Gender and Generics: What makes a gender-specific generic sentence true?

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Abstract

Generic statements assert default properties of a kind. They reflect the relevant features of our concepts and are considered by people generally true of the entire class despite the existence of counterexamples (e.g. birds fly). We report three experiments which explore the factors that lead to the acceptance of generic statements. In particular we examine whether properties that relate to gender differences (lions have manes, or ducks lay eggs) are more likely to be accepted than matched statements that refer to an arbitrary subclass unrelated to gender. Experiments 1 and 2 found surprisingly that gender-specific properties were less likely to be accepted than the neutral control properties. Experiment 3 showed by contrast that gender-specific properties are more acceptable when they relate to reproduction than to appearance-based gender differences. It is argued that reproductive properties are more easily interpreted as referring to a kind rather than to the set of individual members.

Keywords: generics, gender-specific, concepts

Introduction

When we describe the nature of the world, we typically use "generic" sentences. These are unquantified statements making general statements whose truth is resistant to counterexamples (Carlson & Pelletier, 1995). Recent interest in generics has focused, for example, on the way in which children understand gender-based statements (Cimpian & Markman, 2011) and how generic statements serve to reinforce stereotypes and belief in the essential nature of social categories (Leslie, 2014).

The logic of generic sentences and their truth evaluation has proven to be a highly complex issue, and is still the subject of much debate (Greenberg, 2003; Leslie, 2014; Liebersman, 2011). Our aim in the present paper is to explore one particular empirical question concerning statements that describe "minority characteristics" true of less than 50% of the members of a kind. For example, the sentences "Ducks lay eggs" and "Mosquitoes carry malaria" are typical generics. These sentences strike us as clearly true, even if we realize that only adult female ducks lay eggs and only a small proportion of mosquitoes carry malaria.

Leslie, Khemlani, and Glucksberg (2011) established that generic statements about "minority characteristics" can still be considered true when they are given universal quantification, as in the sentence "All ducks lay eggs", which is only true of a minority of ducks. It is as though instead of the sentence meaning "everything that is a duck lays eggs," it means something like "a relevant fact to know about ducks is that some lay eggs." Quantifying the sentence with "all" may reduce the likelihood that people will judge it to be true, but it does not trigger extensional thinking to any great extent. The truth of generic sentences depends not on the absence of counterexamples but on what is considered a relevant fact about the kind. For example, although "Canadians are right-handed" is true of a majority of Canadians, it is not judged as being generically true (Leslie et al., 2011).

The present research set out to examine the factors affecting the acceptability of minority characteristic generic statements relating to gender. All of the items in Leslie et al.'s set of minority characteristics used properties that were just true of one gender of an animal kind. For example there were sentences such as "lions have manes" or "insects lay eggs". Our research question was whether the acceptability of such sentences (even in universally quantified form) is the result of their association with gender. For example, there may be some implicit pragmatic understanding that a gender modifier (male or female) is intended by the speaker. When someone asserts "sheep give milk", it could be argued that the hearer assumes that the speaker intends "sheep" to refer only to the females. Accordingly in Experiments 1 and 2 (which are close replications) we compared two conditions, one in which a generic property was true of just one gender of a fictitious animal, and one in which it was true of just one of two subtypes, unrelated to gender. We predicted that the gender-related generics would be more likely to be accepted as true than the gender-neutral generics.

Experiment 1

The first experiment was designed to test whether minority characteristics would be accepted as true more readily if they relate to one particular gender rather than to a non-gender based variety within a species. We hypothesised that people interpret the generic "ducks lay eggs" as applying to a subset of the kind, in particular just to the females. Hence they would accept a minority characteristic generic sentence when it was true of females, but not males, but would reject it if it was true of just one half of a species, but regardless of gender.

Method

Participants. Fifty students at "Kore University" of Enna (Italy), participated voluntarily, 25 in each group.
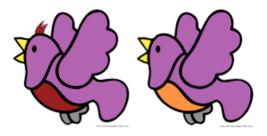

Figure 1: Rattle Bird, Male (or Type A) on the left and Female (or Type B) on the right, in Experiments 1 & 2.

