

How Accessibility Might Influence the Take the Best Heuristic

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Abstract

The Take the Best heuristic is used when making dual-choice decisions and estimations. This heuristic is an efficient decision-making strategy producing relatively accurate decisions based on limited information. However, decision-making processes are susceptible to bias caused by differential accessibility of information in memory. This article highlights how accessibility might bias decisions made using the Take the Best heuristic.

Imagine that you are taking a stroll with a friend, discussing a violent encounter you have had. Next, imagine that you come across two individuals in the midst of a physical confrontation, such that one has the other in a firm hold and is hitting the person on the head with a closed fist. You immediately assume that the two individuals are at odds and are fighting. However, on observing their confrontation, you later discover that the two are brothers, rather than adversaries, and are simply playing. Why did you make this error?

Humans tend to make split second decisions using mental shortcuts called heuristics. Heuristics are very efficient decision-making strategies. On average, they produce decisions approximately as accurate as decisions produced by extensive algorithmic decision-making processes (Gigerenzer & Goldstein, 1996). However, due to their nature, these mental shortcuts are highly sensitive to bias. Specifically, information that is highly accessible in memory may bias these heuristics.

Accessible information refers to information present in memory that is brought to the forefront of individuals' minds. Additionally, easily accessible information has been shown to bias decisions about others (Higgins, Rholes, & Jones, 1977). In the example above, the conversation about a hostile event made information pertaining to fighting highly accessible. Because this information was highly accessible, interpreting the observed confrontation as hostile rather than benevolent was easiest. So, because it is known that decisions can be biased by accessible information, pinning down where in the decision-making process accessible information might create bias would be advantageous. One potential strategy for doing this is to assess how previously proposed heuristics operate and examine at

what points in their operation accessible information might generate bias.

Many heuristics have been proposed to guide decision-making (see Gigerenzer & Goldstein, 1996; Tversky & Kahneman, 1974, for a review). However, the current focus is on the heuristic known as the Take the Best heuristic (TTB). This paper will briefly review the TTB heuristic and then suggest where and how accessible information might bias the decisions reached by this heuristic.

The TTB Heuristic

The TTB heuristic functions according to several principles. The first of these principles is the *recognition principle* (Gigerenzer & Goldstein, 1996; Newell, Weston, & Shanks, 2003), which simply dictates that when making a choice, if one option is recognized and the others are not, then the recognized option is chosen. The second of these principles is the principle of *cue validities* (Gigerenzer & Goldstein, 1996; Newell et al., 2003). This principle suggests that individuals retain, in memory, information concerning how valid a cue is when making a decision. Additionally, the principle of cue validities is only necessary if the requirements of the recognition principle are not met. That is, the knowledge of how valid a cue is is only necessary when multiple options are recognized.

In addition to the principles of recognition and cue validities, three rules operate in the TTB heuristic. They are the *search*, *stop* and *decision* rules (Newell et al., 2003). The search rule states that, when making a decision, one must search memory for available information that may distinguish between choices. The stop rule states that once significant information has been found supporting one choice or another, the memory

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search will stop. The decision rule then follows that once the search has stopped, a decision will be made based off of the information located.

The search, stop, and decision rules, and the recognition and cue validity principles then work together in a five step decision-making process known as the TTB heuristic (Gigerenzer & Goldstein, 1996). In the first step of the TTB heuristic, the recognition principle is enacted. That is, if among several options, one is recognized, searching is stopped. If more than one option is recognized, then the process proceeds to step two. However, if both of the options are recognized, then one of the options should be chosen randomly.

If the decision proceeds to the second step, a memory search ensues. Information which may discriminate between the available options is sought out. Information is evaluated sequentially with respect to its ecological validity. Ecological validity is defined as how useful a piece of information has been in successfully providing an accurate judgment in the past. Therefore, the more successful a piece of information has been in the past at providing an accurate judgment, the quicker it is evaluated. Once a piece of information is chosen (i.e., that with the highest ecological validity), a decision is made as to whether the information discriminates between the choices, in the third step.

If the information discriminates, then the search is stopped in the fourth step (Gigerenzer & Goldstein, 1996). However, if the information does not discriminate, then the process returns to step two and continues searching until a discriminatory piece of information is found. In the fifth and final step, if a discriminatory piece of information is found, then the option implicated by the discriminatory piece of information is chosen. However, if no such information is found, then an option is chosen at random.

