The generics-as-default hypothesis and the generic overgeneralization effect

Presentation of Leslie, Khemlani, & Glucksberg (2011) and Lazaridou-Chatzigoga, Katsos, & Stockall (2015)

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1 Roadmap
- Introduction to the generics-as-default hypothesis and Generic Overgeneralization Effect
- Leslie, Khemlani, & Glucksberg (2011)
- Lazaridou-Chatzigoga et al.’s (2015) response

2 The psychology literature: the generics-as-default view

2.1 Fundamental questions
- Crosslinguistically, generics are often unmarked, presenting a potential challenge for acquisition.
- At what age are generics acquired, particularly in comparison to universals and other constructions?
- How do generics fit in to the interface of language and cognition?
- What is the relationship between universals and generics?

2.2 The generics-as-default view
- Generics are a default, innate mode of thinking that children do not need to learn.
- Quantification must be learned, while genericity comes for free.
- Dual systems
  - System 1 (genericity): fast responses, automatic, effortless, intuitive
  - System 2 (quantification): slower, more effortful, more reflective

2.3 Motivation for the GaD view
- Hypothesis: Because System 1 (genericity) is easier and faster than System 2 (quantification), it might be used incorrectly in situations that call for System 2.
  - This might lead people to incorrectly interpret quantified statements as generics.
- Marked/unmarked forms
  - Crosslinguistically, generics are unmarked.
- Deaf children
  - Deaf home signers appear to use generics at approximately the same rate as hearing children, despite never being exposed to either spoken or signed language (Goldin-Meadow, Gelman, and Mylander, 2005; Leslie, 2007).
- Pirahã
  - According to Everett (2005), Pirahã has generics but no universal quantifiers.
- Reasoning
  - Jönsson and Hampton (2006): all ravens are black is often judged as more likely than all young jungle ravens are black.
  - This “mistake” in reasoning can be explained if participants sometimes interpret universals as generics.
3 Motivation for the GaD view: evidence from Acquisition

3.1 Hollander et al. (2002)
- Study with 3-year-olds, 4-year-olds, and adults
- 3- and 4-year-olds were both adult-like with generic questions
- Only 4-year-olds were adult-like with all and some questions
- 3-year-olds treated all questions as generics
- Important caveat: children may be less aware of contextual restriction.

3.2 Early acquisition of generics in CHILDES
- In a CHILDES study, Gelman, Goetz, Sarnecka, and Flukes (2008) found that all children were producing generics at the age of two.

3.3 Leslie and Gelman (2012)
- Study with 3-year-olds, 4-year-olds, and adults
- Participants were presented with facts about animal kinds as either generics or quantified statements.
- Children and adults mistakenly recalled many quantified facts as generic, but correctly recalled generics as generics.

4 Predictions of the GaD view
- Generics should be easier for children to acquire than quantifiers.
- Quantifiers should be more difficult to process than generics.
- Generic overgeneralization effect (GOG): Both adults and children may sometimes fail to process more costly quantifiers and treat them as generics.

Types of generics
- Quasi-definitional: property must be universally true of all the members of the kind, with no exceptions.
  - Example: Triangles have three sides.
- Majority characteristic: property must be central, principled or essential (Gelman 2003; Medin and Ortony 1989) and directly related to the nature of the kind. It must be highly prevalent, while allowing some exceptions.
  - Example: Tigers have stripes.
- Minority characteristic: property must be central, principled or essential, but only be held by a minority of the kind. Restricted to methods of gestation, methods of nourishing the very young, and characteristic physical traits exhibited only by one gender.
  - Example: Lions have manes.
- Majority: property must be prevalent among members of the kind, but must not be a principled connection (Prasada and Dillingham 2006, 2009).
  - Example: Cars have radios.
- Striking: property must only be exhibited by a small minority of the kind, and must signify something dangerous which is to be avoided.
  - Example: Sharks attack people.
5 Leslie et al. (2011): testing the generics-as-default hypothesis and generic overgeneralization effect

