

4.3.2 Interest in Differentiation

When *each* is used, context must support the emphasis on differentiation. That is, there must be interest in what is being differentiated. Most elements within a sentence can play a role in supplying interest. Extrasentential context can provide interest as well, as demonstrated in the previous section. When no element supplies interest in differentiation, sentences containing *each* are quite degraded.

(25a,b) are based on examples from VanLehn (1978:81), which in turn are drawn from examples and discussion in Vendler (1967:77-8). VanLehn suggests that (25b) is okay and (25a) is not because "weighing the whole basketful and weighing each apple individually are so pragmatically distinct," while taking one apple at a time versus taking them all are not. The use of *each* indicates that the distribution is important, yet in (25a) whether the action was distributed doesn't really matter and *each* is infelicitous.

- (25) a. ?# *Ricky took each apple.*
b. *Ricky weighed each apple.*

I asked six linguist informants for their intuitions on this example: Did they found (a) better, (b) better, or no difference between (a) and (b). I also requested that they rate the sentences on the (OK-?-*) grammaticality scale. Three of the informants found (b) better than (a), in line with my own intuitions. Of these three, one said that (a) sounded incomplete, and one observed that (a) is only good with the addition of *one by one* or *and weighed it*. A fourth informant noted of this and other similar comparisons he was asked to make: "[It's] hard to judge. [There's] no contrast in

grammaticality in the OK-?-* sense, to me they fit in the # scale (pragmatically odd). To the extent that I can come up with a bunch of individual events, they all work fine (i.e., if you add *separately* or *individually* at the end, they are all fine).” In other words, this person was devising ways to satisfy the Differentiation Condition. The remaining two informants found (a) and (b) equally fine in (25) and in other examples they were asked to judge (see below for those examples). These two people seem to have not paid any attention to the Differentiation Condition; perhaps this was because they were considering the items strictly with respect to the grammaticality scale, which was not after all the appropriate scale to use. The other informants seemed to use to the more relevant oddness scale instead, though not all said so explicitly.

(25a) and (b) differ with respect to the choice of verb. I will further discuss this example and the effect of predicate type shortly. Other intrasentential elements should be able to influence whether interest in differentiation is established as well. Below I consider how various other elements affect the acceptability of sentences containing *each*.

Note that *every* is okay in the (25a) and in all the examples discussed here where *each* is degraded. This is understandable. In (25a), for instance, there are many reasons for someone to care why **all** the apples were taken, but not many reasons to care why the apples were taken one by one.

4.3.2.1 Common Nouns

The smallest domain/closest element that could satisfy the Differentiation Condition is the common noun in the quantified phrase. Humans are inherently interesting, so using *each* with a human noun can satisfy the Differentiation Condition straight off— *each* says the differentiation of subevents should be possible, i.e. of some interest, and having a different human object in each subevent **is** interesting. On the other hand, inanimate objects have less built-in interest, so the Differentiation Condition is not usually satisfied simply by having a different object in each subevent:

- (26) a. ? *Melinda described each desk.*
b. *Melinda described each visitor.*

In (26b) it is hard to imagine Melinda describing all the visitors at the same time, but the Differentiation Condition can sometimes be satisfied by having different objects in each subevent where the subevents themselves take place at the same time and place. *Each* is satisfied in (27) because one cares about individual cats, even though *not separately* calls for at least some of the woundings to take place at the same time and place. If there are three or four cats, one can imagine all the woundings taking place simultaneously.

- (27) *The cruel girl wounded each cat, but not separately.*

Now consider a situation in which there were 100 chicks and 97 were lifted individually and 3 were lifted together. Can (28) be uttered truthfully about this situation given the theory I have proposed? With 100 chicks it is rather unlikely for there to be interest in each individual chick.

- (28) *Mary lifted each chick out of the water.*

My intuition is that (28) can be used for this scenario and, more generally, that *each* can be employed in situations where there is almost but not completely total distributivity, as long as the few odd cases where individuation does not hold are unimportant, such as when there is a large number of objects. Charity is at work here, allowing for some exceptions.

In addition to specifying objects which are themselves of interest or not, the quantified noun can affect the level of interest in how the event took place. In (29b), we are interested in how the carrying was accomplished— all the bags at once, a few together, one at a time— because bags can be awkward and heavy to carry and we might expect that only one can be carried at a time. But (29a) is odd, because we expect that it should be possible to carry more than one plate at a time, while the use of *each* suggests that they were carried one by one. Furthermore, the result of the event, that all of the plates ended up in the kitchen, seems more important than whether they were carried all at once or not. The Differentiation Condition has not been met in (29a)— there is little interest in differentiating the carrying subevents.

