Linguistic and non-linguistic cues to acquiring the strong distributivity of each

Tyler Knowlton & Victor Gomes*

Abstract. The universal quantifier each is more strongly distributive than its counterparts every and all. It forces predicates to apply to individuals, it more often supports pair-list readings, it’s unfriendly to genericity, and, in psycholinguistic tasks, it encourages encoding and remembering individual properties. But what information leads learners to acquire this aspect of each’s meaning? We explore the hypothesis that, because of its meaning, parents are more likely to use each in situations that independently promote representing the domain of quantification as a series of individuals (as opposed to a group). In line with this, we find that in child-directed speech, parents often use each to quantify over small numbers of physically present things. The same cannot be said of every and all. Because such situations are independently known to trigger object-files – the mind’s system for representing individuals – we argue that these cases are ideal for acquiring the individualistic aspect of each.

Keywords. language acquisition; corpus investigation; quantification; psychose-mantics; distributivity; universal quantifiers

1. Introduction. Acquiring the meaning of each is notoriously protracted. Even 5- and 6-year-olds seem insensitive to some of the subtleties of its meaning (see Syrett 2019 for a helpful review). Perhaps this is in part explained by the fact that in acquiring the meaning of each, learners need to figure out at least three things. First, they need to hone in on its semantic category: that it’s a quantity term and not, for example, a name for a property. Some work suggests that learners can use syntactic bootstrapping to this end (Syrett et al. 2012; Wellwood et al. 2016). In particular, noticing that each is a determiner (based on its syntactic distribution) and not, say, an adjective gives children reason for thinking its meaning is about quantity.

Second, learners need to figure out its quantificational content. That is, they need to figure out that each is a universal quantifier (like every or all) and not an existential quantifier (like some) or a proportional quantifier (like most). There is a good deal of work suggesting that certain details of pragmatic context can help learners solve this so-called “subset problem” (e.g., Piantadosi et al. 2008; Rasin & Aravind 2021).

But even assuming learners have a way to sort out these first two issues, there’s another aspect of each’s meaning to consider: how exactly to represent that quantificational content. While each has universal content – like every and all – there are numerous reasons for thinking that each expresses that universality, in some sense, in a more strongly distributive way (see Section 2). This paper is concerned with how learners figure out that aspect of each’s meaning. What in their input could lead them to make a distinction between, for example, each and the less distributive every?

Put another way, a child hearing “each” and “every” needs to pair those pronunciations with meanings. If we suppose learners have (perhaps innately) one concept of universal quan-

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ification that’s strongly distributive/individualistic and another concept of universal quantification that’s less individualistic, this amounts to a mapping problem. How do learners figure out that they should pair the pronunciation “each” with the strongly distributive concept and not the other universal concept?

Here, we build off the proposal that the meaning of each – unlike that of every or all – serves as an instruction to the cognitive system for representing independent individuals (Knowlton et al. 2021b; Knowlton 2021). This idea is elaborated on in Section 2.1. In line with this psychosemantic proposal, we introduce and pursue the hypothesis that there are simple cues to representing the things quantified over by each as independent individuals in natural parent-child interactions (Section 3). In the corpus study reported in Section 4, we provide initial support for the plausibility of this acquisition proposal. Namely, we find that parents often use each when the domain of quantification consists of small numbers of physically present objects. The same cannot be said of every and all. This suggests that parents often use each in situational contexts that are independently known to promote representation of individuals in adults and children (e.g., Wood & Spelke 2005), which we argue are ideal situations for mapping each to the strongly distributive universal concept.

That said, the acquisition question raised above persists whether or not the proposal about the meaning of each that we adopt is right. Learners need to acquire knowledge of how each differs from the other universals, however this difference is represented. We think the acquisition proposal on offer meshes well with the psychosemantic proposal that links each and every to different cognitive systems. But in Section 5, we return to the issue of whether and how our acquisition proposal could be brought into alignment with other views on the difference between each and every (in particular, those of Beghelli & Stowell 1997 and Tunstall 1998).

