# 30. Automated Choice Heuristics

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In his Nobel Prize address, Herbert Simon urged choice theorists to stop pretending that actual choices can be predicted from theoretical models of optimal choice. He argued that any descriptively adequate account of human decision making must make contact with the actual psychological processes that are involved and that "the neoclassical ambition of avoiding [this] necessity is unrealizable" (1978, p. 507).

Many choice theorists have taken up Simon's challenge. They have sought to identify the various "heuristics" people use to simplify choice – the procedures they use to limit the amount of information that is processed or the complexity of the ways it is combined. In a prototypical study, a respondent might be asked to make several hypothetical choices among apartments, whose attributes (e.g. monthly rent, miles from work, square footage) are listed as rows of numeric values (e.g. $560, 12, 900, respectively). The respondent's choice processes are then either inferred from the choices she makes or are more directly observed through "process tracing" methods that use computerized displays to track the attributes and options that the respondent considers, the order in which they are considered, and, sometimes, the time spent pondering each piece of information.

On the basis of process tracing methods, verbal protocols, introspection, and theory, many different choice heuristics have been postulated (for reviews, see Payne, Bettman, & Johnson, 1993; Gigerenzer, Todd, & the ABC Group, 1999; Gigerenzer, Czerlinski, & Martignon, Chapter 31, this volume; Gigerenzer & Goldstein, 1996). These choice heuristics, such as "elimination by aspects" (Tversky, 1972), are conscious strategies that are intentionally designed to simplify choice. When a decision maker is presented with a matrix of numbers summarizing the attributes of six different apartments, nothing spontaneously "happens"; no intuitive computation generates an impression of which option is best. The decision maker must consciously decide how to process that information. These deliberate choice heuristics are viewed as heuristics by the

people who use them – they would describe what they are doing as a simplifying strategy. Indeed, the "adaptive decision maker" envisioned by some choice theorists (Payne, Bettman, & Johnson, 1993) is not only aware that he is using heuristics, but modifies them strategically as choice conditions change. The deficiencies of these heuristics are not lost on decision makers – they often recognize when they are ignoring potentially relevant information, but may regard their strategies as appropriate given their computational limitations or their desire to conserve effort.

These deliberate choice heuristics differ substantially from the judgmental heuristics of the "heuristics and biases" research program, which are largely based on impressions that occur automatically and independently of any explicit judgmental goal (Tversky & Kahneman, 1983, Chapter 1, this volume). For example, when presented with a description of a political activist and the category bank teller, people notice the dissimilarity spontaneously. This rapid and intuitive judgment may, in turn, be used to conclude that the person is unlikely to be a bank teller by a process that Kahneman & Frederick (Chapter 2 this volume) term *attribute substitution*. Importantly, however, the people making the judgment do not typically view this process as a heuristic. They are not deciding to use resemblance in favor of some other procedure for judging probability. They do not see it as an effort conserving procedure, or a simpler version of another procedure they might instead perform. Using resemblance to judge probability is called a *heuristic* (the "representativeness heuristic") only by reference to an "outside" normative standard of judgment, which requires that these probability judgments reflect considerations other than resemblance alone.

The distinctions between the "deliberate" choice heuristics (e.g. elimination by aspects) and the "automatic" judgmental heuristics (e.g. representativeness) largely reflect the different types of stimuli used in choice tasks and judgment tasks. Research on choice heuristics was conducted with an eye toward the computational and memory limitations that Simon repeatedly emphasized, and focused on how people cope with complexity; how they make reasonable decisions when the amount of information confronting them exceeds the amount they can comfortably process. The experimental stimuli used by these researchers are often abstract and do not evoke any type of intuitive impression. Consequently, respondents must rely on some type of analytic solution (though the "analysis" may be rather crude). In contrast, much of the research on judgment heuristics was guided by the analogy with perception, and presented respondents with more concrete stimuli (e.g. personality descriptions) that evoke an immediate impression upon which the requested judgment can be based. In the shorthand used by Kahneman and Frederick (Chapter 2, this volume), traditional judgment heuristics are *System 1 heuristics* – they result from cognitive processes that are rapid and not entirely controllable – whereas traditional choice heuristics are *System 2 heuristics* – they result from slower and more deliberate mental processes.