- (29) a. ? *The maid carried each plate to the kitchen.*
b. *The maid carried each bag of groceries to the kitchen.*

4.3.2.2 Predicate Types

As was already observed with example (25), the kind of predicate in the sentence can play a role in satisfying the Differentiation Condition. *Each* sounds better with some predicates than with others. One critical difference in predicates seems to be whether the predicate emphasizes how the event was accomplished (the process) or what the result of the event was. This distinction was alluded to in the discussion of example (29). Consider now the pairs of sentences in (30-32). The predicates in the (a) versions of these examples are more oriented to the result of the event, while the (b) versions are more oriented to the process.

- (30) a. ?? *Carol cooked each potato.*
b. *Carol mashed each potato.*
- (31) a. ? *The trainer filled up each bag.*
b. *The trainer carried each bag to the locker room.*
- (32) a. ?? *Terry destroyed each lampshade.*
b. *Terry photographed each lampshade.*

Whether distribution is considered important or of interest, and therefore whether *each* is acceptable, depends on the emphasis of the predicate. The general correspondence is that distributivity is important to process of the event but not to the result, so *each* is better with predicates which stress the process.

With predicates which emphasize the result of the event, the process is correspondingly less important. Since how the event was accomplished is not significant with such predicates, individuating the event is unimportant. The use of *each* is inconsistent with this, so it is hard to satisfy the Differentiation Condition and *each* sounds odd. Often the result does not change according to how the event was accomplished, further diminishing the process. In (25a) above and (32a), for example, whether the event was distributed does not affect the result. In the end,

all of the apples were taken, and all of the lampshades were destroyed. It does not matter whether they were taken or destroyed one at a time or a few at a time. Furthermore, even if the apples were taken one at a time, the result of each subevent was the same. One feature which identifies result predicates is that many of them, such as those in (31a) and (32a), are 'gradable' (Quirk, Greenbaum, Leech, & Svartvik 1985:404); the result can be graded by degree adverbials such as *completely* and *partially*. Perfective particles such as *up* in (31a) also help to direct attention towards the result (p. 595).

When the process is important, so is whether the event was distributed or not. The importance of the process can be brought out by using verbs which specify manner or means, as in (30b), or by adding manner/means adverbials. One reason why the process might be considered important is that the result of the event differs according to how the action was done. In (25b), for instance, it matters whether the apples were weighed one at a time or not— the weight obtained is different. The weight of one apple might be five ounces, while three apples together weigh a pound. In (32b), whether the lampshades were photographed singly or not will result in photographs which look different. If a number of shades are photographed together, then it may be hard to see the details of some of them, or even see how many there are. Furthermore, when the process of the event is distributed, the result of one subevent can often be distinguished from the result of the other subevents. In weighing different apples, you are likely to end up with a different weight for each apples, and in photographing different lampshades you end up with different pictures. Hence, it is easy to satisfy the Differentiation Condition in such cases and *each* sounds fine.

As just mentioned, different kinds of adverbs can influence whether the result or process of an event is emphasized. (32a), with the result predicate *destroy*, is not improved by addition of a degree adverb in (33a), since the adverb simply reinforces the emphasis on the result of the event. In contrast, the manner adverb in (33b) draws attention towards the process and employing *each* is more natural.

- (33) a. ?? *Terry completely destroyed each lampshade.*
 b. *Terry methodically destroyed each lampshade.*

Context of use can change the built-in emphasis of a predicate as well. Suppose that Amy is interested in the weight of all of the apples together, and she asks Ricky to carry out the task. If she hears (25b), she is likely to think the sentence rather odd. There are numerous ways of figuring out the total weight of the apples, either weighing the apples singly or in subgroups and tallying up the results, or weighing them all at once. Amy should not particularly care how the job was accomplished. The result is the same in any case. On the other hand, if Amy is not only interested in the total weight of the apples, but also in how long it takes to figure it out, then the process once again becomes relevant. If there is a large number of apples, then weighing them one by one will take considerably longer than weighing them all together. In that context, (25b) is once again acceptable, especially if *each* itself is accented.⁷

4.3.2.3 Secondary Predicates and Subjects

The previous section concentrated on when attention is directed to how an event was accomplished. Now consider once again the role of the participants in the event. Besides common noun choice, there are a number of other ways in which interest can be drawn to participants.