The TTB heuristic is a one-reason decision-making heuristic, designed for dual-choice decisions and estimations (Broder, 2003; Gigerenzer & Goldstein, 1996; Newell et al., 2003). When the TTB heuristic is used decisions are made based off of one piece of information, rather than all available information. Additionally, when using the TTB heuristic decisions are made based on information already in memory (Gigerenzer & Goldstein, 1996). Therefore, a judgment based on information received from outside of a person's memory (e.g., from a menu of information) would not qualify as a judgment made using the TTB heuristic (Broder & Schiffer, 2003).

To illustrate the operation of this heuristic, consider the example that opened this paper. Obviously, the decision involved in the opening example is much more complicated than simply choosing between two options; however, it will suffice for the purpose of illustration. In

the opening example there are two options: a) either the observed individuals are fighting, or b) they are rough-housing in good fun.

In the first step of the TTB heuristic, if only one of the options is recognized, then it is chosen. However, if neither is recognized, then an option is chosen at random. In the current instance, both options are recognized. Under these circumstances, the TTB heuristic proceeds to the second step.

In the second step of the TTB heuristic, a memory search is done starting with information that has previously helped make this same decision. Suppose that the first piece of information that has been most useful in the past is whether the individuals are striking one another. Therefore, this piece of information is chosen for consideration in the third step.

In the third step of the TTB heuristic, whether this piece of information discriminates between the two options is determined. Because the observed individuals are striking one another, this information is deemed discriminatory. Having been deemed discriminatory, the process then continues to the fourth step.

In the fourth step of the TTB heuristic, recognition that a discriminatory piece of information has been found occurs and the memory search for additional information ceases. Finally, in the fifth step of the TTB heuristic, the chosen information is used to make the decision. Because the individuals seen in the opening example are striking one another, it is determined that they are fighting rather than rough-housing in fun. This is one potential way the TTB heuristic might arrive at the assumption made in the opening paragraph. However, this same process could have resulted in a different decision, depending on a few details. These details include information accessible in memory.

TTB Heuristic and Accessibility

When a piece of information is accessible, a) fewer similarities between the accessible information and environmental stimuli are necessary for accessible information to be considered applicable to or descriptive of environmental stimuli, b) accessible information is considered as applicable to a wider range of stimuli observed in the environment, and c) accessible information blocks other less accessible information that may be more descriptive of environmental stimuli (Bruner, 1957). Accessible information has been shown to influence numerous behaviors and cognitions, such as motor and social behavior (Bargh et al., 1996), social judgments (Higgins, Rholes, & Jones, 1977), information weighting (Sherman, Mackie, & Driscoll, 1990), goals (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001) and performance (Dijksterhuis & Knippenberg, 1998). Although, these are not instances of dual choice or estimation decisions, the point remains that accessible

information can bias cognition. Examining how such information can bias the operation of the TTB heuristic might be helpful in demonstrating one way in which quick decisions can be biased. Accessibility may influence the TTB heuristic during its first and second steps.

The first step of the TTB heuristic is governed by the recognition principle (Gigerenzer & Goldstein, 1996). The recognition principle dictates that if an option is recognized, then it is chosen. Bruner (1957) suggests that when information is made accessible, a wider range of stimuli in the environment can be recognized as related to this accessible information. Therefore, when information is accessible, environmental stimuli can be easily recognized as related to the accessible information.

Additionally, accessible information shields other, potentially more applicable, pieces of information from consideration. Because accessible information becomes easily recognized and blocks other potentially applicable information, and because the first step of the TTB heuristic uses that which is recognized, the decisions using the TTB heuristic would be biased towards choosing accessible information. The earlier example is used here to demonstrate how the TTB heuristic might be biased in this way.

Thinking about a violent confrontation would have made information pertaining to fighting accessible in memory. Upon seeing the two individuals' rough-housing, the accessible information would have made it easier to recognize the confrontation as an instance of fighting. Additionally, because accessible information (e.g., fighting) blocks other information that may be just as applicable to stimuli in the environment (e.g., rough-housing), information pertaining to rough-housing may be blocked, thus decreasing its likelihood of being recognized. Therefore, only the fighting option would have been recognized and chosen. However, how this decision could have been reversed had information pertaining to rough-housing been made accessible rather than information pertaining to fighting is easily seen. So, accessible information can bias the TTB heuristic at the first step. However, accessible information may also bias the TTB heuristic in its second step.

