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Talking and Thinking about Animal and Artifact Kinds Via Different Types of Generics

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Talking and Thinking about Animal and Artifact Kinds Via Different Types of Generics

by

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Abstract

Generic statements such as *Cows moo* and *Cars have wheels* allow us to talk about kinds or categories. There are several forms of generic statements in the English language however, this study focused on two forms: the definite singular form (e.g. *The cow moos*) and the bare plural form (e.g. *Cows moo*). This study investigated whether native English speakers think about novel animal kinds and novel artifacts differently when they learn about novel kinds using the aforementioned forms. Through the use of surveys, we tested the hypothesis that definite singular noun phrases assume that the category being referred to does not contain principled variation amongst members of the kind, and thus does not contain any sub-kinds and that bare plural generics do not make this assumption. In Experiment 1, participants (n=69) were presented with novel animal kinds. Participants assigned to Version 1 only received the bare plural form, and participants assigned to Version 2 only received the definite singular form. They were asked to choose from a 7-point Likert-type scale, how likely it is that there were subkinds of the novel animal. Experiment 2 followed a similar process except the participants (n=42) were asked to choose how likely novel artifacts were custom-built by inhabitants (suggesting variation potentially due to there being different subkinds) or mass-produced by machines (suggesting minimal variation potentially due to there not being different subkinds). Though our results were not significant, they were leaning in the right direction. Perhaps further studies with larger sample sizes will produce significant results. An alternate hypothesis about how definite singular and bare plural generics may differ in their use is also proposed as a useful avenue for future research.

Keywords: generics, cognitive psychology

Talking and Thinking about Animal and Artifact Kinds Via Different Types of Generics

In our everyday lives without giving it any thought we say things like, "Birds are colorful." With this statement, we can talk about the entire kind, birds, and make a generalization about what they look like. This type of language falls under generics. According to Gelman, "they are kind-referring expressions" (Gelman, 2004 p. 2). A kind "can be considered as an individual that has properties on its own" (Reiter & Frank, 2010, p.41). In other words, kinds can be thought of as categories and we refer to them by using nouns (Gelman, 2004). Generics deal with generalized statements about kinds and "imply that a category is a coherent, stable entity" (Gelman, 2004, p.3). Take the statement "Dogs are good." In this example, the kind we are referring to is "dogs". This is a general statement being made about dogs as a whole category and while we know some dogs are good, some are quite mischievous and others may even be aggressive. This shows that generics allow exceptions and from a young age we acknowledge that. In Brandone et al.'s 2012 study, children were able to recognize that "generic facts can be considered true even if they are not true of all or even most members of a category…young children do not interpret generics as statements about the number or proportion of individual category members that possess a particular property," (p. 430). Generics allow for some members of a category to be different from the generic statement.

Generics are salient from early on in life. We acquire generic language by about two and a half years old from our parents, caregivers or teachers, etc., since "generic statements are commonplace in child-directed speech" (Cimpian & Erickson, 2012, p.160). Generic language and generic statements help us to make inferences and extrapolate what we have learned to new information we encounter (Gelman 2004). If as children our parents tell us, "Firefighters are kind.", when we encounter them, we expect that firefighters will be kind and caring people. Taking this idea a step further, now that we have acquired that information about firefighters and we know that firefighters are kind and wear uniforms when we encounter police officers who

also wear uniforms, we may also view them as being kind. The generic information we acquire when we are young serves as building blocks in our memory and reasoning. We learn category-wide generalizations through the use of generics. In other words, after we learn about one or two members of a category, we make a generalization about the category as a whole. When we learn that Fido and Spot are dogs and have four legs, though we have not seen every dog, we make a category-wide generalization that applies that property to the entire kind resulting in the generic knowledge that dogs are four-legged. We also learn about the different properties of animals like their behaviors, physical characteristics, etc. through generic statements like “Dogs say woof. Dogs have four legs.”, “Cows say moo. Cows make milk.” (Gelman, 2004). We expect that if we see a dog it will bark and if we see a cow it will moo.

Though these generic statements lump together entire categories, they allow for exceptions (not every dog may have four legs and only female cows produce milk) and they are critical in our early years for our learning. According to Gelman (2004), by about age 3 or 4, children’s rate of production of generics increase, and by this time, we learn that though “generics imply broad generalizations [they] also allow for exceptions” (Hollander et al., 2002). In Hollander et al.'s research on children's ability to interpret generics, it is shown that by 4 years old, just like adults, children are able to distinguish that though generic statements are generally true, they do not always include all members of a kind (2002). By ages 4 and 5, “when learning about novel features of living things” children:

> …are more likely to attribute functional, life-sustaining powers … if they are introduced via generic [statements] than via nongeneric statements (Cimpian & Markman, 2009). “For example, when children were told that snakes have holes in their teeth, they explained the presence of the holes by invoking the functions they could fulfill: allowing snakes to "swallow things," or to "chew better," or to "drink the blood out of predators...When features of unfamiliar artifacts were introduced via generic statements, 5-year-olds often conceptualized them as functional aspects of the artifacts' intended design. (Cimpian & Erickson, 2012, p.160).

