Journal of Experimental Child Psychology 174 (2018) 60–76

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

The development of the representativeness heuristic in young children

Samantha Gualtieri *, Stephanie Denison

Department of Psychology, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada

ARTICLE INFO

Article history:
Received 24 November 2017
Revised 11 May 2018
Available online 15 June 2018

Keywords:
Decision making
Representativeness heuristic
Base-rate neglect
Cognitive development
Probabilistic reasoning
Heuristics and biases

ABSTRACT

In classic examinations of the representativeness heuristic, Kahneman and Tversky (1973) presented adult participants with a description of an individual who fit their stereotype of a typical engineer. Importantly, even when participants were told that the individual was drawn from a sample of 70 lawyers and 30 engineers, they estimated that the individual was an engineer at very high levels, showing that they relied almost exclusively on the personality description. Relying on the representativeness heuristic can lead to base-rate neglect and, thus, biased judgments. Two experiments provide insight into the development of the representativeness heuristic in young children using an adaptation of the classic lawyer–engineer problem. Experiment 1 ($N = 96$) established that 3- to 5-year-olds can use base-rate information on its own, and 4- and 5-year-olds can use individuating information on its own, to make inferences. Experiment 2 ($N = 192$) varied the relevance of the individuating information across conditions to assess the pervasiveness of this bias early in development. Here 5- and 6-year-olds, much like adults, continue to attempt to rely on individuating information when making classifications even if that information is irrelevant. Together, these experiments reveal how the representativeness heuristic develops across the preschool years and suggest that the bias may strengthen between 4 and 6 years of age.

* Corresponding author.
E-mail address: sgualtieri@uwaterloo.ca (S. Gualtieri).

https://doi.org/10.1016/j.jecp.2018.05.006
0022-0965/

Introduction

Cognitive psychologists have a long-standing interest in the biases that affect decision making. In their seminal work, Kahneman and Tversky (1973) established numerous cases of base-rate neglect. For example, in the lawyer–engineer problem, participants read a personality description randomly selected from a sample of lawyers and engineers. The description was of a conservative man who enjoyed puzzles and did not care for social issues. Participants were then asked how likely it was that the man was an engineer as opposed to a lawyer. Importantly, participants were either told that the group from which he was sampled included 70 lawyers and 30 engineers or that it included 30 lawyers and 70 engineers. Despite these differences in base-rates, participants in both conditions estimated that the man was an engineer at nearly identical levels. That is, people neglected base-rate information (i.e., the number of lawyers and engineers in the sample) and relied more heavily on individuating information (i.e., the personality description, which fit their representation of a typical engineer). This is termed the representativeness heuristic (Kahneman & Tversky, 1973), and it can lead to base-rate neglect and biased judgments.

Since the initial publication of this work, many have investigated why adults neglect base-rates (see Kahneman, 2011, for a review), but few have investigated when this bias develops. Most research on the development of base-rate neglect has focused on children over 5 years of age because this was when basic probabilistic reasoning was thought to emerge. However, we now know that preschoolers, infants, and even nonhuman primates can use proportional information in their inductive inferences (e.g., Denison, Konopczynski, Garcia, & Xu, 2006; Kushnir, Xu, & Wellman, 2010; Rakoczy et al., 2014; Teglas, Girotto, Gonzalez, & Bonatti, 2007; Xu & Garcia, 2008). This early emergence of probabilistic reasoning provides an opportunity to investigate the development of heuristics and reasoning biases, particularly those involving base-rates, in children younger than those previously tested. Therefore, one main goal of the current experiments was to examine the age at which children begin to neglect base-rates in favor of applying representativeness by examining the youngest age group tested to date, 3- to 6-year-olds.

Because we are testing children younger than those previously studied, it is important to establish whether children at each age can use each piece of information on its own to make predictive inferences. Some previous investigations of the representativeness heuristic in young children did not provide baseline measures of children's ability to use base-rate and individuating information separately. This limits the conclusions that can be drawn from this work. In particular, previous work often overlooked young children's knowledge of characteristic information, which is essential to generating a response based on the representativeness heuristic. For instance, although Jacobs and Potenza (1991) and Davidson (1995) found that 6- and 7-year-olds provided responses in line with base-rate information more often than older children and adults, these younger participants were presented with characteristic group information with which they were likely unfamiliar (e.g., cheerleader and band member stereotypes). Thus, their increased use of base-rates likely arose from a lack of category information rather than an ability to override a heuristic response with a normative one (Stanovich, West, & Toplak, 2011). This important problem was highlighted in an investigation of 5- and 8-year-olds' responses to base-rate problems that used both familiar and unfamiliar group information (De Neys & Vanderputte, 2011). The younger children provided normative responses only when they were unfamiliar with the presented stereotypes (and thus had only base-rates to rely on). This demonstrates the importance of establishing whether children have the relevant social information to provide a normative or heuristic response in a particular paradigm. Therefore, in Experiment 1, we examined preschoolers' use of base-rate and individuating information separately to provide a foundation for interpreting their responses when this information was provided in tandem in Experiment 2.

Important variants of the lawyer–engineer problem, which manipulate the relevance of the social information provided, have revealed how readily adults use individuating information in their inferences (see Kahneman & Tversky, 1973). In a typical experiment, participants are given individuating information relevant to their classification. Relying on individuating information is reasonable in this