

Cognitive heuristic approaches to decision making



We rely on our past experiences when we make judgements about various uncertain events in our everyday life, but how valid these judgements actually are? Relatively ' little is known about the psychological mechanisms by which people assess the probability of an uncertain event or the value of an uncertain quantity' (Tversky & Kahneman, 1974: 1124). Amos Tversky and Daniel Kahneman have done highly influential work on decision-making in the field of cognitive and social psychology, which have shown the frequency of irrationality in people's beliefs and decisions (Ashcraft, 1994; Kahneman, Slovic, ; Tversky, 1982). Tversky and Kahneman proposed that people use a limited number of cognitive heuristic approaches, which are learned ' rules of thumb' when judging probability or frequency of uncertain phenomena. Even though cognitive heuristics are prone to inaccuracies, one must emphasize that heuristics are surprisingly efficient cognitive strategies in guiding our decision making process, even though they can misguide us (Wolf, 2001). Tversky and Kahneman have identified a number of such heuristics, but we shall concentrate on only one of them: frequency judgements, or availability heuristic.

Ideally we would always engage ourselves into a systematic and deep elaboration of any given problem, by defining it and generating alternative solutions to the problem, before making our final decision about the matter (Chaiken, 1980; Fiske ; Taylor, 1991). But this is impossible since deep elaboration is very time consuming and our short term memory is limited in its capacity to hold such large amount of information at once (Mitchell, 2003). Moreover, we often simply do not have the knowledge and the relevant information required to analyse every aspect of the problem

(Carlson, 2002). We are thus likely to engage into a reasoned thought if the issue is one that matters to us, but very often we base our judgement on partial information following heuristics. (Gleitman, 1999; Carlson, 2002).

Cognitive heuristics are very useful 'shortcuts' that allow us to reduce the variety of possible answers to a problem and process information as quickly and as easily as possible (Ashcraft, 1994; Kahneman, et al. , 1982). We use heuristics often unconsciously, out of a habit, without usually stopping to consider and reflect on our judgements (Carlson, 2002; Wolf, 2001).

However, Gigerenzer (in press) questions the claim that people generally rely on heuristics rather than logical thinking by criticizing that the failure of the cognitive heuristics in developing into a theory of human reasoning over the 20 years of research is the most prevalent result of these studies (Kahneman, 1986). Regardless of this critique one must note that 'the judgement research has extended work on inductive reasoning to real-world problems and has produced a large collection of reasoning errors that deserve further study (Kahneman, 1986: 112). When we judge the frequency or prevalence of some event by the ease with which relevant instances come to mind we are relying on the availability heuristic (Tversky & Kahneman, 1974).

In a study by Tversky & Kahneman (1973) the accuracy of memory retrieval through availability was assessed by giving 28 subjects 7 seconds to estimate the number of categories, such as Russian novelists or flowers, they could retrieve in 2 minutes and then 2 minutes to actually retrieve the instances. The correlation between production and estimation over 16 categories was 0.3, showing that people can assess availability quickly and

accurately (Tversky & Kahneman, 1973). One plausible theory explaining this phenomenon is that availability heuristic bases the judgement of frequency on the strength of the association. According to Bousfield & Sedgewick (1944) the subjects use the number of instances retrieved immediately from long term memory to estimate the number of instances that could be retrieved in a much longer period of time (Kahneman et al. , 1982).

Thus availability heuristic is a mediating variable rather than a dependent one (Tversky & Kahneman, 1973). The fact that instances of common classes are easier to recall than rare ones and that repetition strengthens associative connections underlies the accuracy in judgements through availability (Tversky & Kahneman, 1974). However, the availability heuristic is not only influenced by the actual frequency of any given event but also a number of other variables, which are related to the fact that our memory storage is biased since it is based on retrieval cues, which are affected by the event's recency, familiarity or its salience (Gleitman, 1999; Tversky ; Kahneman, 1974). This becomes evident when people become primed by the news: Many studies have shown that rare, dramatic and sensational events are judged to be much more frequent than they actually are, because the vividness of the information increases its accessibility (Athabasca, 2003). The negative consequences of these ' biases due to the retrievability of instances' are apparent in the role availability plays in maintaining and establishing prejudice and stereotypes (Halpern, 1984; Tversky ; Kahneman, 1974: 1127).

When a minority person commits a crime, other members of the same minority are consequently often distrusted as well (Halpern, 1984). In

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another study by Tversky ; Kahneman the availability for construction was assessed by studying judgement of word frequency. The subjects were asked whether there are more words in the English language that begin with the letter k or have k in the third position. It was proposed that classes whose instances are easy to construct will be perceived as more frequent than classes of same size which are harder to imagine, thus revealing ' a bias due to the effectiveness of a search set' (Tversky ; Kahneman, 1973; Tversky ; Kahneman, 1974: 1127). Therefore it was hypothesised that people judge the words beginning with the letter k more frequent, because it is much easier to retrieve words by their first letter than by their third letter. This is indeed what happened, even though the opposite is actually true - there are many more English words with k in the third position than in the first position (Tversky ; Kahneman, 1973).

Different search sets are triggered by different tasks (Tversky ; Kahneman, 1974). When rating the frequency of abstract words (thought, happiness) and concrete words (door, juice) in written English, people tend to search for a context where these words could appear, and it seems easier to retrieve contexts with abstract concepts (love in love stories) than concrete ones. This was observed in a study in which subjects mistakenly judged abstract words to be more numerous and to appear in a much greater variety of contexts than concrete words (Tversky ; Kahneman, 1974). It seems then that we employ a limited number of search strategies depending on the type of the task, and we seem to often hold on to the first satisfactory answer obtained through the use of heuristics, even though it may lead into serious error. Following these principles, we shall now investigate the availability

heuristic with a similar word fragment judgement task to that of Tversky's & Kahneman's (1973) experiment.

There were two conditions: Group A was asked: ' How many words of the form '—ing' would you expect to appear in a 2000 word passage? Group B was presented with the same question, except the word fragment was in a different form. It was '—n-' instead of a '—ing'. Subjects were told to provide their answer within 30seconds. The frequency of the words should be mediated by an assessment of availability.

It should be much easier to come up with examples of the ' ing' words than with the ' n' words and with these examples readily available people should estimate a higher frequency for the ' ing' word fragments, even though, naturally, the ' n' pattern is actually more frequent as it includes the ' ing' pattern and thus certainly contains more possibilities. Thus it was hypothesised that group A (' ing' words) will estimate that a higher number of these words would appear within 2000 word passage and that group B would generate a less numerous estimate for the ' n' word fragments.