First, in Tunstall (1996) I noted that adding a secondary predicate to a questionable *each* sentence improves it:

⁷The three linguist informants who found a contrast between (25a) and (b) above, also judged (b) to be better than (a) in examples (32). The judgements on (30) were a bit more mixed. (I did not ask them about (31).) Their comments support the theory I have been developing. In regard to (32), one informant remarked that *all the* or *every* sounds better in (a). For (30), one informant found (b) better than (a) but observed that (b) has to be used in the right context: “i.e. it has to be important that she mashed them one by one. It helps if mashing a potato is a difficult job, and Carol did it effortfully over an extended period of time; or say, if she mashed potatoes defiantly as part of a domestic dispute.” Another said, “Both sentences [in (30)] evoke a sort of strange image, involving cooking or mashing the potatoes one at a time. In such a scenario, neither sentence is worse than the other.” The third informant said both (30a) and (b) sounded incomplete.

- (34) a. ?? *Alice remembered each camper.*
 b. *Alice remembered each camper happy.*
- (35) a. ?? *Each person in the room left.*
 b. *Each person in the room left tired.*

One explanation for this behavior is that the secondary predicate directs attention to the individuals in the set it modifies (the *each*-phrase) and relays a property of those individuals that held during the process of the event. The emphasis on individuals reinforces *each*, and the property adds content to the subevents, thus satisfying the Differentiation Condition without requiring differentiation on another dimension. Alternative explanations will be suggested in the following chapter.

Secondly, many of the odd-sounding examples in this section improve with passivization. For instance, *Each apple was taken* sounds better than *Ricky took each apple*. My sense is that when *each* is in the subject position of a passive, even more attention is directed to the individuals in the restrictor set than is usual with *each*. The form corroborates that the individuals are of interest. In this way, passivization is quite similar to adding a secondary predicate.

Lastly, differentiation can obtain with respect to participants in the event other than those in the quantified set. When *each* is in object position, for example, the Differentiation Condition is sometimes satisfied by there being a different agent in each subevent. Awkward examples with result predicates (where it is difficult to satisfy the Differentiation Condition) improve with an indefinite subject:

- (36) a. ?#*Ricky took each apple.*
 b. *A clerk took each apple.*
- (37) a. ??*Fatima ate each slice of banana bread.*
 b. *A child ate each slice of banana bread.*
- (38) a. ? *The trainer filled up each bag.*
 b. *A trainer filled up each bag.*

The intuition is that the preferred scoping in such cases is *each*>*a*. Examples with process predicates seem unchanged with an indefinite subject, with a preferred scoping of *a*>*each*. Since the Differentiation Condition is easily met by the predicate, different agents are not needed.

- (39) a. *Ricky weighed each apple.*
b. *A clerk weighed each apple.*
- (40) a. *The trainer carried each bag to the locker room.*
b. *A trainer carried each bag to the locker room.*

This phenomena will be discussed at length in Chapter 5 where the effect of the Differentiation Condition on the scope behavior of *each* is investigated.

4.3.3 Summary

For the Differentiation Condition to be fulfilled a way must be found to differentiate the subevents associated with the individuals in *each*'s restrictor set. I have shown that what counts as a distinct subevent is contextually variable, depending on what the context cares about. The examples I employed focused primarily on how various intrasentential elements influence the context. In some cases time and/or space is relevant for differentiation; in other instances it is the participants in the event. When the context does not supply a dimension of interest on which to differentiate, the use of *each* is not supported and the sentence sounds odd.

In contrast to *each*, *every* does not demand interest in differentiation. What matters for *every* is simply that there be some amount of event distributivity. How the subevents are distributed is not particularly important. Hence, all of the examples presented above which were odd with *each* are perfectly acceptable with *every*.

Few explicit theories about the difference between *each* and *every* exist. Recently Beghelli & Stowell (1997) offered one analysis. They accounted for distributive event construals in sentences containing *each* and *every* by requiring that QPs headed by these quantifiers scope over an existential quantifier over events at LF. While they mentioned some differences between *each* and *every* in sentences containing clausal negation, they did not discuss partial vs. total event

distributivity and there is nothing equivalent to the Differentiation Condition in their system. Their account of the negation examples does not extend to the phenomenon I have discussed here where *each* sounds odd in certain sentences but not others yet *every* is always fine.

I provide an initial formalization of my analysis of *each* and *every* in §4.5. In section 4.6 I present the results of a questionnaire study in which participants chose whether *each* or *every* sounded better in a particular context. The results support the claims put forth here. Before taking up those topics, I discuss cases in which the universal sense of *every*'s meaning is emphasized, backgrounding its distributive nature.