5.1 Experiment 1: The GOG Effect
- Main question: Does the GOG effect hold up, and if so, for which types of generics?
- Design: 6 x 3 repeated measures factorial design
  - Factor 1: Predicate type
    - Quasi-definitional, majority characteristic, minority characteristic, majority, striking
  - Factor 2: Statement type
    - Existential
      - Example: Some ducks lay eggs
- Generic
  - Example: Ducks lay eggs
- Universal
  - Example: All ducks lay eggs

- Method
  - Participants were asked to judge their agreement with each statement by selecting yes or no.
- Results & discussion
  - The GOG effect occurred for universally quantified statements for majority characteristic and minority characteristic statements.
  - However, there was little evidence for this effect for properties that are not characteristic.

5.2 Experiment 2a: Quantification over subkinds
- Background: A potential problem with experiment 1 is that subjects may interpret all as applying to subkinds rather than individuals.
  - All ducks lay eggs = all kinds of ducks lay eggs
- Main question: Are the results of Experiment 1 due to the generics-as-default hypothesis, or to quantifying over subkinds?
- Design
  - Experiment 2a provided a context designed to encourage participants to interpret the sentences from Experiment 1 as quantifying over individuals rather than kinds.
  - This context included population information about the species.
  - Example: Suppose the following is true: there are 431 million ducks in the world. Do you agree with the following: all ducks lay eggs.
- Method
  - Participants were asked to judge their agreement with each statement by selecting yes or no.
• Results & discussion
  o The GOG effect did not disappear in a context that invited participants to quantify over individuals rather than kinds.
  o However, the GOG effect was reduced.

5.3 Experiment 2b: Paraphrase task

• Main questions:
  o Could the observed GOG effect be due to a subkind interpretation or a restricted interpretation?
  o How often do participants “switch” from the original statement type (existential, generic, or universal) to a different statement type?

• Design & method: Participants were given sentences from Experiment 1 and asked to type out a paraphrase, retaining as much of the original meaning as possible.

• Results & discussion
  o Only 1% of paraphrases included subtyping language: participants were not at least consciously adopting subkind interpretations.
  o Universal statements were paraphrased as generics significantly more often than universal, generic, or existential statements were paraphrased as any other type of statement.

<table>
<thead>
<tr>
<th>Paraphrased as</th>
<th>Original statement type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existential</td>
</tr>
<tr>
<td>Existential</td>
<td>62</td>
</tr>
<tr>
<td>Generic</td>
<td>12</td>
</tr>
<tr>
<td>Universal</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

5.4 Experiment 3

• Main questions
  o Do participants have the needed background knowledge to succeed at the task?
  o Does the GOG effect persist after participants are made to think about relevant counterexamples?

• Method
  o Participants were asked to judge the truth value of relevant counterexamples in a knowledge task.
    ▪ Example: *Male ducks lay eggs.*
  o Participants were also given the same truth value task as in Experiment 1, with the same sentences. Half were given this original task prior to the knowledge task, and half were given it after the knowledge task.

• Results & discussion
  o Participants were aware of the relevant background information (e.g., gender discrepancies) needed to judge the sentences.
  o The GOG effect was replicated.
  o However, the knowledge test did seem to affect results: participants accepted minority characteristic universals as true 50% of the time before the knowledge test, but only 32% of the time after the knowledge test.
5.5 Experiment 4: the availability of correct alternatives

- Main question: Does the GOG effect persist when participants are offered correct alternatives?
- Design
  - Participants were presented with pairs of statements
    - Comparing universals with affirmative existentials
      - All Xs are Ys
      - Only some Xs are Ys
    - Comparing universals with negative existentials
      - All Xs are Ys
      - Some Xs are not Ys
- Method
  - Participants were asked to indicate the extent to which they agreed with one statement over the other using a 6-point scale.
- Results & discussion
  - The GOG effect persisted even when correct alternatives were available.