2. Each is more distributive than every/all. Both each and every are often talked about as being “distributive universals” (e.g., Vendler 1962; Gil 1995; Beghelli & Stowell 1997; Tunstall 1998; Winter 2002; Champollion 2020). Generally, this refers to the observation that both quantifiers are somewhat resistant to combination with collective predicates like gathered in the hall or surrounded the teacher, as in (1).

(1) a. ?Each student {gathered in the hall/surrounded the teacher}.
   b. ?Every student {gathered in the hall/surrounded the teacher}.

But at least since Vendler (1962), it has been noted that each is, in some sense, even more individualistic. For example, many of the authors cited above note that (1-b) is at least slightly better than (1-a). And as Landman (2003) notes, every but not each can combine with verbs like combine in (2). Likewise, every NP can be used to refer to a whole group, whereas each NP cannot, as in (3).

(2) a. #In this class I try to combine each theory of plurality.
   b. In this class I try to combine every theory of plurality.

(3) a. #The press is each person who writes about the news.
   b. The press is every person who writes about the news.

Another sense in which each highlights individuals to a greater extent than every is that the former supports pair-list readings even in contexts where the latter doesn’t (Beghelli 1997; Surányi 2003; Szabolcsi 2010). To take one example, the question in (4-a) can be answered
with the pair-list (one-by-one) response in (4-b). But the same response is seemingly not available for the *every*-variant in (5). A response more like (5-c) is preferred.

(4) a. Which book did you loan to each student?
   b. *Frankenstein* to Fred, *Persuasion* to Paula, and *Dune* to Dani.

(5) a. Which book did you loan to every student?
   b. # *Frankenstein* to Fred, *Persuasion* to Paula, and *Dune* to Dani.
   c. There’s no one book that I loaned to every student.

Pair-list readings also arise more easily with *each* in cases like (6).

(6) a. Determine whether each number in this list is even: 2, 4, 5.
   ≈ for each number, determine whether it is even
   b. Determine whether every number in this list is even: 2, 4, 5.
   ≈ determine whether the following is true: every number in this list is even

Yet another way to see the strong distributivity of *each* is to consider its unfriendliness to generic interpretations. Beghelli & Stowell (1997) discuss examples like (7), which they attribute to Gil (1992). In (7), *each* seems ill-suited to stating a universal generalization over all of the world’s languages whereas *every* is compatible with this sort of generic thought.

(7) After devoting the last three decades to a study of lexical semantics, George made a startling discovery:
   a. # Each language has over twenty color words.
   b. Every language has over twenty color words.

In the same vein, (8-a) calls to mind a situation where someone recently mixed a few drinks and wants help getting them ready to serve, whereas (8-b) sounds more like part of a recipe.

(8) a. Each martini needs an olive.
   b. Every martini needs an olive.

Lastly, we can see the strong distributivity of *each* reflected in sentence verification tasks. Vendler (1962) predicted this in his early investigations into universal quantifiers, saying: “*Each* ... directs one’s attention to the individuals as they appear, in some succession or other, one by one”. Building on that intuition, Knowlton et al. (2021b) show that when participants are asked to evaluate sentences like (9) with respect to images of shapes, they encode and recall group properties – like the number of circles – better in the *every* condition than the *each* condition.

(9) a. Each circle is green.
   b. Every circle is green.

Likewise, Knowlton (2021) reports that participants recall individual properties – like the hue of a particular circle – better if given the *each*-variant to evaluate. In both series of experiments, the only difference between conditions was the quantifier. Describing the scene with (9-a) versus (9-b) doesn’t change the answer participants give (“true” or “false”) but it does modulate how they represent the domain of quantification (as a collection whose cardinality can be estimated or as a series of independent individuals with associated properties).
2.1. EXPLANATIONS OF EACH’S STRONG DISTRIBUTIVITY. There are various sorts of explanations that have been given for the linguistic and psycholinguistic facts reviewed above. It is not our aim to try to definitively decide between them. As noted in Section 1, the acquisition question at issue here is, in some sense, orthogonal to the exact details of what learners end up acquiring. To be sure, we think the acquisition proposal pursued below meshes best with one particular proposal about what gets learned. But one could also imagine ways in which other proposals might be compatible with our learning story. With this in mind, we briefly turn to summarizing some ideas for explaining this distributivity difference between each and every.