In this way, we see how generics impact learning and assist in understanding information about novel kinds.

Not only are generics used as a tool in teaching, but according to Andrei Cimpian's 2010 study, generic language contributes to children's motivation when facing new tasks. Even when receiving positive feedback, children's motivation was impaired whether positive or negative generic language was used. The children "felt less happy and less competent, and liked the game less.", when exposed to the generic statements (Cimpian, 2010, p.1336). The generic statements set high expectations for the children to meet and perhaps those expectations add additional pressure when facing a new task (Cimpian, 2010). Generic statements about "ethnic groups might also affect children's motivation, especially since these groups are a common target of stereotypes related to academic performance… both positive and negative." (Cimpian, 2010). Having prior knowledge of generic statements influenced the way children thought and this may have caused children to feel less motivated. For example, positive generic statements might have left children feeling less motivated because they felt they did not have to work as hard and negative generic statements might have left the children feeling less motivated to even try new tasks after hearing that certain ethnic backgrounds excel academically over others (Cimpian, 2010). For instance, after hearing "Asians are good at math," Asian children may feel less motivated to perform a mathematics task since they think they do not have to work as hard. Conversely, this same positive generic could cause children who are not Asian to feel less motivated to perform a mathematics task because they feel that since they are not Asian, they will not perform as well.

As previously mentioned, we learn generics at a young age, generics can affect our motivation, and generic beliefs can also affect our thought processes. In Cimpian & Erickson's 2012 study, they showed that generic statements may impact the development of children's theories and concepts and that generic format of beliefs determine what causal attributions children make. For example, when children were learning information about new living things and unfamiliar artifacts, when the information was presented using generic language, it

influenced the children's causal attributions as opposed to when the information was presented using non-generic language. By their work, we learn that not only do generic statements themselves impact our reasoning, but they lead to generic beliefs that get embedded in us and have an effect on our future reasoning (Cimpian & Erickson, 2012).

Once generic beliefs are formed, they "apply a feature to a group as a whole…" (Hammond & Cimpian, 2017, p.607). The example Hammond & Cimpian use is "Men are strong". Though we know that some men may not be as strong as others, once that generic belief is in place, we view the group, men, as being strong (2017). Generic beliefs can be harmful as they may be embraced with little evidence on one hand, or on the other hand, be rejected even in the presence of evidence (Hammond & Cimpian, 2017). According to Prasada et al., "generalizations such as ''pit-bulls maul children'' or ''sharks attack swimmers''…can hold for just a very small percentage of the instances," (2013, p. 406). These negative generic beliefs are not limited to just the animal domain. We carry these generic beliefs into dealing with social groups and have certain expectations and judgments. From Hammond & Cimpian's study, we learn that our generic beliefs are "central to stereotype structure…[and] may be primary in stereotyping in part because they are cognitively easy," (2017, p. 612). In such circumstances, generics can be adverse as they may cause incorrect information to be solidified in our minds.

Generics are a part of our life from the time we are babies, all the way through adulthood. They can be harmful, but for the most part generics are beneficial to us. They assist us in learning about new categories as illustrated in Rhodes et al.'s research, 2-year-olds were able to learn about a new category after being exposed to generic language (2018). These children were able to "acquire completely new social categories" and this showed "generic language importantly influences how children use social categories to make sense of the social world," (Rhodes et al., 2018). According to Graham et al., 30-month-old children use "generic/nongeneric distinction to guide their inductive inferences about novel kinds when

sentence plurality remained constant," (2012, p.13). Following generic language, children used this new knowledge and applied it to the new members of a category they encountered.

Previous studies have focused on children and their interpretations and understanding of generic statements. In this study, we will be focusing on adults and how they understand different generic *types*. There are several generic types as mentioned by Leslie & Lerner, "In addition to definite and indefinite singular generics, there are also bare singular generics [and] …bare plural generics, which have received the most discussion in the literature" (Stanford Encyclopedia of Philosophy, 2016, "Generic Generalizations"). To demonstrate, when we say, "The chicken says cluck," this is using the definite singular. Changing "the" to "a," as in, "A chicken says cluck" the statement is now in the indefinite singular form. In the bare plural generic form we would say, "Chickens cluck". In this particular example, we were able to say the generic statement in each form. However, generics are not always interchangeable. For example, using the bare plural we can say, "Animals can move on their own" but, we cannot use the definite singular (#"The animal can move on its own") to talk about the kind animal. The bare plural form is the most general form since it can be applied to all kinds and all properties that characterize kinds. As in the previous example, the definite singular generic form is limited in the kinds that can be used with it. The definite singular is also limited in the types of properties it can occur with. For example, we can characterize dogs via the generic "The dog has four legs", but not #"The dog wears a collar" even though we can use bare plural generics for both properties (e.g. "Dogs have four legs"; "Dogs wear collars"). In the indefinite singular form, we are limited to talking about a subset of properties that have a principled connection to the kind (Prasada & Dillingham, 2009). For example, we can use generics like, "A dog has four legs" but not #"A dog wears a collar."