Although the prototypical choice heuristic is considerably more deliberate than the prototypical judgmental heuristic, there are situations in which choices are governed by (and simplified by) intuitive impressions. This chapter discusses two such automated choice heuristics: "choosing by liking" – basing choice on an immediate affective evaluation; and "choosing by default" – choosing the option that first comes to mind. These two automated choice heuristics are akin to the judgment heuristics of the heuristics and biases literature – they are governed by rapid and intuitive processes, they are relatively immune to introspection, and their associated biases may not be recognized by the people who use them.

## CHOOSING BY LIKING

Choice is typically modeled as a cognitive procedure involving an analysis of an option's constituent features. However, some have proposed an alternate view, arguing that choices might also be made intuitively; by the spontaneous affective evaluation of liking or disliking that options may elicit – a procedure that Wright (1975) calls *affect referral*, Schwarz and Clore (1988) term the *"How-do-I-feel-about-it" heuristic*, and Slovic, Finucane, Peters, and MacGregor (Chapter 23, this volume) call the *affect heuristic*. Image theory (Beach & Mitchell, 1987; Beach, 1990) advanced a similar view, proposing that affective evaluation may work in conjunction with cognitive evaluation – that affective valuation is used as a quick initial screen for alternatives, whereas cognitive evaluation is reserved for those alternatives that surpass some affective threshold.

Relying on intuitive affective impressions (what Kahneman terms *choosing by liking*) may be a successful heuristic if the features that mediate our initial affective response correspond closely with the features that determine our subsequent enjoyment. If the spaciousness of apartments determines how much we like them while apartment hunting and determines how much we actually enjoy living in them, choosing by liking may be a perfectly adequate heuristic. However, if affective evaluation is unconsciously governed by something not closely correlated with subsequent satisfaction (e.g. similarity to our previous apartment, the song that is playing when we enter), choosing by liking could lead one astray.

In general, the reliance on spontaneous affective response may be an effective decision heuristic. Indeed, Wilson and colleagues have suggested that affective impressions may be more accurate than analytic assessments of an option's constituent features – that a more thorough cognitive analysis can degrade rather than enhance evaluative validity. To this effect, Wilson et al. (1989) quote a judge at the Berlin Film Festival who noted:

I went to every screening with a fresh pack of note cards that I would dutifully cover with my impressions of each and every film. The result, of course, was that the movies ceased to be fun and turned into problems, a struggle against time, darkness and my own esthetic emotions which these autopsies confused. I was so worried about evaluating every aspect of every film that my entire system of values went into shock, and I quickly

realized that I could no longer easily tell what I liked or didn't or why (p. 288; originally published in Vargas Llosa, 1986, p. 23).

Some experimental results seem to confirm this observation. For example, Wilson and Schooler (1991) found that subjects who simply rated how much they liked various brands of strawberry jam produced ratings that corresponded better with gustatory experts than subjects who first listed the reasons they liked or disliked a jam before rendering their global ratings. Similarly, Wilson et al. (1993) found that subjects who were instructed simply to choose the poster they liked most ended up liking their poster more (and were more likely to still be sporting it on their dormitory wall) than subjects who first analyzed each poster along several dimensions before making their final decision. When people reflect about the reasons they like or dislike something they may focus on features that seem to be plausible determinants of liking rather than the features that actually mediate liking.

Although affective impressions may be often an accurate proxy for the overall quality of an option, and superior to clumsy attempts at multiattribute utility analysis, several properties of affect render it an imperfect and, sometimes, markedly deficient basis for choice: (1) it is insufficiently sensitive to quantitative detail; (2) it is unduly influenced by transient contextual cues; (3) it is excessively affected by familiarity. The following sections discuss these properties of affect, and the biases that may be introduced by using affective response as a choice heuristic.

