Bachelor Informatica

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Development of an interactive experiment on the effect of sequential information on the formation of generic beliefs

Bodi Boelé

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Supervisor(s): Dr. Patricia Mirabile

Signed: -

Abstract

Generic statements are statements such as 'ducks lay eggs', 'tigers are striped', 'lions have manes' and 'ticks spread Lyme disease'. They express generalizations about the members of a kind. The statements lack any form of quantification and are therefore 'bare'. The universally quantified version of a generic statement should be rejected by it's incorrectness; 'All ducks lay eggs' which is wrong since many ducks (all male ducks) do not lay eggs. Building on earlier (ongoing) investigations on generics and alternatives, this paper will discuss the implementation of an interactive experiment including a pilot experiment.

Contents

CHAPTER 1

Introduction

1.1 Generic statements

'Ducks lay eggs', 'tigers are striped', 'lions have manes' and 'ticks spread Lyme disease'. These are all generic statements. Generics statements express generalizations about the members of a kind. The statements mentioned lack any form of quantification and are therefore 'bare'.

'Bare' generic statements express useful generalizations, but it is difficult to come to an unambiguous conclusion on when people think these statements are true. There is no unique critical point where people in general tend to designate a statement as true. For example when people have to judge the statement 'lions have manes', the predominant conclusion will be true, although less than 50% of lions (only the older male lions) have manes. When asked about the statement 'ticks spread Lyme disease' the predominant conclusion as well would be true, even though the statement is only true for 2.7% (RIVM 2019) of tick bites that actually transfer the disease whereas 20% of ticks carry the disease. These rather large differences in truth-conditions as investigated by Leslie, Khemlani, and Glucksberg 2011 are caused by the generic overgeneralization effect.

1.1.1 Overgeneralization effect

Experimental psychology has highlighted a number of biases and preferences such as the generic overgeneralization effect, the bias for people to accept a generic statement based on rare events and the biased position of people where they are more negatively biased towards non-human categories. For example people tend to classify 'Men attack people' as false and 'Sharks attack people' as true, even though the chance of men attacking people is vastly higher than the chance of sharks attacking people.

The experiments conducted by Leslie, Khemlani, and Glucksberg 2011 where they compare how people assert different formulations of generic statements, shows that people tend to falsely accept (over)generalized statements when offered a more descriptive alternative, as described in the previous section.

Tasimi et al. 2017 concludes that people are biased towards generics involving non-human entities. Their research also suggests that it is necessary to expand on the cognitive processes underlying these effects which is part of the goal of the overarching research project of this project.

1.1.2 Impact on generic beliefs

According to Cimpian, Brandone, and Gelman 2010 'generic statements require little evidence for acceptance' such as the previously mentioned tick example and other striking generics like 'Rottweilers maul children' and 'Lions eat people' even though these statements are only true for exceptional cases. According to their research generic statements are often judged as true based on little evidence, but these implications go far beyond what is needed to accept them. This

underlines the importance of the parent research on how people form these beliefs and what the effect of sequential information is on their judgement.

Rooij and Schulz 2019 analysed generic statements based on the intuition that other authors had formed over the years and claimed to be natural. In their paper they suggest that people tend to accept and interpret generics based on a distorted picture of it provided by the media instead of on actual frequencies.

1.2 Goal

The goal of this research project is to implement an interactive experiment which enables investigation of the effect of sequential information on the semantics of generic statements. The focus of this experiment will be on the importance of the learning process on the formation of beliefs regarding generic statements. This project seeks to implement an online tool which will be tested using a pilot experiment and afterwards be used in an ongoing research project by Rooij and Schulz n.d. on 'Generics and Alternatives'. In their research Rooij and Schulz n.d. use a statistical approach to the meaning of generic sentences. Their paper discussed 3 studies that tested their proposal. They presented participants, who were recruited through Prolific, with a visual scene and asked to judge the assertability of the generic sentence. In their conclusion they mention two shortcomings of their research that should be the focus of future work, that is where this thesis ties in with the investigation. This to be add ground to build a solid basis from where further theoretical work can be directed.