4.4 Stressing Exhaustiveness

According to the Event Distributivity Condition, *every* is only licensed in a sentence which denotes a partially distributed event. But there is a class of examples where it seems that this condition is not met. All are cases where the exhaustive nature of the event— the fact that all of the members of the common noun set were affected— is being especially emphasized. In such cases, distributivity seems to still play a role.

Some speakers report that (41a) and (b) can be uttered truthfully about an event in which all of the boxes were lifted together. I propose that this is possible because the addition of *single* in (a) and the use of pitch accent in (b) (indicated by capital letters) function to emphasize the universal part of *every*'s meaning while diminishing interest in whether the action was distributive or not.

- (41) a. *Caroline lifted every single box.*
b. *Caroline lifted EVERY box.*

However, it is one thing to draw attention away from the collective/distributive nature of the event and another to attempt to invalidate the Event Distributivity Condition outright, as with the addition of *together, at once, at the same time*. I find (42a) quite odd in contrast to (42b):

- (42) a. *??Caroline lifted EVERY box at the same time!*
b. *Caroline lifted all the boxes at the same time!*

More of a context doesn't help much:

(43) ??*Caroline didn't want to make multiple trips, so she carried EVERY box to the truck at once.*

(41a) and (43) suggest that while *every* can be used to stress exhaustiveness, it cannot be used to also stress collectivity.

Furthermore, emphasizing that the event applied to all the member of the quantified set does not improve sentences containing collective cardinality predicates, as in (44), but does help some sentences with collective predicates which have distributive subentailments as part of their meaning, as in (45) (cf. examples (2-4) in §4.1.1):

(44) **Every single student (here) is numerous/is a large group.*

(45) a. ?*Every single student here is alike!*

b. ??*Every single student in the dorm gathered in the hall.*

c. ??*Every single professor in the department met for lunch.*

d. ?**Every single protester at the rally dispersed/scattered in all directions.*

The ungrammaticality of (44) indicates that *every* is still distributing to individuals in its restrictor set. *Be numerous* and *be a large group* are not compatible with that. In (45), however, those individuals can be associated with the distributive subentailments of the predicates, while at another level of event structure the predicate can apply to the non-distributed group. These examples reinforce the point that when exhaustiveness is stressed, some sort of reduced distributivity requirement remains. Normally distributive subentailments are not enough to fulfill the Event Distributivity Condition.

The examples in this section imply that distributivity and universality are not separate meanings for *every*, but rather two aspects of its meaning. As of yet it is unclear how widespread the use of *every* to stress exhaustiveness– and correspondingly de-emphasize distributivity– is. I leave further investigation of this issue to further research.

4.5 Formalization

In (46) and (47) below I present a partial semantic formalization of the lexical meanings of *each* and *every*, incorporating the Differentiation and Event Distributivity Conditions. The analysis is further developed in Tunstall (1998).

The first two lines of these definitions give a fairly standard translation of *each* and *every*, phrased in the event-based framework of Lasersohn (1995) which I have adopted here. I assume that *each*- and *every*-phrases are of a type which can combine with an open sentence (the “*f*” in the formulas below) to yield a complete sentence: they take as arguments functions from groups/individuals to sets of events and output sets of events. Such a denotation permits quantifiers to refer to event structure if they need to. Lasersohn’s treatment of monotone-decreasing quantifiers such as *fewer than three* is roughly parallel to my analysis of *each* and *every* in that the lexical semantics he gives for these quantifiers also makes reference to events.

(46) Translation of *Every*

$$e \in [[\text{every } N]](f) \text{ iff} \\ \forall x [x \in [N] \rightarrow \exists e' \leq e [e' \varepsilon f(x) \ \& \\ \exists y [y \in [N] \ \& \ y \neq x \ \& \ \exists e'' \leq e [e'' \varepsilon f(y) \ \& \ e' \neq e'']]]]]$$

(47) Translation of *Each*

$$e \in [[\text{each/every } N]](f) \text{ iff} \\ \forall x [x \in [N] \rightarrow \exists e' \leq e [e' \varepsilon f(x) \ \& \\ \forall y [y \in [N] \ \& \ y \neq x \rightarrow \forall e'' \leq e [e'' \varepsilon f(y) \rightarrow e' \neq e'']]]]]$$

The Event Distributivity Condition is encoded by the last line of (46) and the Differentiation Condition by the last line of (47). The difference between (46) and (47) is simply that whereas *every* requires that there be at least two distinct subevents (for every object that is acted upon in one subevent we simply need to find one other object that is acted upon in another subevent), *each* requires all the subevents to be distinct (for every affected object we must check that all other objects are in another subevent).