## Insensitivity to Features that Affect Enjoyment/Aversiveness

Hedonic efficiency is served when the intensity of our desires and aversions corresponds closely with the intensity of our pleasures and pains. The link is strong most of the time (e.g., people take greater steps to avoid a bee's stinger than a mosquito's proboscis). However, affect is not an infallible guide, and may be insensitive to certain features of an outcome that matter. For example, the fear generated by the prospect of an electric shock is insensitive to its probability of occurrence (see, e.g., Bankhart & Elliott, 1974; Elliott, 1975; Monat, Averill, & Lazarus, 1972; Snortum & Wilding, 1971). Loewenstein, Weber, Hsee, and Welch (2001) argue that this may explain why judgments and choices are often insensitive to variations in probability except for those involving a transition from impossibility to possibility or from likelihood to certainty.

Consistent with such an account, Rottenstreich and Hsee (2001) found that people would pay nearly as much to avoid a 1% chance of an electric shock as they would pay to avoid a 99% chance of it ($7 and $10, respectively). Similarly, Kahneman, Ritov, and Schkade (2000) argue that the dramatic scope insensitivity displayed in contingent valuation studies (see Frederick & Fischhoff, 1998, for a review) occurs because willingness to pay is an expression of affective response and affective response is insensitive to quantitative detail (e.g. whether the proposed intervention saves 2,000 birds or 200,000).

The link between liking and enjoyment may also be weakened or broken when decisions are made by consulting one's memories, because important

aspects of an experience, such as its duration, may be lost in its transcription to memory (see Kahneman, 2000 for a discussion). A simple and memorable experiment reported in Kahneman, Fredrickson, Schreiber, and Redelmeier (1993) illustrates this. In that study, subjects were sequentially (the order was randomized) exposed to two mildly painful experiences: a "short" episode, in which they immersed one hand in cold water (57° F) for 60 seconds; and a "long" episode, in which they immersed their other hand in cold water for 90 seconds: 60 seconds in 57° water plus an additional 30 seconds during which the water was warmed to 59 degrees (which made the water less uncomfortable, but not pleasant). When the participants were later asked which of the two experiences they preferred to repeat, most chose the "long" trial. For someone who wants to minimize pain, this choice is obviously not correct, because the 30 seconds of diminishing pain is still additional pain. However, although these choices are wrong, they are not crazy or silly. As Kahneman and colleagues note, choosing by liking is certainly a sensible strategy – what could be more reasonable than preferring the experience that is remembered as being better?

### Excessive Responsiveness to Co-occurring Yet Irrelevant Features

Affective responses to a particular object or event may be strongly influenced by contextual features that do not influence the actual enjoyment it provides. As marketers well know, pairing beer with images of camp fires or trout streams or attractive women may enhance consumers' affective response to it. However, to the extent that these contextual features either do not actually enhance the enjoyment of beer or are not present when the beer is consumed, affective response (liking) is divorced from subsequent hedonic response (enjoyment).

Evaluations made by other animals may also be susceptible to idiosyncratic features that do not correspond to the quality of outcomes. For example, female zebra finches strongly prefer to mate with male finches whose heads are artificially adorned with crests of white feathers (Burley, cited in Angier, 1999). In fact, the preference is so strong that these curious crested males are permitted liberties not normally enjoyed (e.g., shirking on nest-building responsibilities, mating with other females who are eager for their services). Because these artificial crests resemble nothing that finches ordinarily possess, the usual evolutionary story breaks down, as it is unclear why the crested finches should be thought to bear superior finch genes when they are not supposed to have a crest in the first place. Similar results were found with red leg bands (but not white ones). The source of such aesthetic preferences remains a mystery, and the only "explanation" is the speculation that the white hats or red socks co-opt and arouse some neurophysiological pathway that exists for some other unknown purpose.

When the relevant currency is experienced utility rather than reproductive success, the standards for "rational" choice may be more permissive. If we prefer mates with large breasts or sideburns or flat stomachs, we may regard our

preferences as their own justification. Or not. Mismatches might still exist between the degree to which a feature excites our affective response at the moment of decision and its eventual importance to our overall satisfaction. Some features (e.g. a sexy voice) may be more durable and important sources of enjoyment than others that are initially more affect-inducing. The extent to which reliance on our affective responses serves our interests is an open question. It may be a better guide for jams than for cars, and better for posters than for books. Often, the validity of our affective response depends on a normative judgment about the types of utility that ought to count. The answer is not always straightforward: Do charismatic students deserve higher class participation grades (or not)? Is it wrong to be especially concerned about animals that are cute (or not)? Is it irrational to pay more for water that comes in a snazzy bottle (or not)?