In the second step of the TTB heuristic a person searches memory for information pertinent to the judgment being made. Additionally, this information is examined in descending order, beginning with information having the most ecological validity. However, accessible information masks other less accessible information, even if it is more applicable to the observed stimuli. Therefore, accessible information may mask less accessible information which may be equally or more ecologically valid, thus biasing the memory search by suppressing all less accessible information regardless of ecological validity.

Additionally, if this accessible information is deemed discriminatory, then it will be used to make the decision, per the third step of the TTB heuristic. Again, the opening example is useful in illustrating how bias might occur in the second step as just described.

If the observed individuals' behavior is recognized as both fighting and rough-housing, the TTB heuristic would then continue to the second step wherein the memory search would begin. If the information pertaining to fighting had become accessible, this information may block information pertaining to rough-housing and other less accessible information regardless of ecological validity, thus highlighting, in memory, information pertaining to fighting. This may then make information pertaining to fighting function as if it were the most ecologically valid. Information pertaining to fighting would then be passed to the third step. If it is then decided that this information about fighting is informative as to what the two individuals are doing, it will then be used. Again, imagining how this decision could be changed simply by making information pertaining to rough-housing accessible rather than information pertaining to fighting is simple.

Summary and Conclusion

People are often faced with many options when making judgments or decisions. The TTB heuristic dictates that when a person is presented with two options and one option is recognized, the recognized option is chosen. If neither option is recognized, then one of the options will be randomly chosen. If both options are recognized, then people will search their memory for telling information. Additionally, the TTB heuristic dictates that information will be searched sequentially in the order of how often each piece of information has successfully led to a decision in the past. If a piece of information is found that helps to discriminate between a person's options, then it will be chosen. If no such piece of information is ever found, then the choice is made randomly. However, accessible information may bias this decision-making process either in the first step, by changing what is recognized, or in the second step, by highlighting accessible information and suppressing less accessible information.

Gigerenzer and colleagues (Gigerenzer & Goldstein, 1996; Gigerenzer & Selton, 2002) have proposed that people maintain an adaptive toolbox of heuristics. They suggest that from this toolbox, people select decision-making heuristics specific to a decision-making demand. Here, it seems to have been fruitful to speculate how the TTB heuristic might be biased by accessible information. Perhaps it would be advantageous to further identify how accessible information might influence other decision-making heuristics that comprise the adaptive toolbox. By doing so, a better understanding on how accessible information influences heuristic driven processing might be achieved.

References

- Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71*, 230-244.
- Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1014-1027.
- Broder, A. (2003). Decision making with the “adaptive toolbox”: Influence of environmental structure, intelligence, and working memory load. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 29*, 611-625.
- Broder, A., Schiffer, S. (2003). Take the best versus simultaneous feature matching: Probabilistic inferences from memory and effects of representation format. *Journal of Experimental Psychology, 132*, 277-293.
- Bruner, J. S. (1957). One perceptual readiness. *Psychological Review, 64*, 123-152.
- Dijksterhuis, A., & van Knippenberg, A. (1998). The relation between perception and behavior, or how to win a game of trivial pursuit. *Journal of Personality and Social Psychology, 74*, 865-877.
- Gigerenzer, G., & Goldstein, D. G. (1996). Reasoning the fast and frugal way: Models of bounded rationality. *Psychological Review, 103*, 650-669.
- Gigerenzer, G., & Selton, R. (2002). *Bounded rationality: The adaptive toolbox*. Cambridge, MA: MIT Press.
- Higgins, E. T., Rholes, W. S., & Jones, C. R. (1977). Category accessibility and impression formation. *Journal of Experimental Social Psychology, 13*, 141-154.
- Newell, B. R., Weston, N. J., Shanks, D. R. (2003). Empirical tests of a fast-and-frugal heuristic: Not everyone “takes-the-best.” *Organizational Behavior and Human Decision Processes, 91*, 82-96.
- Sherman, S. J., Mackie, D. M., Driscoll, D. M. (1990). Priming and the differential use of dimensions in evaluation. *Personality and Social Psychology Bulletin, 16*, 405-418.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*, 1124-1131.