Materials. Each booklet contained four sets of illustrated descriptions of four fictional dimorphic species of creatures (Tabbie Toad, Rattle Bird, Crabby Beatle, Cranky Fish). In each story, a picture and description was given of two different types, and of the species in general, which was referred to with a Definite Singular phrase. In the Gender group, the two types were labeled as male and female, while in the Neutral group they were labeled as two sub-varieties with both male and female members.

For example, the gender-based story for the Rattle Bird was as follows (but in Italian):

The Rattle Bird comes in two forms corresponding to the male and the female of the species. This is the male Rattle Bird (left). This is the female Rattle Bird (right). In spring, the female Rattle Bird grows spots on its wings. [Accompanying picture]. These Rattle Birds are found in France. The male has a sharp beak, and a crest on its head, whereas the female doesn't have either. The female has a coo-ing call, but the male is silent. The Rattle Bird lives in forests and dense woodland and is related to the dove; it only eats worms, beetles and small fishes that can be found in small lakes and rivers.

The gender-neutral version of the story was similar but began:

The Rattle Bird comes in two closely related forms with some minor differences. Both male and the female of the species can have either appearance, and the two forms, which are equally common, interbreed freely. This is the brown form of the Rattle Bird (left). This is the yellow form of the Rattle Bird (right)

Each text was followed by 9 sentences: 4 generic (2 each for male and for female in the gender condition), 3 true and 3 false. For instance, for the noun "Rattle Bird" the following 10 sentences were constructed:

1) *It is only found in Asia* (False)
2) *It is related to the dove* (True)
3) *It lives in forests* (True)
4) *It grows spots on its wings in spring* (Generic-female)
5) *It has crest on its head* (Generic-male)
6) *It eats nuts and seeds* (False)
7) *It has a yellow tail* (False)
8) *It eats small fishes* (True)
9) *It has a sharp beak* (Generic-male)
10) *It has a cooing call* (Generic-female)

The true sentences matched information given about the whole species, while the generic sentences were only true of one of the pictured creatures. Two booklets were created, one for each Condition. The order of the stories within the booklets was randomized. The task was translated into Italian by the first author (e.g. 8) *Si nutre di piccoli pesci*).

Design and Procedure. Participants were randomly divided into 2 groups, each receiving one of the 2 booklets (either the gender or the neutral) with the four sets of stories. The first page of each booklet contained a cover sheet with the instructions "*This experiment is simple and short. You will be shown a couple of pictures of fictional creatures, and a text that describes them. Then you will be asked to say whether a number of sentences are true or false for the species, based on the information you have been given*".
Participants circled one of 2 response options (true or false), printed to the right of each sentence.
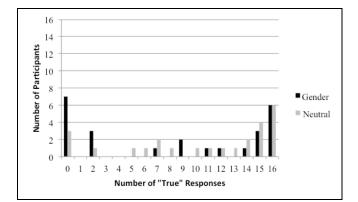

Figure 2: Distribution of responses across conditions in Experiment 1

Results and discussion. Responses to True and False statements were strongly positive and negative as predicted. Interest centred on the acceptance of the generic test statements in each condition. Each participant saw four species and judged four generic statements about each, giving a total possible number of "true" judgments of 16. Figure 1 shows the distribution of number of true judgments to generics by condition (gender or neutral). The first point to note is that the distribution is non-normal. Both conditions showed considerable variation between individuals, with 13 of the 25 participants in the Gender condition choosing to accept either all (6) or none (7) of the statements. The Neutral condition showed a more uniform distribution, with a slightly greater preponderance of

participants accepting the majority of the generics (16 out of 25, compared to 14 out of 25 for the gender condition).

Overall, 52% of generics in the Gender condition were considered true, while 66% of the neutral generics were estimated true. Thus, the amount of agreement with the generic statements was in fact greater for the neutral stories than for the gender based stories. Because of the distributions, a median-split chi-square test was used to test for differences in frequencies across conditions, and showed no significant difference ($\chi^2 = 0.3$, p >,5).

The results therefore leant no support to our hypothesis that minority characteristics would be better supported when they were specifically related to one gender. To test the robustness of this result we decided to replicate the study while making one change to the materials. In Experiment 1 we used the Definite Singular form for describing the kinds and an anaphoric singular sentence to express the generic statements. Previous research (e.g. Khemlani et al., 2007; 2012; Leslie et al., 2011) used bare plurals in their experiments (i.e. ducks lay eggs) and found high rates of acceptance (e.g. 89% of gender-based minority characteristics were accepted as true in Khemlani et al, 2007). We therefore sought to replicate the results of Experiment 1 with the same materials and design, but changing the definite singular phrase (The Rattle Bird) to the bare plural form (Rattle Birds).