The correspondence between affective evaluation and subsequent enjoyment may also be degraded by the influence of transient physiological states. Read and van Leeuwen (1998) found that hungry people were more likely to select a caloric snack for consumption the following week, although current hunger level is irrelevant with respect to the type of snack that will taste best then. Correspondingly, affective responses may provide an insufficient motivation *if the* contextual features that excite both affective and hedonic responses are not present now, but will be present later. Loewenstein (1996, p. 287) speculates that declining sexual activity in married couples may occur despite constant enjoyment of the sex itself, because the pleasures of sex cannot be appreciated from a "cold" state that begins to prevail once proximity alone ceases to be sufficiently arousing. He suggests that having sex only when we feel like it (choosing by liking) may be a less adequate guideline than an equally simple rule like: "Have sex nightly, regardless of immediate desire." For further discussion of failures to predict changes in preference brought about by changes in arousal or circumstance, see Loewenstein and Adler (1995), Loewenstein, Nagin, and Paternoster (1997), Loewenstein, Prelec, and Shatto (1998).

It is unclear whether prevailing affective states bias choices because people overestimate the durability of this state (e.g., currently hungry people erroneously believe they will be equally hungry in the future) or because people are unable to disregard feelings they "know" to be irrelevant – much as they are unable to ignore obviously irrelevant anchors in quantity judgments. Perhaps, hedonic predictions are first anchored on the emotion one feels while contemplating the future outcome and then adjusted to reflect the recognition that intervening events will alter future enjoyment.

## Familiarity Effects

Extensive and diverse evidence shows that familiarity to a stimulus increases affective response to it. Rats raised to Mozart prefer Mozart to Schoenberg (Cross, Holcomb, & Matter, 1967). Chicks raised with matchboxes prefer the company of matchboxes to the company of other chicks (Taylor & Sluckin, 1964). People prefer the number 4 to the number 19 (Zajonc, 1968), prefer the

letters in their name to other letters (Nuttin, 1985, 1987), and prefer their mirror image, which they see every day, to their actual image, which they see only in photographs (Mita, Dermer, & Knight, 1997). These "mere exposure" effects have also been found with geometric figures, Chinese and Japanese ideographs, Turkish words, foods, odors, flavors, colors, people, and random sequences of tones (see Zajonc, 1998, for a review).

Many of these examples admit little room for a divergence between liking and enjoyment – it is not clear whether any distinction can be made between how much one "likes" a particular trapezoid and how much one "enjoys" it. In other cases in which there is a temporal separation between choice and consumption, the distinction becomes sharper. For example, although a familiarity-based affective response might cause chicks to prefer a nearby matchbox to another nearby chick, they might actually enjoy the companionship of other chicks more than they enjoy the proximity of matchboxes. Similarly, familiarity could increase the tendency to choose a particular brand of spaghetti sauce without actually improving its taste. Indeed, strong familiarity effects could sustain the selection of the status quo brand in the face of steadily decreasing enjoyment.

### Discussion

Choosing by liking qualifies as an automated decision heuristic because affective impressions are readily available and provide an easier basis for decisions than a deliberate cognitive assessment of each option (see Slovic et al., Chapter 23, this volume). Bargh (1997, p. 23) proposes that "all stimuli are evaluated immediately as good or bad, without the participant intending to evaluate ... everything that one encounters is preconsciously screened and classified as either good or bad, within a fraction of a second after encountering it." The success of using one's immediate affective response as a choice heuristic depends on how closely it corresponds to the actual value or subsequent utility. Several characteristics may attenuate this correspondence and render affective response an imperfect basis for choice. First, affect can be insufficiently responsive to relevant aspects of options, such as their probability or duration. Second, affect may be overly responsive to irrelevant features, such as cooccurring, but logically irrelevant stimuli. Third, affect may be heightened by familiarity, though familiarity may not increase enjoyment.