CHAPTER 2

Theoretical background

The main approach to statistical analysis of generic sentences is the use of the majority rule. Assuming a sentence 'tigers are striped' (form: 'Gs are f') the majority rule for a generic sentence is defined as:

Definition 2.0.1. A generic sentence of the form 'Gs are f' is true i.f.f. $P(f|G) > \frac{1}{2}$

The majority rule has various shortcomings. Such as the 'ticks' example mentioned in the introduction. With 2.7% this statement should come back as false, by definition of the majority rule, but somehow participants chose otherwise. To overcome these shortcomings Rooij and Schulz n.d. discuss that by taking into account various notions of alternatives, many shortcomings of the majority rule can be overcome.

CHAPTER 3

Method

The initial goal was to implement JavaScript within Qualtrics to reach the desired result, but after some research the desired result was not possible with the tools on hand. Then the decision was made to program in Python, which had been the language of preference for all involved. Unfortunately the desired server-based questionnaire could not be run through Python and therefore the desired program has been built using in the form of a website, using JavaScript, CSS and PHP.

3.1 Experimental Setup

This experiment will build on the basis created by Rooij and Schulz n.d. In their experiment they show the contestant a grid consisting of 2 differently coloured bugs, as shown in 3.1. The contestant is able to rate the generic statement using a 0-5 integer scale. To be able to investigate the influence of sequential data on the semantics, we used a set-up similar to that of the previous experiment as shown in 3.1. The interactive implementation has a similar appearance, except that the field will be initialised as a board consisting of tiles, somewhat resembling a game of memory. The user must interact with the interface and sequentially turn around all tiles on the user's side of the board, one by one, before being able to rate the presented statement. An example of this board is given in 3.2. The experiment forces the contestant to have a sequential learning process.

3.2 Data

The data to be used in this thesis will be gathered through a pilot experiment using the interactive web questionnaire created for this purpose. Participants for this pilot experiment will be recruited using social media connections, to also be able to receive feedback on the questionnaire itself.

The extended experiment will recruit participants via Prolific.ac, an online platform aimed at connecting researchers and participants willing to fill in surveys and questionnaires in exchange for compensation for their time Palan and Schitter 2018.

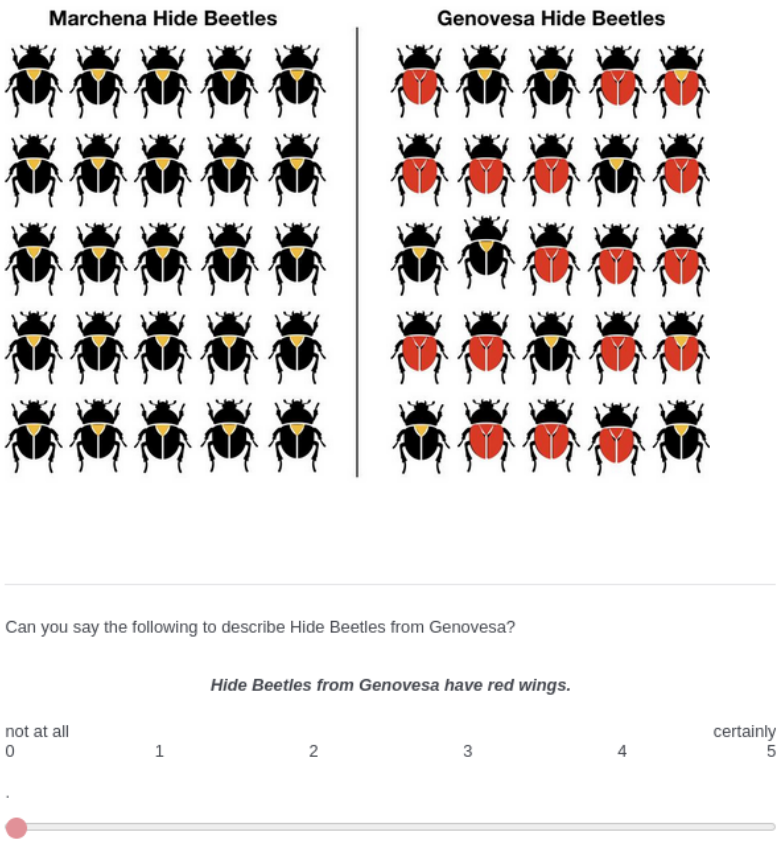

Figure 3.1: Sample of experiments done by Rooij and Schulz n.d. as seen by the contestant

Figure 3.2: Sample of the experiments set-up

CHAPTER 4

Results

4.1 Gathering data

4.1.1 Experimental set-up

CHAPTER 5

Discussion

5.1 Ethical aspects

CHAPTER 6

Conclusions

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