The experiments in this thesis will focus on the definite singular generic type and the bare plural generic type. Since generics can impact our thought processes, we wanted to see

how the different generic forms may affect the interpretation of kinds from two domains: animals and artifacts. We hypothesize that when we hear “The dog barks,” (definite singular) we are less likely to think that there a different subkinds (or in this case breeds) of dogs versus when we hear “Dogs bark” (bare plural). Using people, if we hear the statement, “The Canadian is nice,” (definite singular) we are more likely to assume that the speaker is not Canadian themselves. When we think of groups that we are *not* a part of, we view them as being homogeneous or not having much variance; we tend to assume that everyone is the same, but we do not make that same assumption for the group we are part of. If we heard the same statement in the bare plural form “Canadians are nice” the speaker could be perceived as being Canadian or they could be something else. The bare plural generic statement allows for the interpretation of having different subkinds or variance. Knowing this, we set out to test and see if the use of different generic types will cause us to have different assumptions about the kinds being referred to.

Purpose of the Present Study

In the present study, we examined how native English speakers use and interpret two different generic forms (bare plural and definite singular) to talk about animals and artifacts. We hypothesize that definite singular noun phrases assume that the category being referred to does not contain principled variation amongst members of the kind, and thus does not contain any sub-kinds. When using definite singular, members of a category can be thought to be essentially the same. We further hypothesize that bare plural generics do not make this assumption. When using bare plural generics, members of a category can be thought to contain principled variation amongst members of the kind and thus contain different sub-kinds. Given this, we predict that when introduced to a novel animal with the definite singular, (i) participants will be less likely to think that there are different sub-kinds than when introduced to the novel animal with the bare plural. This prediction was tested in Experiment 1. We also predicted that when introduced to a novel artifact with the definite singular (ii) participants will be more likely to think that items are

mass-produced than when presented with the bare plural, on the assumption that machine produced artifacts would display less variability than custom-built ones. This prediction was tested in Experiment 2.

Experiment 1

Method

Participants

The participants in this experiment were at least 18 years of age and were self-identified native English speakers. Participants needed to be at least 18 years old to provide informed consent and they needed to be self-identified native English speakers to eliminate any possible cause of difference from having a native language other than English. Participants were also required to reside in the United States to reduce variation in English spoken since there are differences in the types of English spoken in other countries. In an effort to preserve anonymity no, age or gender demographics were collected. In Amazon Mechanical Turk, only "masters" were allowed to participate in the experiment. Master users are workers who have participated successfully in a wide range of experiments (https://www.mturk.com/worker/help#what_is_master_worker).

This experiment had a total of 74 participants. There were 35 participants in Version 1 (the bare plural condition) however, two participants from this condition were excluded from the statistical analyses because they answered fewer than the required 14 out of 16 comprehension questions. There were 39 participants in Version 2 (the definite singular condition) however, 36 participants were used in the analysis. Three participants were excluded because they answered fewer than the required 14 out of 16 comprehension questions.

Materials

Qualtrics was used to create the surveys. Before beginning one of two surveys, there were instructions that contained information about the animals on the planet and let the participants know that some of the novel animals have variation amongst their individual members due to the members coming from different subkinds of that kind and other novel animal kinds did not. (See Appendix B). There were 8 trials in each condition. Each trial contained a short description for each novel animal accompanied by 2 comprehension questions to which participants responded “yes” or “no”. For example:

Grumfibulas are nocturnal creatures that live under rocks. They have a hard, outer shell with spikes and they click to communicate with each other. Grumfibulas multiply quickly but only live for a few days.

Are grumfibulas nocturnal creatures?

Are grumfibulas fluffy?

The comprehension questions were displayed in blue to make sure that participants paid attention to them. Following the 2 comprehension questions, participants were presented with the main question being examined. This response was recorded using a Likert-type 7-point scale. For example:

Consider grumfibulas. How likely is it that there are different sub-kinds of grumfibulas?

1------2------3------4------5------6------7

Extremely unlikely Extremely likely

Version 1 of the experiment used bare plurals in all statements and questions to refer to the novel animal kind. Version 2 replaced the bare plurals with definite singulars. Each survey was designed to last approximately 15 minutes however, most participants finished in less time.