One way of capturing differences between each and every is Beghelli & Stowell (1997)’s cartographic approach. They propose that each comes with a strong DIST feature, which triggers movement to the specifier of a functional projection, DistP, housing the distributivity operator. Associating with this operator gives each its strongly distributive meaning. In contrast, every has a weak DIST feature, and only optionally moves to the specifier of DistP. Given the relative position of DistP and the generic operator, GEN, Beghelli & Stowell also capture each’s resistance to generic interpretations. In particular, GEN is lower than DistP, and since each must move to DistP, it always out-scopes GEN. Assuming only material within the scope of GEN can receive a generic interpretation, each avoids such an interpretation. Beghelli (1997) extends this approach to pair-list questions. That said, Surányi (2003) and Szabolcsi (2010) argue that a purely scope-based approach is unable to explain cases like (6) and Brendel (2019) raises further empirical complications.

In contrast to a purely syntactic approach, other theorists have considered placing strong distributivity into the lexical specification of each (e.g., Szabolcsi 2010; LaTerza 2014; Champollion 2017). On one such view, Tunstall (1998) proposes that each and every impose different conditions on events they describe. In particular, each imposes the very strict condition of full event differentiation: Each object in the denotation of the determiner’s internal argument has to be part of a separate event, at some level. For example, Kermit lifted each box is true if and only if Kermit lifted each box independently of the others (i.e., one at a time). Less stringently, every imposes a condition of partial differentiation: There has to be some object in the denotation of the determiner’s internal argument that is part of a separate event from some other object in that denotation. So Kermit lifted every box is true if and only if Kermit lifted all the boxes, but not all at once (i.e., there were at least two separate lifting events). In contrast, all imposes no such condition (meaning Kermit lifted all boxes can be true even if he lifted them all at once). Brasoveanu & Dotlačil (2015) offer some experimental support for Tunstall’s differentiation condition: When resultatives are present to enforce event differentiation, reading times decrease for sentences with each but not for sentences with every.

On another view that places the difference within the lexical specifications, Knowlton et al. (2021b) and Knowlton (2021) propose that each and every have formally different concepts of universal quantification as their meanings. In particular, each has a restricted first-

1 It is also not clear how a purely syntactic view would capture the result that sentences with each encourage treating the internal argument as a series of independent individuals whereas those with every encourage grouping the satisfiers of the internal argument. The distributivity operator with which each associates is responsible for ensuring that the predicate it combines with applies to individuals. But the psycholinguistic results come from testing participants on sentences with distributive predicates (e.g., be green). These predicates likewise enforce application to individuals (every circle is green if and only if each individual circle is green). So if associating with the distributivity operator is responsible for the results, why would combining with a distributive predicate not have the same effect?
order meaning whereas *every* has a restricted second-order meaning. On this view, a sentence like *each frog is green* is represented in a way that implicates only individuals (e.g., *frog₁ is green* & *frog₂ is green* & ...) whereas *every frog is green* is represented in a way that calls for grouping the satisfiers of the internal argument (e.g., *the frogs are such that they are all green*). Because they treat the internal argument differently, these proposed representations serve as instructions to distinct cognitive systems: the system for representing object-files (Kahneman & Treisman 1984; Kahneman et al. 1992; Carey 2009) and the system for representing ensembles (Ariely 2001; Whitney & Yamanashi Leib 2018). This distinction is schematized in Figure 1.

These two concepts of universal quantification could be thought of as two different “modes of presentation” of universality. The first-order concept behind *each* – which avoids quantifying into uppercase variable positions – eschews any notion of grouping the frogs. But the second-order concept behind *every* calls for restricting the domain to the things that satisfy the internal argument. The way the mind delivers individual representations is with object-files, and the way it delivers group representations is with ensembles. In that sense, these different concepts are closely tied to different non-linguistic cognitive systems.