Regardless of whether we intend to rely on it, our spontaneous affective evaluations likely play an important role in our decision making, and often intrude even when we want to make decisions on a cognitive basis. First, because affective responses precede more cognitive evaluations, they may dominate judgments and choices when respondents have too little time for deliberative reflection (see, e.g., Finucane, Alhakami, Slovic, & Johnson, 2000). Second, by providing *some* basis for choice, our initial affective response may discourage further effortful analytic assessment. Third, judgments may be anchored on one's initial affective evaluation even when attempts are made to supplement this with more analytic evaluations. Furthermore, because affective evaluation

comes first, the option that elicits the most favorable affective response may enjoy the special status of being a default option – of being the thing we choose unless we can marshal a decisive case in favor of something else. The following section discusses the role of defaults in choice, and argues that "choosing by default" has aspects of an automated decision heuristic because defaults may be established by intuitive psychological processes.

## CHOOSING BY DEFAULT

Choices are ordinarily thought to be based on some type of assessment of options (if only an intuitive affective impression). However, some choice procedures may bypass the evaluation stage altogether, deferring instead to a default option. Defaults may be established via historical precedent, perceptual salience, conspicuousness, or some other feature that qualitatively distinguishes one option from the rest. The following sections discuss two sources of defaults and the biases associated with choosing by default.

### The Status Quo

Considerable anecdotal and experimental evidence suggests that the option one currently possesses or customarily chooses is preferred over other options to a degree that is difficult to justify. Hartman, Doane, and Woo (1991) provide a prototypical example: Customers who currently enjoyed reliable electrical service were unwilling to accept less reliable service for a discount on their electric bill, yet few of those who currently suffered from unreliable service were willing to pay an equivalent premium to obtain reliable service. Johnson, Meszaros, Hershey, and Kunreuther (1993) found a similar result. In New Jersey, the "standard" (or default) auto insurance policy does not entail the right to sue for pain and suffering from minor injuries, although that right may be obtained by choosing a higher-priced policy. Only 20% of New Jersey residents chose to acquire that right. However, in Pennsylvania, where the "standard" (or default) policy does entail a full right to sue, 75% chose to retain that option, in preference to the cheaper limited-rights option. Johnson and colleagues calculated that Pennsylvanians spent $200 million more on insurance than they would have if limited rights had been designated as the default option.

The status quo is given favored treatment in the NFL's instant replay system as well. When the "on-field" call is challenged, it is reviewed by the replay official, who has access to multiple angles and slow motion photography. However, despite these advantages, the on-field call is given preference in any "close calls"; the replay official is instructed to defer to the on-field call unless he has "indisputable visual evidence." Although there are reasons to minimize challenges of on-field calls (such as maintaining the flow of the game), once a ruling has been challenged and is going to be reviewed anyway, it makes little sense to give more weight to the first call when the second can be made with better information.

## Focal Points

Historical precedent is not the only way a default option might be established. Sometimes, an option may become a default by virtue of its conspicuousness or psychological prominence. For example, Schelling (1960) has argued that equal division is often chosen merely by virtue of its mathematical simplicity – not because equality is compelling in a logical, moral, or legal sense. He notes that the results of long negotiations involving many complicated issues and parties with greatly differing bargaining power often converge on some crudely simple, but psychologically conspicuous benchmark like "splitting the difference" or "the 38th parallel," because those focal points possess prominence, uniqueness, simplicity, or something else that makes them qualitatively differentiable from the continuum of alternatives that one could consider.

Schelling's speculation is supported by experimental evidence. Harris and Joyce (1980) found that when people allocated profits among members of a group venture, they chose to distribute profits equally, even when members generated different amounts of revenue. However, when asked to allocate expenses, equal division was again favored, even though this left profits unequally distributed. The authors commented that respondents' choices seemed to be motivated by the simple heuristic of dividing equally rather than a true preference for equality of outcome per se; that responses reflected an overlearned share-and-share-alike rule "without regard to *what* is being shared or what each participant's ultimate fate is" (p. 177). Similarly, Rabin (1997) observed that people generally have a "one-pie-at-a-time" conception of allocation problems, favoring equal distribution of the focal pie, without considering the initial or final wealth levels of the parties involved.