To understand the formalizations, it is helpful to work through a few examples:

(48) *Jamie lifted every basket.*

$$e \varepsilon [\text{Jamie lifted every basket}] \text{ iff} \\ \forall x [x \varepsilon [\text{basket}] \rightarrow \exists e' \leq e [e' \varepsilon [\text{lift}]](\langle j, x \rangle) \ \& \\ \exists y [y \varepsilon [\text{basket}] \ \& \ y \neq x \ \& \\ \exists e'' \leq e [e'' \varepsilon [\text{lift}]](\langle j, x \rangle) \ \& \ e' \neq e'']]]]$$

“An event e is an event of Jamie lifting every basket if for every basket x there is a subevent e' which is part of e in which Jamie lifted x , and **there is a basket y** that is not the same as x **and a subevent e''** which is part of e in which Jamie lifted y , and the subevent e' of lifting x is not the same as the subevent e'' of lifting y .”

(49) *Jamie lifted each basket.*

$$e \varepsilon [\text{Jamie lifted each basket}] \text{ iff} \\ \forall x [x \varepsilon [\text{basket}] \rightarrow \exists e' \leq e [e' \varepsilon [\text{lift}]](\langle j, x \rangle) \ \& \\ \forall y [y \varepsilon [\text{basket}] \ \& \ y \neq x \rightarrow \\ \forall e'' \leq e [e'' \varepsilon [\text{lift}]](\langle j, x \rangle) \rightarrow e' \neq e'']]]]$$

“An event e is an event of Jamie lifting each basket if for every basket x there is a subevent e' which is part of e in which Jamie lifted x , and **for every basket y** that is not the same as x , **every subevent e''** which is part of e in which Jamie lifted y is not the same as the subevent e' of lifting x .”

A final comment about these definitions. Consider whether a sentence such as (50) can be uttered truthfully about an event which does not contain any cats.

(50) *Every cat is sleeping.*

My intuitions tell me that the sentence is neither true nor false in this case. The sentence is odd, not because of the use of *every*— it has nothing to do with distributivity or universality— but simply because there are no cats. I would feel the same way about *A cat is sleeping*. But what about if there is an event with only one cat in it and this cat is sleeping? Once more my intuition is that (50) is neither true nor false of the event, and the sentence is merely odd, this time because of the use of *every* in particular. *Every cat* seems to imply that there are at least two cats (perhaps even at least three). The definitions in (46) and (47) do not capture these intuitions. With respect to an event with no cats, the (50) would be trivially true. With respect to an event with only a single cat, the sentence would be false. The intuitions could be accounted for by adding the requirement (or presupposition) that there be at least two members in *each's* and *every's* restrictor set, but I will keep the simpler formulations at this time.

4.6 Experiment 2 – Quantifier Selection in Context

I have argued that *each* is subject to the Differentiation Condition. Each individual in the set *each* quantifies over must be associated with a subevent, and these subevents must be distinct from one another. This requirement directs attention to the individuals in *each*'s restrictor set. In contrast, *every* emphasizes its restrictor set as a whole, or at least does not stress the separate individuals which comprise the set. In a context where a set is established and individuals of that set are distinguished, *each* should be favored over *every*, while in a context where the individuals are not differentiated, *every* should be favored over *each*. This prediction was confirmed in a simple questionnaire study.

4.6.1 Method

Thirty-eight undergraduate students in introductory linguistics courses at the University of Massachusetts participated for course credit. Participants read on paper short paragraphs that discussed a set of objects or people, describing either how they differed or how they were the same. Participants were asked to choose whether *each* or *every* fit best into the final sentence of the passage, which referred again to the set of objects/people, and to circle their choice. There were two items, shown in (51) and (52). A given participant saw one instance of each condition.

(51) a. **“Different” condition**

Max was writing a story about the uniforms that workers at local stores had to wear. The new supermarket on the corner required their employees to wear a button-down shirt with a collar, but various colors were allowed. On Monday, the deli clerk had on a striped shirt and the cashier in the express lane had on a floral shirt. The manager’s shirt was red. ...

b. **“Same” condition**

Max was writing a story about the uniforms that workers at local stores had to wear. The new supermarket on the corner had a strict dress code. They required their employees to wear a white button-down shirt with a collar, a narrow red tie, and black pants. In addition, anyone with long hair had to put it up in a pony tail. ...

a/b. **Final (target) sentence**

...When Max visited that store he wrote down on his notepad what (each / every) employee was wearing.

