Pitfalls in Teaching Judgment Heuristics

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Demonstrations of judgment heuristics typically focus on how heuristics can lead to poor judgments. However, exclusive focus on the negative consequences of heuristics can prove problematic. We illustrate the problem with the representativeness heuristic and present a study (N = 45) that examined how examples influence understanding of the representativeness heuristic. Students received a definition of the heuristic, a definition plus examples of the heuristic leading to poor judgment, or a definition plus examples of the heuristic leading to both good and poor judgments. The results suggest that providing examples of heuristics leading only to poor judgments undermined comprehension.

Teaching often requires providing students with demonstrations or examples that illustrate a point or construct. Examples seem particularly important for constructs that are broad, abstract, or difficult to grasp. Judgment heuristics appear to meet all of these criteria, and our experience in teaching indicates that students often have a particularly difficult time understanding and recognizing them. Supplementing the teaching of heuristics with concrete examples would thus seem especially helpful to students.

In a recent article in this journal, Swinkels (2003) described a demonstration to illustrate heuristics at work. The demonstration involves students responding to four scenarios, each illustrating a different heuristic: representativeness, availability, simulation, and anchoring and adjustment. Swinkels's activity provided engaging examples and promoted active discussion, and we anticipate that many in-

structors will adopt Swinkels's activity in teaching heuristics in their courses. However, several of Swinkels's examples—like many textbook examples—illustrate how heuristics can backfire and lead to poor judgments rather than how they often result in good judgments.

Although we recognize the pedagogical utility of providing illustrations of poor judgments stemming from heuristics, overemphasis on inaccuracies may present two problems. First, too much emphasis on poor judgments may create the perception that heuristics invariably lead to misjudgments, and students may fail to recognize that heuristics are shortcuts that generally work. Indeed, it is because heuristics work so well that people may overuse them. Second, our experience teaching heuristics through examples of poor judgments reveals that students become adept at recognizing misuses of heuristics but have difficulty recognizing or generating examples of when heuristics work. To ensure that students have a full understanding of heuristics, we propose that instructors provide students with examples of heuristics leading to good judgments alongside examples of heuristics leading to poor judgments.

What are examples of heuristics leading to good judgments? We suspect that many students, and perhaps even some instructors, have difficulty generating examples of various heuristics leading to good judgments because they never learned or thought about such examples. Perhaps as a testament to the powerful influence of psychology textbooks, many students of psychology may learn only examples of poor judgments resulting from heuristics because many textbooks present primarily or only examples of heuristics leading to poor judgments (e.g., Davis & Palladino, 2004; Kassin, 2003; Myers, 2004; Passer & Smith, 2001). Although textbooks tend to focus on heuristics leading to poor judgments, research suggests that heuristics can be adaptive, resulting in quicker judgments that are just as accurate as judgments made without the aid of heuristics (e.g., Goldstein & Gigerenzer, 2002).

We focus on the representativeness heuristic and provide examples of how this heuristic can lead to good and bad judgments. We then present a study that examined students' understanding of the representativeness heuristic to test whether providing examples of heuristics leading to both sensible and poor judgments improved comprehension of the heuristic.

The Representativeness Heuristic

The representativeness heuristic involves judging the likelihood of something by considering how well it matches a particular category or prototype (Kahneman & Tversky, 1972). For example, when selecting from several options, students are more likely to guess that a man who has unusual tastes, is married to a performer, and has multiple tattoos is a trapeze artist than a librarian or lawyer, even though the latter two occupations are statistically more likely (Swinkels, 2003). Students are inclined to err because they ignore the base rate for the occupations and instead rely on the fact that the description matches more closely the prototype of a trapeze artist than the prototype of a lawyer or librarian.

Although the trapeze artist example provides a nice illustration of the misuse of the representativeness heuristic, we recommend that instructors couple misuse examples with examples of the heuristic leading to good judgments. For example, people who need assistance while in a store seek help from someone who looks like an employee rather than devote time and effort to asking everyone around them if he or she is an employee. That is, they seek someone wearing a smock, vest, uniform, or name tag emblazoned with the company name or logo, thus matching their prototype of a store employee. Do they know for certain that this person is an employee? No, but they are generally confident because the person so closely matches their prototype of a store employee. Any time people infer that the person wearing an apron and carrying a tray works at the coffee shop, that the person wearing a police uniform is a police officer, and that the tallest student on campus is on the basketball team, they are using the representativeness heuristic.