Allison and Messick (1990) and Messick (1993) argue that "divide equally" is a social decision heuristic that is often applied with little deliberation. Results by Roch, Lane, Samuelson, Allison, and Dent (2000) support this view. In that study, respondents participated in a confidential, 8-person, resource-sharing task, and were told that they could stake the first claim to some amount of $60. Half of the respondents were put under cognitive load (by being required to remember the number 91704305) and half were not. The mean request of the cognitive load group was $8.18, which was not significantly different from their "fair" share of $7.50 ($60 ÷ 8 people). However, the control group, who was not impaired by the additional memory task, requested $17.00 – more than twice their fair share. The authors concluded that individuals first anchor on equal division, and adjust from that when they possess sufficient cognitive resources to do so. In the language used by Kahneman and Frederick (Chapter 2, this volume), being fair required only System 1, because equal division is an "obvious" solution, whereas being greedy required the help of System 2 to override the "obvious" solution proposed by System 1.

Much evidence suggests that the pull of equal allocation is strong for intra-personal allocation as well. Samuelson and Zeckhauser (1988, pp. 31–33) reported that about half of all Harvard employees divided their retirement

funds equally between TIAA (a portfolio of bonds, commercial loans, mortgages, and real estate) and CREF (a broadly diversified common stock fund), and that most retained that equal division regardless of stock market performance. Benartzi and Thaler (2001) proposed, more generally, that investors often apply a "1/$n$ heuristic" dividing their resources equally between whatever set of funds they happen to consider. Equal division may apply across time as well. Frederick and Loewenstein (2001) found that when intertemporal choices were framed as allocating goods among time periods, the modal response was equal division. The popularity of equal division contrasts with the typical findings of positive time preference (preference in favor of early periods) found when people are asked to choose between a smaller proximate reward and a larger distal reward and also contrasts with the preference for improvement when people are asked to choose between declining, flat, or improving sequences.

### Is Choosing the Default a Sensible Heuristic?

In some cases, the preference for defaults and the asymmetric treatment of choice options may be justified. For example, there are often good reasons for retaining the status quo. First, other alternatives may be more uncertain, and the downside risk might be considered larger than the upside benefit. Second, the transaction costs associated with switching must be weighed against the potential benefits of finding a better alternative. Third, one might legitimately infer that previous choices were based on good reasons – even if those reasons can no longer be recalled. We can probably all recall an instance of trying something "new" only to discover that we have tried that option before, and to be reminded of why it became dispreferred in the first place.

However, the reliance on psychologically conspicuous defaults can bias choice because the factors that determine psychological prominence may diverge from those that determine outcome quality. For example, as Schelling (1960) noted, the attractiveness of equal division may extend well beyond its actual merits in a particular choice. Individuals may allocate retirement funds equally between bonds and stocks because equal division immediately suggests itself as a basis for choice, not because that allocation necessarily serves fundamental interests (such as growth potential and security) any better than a 40–60 or 65–35 split.

## CONCLUSION

The heuristics most commonly discussed in the literature on judgment (e.g., representativeness, availability) are based on mental computations (e.g., of similarity) that may be spontaneously generated (see Kahneman & Frederick, Chapter 2, this volume). In contrast, most of the heuristics discussed in the decision-making literature (e.g., elimination by aspects) are deliberate analytic procedures intentionally designed to simplify choice. Some have even endorsed the view of "adaptive decision makers" (Payne, Bettman, & Johnson, 1993), who

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balance effort and accuracy by tailoring the sophistication of heuristics to the importance of the decision.

In some cases, however, choices are mediated by the type of spontaneous assessments that underlie many intuitive judgments. This chapter discussed two automated choice heuristics – *choosing by liking* (choosing the option that generates the most favorable affective response) and *choosing by default* (choosing the option that first comes to mind). These may be considered "automated" choice heuristics because affective response and psychological conspicuousness may be rapidly and unconsciously generated, rather than deliberately selected. Also, like many judgmental heuristics, they are qualitatively distinct strategies, rather than stripped down versions of theoretically optimal procedures.

Not all choices permit the operation of these automated heuristics. Some choices may be too "dry" to evoke any affective response. It seems unlikely that affective response could be used to distinguish between different health insurance plans or retirement packages or staplers or motor oils or abstract representations of multiattribute options. Similarly, situations in which one option enjoys much greater psychological salience may be the exception rather than the rule. When the intuitive impressions that could support these automated choice heuristics are absent, more deliberate choice heuristics may prevail.