

*Every* provides an implicit comparison class  
when *each* does not

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# *Each* and *every* are obviously similar

- (1) a. *Each* frog is green  $\leftrightarrow$  *Every* frog is green (both are universal quantifiers)  
b. Some/Most frogs are green
- (2) a. \**Each*/?*Every* frog gathered by the pond. (both are distributive)  
b. All the frogs gathered by the pond.

# *Each* is 'more individualistic' than *every*

- (3) a. Take *every* one of them  
b. Take *each* one of them...  
and examine it in turn



- (5) Which book did you loan to *each* student?

*Frankenstein*  
to Frank



*Persuasion*  
to Paula



*Dune*  
to Dani



- (4) In this talk,  
a. ✓ I combine *every* theory of quantification  
b. # I combine *each* theory of quantification

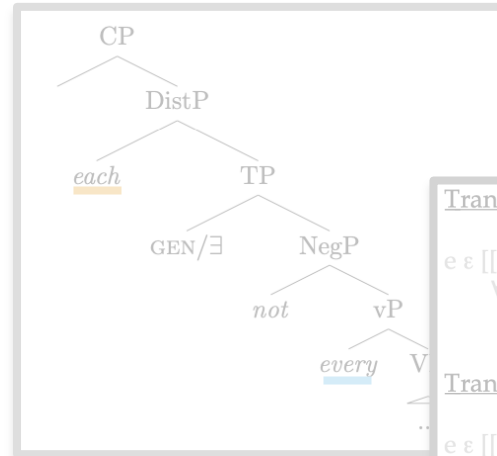
- (6) Which book did you loan to *every* student?  
*A: There's no one book I loaned to every student*

**The Challenge:** How to accommodate these sorts of (subtle, non-categorical) observations while also explaining the (obvious) fact that *each* & *every* are distributive universal quantifiers?

# *Each* is 'more individualistic' than *every*

## Syntactic Position

(Beghelli & Stowell 1997)



## Event differentiation

(Tunstall 1998)

### Translation of *Every*

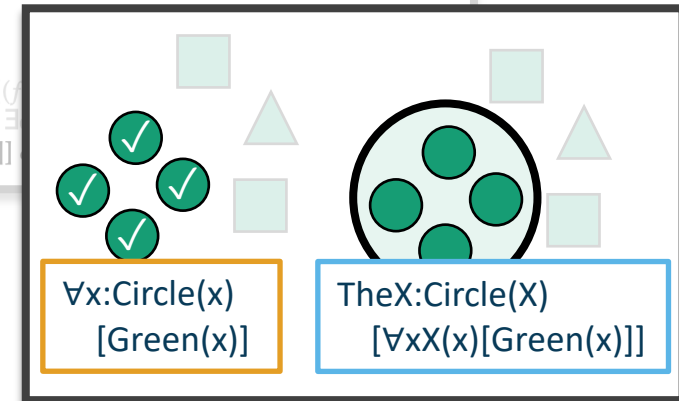
$e \in [[\text{every } N]](f) \text{ iff}$   
 $\forall x [x \in [[N]] \rightarrow \exists e' \leq e [e' \in f(x) \&$   
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### Translation of *Each*

$e \in [[\text{each/every } N]](f) \text{ iff}$   
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## Formally distinct mental representations

(Knowlton, Pietroski, Halberda, & Lidz 2022; Knowlton 2021)



**The Challenge:** How to accommodate these sorts of (subtle, non-categorical) observations while also explaining the (obvious) fact that *each* & *every* are distributive universal quantifiers?

# Proposed meaning difference

*Each frog is green*

$\forall x:\text{Frog}(x)[\text{Green}(x)]$

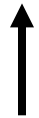
$\approx$  Any individual<sub>x</sub> that's a frog is such that it<sub>x</sub> is green

*Every frog is green*

TheF:Frog(F) $\{\forall x:F(x)[\text{Green}(x)]\}$

$\approx$  The frogs<sub>F</sub> are such that

any individual<sub>x</sub> that's one of them<sub>F</sub> is such that it<sub>x</sub> is green



“The frogs”

$\{x: x \text{ is a frog}\}$

The **set** of frogs

$\lambda X:\forall x(X(x) \equiv \text{Frog}(x))$

The **things**<sub>x</sub> such that for each thing, it's one of them<sub>x</sub> iff it's a frog

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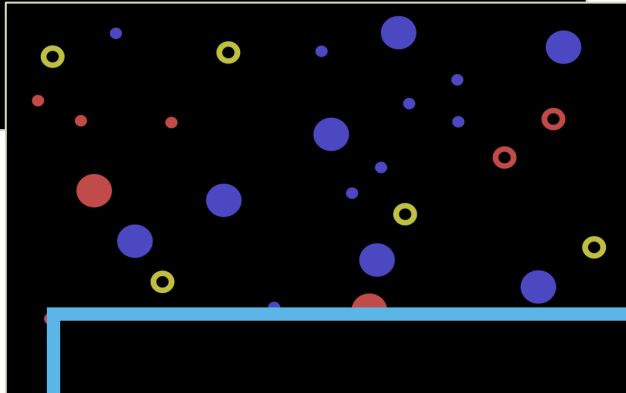
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*Every*'s meaning has a semantic constituent corresponding to a grouping of its first argument;  
*Each*'s meaning does not