Procedure

The surveys were set up in Qualtrics and the appropriate links were set up in Amazon Mechanical Turk (mTurk). Amazon Mechanical Turk (mTurk) is a “marketplace for completion of tasks that requires human intelligence” (https://www.mturk.com/worker/help). Using this platform allowed us to ensure that each participant took the experiment only once as well as allowed us to compensate each participant. Each participant accessed the survey through mTurk using a computer or smartphone of their choice.

Participants were randomly assigned to one of the 2 conditions. Once the participant gave consent, they received instructions which contained information about the animals on the planet and let the participants know that some of the novel animals have variation amongst their individual members due to the members coming from different subkinds of that kind and other novel animal kinds had variation among members even though there were no subkinds of that kind of animal. (See Appendix C). After completing the survey, each participant was given a verification code to enter into mTurk. This code ensured the completion of the task. After completion and entry of the code into mTurk, each participant was compensated $.75 for their time.

Once all the data was collected, the responses were downloaded from Qualtrics, and a file with participants' verification code and completion time was generated from mTurk. The data sets were used to double-check that each participant completed the entire survey. Once it was confirmed that each survey was complete, the number of comprehension questions answered correctly was used to determine which participants would be included in the data analysis. Participants who answered 14 out of 16 comprehension questions or more were included in the analysis.

Results

An ANOVA with generic type as a between-subjects factor and item as a within-subjects factor and the participants' mean ratings as the dependent variable was conducted. There was a main effect of item ($F(7,469) = 5.35$, $p = .001$) however, there was no main effect of generic type and there was no interaction between item and generic type. Generic type was the main variable of interest. Though the difference in the means is in the predicted direction with a higher mean in the bare plural condition ((M=4.35, SE=.21), 95% CI [3.93,4.77]) than the definite singular condition (M=4.08, SE=.20), 95% CI [3.68,4.48]), the difference not significant, $F(1,67)=.84$, $p>.05$.

Discussion

The null hypothesis will be retained because there was no effect of generic type. For both definite singular generics and bare plural generics, participants thought there might be sub-kinds of each animal. The data for this experiment was leaning in the right direction. The lack of significance may have been due to a lack of power. The main effect of items shows that there were differences amongst the items in participants' ratings of how likely the items were to have subkinds. But importantly, the interaction between item and generic type was not significant. This indicates that the items did not differ in the extent to which subkind ratings for them were affected by the type of generic used. Perhaps, the results of this data were not significant since because we (people on a whole) already know that there are different subkinds of animals, and participants made their choices with that in mind. Inspecting the items, it appears that the items that got the highest (items 2 and 3) and lowest (item 6) ratings differed from those in the middle in that the highest mentioned the animal's adaptive outer layer and the vast life-span and the lowest had more of habitual information. In future experiments, we may want to avoid items of this sort since they suggest high or low likelihoods of subkinds independently of generic type. It may be useful for future experiments to use only items that do not elicit extreme values as it

may allow us to detect the effect of generic type more easily for items of that sort than items for which participants already have strong beliefs about whether they have subkinds independently of the generic type.

Experiment 2

Experiment 2 differed in two ways from Experiment 1. First, novel artifact kinds were used rather than novel animal kinds. It is possible that participants may be less likely to have prior ideas about whether artifacts have subkinds and thus may allow the form of generics to influence their construals of the novel kinds to a greater degree. Second, instead of directly asking about subkinds, the experiment sought an indirect measure of whether there are subkinds. On the assumption that if there are subkinds, one might expect a greater amount of variation, we asked participants to guess the likelihood that a novel artifact was custom built (suggesting greater variability) by hand or machine-made (suggesting less variability).

Method

Participants

This experiment had a total of 47 participants. There were 27 participants in Version 1 (the bare plural condition) however, three participants were excluded from this condition since they answered fewer than the required 14 out of 16 comprehension questions. There were 20 participants in Version 2 (the definite singular condition) however, 18 participants were used in the analysis. Two participants were excluded since they answered fewer than the required 14 out of 16 comprehension questions.

Materials

Same as Experiment 1 except that novel artifacts were described rather than novel animals. Also, prior to beginning one of two surveys, there were instructions that contained

information about the skilled inhabitants of the planet, their self-sufficient culture with many "do-it-yourself" stores alongside stores with artifacts that are mass-produced in factories. This description was put in place to provide participants with some context about the nature of the novel planet and provide them with some motivation to consider novel artifact kinds to be either custom-built or machine-made (See Appendix C). A sample trial looked like this:

Fingolas are tools for the most skilled fishermen. They are comprised of several parts: a long rod, a clasp on the end and a trigger which causes the clasp to open and close.

Are fingolas used by the most skilled fishermen?

Are fingolas made of one part?

Consider fingolas. How likely is it that fingolas are mass-produced versus handmade?

1---2---3---4---5---6---7

Likely to be mass-produced by machines Likely to be custom-built by individual inhabitants

Procedure

Experiment 2 followed the same procedure as Experiment 1.