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2 The proposed meanings are restricted in the sense that the first argument serves to restrict the domain of quantification. So, *each frog is green* has a meaning like “∀ₓ: Frog(x)[Green(x)]” (≈ each thing such that it is a frog is such that it is green) as opposed to the unrestricted “∀ₓ[Frog(x) → Green(x)]” (≈ each thing is such that if it is a frog it is green). Knowlton et al. (2021c) offer some initial support for thinking quantifier meanings in general are restricted in this sense. But at issue here is the difference between *each* and *every*. 

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Figure 1. Proposed meanings and related non-linguistic representations.
It is worth being clear that although object-files and ensembles are most often discussed in the visual modality, this proposal is not meant to be restricted to the visual domain. Object-file and ensemble representations are more general. They can be formed in response to auditorily-presented tones and they can be inferred (e.g., Jordan et al. 2010; Hyde 2011; Gallivan et al. 2011). Indeed, we expect the representation created in response to hearing *every unicorn has a horn* to involve an ensemble despite there being no direct perceptual access to unicorns.

But importantly, this proposal does not predict that people will always represent object-files upon encountering a sentence with *each* or ensembles upon encountering a sentence with *every*. The idea is that the meaning representation carries some weight in determining which non-linguistic cognitive system will be deployed, but undoubtedly other considerations play a role (Lidz et al. 2011). The meaning, on this view, can be seen as a cognitive recipe for assembling a thought, but this far from guarantees that the recipe will be followed (Pietroski 2018; Knowlton et al. 2021a).

As noted, we think the acquisition proposal presented below pairs well with idea that there is a psychosemantic difference between *each* and *every* along the lines in Figure 1. For ease of exposition, the rest of this paper will assume this view about what gets acquired. In Section 5, we return to the question of whether alternative ideas about what gets acquired might be compatible with the proposed acquisition story.

3. Acquisition proposal: Object-files as a route of semantic access. Supposing what learners need to do is pair the pronunciation “each” with a first-order universal concept instead of a second-order one, the question is how children solve this mapping problem. What in their input could lead them to favor one concept over the other? We propose that relatively low-level properties of the domain of quantification set up ideal situations for learning.

In particular, as the corpus study presented in Section 4 confirms, parents use *each* to quantify over domains that are physically present in small numbers. These are two properties that are known independently to promote representation of object-files. Physical presence matters because spatial information is privileged over other kinds of information, like color or size (e.g., Xu & Carey 1996). Small number matters because there is a working memory limit (of 3) on the number of object-files that can be simultaneously represented (e.g., Feigenson & Carey 2005). Wood & Spelke (2005) offer a striking demonstration of the importance of this working memory limit. They showed that in otherwise identical experimental setups, 6-month-old infants successfully distinguished 8 versus 4 actions but failed to distinguish 4 versus 2 actions. That is, when the context of presentation involved large numbers, infants spontaneously recruited their ensemble processing system (which has no such working memory constraint). But when shown 2 or 4 actions, infants attempted to represent them as individual object-files (or, “event-files”, in this case), and failed due to the working memory load.

So, the fact that the things being quantified over with *each* are present in small numbers causes children to represent them as object-files. Representing the domain of quantification as object-files in turn provides reason to favor the first-order concept, as this concept serves as an instruction to create object-files.

To consider a concrete case, imagine a parent sees a small number of frogs and wants to point them out to their child. Parents might want to individuate those frogs for any reason (e.g., if there is a high degree of spatial separation between them or if they are particularly heterogeneous). Given that small numbers of objects also independently trigger object-files,
the frogs in this scenario are likely to be represented as object-files. And given the proposed meanings, parents would thus be more inclined to describe such a situation with *each frog is green*. Now imagine a learner who knows the meanings of *frog* and *green* but not *each*. They are wondering which concept of universal quantification *each* picks out. But suppose that based on the context – the frogs are physically present and there are only four of them – the learner is also treating the relevant frogs as object-files. This provides strong evidence for favoring the first-order universal concept, which itself promotes treating the domain as object-files. The situation independently highlights individuals, so it would make sense that the parents’ utterance offers an instruction for building a thought that does the same.