In addition, to be sure that the scope of the sentences was understood, we repeated the bare plural noun phrase at the start of each sentence (e.g. Rattle birds are only found in Asia).

Experiment 2

In Experiment 2 we aimed to replicate the first experiment with some changes. In order to emphasize the generic nature of the sentences we used a bare plural form in both the story and the sentences in place of the singular definite form "The Rattle Bird" and anaphoric pronoun "it lives in forests". Otherwise the procedure was unchanged.

Method

Participants. A further 50 students at "Kore University" of Enna (Italy), participated without any reward.

Material. The materials were the same as in Experiment 1 save for the changes described above.

Design and Procedure. The design and procedure were the same as in Experiment 1.

Results and Discussion. As in Experiment 1 we counted the number (out of 16) of generics that were judged as true by each participant. The distributions for each condition are shown in Figure 3. This time, agreement with the generic statements was clearly greater for the neutral stories (58%) than for the gender based stories (12%).

This time the difference between the generalization of generics in the neutral and the gender condition was much greater and significant ($\chi2 = 13.3$, p < .001 on a median test). Thus, contrary to our prediction, people were much

happier to allow a generic to be true of only one kind of creature when it was NOT associated with a male/female difference.
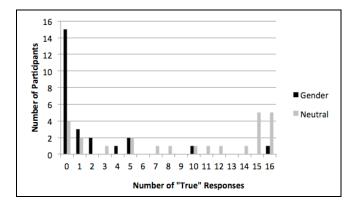

Figure 3: Distribution of responses in Experiment 2

Nevertheless, changing the noun from singular into bare plural, and repeating the noun in the sentences also had an apparent impact on the results. While acceptability was much the same in the neutral case, acceptability of a gender-specific characteristic was much lower with the bare plural noun placed at the head of each sentence. It is possible that the definite singular form "The Rattle Bird as a species" encourages interpretation of the sentences as referring to the relevant gender only, so making them more acceptable (but still no more acceptable that a gender-neutral distinction). On the other hand the bare plural "Rattle Birds" clearly refers to the whole set of individuals, and so the fact that the characteristic does not apply to one of the genders may be more evident. Further research is needed to explore the basis of this effect.

Experiment 3

It is striking that in spite of a high rate of acceptance of gender-based minority characteristics in previous research (e.g. Khemlani et al., 2007), our results were far less positive. One possible reason may be the fictional creatures that we have used. One aim of Experiment 3 was therefore to compare fictional cases with real-life examples, to see whether the use of fictional cases is valid. The second aim was to test an alternative hypothesis about when gender-based minority characteristics would be acceptable.

Gender-based generics in previous research have sometimes used reproductive properties ("lays eggs", "suckles its young") and sometimes differential appearance ("has a mane", "is red"). By contrast, all the sentences used in Experiments 1 and 2 were about appearance only. We hypothesized that a key factor in accepting the truth of gender-specific minority characteristics may relate to reproduction per se, rather than to other gender related features. We therefore constructed gender stories differentiating between features of physical appearance and reproduction. We then expected a stronger True response for

the generics about reproduction than for the generics about appearance.

The Experiment therefore had two factors, fictional versus real-life creatures and reproductive versus appearance gender-based properties. We predicted that acceptance would be stronger for real-life than for fictional cases, but that the difference between reproductive and appearance features would be evident in both kinds of case.

Method

Participants. A further 50 students at "Kore University" of Enna (Italy), participated voluntarily.

Materials. Each booklet contained four sets of descriptions with pictures: two based on real creatures (lions and deer) and two on fictional dimorphic creatures (Tabbies and Rattles). Each story was followed by 6 sentences: 2 true, 2 false, 1 generic on physical appearance (i.e. lions have manes), and 1 generic on reproduction (i.e. lions give live birth to their young). The order of the stories within the booklets was randomized. The form of the sentences was a bare plural as in Experiment 2.