Results

An ANOVA with generic type as a between-subjects factor and item as a within-subjects factor and the participants' mean ratings as the dependent variable was conducted. Generic type was the main variable of interest. There was no difference in the means of this experiment (bare plural ((M=3.66, SE=.14), 95% CI [3.38,3.94] and definite singular ((M=3.66, SE=.16), 95% CI [3.34,3.98]). The results were not significant, $F(1,35)=.11$, $p>.05$. There was also a main effect of item ($F(7,245) =7.24$, $p<.01$) and there was no interaction between item and generic type ($F(7,245) =.92$, $p>.05$).

Discussion

There was no difference in participants' judgment of the likelihood that an artifact was custom-built (suggesting high variability and perhaps subkinds) versus machine-made (suggesting low variability and perhaps no subkind) when presented with definite singular generic noun phrases or bare plural generic noun phrases. The main effect of item shows that there were differences amongst the items in participants' ratings of how likely the items were to be custom-built by inhabitants or mass-produced by machines. More salient however, the interaction between item and generic type was not significant. This indicates that the items did not differ in the extent to which ratings for them were affected by the generic type used. Bearing this in mind, the participant pool for this experiment was fairly small so a bigger participant pool could assist and give better results. Possibly in this experiment, though we understood and thought of mass-produced by machines as having low variability and custom-built by individuals as having high variability, this was probably unclear to the participants. Inspecting the items, it appears that the items that got the highest and lowest ratings differed from those in the middle in that the highest mentioned use by a specific sample (in this case, "skilled fishermen) and the lowest mentioned a specific function. In future experiments, we may want to utilize items that avoid these properties since they suggest high or low likelihood of subkinds independently of generic type.

In this experiment, the language used could have also contributed to the way the participants responded about the artifacts. Perhaps we should also ask participants about subkinds; how likely or unlikely they think there are subkinds of each artifact. Though there may be variation in the artifacts, there may not be subkinds. One artifact may be structurally/ physically different from another however this does not mean that there are different subkinds. In Experiment 1, we explicitly differentiate variation within the kind as opposed to variation

resulting from there being different subkinds. We should focus on asking about subkinds because it could be that participants in Experiment 2 are assuming variation within the kind.

General Discussion

The current experiments suggest that there is no difference in interpretation of information when presented with the bare plural generic form or the definite singular generic form, however it could be that the current hypothesis is right. Unlike the comprehension questions we had in place to ensure participants were reading the material presented on each trial, we did not have something in place to ensure that participants read the instructions. If participants did not read the instructions carefully, their choices could have been completely random rather than leaning in the right direction because they did not read the instructions thoroughly in the beginning. Maybe running a similar experiment with a check in place for understanding the instructions would yield better results. A larger sample size is needed to ensure that the lack of significant results is not due to a lack of power. Also, as previously mentioned, Experiment 2 could be done modeled after Experiment 1: asking participants if the novel kind has subkinds rather than if items were custom built by inhabitants or mass-produced by machines. It may be that since animals are already thought of and known as having sub-kinds, this affected how participants responded. Though we know that there are different sub-kinds of plants, most of us know fewer subkinds for plants than animals, maybe using plants would be a good way to test for principled variation since plants has not been explored as much and we may have less strong ideas about whether there are subkinds in these categories.

Previous research has shown differences between the interpretation of generic information concerning human and non-human categories (Tasimi et al., 2017). Knowing this, a similar experiment could be done where animals and artifacts could be compared to human categories to see if there is a difference between how generics about animals and artifacts are interpreted as compared to generics human categories.

It is also possible that there was no difference between the definite singular and bare plural generic forms because the current hypothesis is incorrect. Perhaps the different generic types do not lead to different beliefs or interpretations but provide us with tools to view things differently. Maybe using the definite singular does not lead to a belief that there is no principled variation within the kind, rather it allows us to talk *as if* there is no principled variation within the kind. To test this, experiments could be set up where participants are asked to indicate which generic type they would choose to talk about a category *as if* there are not any subkinds.

An alternate way of testing this possibility may be to see if the definite singular form is preferred to the bare plural form when talking about properties of known kinds for which there is no variation amongst subkinds (e.g. all kinds of birds have feathers) and comparing that to a property for which there is variation amongst subkinds (e.g. not all birds fly). Thus, for example, is the relative goodness of "The bird has feathers" compared to "Birds have feathers" when both are interpreted generically larger than that of "The bird flies" compared to "Birds fly" when both are interpreted generically? Another way to test this is by conducting experiments along these lines using novel kinds. One could plainly tell participants if a property varies across subkinds or not, then ask the participants if the definite singular form sounds good or if the bare plural form sounds good to characterize the kind in terms of that property.

If the predicted differences materialize in these experiments, it would suggest that definite singular and bare plural generics do not suggest whether there are subkinds or not. Rather, it would suggest that they provide tools for talking about kinds when it is useful to talk about the kinds as if there are no subkinds; for example, when all subkinds have the property in question as compared to when one cannot talk as if there are no subkinds; when not all subkinds have the property in question.