In other words, the idea is that linguistically, *each* encourages treating the domain of quantification as individuals, which are represented with the object-file system. Perceptually, small numbers of physically present objects (or actions) trigger object-file representations. So by quantifying over small, physically present domains, parents create an ideal circumstance for acquiring *each*. Note that this proposal implicates a richer notion of perception than is often appreciated in the word-learning literature: Perception doesn’t merely provide access to object-concepts, but to certain construals of them (a series of object-files versus an ensemble).

Given this proposal, one might wonder why *each* seemingly takes learners so long to acquire. As noted above, various studies suggest that children are insensitive to *each*’s strong distributivity until they are surprisingly old (e.g., Brooks & Braine 1996; Syrett & Musolino 2013; Achimova et al. 2017). At the same time, pre-verbal infants can represent object-files (for helpful reviews, see Feigenson et al. 2004; Spelke & Kinzler 2007). And we suspect the concept of universal quantification that gets paired with *each* is likewise available from a young age. But if both the concept and the route of semantic access are in place early on in development, why does it seemingly take learners so long to acquire the meaning of *each*?

We think there are two factors at play. First, as already mentioned, learners will not be in a place to choose between the relevant concepts until they realize that *each* is a quantifier and moreover one with universal content. As this likely involves syntactic bootstrapping and pragmatic reasoning, learners need to have first acquired enough syntactic and lexical knowledge.

Second, mapping problems are hard. Up to this point, we have remained agnostic about particular learning mechanisms. But we think the protracted acquisition timeline tells against the operative mechanism being global cross-situational learning models that take into account multiple hypotheses. Instead, we think mapping problems like this one are solved by making and trying to verify a proposal in the moment (Trueswell et al. 2020). To do so learners require just the right coordination of word and world; cases in which the utterance and relevant scene are temporally coordinated and in which the scene supports the right construal. Such “referential gems” are rare (Gleitman & Trueswell 2020). Indeed, learners likely need to encounter a few of these gems before they get lucky enough to propose the correct hypothesis and be in a position to confirm it.

**4. Results of a corpus investigation.** To provide some initial support for the proposal outlined above, we analyzed videos of naturalistic parent-child interactions from the Language Development Project corpus (Goldin-Meadow et al. 2014). Utterances that contained a universal quantification...
tifier spoken by parents to their (14-58 month-old) children were isolated. Out of 223,390 utterances in the portion of the corpus considered, 223 contained each, 139 contained every, and 2,915 contained all (out of which we randomly sampled 217 to analyze). Each utterance and corresponding video was coded with respect to the distinctions in (10).

(10) a. What is being quantified over linguistically? (e.g., individuals, times, events)
   b. Is the domain of quantification physically present around the time of utterance?
   c. How many things are being quantified over?

Sample utterances from one parent-child pair are given in Figure 2. For the each example (you want one bite of each piece, huh?), individuals are being quantified over (pieces of banana) and those individuals are co-present around the time of utterance. In the every case (every time you color you get better), times are being quantified over (times that the child colors), and as such, the domain is not physically present. At best, only one time of coloring is physically present (though, in this case, the coloring happened well before the time of utterance). In the all case (all the yellow ones are in a row), quantification is again over individuals (yellow cars), and the domain is physically present, though in a larger quantity than in the each case.

![Figure 2. Example parent-child interactions from the Language Development Project corpus.](image)

These examples are representative of how parents generally use universal quantifiers in their speech to children. Parents are more likely to quantify over individuals (versus e.g., times or locations) with each than with every ($\chi^2 = 169.8, p < .001$) or all ($\chi^2 = 24.8, p < .001$), replicating previous work (Knowlton & Lidz 2021). This already suggests that the domain of quantification is more likely to be physically present in small numbers when universal quantification is indicated with each. But we cannot know for sure from transcripts alone.