# Psycholinguistic evidence

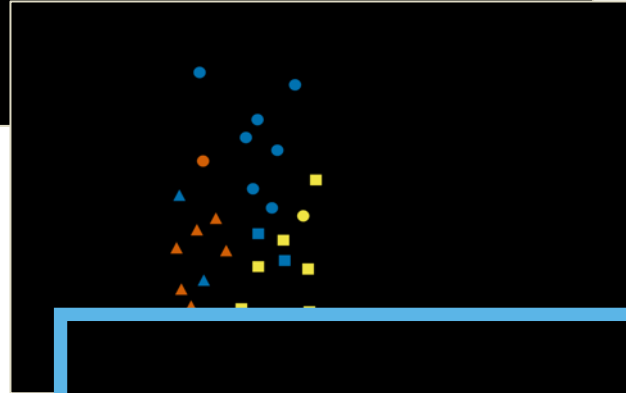
{Each/Every}  
big circle is blue



How many big circles  
were there?

Performance: *Every* > *Each*

Is {each/every}  
circle blue?



Where was the middle  
of the circles?

Performance: *Every* > *Each*

Is {each/every} circle  
green?



Did one circle  
change its color?

Performance: *Each* > *Every*

# Psycholinguistic evidence

{Each/Every}  
big circle is blue

Is {each/every}  
circle blue?

Is {each/every} circle  
green?

→ Can we find evidence of the proposed meanings outside of sentence verification tasks?

How many big circles  
were there?

Where was the middle  
of the circles?

Did one circle  
change its color?

Performance: *Every* > *Each*

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# A language-internal prediction

## *Each NP*

➡ Implicates no grouping of domain entities

## *Every NP*

➡ Introduces the plural entity the NPs

**Prediction:** *every NP* should be better able to serve as a plural antecedent than *each NP*

**Exp 1:** *every* is better able to provide a plural comparison class for sentence-internal *same*

**Exp 2:** *every* is better able to provide a plural antecedent for sentence-internal *they*

# Predicates with *same* require a comparison class

- (7) a. #Kermit is the same color (same as what??)  
b. The frogs are the same color

**Prediction:** Because *every frog* implicitly introduces the frogs, it should behave more like (7b);  
*each frog* doesn't introduce such a group, so should behave more like (7a)

# Sentence-internal *same*: forced-choice judgment

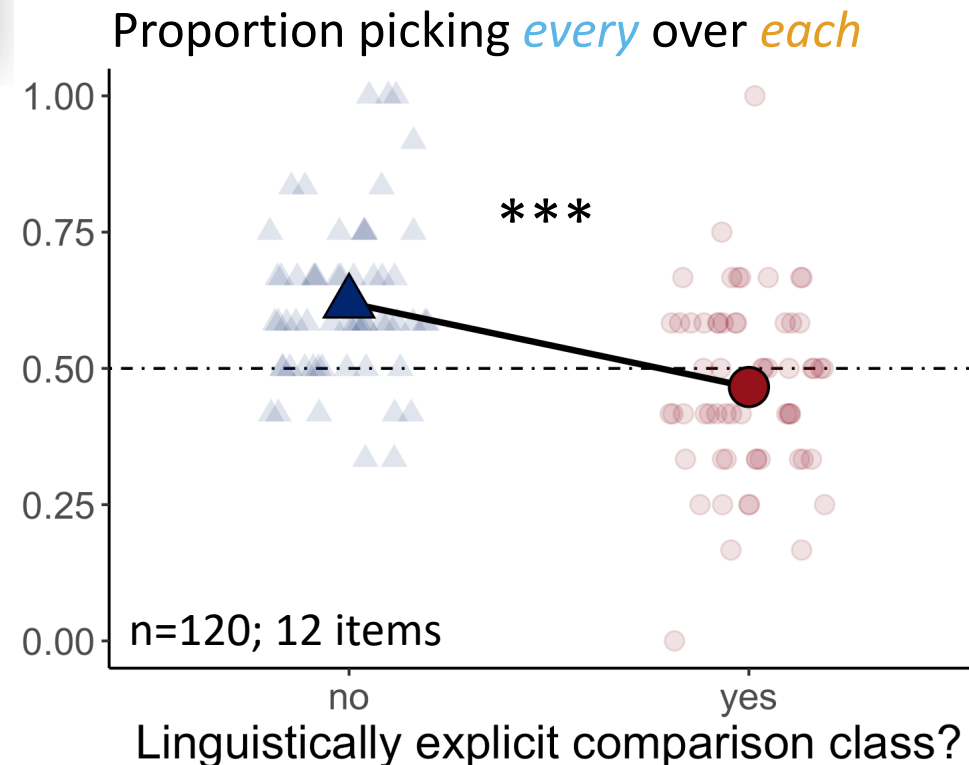
[Implemented in PClbex (Zehr & Schwarz 2018)]

Ann and Frank decided to throw a school Halloween party.