Past research has shown that generics are an essential, habitual part of our everyday speech and learning. From the time we are young we use generic language and it comes to us

almost like second-nature and at times they help shape our judgements and beliefs. Future research must be done to know whether differences in generic types impact the way we think about things. It remains to be seen if different forms of generics have different interpretations or different uses, or both.

References

Brandone, A. C., Cimpian, A., Leslie, S., & Gelman, S. A. (2012). Do Lions Have Manes? For Children, Generics Are About Kinds Rather Than Quantities. Child Development, 83(2), 423-433. doi:10.1111/j.1467-8624.2011.01708.x

Cimpian, A. (2010). The Impact of Generic Language About Ability on Children's Achievement Motivation. Developmental Psychology, 46(5), 1333–1340.

Cimpian, A., & Erickson, L. (2012). The Effect of Generic Statements on Children's Causal Attributions: Questions of Mechanism. Developmental Psychology, 48.

Gelman, S. A. (2004). Learning Words for Kinds: Generic Noun Phrases in Acquisition.

Graham, S. A., Nayer, S. L., & Gelman, S. A. (2011). Two-Year-Olds Use the Generic/Nongeneric Distinction to Guide Their Inferences About Novel Kinds. Child Development, 82(2), 493–507. doi: 10.1111/j.1467-8624.2010.01572.x

Hammond, M. D., & Cimpian, A. (2017). Investigating the cognitive structure of stereotypes: Generic beliefs about groups predict social judgments better than statistical beliefs. Journal of Experimental Psychology: General, 146(5), 607–614. doi: 10.1037/xge0000297

Hollander, M. A., Gelman, S. A., & Star, J. (2002). Children's Interpretation of Generic Noun Phrases. Developmental Psychology, 38(6), 883–894. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/12428701

Leslie, S.-J., & Lerner, A. (2016, April 24). Generic Generalizations. Retrieved from https://plato.stanford.edu/entries/generics/

Prasada, S., Khemlani, S., Leslie, S.-J., & Sam Glucksberg, S. (2013). Conceptual distinctions amongst generics. Cognition, 126, 405–422.

Reiter, N., & Frank, A. (2010). Identifying Generic Noun Phrases. Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics, 40–49. Retrieved from https://www.aclweb.org/anthology/P10-1005.pdf

Rhodes, M., Leslie, S.-J., Bianchi, L., & Chalik, L. (2018). The Role of Generic Language in the Early Development of Social Categorization. Child Development, 89(1), 148–155. https://doi.org/10.1111/cdev.12714

Tasimi, A., Gelman, S. A., Cimpian, A., & Knobe, J. (2017). Differences in the Evaluation of Generic Statements About Human and Non-Human Categories. Cognitive Science, 41, 1934–1957.

Appendix A

Experiment 1 Informed Consent

You are invited to participate in a research study because you are a native speaker of English, are over 18 years of age, and reside in the United States. The purpose of this research study is to investigate how people talk about novel animals and artifacts. The results of the study may help increase generalizable knowledge concerning the factors that govern the interpretation of language and may impact automatic translation algorithms, as well as how second languages are taught.

• If you agree to participate, we will ask you to participate in an online experiment in which you will be told short descriptions about some novel animals (or artifacts) and be asked to make some judgments concerning the characteristics of the animals (or artifacts) in the descriptions after answering some comprehension questions. For example, a sample trial may look something like this:

> Grumfibulas are nocturnal creatures that live under rocks. They have a hard, outer shell with spikes and they click to communicate with each other. Grumfibulas multiply quickly but only live for a few days.
>
> Are grumfibulas nocturnal creatures?
>
> Are grumfibulas fluffy?
>
> Consider grumfibulas. How likely is it that there are different sub-kinds of grumfibulas?

The time commitment of each participant is expected to be 15 minutes.

• Participation in this study may involve certain minimal risks such as breach of confidentiality. Mechanical Turk is a web-based service, and so it is inherently subject to possible security breaches. To minimize the risk of breach of confidentiality, your data will be stored with a number that is not linked to your name. Your participation in this study may involve boredom from answering many questions. To minimize the risk of boredom we have kept the experiment short.

• Potential benefits of participation include the possibility that the results of the study may help increase generalizable knowledge concerning the factors that govern the interpretation of language and may impact automatic translation algorithms, as well as how second languages are taught.

• We will protect your confidentiality in the following manner. This online survey was generated via Qualtrics. The Qualtrics server will not collect IP addresses or identifying information but will collect and store survey responses throughout the duration of the study. Following data collection, the collected data will be exported and stored in encrypted files on password-protected computers in the Principal Investigator's laboratory. This data will be deleted from the Qualtrics server at the completion of the study. Data will remain stored in backup files by the Qualtrics server for 90 days following the date of deletion, at which point it will be permanently deleted. IP addresses will be collected by Amazon in accordance with Amazon's privacy notice as stipulated upon registering as a participant on Mechanical.