(52) a. **“Different” condition**

Yvonne is a preschool teacher. Every morning before the kids arrive she gets the morning activities ready at the crafts tables. It’s important that all of tables are set up a different way. The children like to know that they can go to the next table and do something else if they get bored. On Thursday, she put out painting supplies on one table, play dough on another, and paper and stickers on a third. ...

b. **“Same” condition**

Yvonne is a preschool teacher. Every morning before the kids arrive she gets the morning activity ready at the crafts tables. It’s important that all of tables are set up the same way. The children like to know that they aren’t missing something special at the next table. On Thursday, she put out painting supplies, including paper, different size brushes, and water-based paint. ...

a/b. **Final (target) sentence**

...When the first little boy came in, he scrutinized (every / each) table.

4.6.2 Results and Discussion

Table 4.1 presents the percentage of *each* responses in the two conditions:

Table 4.1 Number of Times *Each* and *Every* Were Chosen per Condition in Experiment 2

<u>Condition</u>	<i>each</i>		<i>every</i>	
a. Different	29	(76%)	9	(24%)
b. Same	14	(37%)	24	(63%)

For analysis, items for which *each* was chosen were coded as ‘1’ and items for which *every* was chosen were coded as ‘0’. A one-factor ANOVA yielded a significant effect of Condition, $F_1(1,37) = 9.49, p < .005$. Participants overwhelmingly chose *each* more often in the Different condition than in the Same condition, supporting the Differentiation Condition as part of the

meaning of *each*. In a context where it has been made clear that the individuals comprising a set are of interest and should be considered, the use of *each* is not only appropriate, but preferred.⁸

4.7 Concluding Remarks

I have demonstrated that *each* and *every* differ with respect to the conditions they place on the subevents which are associated with the members of their restrictor sets. *Every* requires partial distributivity in the event structure, so that there at least two different subevents (the Event Distributivity Condition). *Each* demands that all the subevents be distinct on some dimension (the Differentiation Condition). Furthermore, what counts as a distinct subevent for the Differentiation Condition is contextually variable, depending on what the context cares about. Evidence for these claims came from examining the kinds of sentences and contexts in which *each* and *every* can and cannot occur and from Experiment 2, in which participants chose whether *each* or *every* was more appropriate in describing a particular scenario.

In the following chapter I will argue that differences in the scope behavior of *each* and *every* can be traced back to the differences between the Event Distributivity and Differentiation Conditions.

A final note. Aside from strength of distributivity, *each* and *every* seem to differ in that *each* requires that its domain restriction (restrictor set) be ‘given’ in the present sentence or discourse while *every* does not; that is, whether the domain of quantification for *every* can be free while for

⁸The effect was bigger for item (51) than for item (52). The percentage that *each* was chosen for each item and condition is given below:

<u>Condition</u>	<u>Item (51)</u>	<u>Item (52)</u>
a. Different	84%	68%
b. Same	32%	42%

Analysis on each item separately yielded a significant effect of condition for item (51), $F_1(1,19)=14.29$, $p = .001$; but a marginal effect of condition for item (52), $F_1(1,19) = 2.71$, $p = 0.108$. It is possible that the effect was bigger in item (51) because the target sentence contained a *wh*-word (*what*). The scope of *each* and *every* relative to *what* had to be determined. In the “different” condition, the inverse scoping of *each/every* > *what* obtains, while in the “same” condition the forward scope of *what* > *each/every* obtains. One might argue that *each* was chosen more often in condition (a) in item (51) than in item (52) because *each* is better for inverse scoping than *every*. In Chapter 5 I will argue that *each*'s scope behavior stems from the Differentiation Condition.

each it must be contextually determined. A participant in one of my studies (not reported here) said it well: “Out of context, *every* insinuates every object/person in existence, but if it were in context, *every* would simply imply every object/person previously referred to.... *Each*... seems to refer to a group that must already have been defined.” A number of researchers have made similar observations (e.g. Gil (1995); cf. the entry from the Oxford English Dictionary cited in §4.2.3). Perhaps the fact that *each*'s domain restriction must be specified is related to the fact that differentiation of the subevents associated with the individuals in the quantified set needs to be supported by context. I leave investigation of this topic to further research.