Surprisingly, (select a word) ▾ student showed up in the same costume {  $\emptyset$ .  
as their classmates. }

(select a word) ▾  
each  
every

➡ Participants favored *every* in the absence of another source of the comparison class for *same*



➡ This preference disappeared when the comparison class was made *linguistically explicit*

# A language-internal prediction

## *Each NP*

➡ Implicates no grouping of domain entities

## *Every NP*

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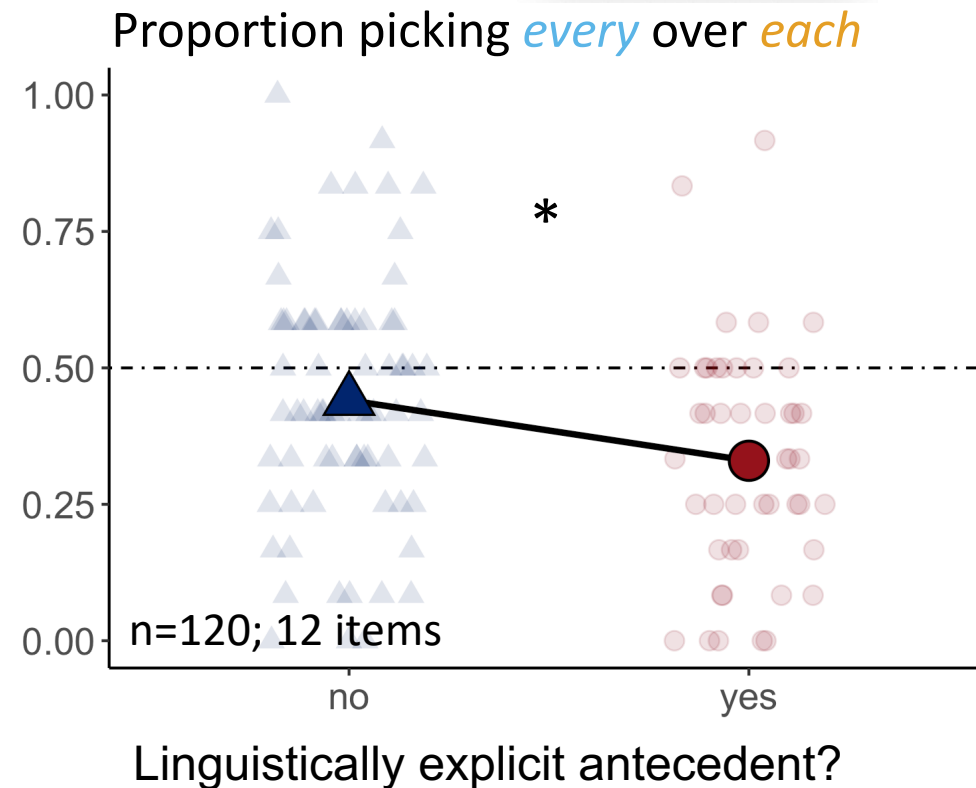
**Exp 2:** *every* is better able to serve as a plural antecedent for sentence-internal *they*

# Sentence-internal *they*: forced-choice judgment

[Implemented in PCIBex (Zehr & Schwarz 2018)]

After { arriving  
the students arrived } at the school party, (select a word) v student was told that they  
each  
every should gather around the table.

➡ Participants were more likely to pick *every* when the **linguistically explicit antecedent** was absent



➡ There's an overall preference for *each*

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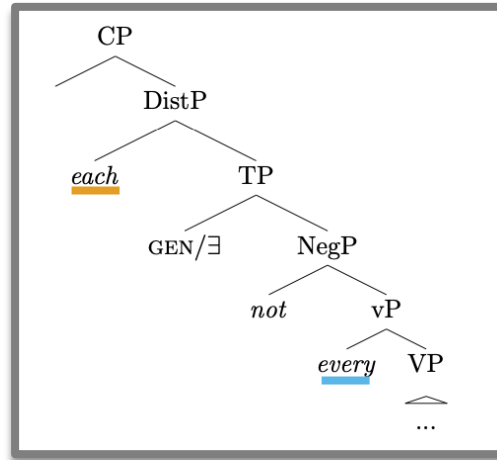
**Exp 1:** *every* is better able to provide a plural comparison class for sentence-internal *same*

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# Could alternative views explain this effect?

## Syntactic Position

(Beghelli & Stowell 1997)



- ➡ Better suited for capturing categorical distinctions
- ➡ Not obvious how scope difference could matter for antecedent availability

## Event differentiation

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Translation of Every

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- ➡ Does not suggest that *every NP* groups the NPs

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# Thanks!

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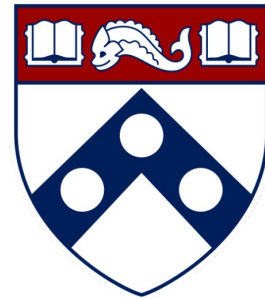
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# MindCORE

Center for Outreach, Research, and Education

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