• Compensation in the amount of $.75 will be credited to your MTurk account following completion of the online survey and subsequent review by the research team, typically within one day of the date of participation. While you may choose to withdraw from participation in this study at any point, compensation will be awarded for completed surveys only.

• As this research is intended for publication, de-identified data will be stored for a minimum of three years after the study is complete and might be published in conjunction with the findings of the research team. By consenting to participate in this study, you are also consenting to having your de-identified data published as part of future publications. Once published in a scientific journal, the de-identified data will be available to other researchers via the journal.

Your participation in this research is voluntary. If you have any questions, you can contact Sandeep Prasada at sprasada@hunter.cuny.edu. If you have any questions about your rights as a research participant or if you would like to talk to someone other than the researchers, you can contact CUNY Research Compliance Administrator at 646-664-8918 or HRPP@cuny.edu.

In place of a signature, please click one of the following:

Press space bar to progress.

I consent, begin the study I do not consent, I do not wish to participate

Appendix B

Experiment 1 Instructions

In this experiment, you will be told about the discoveries of some scientists and then asked some questions about the things discovered.

While traveling through outer space, a group of astronauts discover a new earth-like planet. On this planet, they encounter new life forms and artifacts that they had not previously encountered.

Interestingly, scientists have discovered that some novel kinds of animals have variation amongst their individual members due to the individual members coming from different sub-kinds of that kind (e.g. as, for example, the differences between Fido the dachshund and Rex the Collie back on earth).

Other kinds of animals on this planet have variation amongst their individual members, but this variation is **not** due to there being different subkinds of the kind in question.

On each trial, you will be told about one kind of animal that scientists have discovered on the planet and then asked to answer some questions about that kind of animal and then will be asked to make a judgment as to whether it is likely that the kind of animal described has sub-kinds or not

If you feel that that kind of animal is **very likely to have sub-kinds**, please choose 7. If you feel that that kind of animal is **very likely NOT to have sub-kinds**, please choose 1. Please use the numbers in between to reflect likelihoods in between.

For example, you may see something like this:

> Grumfibulas are nocturnal creatures that live under rocks. They have a hard outer shell with spikes and they click to communicate with each other. Grumfibulas multiply quickly but only live for a few days.
>
> Are grumfibulas nocturnal creatures?
>
> Are grumfibulas fluffy?

Consider grumfibulas. How likely is it that there are different sub-kinds of grumfibulas?

1—2—3—4—5—6—7

Unlikely to have different sub-kinds Likely to have different sub-kinds

Please make each judgment on its own. Do not come up with a strategy for responding. Please do not try to come up with what you think the “right” answer is—just make the judgment based on your gut feeling about the matter having read about that kind of artifact.

Appendix C

Experiment 2 Instructions

In this experiment, you will be told about the discoveries of some scientists and then asked some questions about the things discovered.

While traveling through outer space, a group of astronauts discover a new earth-like planet. On this planet, they encounter new life forms and artifacts that they had not previously encountered.

The inhabitants of the planet take pride in being skilled at making many different kinds of artifacts by putting together components available at the many do-it-yourself stores on the planet. This culture of custom-manufacturing artifacts lives side-by-side with a wide array of artifacts that are mass-produced in factories by machines.

On each trial, you will be told about one kind of artifact that scientists have discovered on the planet and then asked to answer some questions about that kind of artifact and then make a judgment as to whether it is likely mass-produced by machines or custom-built by individual inhabitants.

If you feel that that kind of artifact is very likely to be mass-produced by machines, please choose 7. If you feel that that kind of artifact is very likely to be custom-built by individual inhabitants, please choose 1. Please use the numbers in between to reflect likelihoods in between.

For example, you may see something like this:

> Fingolas are tools for the most skilled fishermen. They are comprised of several parts: a long rod, a clasp on the end and a trigger which causes the clasp to open and close.
>
> Are fingolas used by the most skilled fishermen?
>
> Are fingolas made of one part?

Consider fingolas. How likely is it that fingolas are mass-produced versus handmade?

1—2—3—4—5—6—7

Likely to be custom-built by individual inhabitants **Likely to be mass-produced by machines**

Please make each judgment on its own. Do not come up with a strategy for responding. Please do not try to come up with what you think the “right” answer is—just make the judgment based on your gut feeling about the matter having read about that kind of artifact.

Appendix D

Experiment 1 Items

1. Grumfibulas are nocturnal creatures that live under rocks. They have a hard outer shell with spikes and they click to communicate with each other. Grumfibulas multiply quickly but only live for a few days.

Are grumfibulas nocturnal creatures?