Design and Procedure. Participants were randomly divided into 2 groups, one group first saw the two stories based on real animals and then the two fictional creatures, while the other group saw the stories in the opposite order. Thus, the condition of order of appearance was between subjects and the type of creature (real or fictional) and type of generic (reproduction or appearance) was within. The first page of each booklet contained a cover sheet with instructions. Participants circled one of 2 response options (true or false), printed to the right of each sentence.

Figure 4: Male and Female Lions in Experiment 3

Results and Discussion. The data were submitted to ANOVA with within-subjects factors of Real vs Fictional and Reproduction vs Appearance. There were significant main effects of Reproduction vs. Appearance ($F(1,49)$ = 18.02, p < .001) and of Fictional vs. Real ($F(1,49)$ = 8.73, p < .005). There was no interaction, F<1, (see Figure 5).

We found also a significant effect of the order of appearance of the two conditions, which however did not interact with the other factors. There was a contrast effect. When the fictional cases were seen first, they received higher ratings generally than when seen second, following the more convincing real cases. By contrast when the real cases were seen second they received higher ratings than when seen

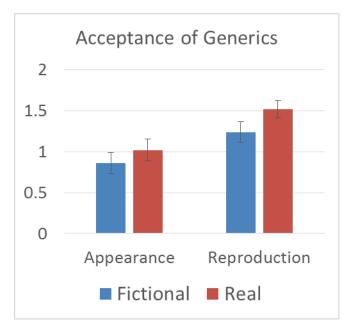first, because of a contrast with the less convincing fictional cases which they followed.

Figure 5. True Responses by condition In Experiment 3. Error bars show Standard Error.

These results supported our prediction that reproduction is an exceptional case that encourages generics because the predicate isn't so much "false" of the males, as that it just doesn't sensibly apply. On the other hand appearance features are quite free to be true of either gender, and so are less likely to be accepted as true.

Real cases were better liked than the fictional ones, but both showed the same effect. This result validates our use of fictional examples. While participants found them less convincing overall, the same preference for reproductive characteristics was shown with both types of material.

General discussion

Our three experiments are an initial exploration of why and when people are willing to accept minority characteristics as generically true. Previous research (Khemlani et al., 2007) has shown that people accept the truth of sentences which are only true of a minority of a class. However all the sentences of this kind that they studied related to gender-specific features such as "lions have manes" or "ducks lay eggs". Our results provide some further understanding of these interesting cases. First, in Experiments 1 and 2, we showed that, surprisingly, people are less willing to accept that a minority characteristic is true of a class when it is linked to gender. In Experiment 2, 58% of generics were accepted when they were true of an arbitrary subset of the class, but only 12% were accepted when they were true of only one specific gender.

Experiment 3 explored a further question about minority characteristics, namely whether gender based features that

relate to reproduction may be more acceptable than those that refer to appearance. In Leslie et al.'s data, the overgeneralisation to universally quantified sentences (e.g. "All ducks lay eggs") was more convincing with reproductive features than with appearance (e.g. "All kangaroos have pouches"), possibly because of the ignorance of some participants. To avoid problems of ignorance, we provided our participants with the relevant information in a short text, and then tested the acceptability of the generics. We found that indeed reproductive features were generally better accepted (76% of judgments in the case of real creatures) than appearance features (51%).

Leslie (2015) discusses a suggestion by Liebesman (2011) to the effect that generics are statements not about individuals (singular or plural) but about kinds. Similarly Hampton (2012a; 2012b) proposes that generics are considered true when they include information that is a part of the intensional prototype that represents the kind. That could explain why very rare but striking properties are also commonly accepted as true (e.g. sharks attack bathers). They are a part of our knowledge base about the kind, because of the need to take suitable precautions when swimming near sharks, and the spectacularly dire consequences of failing to do so. Given this framework, it is possible that reproductive features are more easily attributed to the kind than are gender-based appearance features. Ducks laying eggs is relevant to both male and female ducks, simply because they all, as individuals, began life this way. On the other hand lions having manes is quite specific to the males.

Another explanation for our result in Experiment 3 relates to a hypothesis put forward by Andrei Cimpian (Cimpian & Markman, 2011) that generics are more likely to be acceptable when they reflect essential or deep causal properties of a kind. Reproductive features are a part of a network of strongly related properties of a kind, embedded in theories of sexual reproduction and the rearing of offspring. They would therefore be more likely to find acceptance as generics than gender-differentiating appearance features.

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