Of course, even in the examples we offer, the representativeness heuristic is not foolproof, as evident by the experience of the first author, who arrived at a large warehouse store wearing a tie and holding a clipboard. Fellow customers repeatedly approached him with questions because the real store employees were hard to find and because his appearance (wearing a tie and carrying a clipboard) apparently matched, albeit distantly, their prototype of a store clerk. Moreover, the use of heuristics can illustrate underlying stereotypes and prejudices as when people assume that the African American worker in a store is a clerk rather the manager. Nevertheless, the examples we offer illustrate that the representativeness heuristic, like other heuristics, is pervasive and works successfully for social perceivers in many instances.

We designed this study to test whether providing students with examples of the representativeness heuristic leading to both sensible and poor inferences improves comprehension of the heuristic. We hypothesized that students would display better understanding of the representativeness heuristic when offered examples of the heuristic leading to both good and poor judgments than when offered examples of the heuristic leading only to poor judgments. We also included a control condition in which participants received only a definition of the representativeness heuristic, permitting examination of whether understanding of the heuristic differed between students who received examples and students who did not receive examples.

Method

Participants

Male and female introductory psychology students ($N = 45$) participated at the beginning of class.

Materials and Procedure

We randomly assigned participants to either the control, negative, or balanced condition. Participants in the control condition received only the definition of the representativeness heuristic. We drew the definition from Passer and Smith (2001), who defined the *representativeness heuristic* as "a rule of thumb in estimating the probability that an object or event belongs to a certain category based on the extent to which it rep-

resents a prototype of that category" (p. G-14). We selected this definition because it included terms (e.g., *rule of thumb, prototype*) commonly used in textbook definitions of the heuristic. We ran the experiment early in the semester, several weeks prior to discussion of heuristics by the instructor.

Participants in the negative condition received the same definition plus two examples commonly described in textbooks of how the representativeness heuristic is detrimental to judgments, leading to poor inferences (Nisbett & Ross, 1980; Tversky & Kahneman, 1982). The first example explained why people who learn about a short, slim person who enjoys reading poetry are more likely to infer that the person is an Ivy League scholar than a truck driver. The second example described Linda, a 31-year-old, single, outspoken, bright woman who majored in philosophy and then explained why people are less likely to infer that Linda is a bank teller than to infer that she is a bank teller and active in the feminist movement.

Participants in the balanced condition received the definition plus the poetry enthusiast example. However, rather than receiving the Linda example, participants received a paragraph describing successful uses of the representativeness heuristic, such as inferring that a person wearing a police uniform is a police officer. We wrote the descriptions in the negative and balanced conditions so that they were roughly equivalent in length (471 vs. 458 words, respectively).

After participants had received ample time to read the definition and the examples in the negative and balanced conditions, the experimenter started a computer-generated timer displayed on a screen in the front of the room and directed participants to turn to the next page and take the representativeness heuristics quiz. The quiz comprised 12 brief scenarios and instructed participants to identify which scenarios involved use of the representativeness heuristic. Six of the 12 scenarios involved use of the heuristic. Of these 6, 2 clearly illustrated overuse of the heuristic (inferring that a young woman wearing Greek letters on her T-shirt is a member of a sorority and learning later that she is not; the trapeze artist example described by Swinkels, 2003). The remaining 4 involved sensible use of the heuristic in that the inference drawn by the person in the scenario was likely to be correct (e.g., inferring that a building is a restaurant after seeing through the window people sitting at tables looking at what appear to be menus; inferring that the neighbor's child in your apartment complex is a girl after finding dolls in the apartment complex stairwell).

Six of the scenarios did not illustrate the representativeness heuristic, but instead illustrated other judgment processes such as the availability heuristic (assuming that air travel is more dangerous following a well-publicized plane crash). A sentence appearing after the last item on the quiz instructed participants to record the time that had elapsed on the timer once they completed the quiz.