Are grumfibulas fluffy?

Consider grumfibulas. How likely is it that there are different sub-kinds of grumfibulas?

2. Zeenans are nocturnal creatures that live partially on land and partially in the water. Their fuzzy outer layer changes depending on where they are: their fur will create a seal over their skin when in the water and fluff back up once on land.

Do zeenans live only on land?

Do zeenans have a fur?

Consider zeenans. How likely is it that there are different sub-kinds of zeenans?

3. Rokans have a tough exoskeleton. They fly from tree to tree during the day and can be heard cooing at night before they finally rest. Rokans have a vast lifespan and can live for up to 150 years.

Do rokans have tough exoskeletons?

Can rokans be heard cooing in the day?

Consider rokans. How likely is it that there are different sub-kinds of rokans?

4. Schmeeras enjoy prancing in the sunlight. Their delicate skin reflects beautiful colors as they move around. They whistle and they jump back and forth through the trees. After a long day, they retire into grooves and holes in the trees' bark.

Do schmeeras have tough skin?

Do schmeeras enjoy prancing in the sunlight?

Consider schmeeras. How likely is it that there are different sub-kinds of schmeeras?

5. Ractanoids have soft fur. Since they have been hunted by their planet's inhabitants, they live in bushes for protection and are rarely spotted during the day. They thrive at night. Ractanoids are herbivores, feasting on whatever berries and other fruit they can find.

Do ractanoids have soft fur?

Are ractanoids carnivores?

Consider ractanoids. How likely is it that there are different sub-kinds of ractanoids?

6. Zikous chatter as they crawl from below the ground at 6 pm, every night. Zikous use their claws to break into nests to consume bugs. This meal will last them until the following week since they do not do very much.

Do zikous chatter in the day?

Do zikous use their claws to break into nests?

Consider zikous. How likely is it that there are different sub-kinds of zikous?

7. Frangus are water-dwelling creatures. They operate on their own clock and retreat to their habitats at their own will. They have tough exteriors that protect their inner organs as they hunt for small fish.

Are frangus water-dwelling creatures?

Do frangus have a soft exterior?

Consider frangus. How likely is it that there are different sub-kinds of frangus?

8. Golgas live in large colonies. Without each other, they are bound to die. Golgas glop around on their rubbery skin on land but zip quickly through the water as they move from place to place. They work together to overcome their prey and share the spoils of their work.

Do golgas live alone?

Do golgas have rubbery skin?

Consider golgas. How likely is it that there are different sub-kinds of golgas?

Experiment 2 Items

1. Fingolas are tools for the most skilled fishermen. They are comprised of several parts: a long rod, a clasp on the end and a trigger which causes the clasp to open and close.

Are fingolas used by the most skilled fishermen?

Are fingolas made of one part?

Consider fingolas. How likely is it that fingolas are mass-produced versus handmade?

2. Glots are used for vehicle repairs both at home and by professionals. These tools come with several modifications, depending on what vehicular component needs to be mended. Glots are an essential on this planet.

Are glots used only by professionals?

Are glots able to be modified?

Consider glots. How likely is it that glots are mass-produced versus handmade?

3. Blizzes transport people from place to place. They may be used by a single occupant or formed to accommodate several. Blizzes may be square or round, transparent, or opaque. These devices require ample time to be assembled as the components are unique.

Are blizzes used for transportation?

Are blizzes only opaque?

Consider blizzes. How likely is it that blizzes are mass-produced versus handmade?

4. Gungas come in many shapes, sizes, and colors. They are a household item once used only by the common man, now used by the upper class as well. Gungas are used to keep important items safe and have a special seal to aid in protection.

Are gungas only one shape?

Are gungas used by the upper class?

Consider gungas. How likely is it that gungas are mass-produced versus handmade?

5. Flins contain complex inner workings that are meticulously put together. Flins are used by the planet's inhabitants to clean water by extending the head portion under the surface and dragging it from side to side.

Are flins used to clean water?

Are flins shortened for use?

Consider flins. How likely is it that flins are mass-produced versus handmade?

6. Mors aid in the crushing of spices for special meals. Mors are heavy and may be crafted of different materials. These items are used by the top chefs in this society.

Are mors light?

Are mors used for crushing spices?

Consider mors. How likely is it that mors are mass-produced versus handmade?

7. Frazzers are made for each inhabitant and is used to protect them from the rain. They may be crafted with lighter fabrics or additional layers for colder times.

Are frazzers made for each inhabitant?

Are frazzers used for cooking?

Consider frazzers. How likely is it that frazzers are mass-produced versus handmade?

8. Probs are used for sorting different types of garbage. They suck up the item and automatically detects the garbage type and dispose of it accordingly. Probs are available for the home but are also accessible in public.

Are probs used for sorting clothes?

Are probs available at home and in public?

Consider probs. How likely is it that probs are mass-produced versus handmade?