To analyze the videos of parent-child interactions, we extracted a range of time starting 10 seconds before and ending 30 seconds after each utterance. As seen in Figure 3, parents are overwhelmingly more likely to use each (and to a lesser extent, all) to quantify over things that are physically present, whereas they are more likely to use every to quantify over things that are not. The things quantified over in parents’ speech are more likely to be present given each than given every ($\chi^2 = 133.87, p < .001$) or all ($\chi^2 = 5.37, p < .05$).

As noted above, this is related to the finding that parents more often than not use every to quantify over times. In these cases the entire domain will likely not be present. Even if a parent says every time we go to the store you cry while in a store, they obviously intend the utterance to generalize over more than one store-going. But though it undoubtedly plays a role,
the difference between *each* and *every* does not seem to be entirely driven by the fact that *every* is most often used to quantify over times. As seen in Figure 4, if times are removed from consideration, the things being quantified over are still more likely to be physically present if universal quantification is indicated by *each* than by *every* ($\chi^2 = 7.3, p < .01$).

Having established this difference in likelihood of the domain being physically present, we turn to the size of the domain of quantification. Of particular importance for the acquisition story sketched above is whether the domain is within young children’s working mem-
ory limit of three, as this is the limit of object-files that children can simultaneously represent (Feigenson & Carey 2005). As seen in Figure 5, the domain of quantification is more likely to be within children’s working memory limit given each than given every ($\chi^2 = 16.25, p < .001$) or all ($\chi^2 = 80.97, p < .001$). (This result was unchanged if we used adults’ average working memory limit of four as the cutoff instead of children’s working memory limit of three.)

The resulting empirical picture is clear. In speech to children, parents often use each and all to quantify over physically present individuals. In contrast, they use every to quantify over times or individuals that are not co-present with the utterance. But while each and all pattern together with respect to the domain being physically present more often than not, they come apart with respect to the number of things they get used to quantify over. Parents use each when quantifying over small domains, but use all to quantify over domains that are larger than children’s working memory capacity.

5. Conclusion. The corpus investigation reported above reveals that parents often use each to quantify over small numbers of physically present things. This differentiates it from its universal counterparts every and all in a principled way. Namely, these sorts of contexts independently trigger object-file representations (presumably, this is what leads parents to choose to use each instead of every in these situations). From an acquisition perspective, we think this finding is important, because it sheds light on the evidence learners might use to differentiate a strongly distributive universal like each from a similar but less distributive universal like every.

The idea is that contexts in which each is used independently trigger representations of object-files. This creates an ideal situation for acquisition. If learners have reason to represent the domain of quantification as object-files, then they’ll have reason to pick the universal concept that also triggers object-file representations (the one that serves as the meaning of each) as opposed to a less individualistic concept (the one that serves as the meaning of every).

But what of the other universals? If representing the domain of quantification as a series of object-files is the main route of acquiring each, we might expect representing the domain as
an ensemble to be the main route of acquiring its less distributive counterparts. *Every* presents a particular challenge. On our view about its meaning (see Figure 1), parents who use *every* to indicate universal quantification often mentally represent the domain in exactly this way (as an ensemble). But the above results suggest that learners often hear *every* in contexts where the domain of quantification is not physically present. As a consequence, perceptual cues to representing the domain in the relevant way are not present for *every* as they are for *each*. Absent the ability to read their parents’ minds, what about *every*’s use would encourage learners to group the things being quantified over into an ensemble representation?

Knowlton & Lidz (2021) suggest that it is pragmatic reasoning, not perceptual triggering, that encourages learners to represent ensembles in situations when parents use *every*. The proposal is as follows. Parents often use *every* to express claims that project beyond the local domain. That is, an utterance like *every time we go to the store, you cry* expresses a sort of “generic” speaker meaning. Object-files do not support projecting beyond the local domain, but ensembles do. So if learners are aware of parents’ intended speaker meaning when saying “every” (i.e., that they are making a claim that projects beyond the local domain), then learners would have reason to pair it with the universal concept that also supports projecting beyond the local domain. That is, they would have reason to reach for the second-order universal concept that serves as a call to represent an ensemble. On this proposal, ensembles play as large a role in the acquisition of *every* as we think object-files play in the acquisition of *each*.