Results

Table 1 presents the results of the quiz by condition. For each participant, the total score represents the number of scenarios (out of 12) answered correctly on the quiz and false positives represents the number of distractor scenarios (out of 6) incorrectly identified as illustrations of the representativeness heuristic. We separated the 6 scenarios that illustrated the representativeness heuristic into two groups. For each participant, overuse scenarios represents performance on the 2 scenarios designed to illustrate overuse of the representativeness heuristic and sensible use scenarios represents performance on the 4 scenarios designed to illustrate successful use of the representativeness heuristic. Finally, time elapsed represents the amount of time required to complete the quiz.

Several findings in Table 1 are striking. First, participants in the control condition performed quite well on the task, answering on average over 9 of 12 items correctly. Indeed, a series of t tests using the pooled error term revealed that the total score of control participants did not differ significantly from the total score of participants in the balanced condition, $t(42) < 1$. Second, participants in the negative condition performed worse on the quiz than did participants in the control condition, $t(42) = 4.30, p < .0001$, and participants in the balanced condition, $t(42) = 4.55, p < .0001$. Apparently, providing examples exclusively of the overuse of the representativeness heuristic hampers understanding of the heuristic.

Further examination of the Table 1 reveals that participants in the negative condition made more false positive errors and had greater difficulty identifying illustrations of the heuristic leading to sensible judgments than did participants in the control and balanced conditions. It is noteworthy that participants in all conditions were equally adept at identifying illustrations of the overuse of the representativeness heuristic, $F(2, 42) = 1.12, p > .33$. Examination of the two items in this category revealed that 89% of participants correctly identified the Greek letters scenario and that 96% of participants correctly identified the trapeze artist scenario as illustrations of the representativeness heuristic.

Finally, 2 people did not record the time they took to complete the quiz. Among the remaining 43 participants, we found no difference across conditions in how long it took participants to complete the quiz, $F(2, 40) = 1.29, p > .28$.

Discussion

Participants in the negative condition performed worse on the heuristics quiz than did participants in both the control and balanced conditions. On the other hand, participants performed no better in the balanced condition than in the control condition. How do we account for this pattern of findings? The pattern is not due to prior exposure to the heuristic in other courses or in high school psychology classes. If participants had prior exposure and remembered the content

Table 1.   Quiz Performance by Condition

	Control Condition	Negative Condition	Balanced Condition
Total score	9.6ₐ	6.3_b	9.9ₐ
False positives	1.6ₐ	3.5_b	1.3ₐ
Overuse scenarios	1.9ₐ	1.7ₐ	1.9ₐ
Sensible use scenarios	3.4ₐ	2.1_b	3.3ₐ
Time elapsed (min:sec)	3:40ₐ	3:37ₐ	3:19ₐ

Note.   Means with different subscripts within rows differ at $p < .05$, using the pooled error term.

of that prior exposure, we would have found no difference between conditions in performance.

A more likely explanation is that participants in the negative and balanced conditions ignored the definition they received and evaluated each scenario simply in terms of whether it matched one of the examples they received. Research suggests that examples aid problem solving only when people refer to more than merely surface characteristics of the examples (Quilici & Mayer, 1996). In fact, examples provide little help and can even interfere with performance on problems that diverge from the examples (Catrambone & Holyoak, 1990). By contrast, participants in the control condition, who received no examples, may have evaluated each scenario in terms of whether it fit the definition. Indeed, the absence of examples may have forced control participants to process the definition more deeply and perhaps prompted them to generate their own examples to make the definition more concrete and memorable as they prepared themselves for a test on the heuristic.

Keep in mind that participants in the negative condition not only were more likely than other participants to fail to identify scenarios of the representativeness heuristic leading to good judgments; they also made more false positives. The latter finding suggests that their understanding of the representativeness heuristic was not just restricted; it was confused. The findings thus support our contention that presenting students examples of the representativeness heuristic leading to only poor judgments can be problematic in that it may hamper understanding of the heuristic. More to the point, it may be worse in terms of understanding than providing no examples at all.

We do not recommend that instructors refrain from teaching examples of the overuse of heuristics. After all, sometimes heuristics can lead to poor judgments. Moreover, examples of heuristics leading to poor judgments serve to illustrate that heuristics are not foolproof. Instead, we recommend that instructors provide examples of the heuristic leading to good judgments in addition to examples of the heuristic leading to poor judgment. Such examples would illustrate that the use of heuristics is pervasive and that heuristics generally work successfully for social perceivers.

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Notes