### Table 5

Mean ratings of agreement (and standard deviations) to the universal (6) or the existential (1) formulations of assertions as a function of predication type and polarity of the existential in Experiment 4.

<table>
<thead>
<tr>
<th>Predication type</th>
<th>Polarity of the existential statements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Affirmative</td>
</tr>
<tr>
<td>Quasi-definitional</td>
<td>4.95 (1.92)</td>
</tr>
<tr>
<td>Majority characteristic</td>
<td>4.70 (1.93)</td>
</tr>
<tr>
<td>Minority characteristic</td>
<td>3.77 (2.23)</td>
</tr>
<tr>
<td>Majority</td>
<td>2.03 (1.62)</td>
</tr>
<tr>
<td>Striking</td>
<td>1.93 (1.54)</td>
</tr>
<tr>
<td>False generalizations</td>
<td>1.83 (1.63)</td>
</tr>
</tbody>
</table>

6 Genericity is easy? Formal and experimental perspectives
Lazaridou-Chatzigoga, Katsos, & Linnea Stockall (2015)

6.1 The formal semantics analysis of genericity: problems from a psychological perspective

- Many formal semantics analyses treat generics as quantificational, and “do not assume a categorical distinction between the two kinds of generalisation.”
- Struggle to account for striking and minority characteristics
- How do children learn about the GEN operator?

6.2 The acquisition of generics: critical perspective

- There is some support in the acquisition literature for the GaD view in that generics are acquired at a very young age.
- However, in order to test the GaD view, it is necessary to compare the acquisition of generics and quantifiers—not just look at generics alone.
- Some show that young children comprehend both generics and quantified or specific statements.
• Gelman and Raman (2003)
  o Study with 2-year-olds, 3-year-olds, and 4-year-olds
  o Both children and adults successfully distinguished between specific statements and generics
    ▪ *Do birds fly* versus *Do the birds fly?*
  o This pattern is inconsistent with the GaD hypothesis.

6.3 Critical review of Leslie et al. (2011)
• Experiment 2a: providing population estimates may not be enough to make exceptions salient.
• Paraphrase task does not rule out the sub-kind interpretation.
• *All* is not representative of all universal quantifiers.
  o *All* may be interpreted with respect to context.
  o These unique features may lead to statements with *all* being judged as true even if there are some exceptions.
  o Future work is needed: Do results differ for the quantifiers *all, every, and each*?
• There is a lack of attention to the different types of generics.
  o Research focuses on bare plurals, but what about indefinite singulars and definite singulars?
  o Generics are also not always less marked than quantifiers; for example, in Greek, generics require a definite determiner.
• Ultimately, the quantifier domain restriction alternative has not been ruled out.
• How do children learn specific interpretations of statements that are ambiguous between generics and specifics if they interpret these statements as generic by default?

7 Further comments and discussion
• It’s not clear that one construction being easier to process than another should lead to systematic “errors” like the GOG effect in adults.
• Why don’t children make mistakes with existentials as well as universals?
  o From Leslie et al. (2011): “The only possible GOG errors involving ‘some,’ then, would involve people incorrectly judging a true existential statement to be false because the corresponding generic was false, e.g. judging ‘some Canadians are right-handed’ to be false because the generic ‘Canadians are right-handed’ is false. However, it is extremely easy to determine that such an existential is true: one only needs to think of a single right-handed Canadian in order to accept it. In this way, true existential statements are easy to evaluate, and so it is unlikely that adults would incorrectly rely on the default generic in such cases. It may be harder, though, for people to confirm that a universal statement is true, since they are only true if every single member of the kind has the property in question.”
• Does a semantic analysis with GEN necessarily predict that the acquisition of generics should be difficult?
• The tasks described in Leslie et al. (2011) are all offline, not online.
• The GOG effect *does* seem to be mediated by context, perhaps lending inadvertent support for the contextual restriction interpretation.