In sum, how the domain of quantification is represented – as a series of object-files or as an ensemble – might be a route of semantic access for both *each* and *every*. But what triggers learners to represent the domain in different ways differs. In the case of *every*, details about parents’ intended speaker meaning lead to the formation of ensemble representations; in the case of *each*, perceptual properties of the scene naturally invite representing object-files.4

This is not to say that utterances with *every* never trigger representing the domain of quantification as a series of independent object-files. Parents might well say something like (11-a), which seems to individuate the peas more strongly than an utterance like (11-b).

(11) a. You have to eat every single one of your peas if you want dessert!
    b. You have to eat all your peas if you want dessert!

In principle, these sorts of cases might encourage representing the peas as object-files, which could lead to confusion between *each* and *every*.

In practice though, we suspect cases of *every* used to individuate will not lead learners too far astray. For one thing, in such a case, the domain of quantification would likely be large: (11-a) seems more natural than something like (12).

(12) You have to eat every single one of your pizza slices if you want dessert!

So if situations like (11-a) occur, they would make *every* look more like *all* than like *each* (i.e., the domain of quantification would be physically present in large quantity). But given that *all* is an order of magnitude more frequent than other universals, we suspect learners already know its meaning by the time they are concerned with differentiating *each* and *every*. Perhaps more importantly, instances of *every* used to individuate seem to be rare. In our sample, there were only three instances of parents saying *every one* (and no cases of *every single*

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4We do not yet have a proposal about the route of semantic access for *all*, though we suspect it will be informative to consider approaches that view *all* not as a genuine quantifier, but as an intensifier (e.g., Baker 1995; Brisson 1998).
one). All three were cases in which the domain was physically present, though in two cases, the cardinality of the domain was larger than 3, supporting the (11-a) versus (12) intuition.

As noted above, this acquisition proposal fits well with the particular psychosemantic proposal schematized in Figure 1. But we might wonder whether the acquisition proposal could be made to be consistent with other approaches. On Beghelli & Stowell (1997)’s approach, for example, each and every have the same meanings, but learners need to decide whether or not to append a strong distributivity feature onto one of the lexical items. Given a bias to avoid synonymy, learners might endeavor to find some difference between each and every. Since each is often used when object-files are being represented, they may reason that it should be associated with the distributivity operator, which we might suspect also triggers representations of object-files. If learners already know where the distributivity operator resides in the syntactic tree, then parents’ frequent use of each – but not every – in cases that promote representations of individuals could be seen as evidence that each scopes higher than every. And if Beghelli & Stowell’s explanation of every’s compatibility with generic thoughts is on the right track – if every scopes below GEN whereas each scopes above it – then learning the high position of each could also be taken as evidence that it cannot give rise to generic readings.

Alternatively, perhaps the acquisition proposal could also be made to be consistent with other approaches that situate the difference between each and every in their lexical specifications. On Tunstall (1998)’s view, for example, what needs to be learned is essentially that each enforces a one-to-one correspondence between individuals in the domain of quantification and events. Object-files can be thought of as supporting one-to-one correspondence in the sense that the system itself doesn’t support any sort of generalization beyond individuals. If object-file$_1$ has the property is green and object-file$_2$ has the property is green, from the point of view of the object-file system at least, there is no sense in which the property applies to a group. That said, if object-file$_1$ has the property was lifted by Kermit and object-file$_2$ has the property was lifted by Kermit, there is also no guarantee that both liftings happened separately. So it is not obvious how object-files relate to the event differentiation condition to be associated with each. Moreover, it is not clear how ensembles relate to the partial event differentiation condition to be associated with every.

In any case, whether our acquisition proposal is compatible with various views about the target of learning, it nonetheless shows that thinking about how linguistic meanings are related to non-linguistic conceptual systems can add new tools to the acquisitionist’s arsenal. In particular, we think this case study exemplifies a new sort of “learning by observation” in which rich perceptual outputs (e.g., representing the domain as object-files or as an ensemble) allow the learner to make inferences about linguistic meanings.

References


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