

# Risk and Availability Heuristic: The Role of Availability in Risk Perception and Management

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## ABSTRACT

It is not obvious yet true that people heavily rely on availability heuristic to perceive the level of risks. The availability heuristic leads people to perceive danger based on the level of social media exposure and disaster potential instead of real fatality rates. Since individuals lack awareness of the shortcut bias, it is the government's responsibility to manage hazards. In order to maximize effectiveness, the government transforms the availability into a tool of risk management that makes specific risks more salient. By doing so, the availability heuristic also helps the government receive economic benefits. Yet, the availability is a double-edged sword in application due to concerns about overuse, misleading information, inappropriate allocation of resources etc.

**Keywords:** *Availability heuristic, Risk perception, Management, Relevant application*

## 1. INTRODUCTION

The availability heuristic, or availability bias, is a shortcut that people unconsciously and widely rely on to make decisions and form an impression. The main idea is that "the availability of instances could be measured by the total number of instances retrieved or constructed in any given problem[11]". In other words, when people intend to make a quick and effortless decision, they depend on the available instances retrieved from their minds. This heuristic is frequently discussed in behavioral economics, which serves to explain customers' irrational behaviors. It has now become a widely-used tool applied in brand marketing and policymaking.

Yet, the various use of availability heuristic associated with risks is relatively novel to discuss since most people apply it unconsciously. There are a lot of biological explanations on it, but availability heuristic can demonstrate part of the reason as well. To maximize the efficiency of risk management, the government would also utilize availability as a tool.

Due to the increasing use of availability in risk, this paper will focus on the roles and economic benefits of the availability heuristic associated with risks, particularly risk perception and examples of hazard management. This paper aims to explore the application of availability heuristic in risk perception, and

meanwhile discuss possible consequences when it is inappropriate applied.

## 2. THE AVAILABILITY HEURISTIC

People cannot always go through every complicated procedure in our thinking system whenever they need to decide or react. Human's cognitive system also limits the capacity of issues that can bear on our previous knowledge. So when people tend to retrieve memories, they frequently take mental shortcuts to be effortless and faster[7]. Behavioral economists study many of these shortcuts to predict consumers' behaviors. Availability is one of them, relying heavily on the frequency of an occurrence and the ease of recalling examples[11]. People tend to view these examples as evidence to support their attitudes toward an event. Yet people are unconsciously biased.

The example of availability is everywhere. For example, the public always assumes that taking an airplane is more hazardous than driving a car. Yet, the fatality data in 2015 suggests a contrary claim: there are 1.13 fatalities per 100 million vehicle miles traveled, yet only 0.155 fatalities happened for every 100,000 flight hours[5]. Availability plays a significant role in reinforcing this biased stereotype. Additionally, disaster reports always involve details like data, survivors' stories, and vivid images. Therefore, when people compare the risk level of cars and airplanes, vivid

airplane catastrophe images are easier to remember than minor car accidents. It is reinforced whenever people read news about airplane crashes which constantly increases the availability. This example also demonstrates two characteristics of the availability heuristic: familiarity and imaginability[12].

In addition to the ease of retrieving examples, another characteristic of the availability heuristic is salience. Recent events and personal experiences are more influential to people. Because they are more salient, they are more available in people's minds[12]. For instance, a person with personal floor experience may overestimate the danger than others without the experience. There are other characteristics studied by Tversky and Kahneman, yet only these characteristics would be discussed in the paper, which is the core of availability applications in risk.

### **3. THE ROLE OF AVAILABILITY IN RISK PERCEPTION**

In what situations would people perceive themselves as in danger? The answer can be generated into many, yet all of them could be categorized into two major categories -- "unknown risk" and "dread risk". "Unknown risk" derives from fear when people encounter unfamiliar events or involuntary participation in certain events. While "dread risk" is closely related to the level of severity and seriousness of consequences such as fatalities[4]. The impact of availability on risk perception mainly focuses on the "dread risk" category.

Slovic examined two factors that effectively determine the level of risk perceptions, which are all related to "dread risk": perceived risk compared to frequency of death, and disaster potential[8]. Although Slovic did not claim these factors are influenced by availability, his findings resonate with availability heuristic.

Slovic tested whether the frequency of death is how people perceive the level of danger, and the result rejected this hypothesis. He pointed out that "laypeople incorporate other considerations besides annual fatalities into their concept of risk[8]." This find resonates with the example of a car and airplane fatalities -- the fatality frequency does not determine people's perception. This idea is also supported by Slovic's finding of using disaster potential to explain the estimation discrepancy on nuclear power: "Apparently, disaster potential explains much or all of the discrepancy between the perceived risk and frequency of death values for nuclear power[8]". Accordingly, the availability heuristic explains why the frequency of death is not always related to people's risk perception.

Although the frequency of death does not impact risk perception, the frequency of presses in a country does shape people's estimation of hazard. Goszczynska

compared the mean evaluation of risks in Poland(38.1), the United States(46.1), Hungary(27.7), and Norway(32.4). "This influence could be caused by the availability heuristic: the bigger the country, the more accidents and negative events occur and are reported there[4]". Therefore, when people are asked to rate risks, the frequency of risks is different for people from various countries, which shapes their risk perception differently.

The availability heuristics does not only affect the level of risk perception, but also the type of risks that stand out in a country. Availability heuristics enable certain risks to stand out from others despite what the real magnitude is[10]. For example, risks that are more daily (road accidents, alcohol, cigarette smoking) are perceived more by Hungarians, while Americans tend to perceive more risks about new technologies and chemistry-related products[4].

Besides the domestic propaganda on specific risks, smaller propaganda that involves availability heuristic can happen everywhere, especially the interaction between people will also influence one's risk perception. Interdependence is a factor that influences risk perception[7]. By attending meetings on a certain risk, people expose themselves to biased information and reinforce stereotypes by repetitions. When the number of such conversations increases, availability of risk will increase through social pressure[7]. In all cases, availability of hazards can be constantly increased through daily interactions and group meetings, not to mention the influence of social media propaganda.

In general, availability heuristic influences not only the level of risks perceived, but also the type of hazards. It makes memory retrieval selective and anchors personal opinions: it leads people to rate a risk mainly on its disaster potential and high exposure rather than relying on the hard data. Under the help of social interaction, specific anchored perceptions will be amplified and thus strengthen the credibility.

### **4. EXAMPLES OF APPLYING AVAILABILITY IN RISK MANAGEMENT**

The Availability heuristic is not the only shortcut that people take on a daily basis. Actually, people's judgments and opinions are varying all the time, influenced by various factors. These changes hardly affect the surroundings, yet they can be extremely influential when people cannot make the right judgment and realize the potential hazard to the whole society. Therefore, the government needs to take on the responsibility of appealing to people to be aware of the risk and act accordingly. The availability heuristic leads to biased opinion, yet it can also be an effective tool in risk management strategies used by the government due to its nature.

The choice of channels to spread related information is a key in effective risk management. A common one is various social media, which have already become an inseparable part of people's lives. The choice of social media is not limited to traditional information platforms like New York Times. Any platforms that can increase the exposure of certain risks can be candidates.

By applying the salience of availability heuristic on various social media, the government can easily make some issues stand out for citizens, especially those less obvious, long-term issues. These issues are usually hazardous, yet they need time to happen and grow[10]. For instance, climate change is now a well-known global problem that is highly perilous. But before the issue was highlighted through social media, no one paid attention to the temperature change, a seemingly insignificant natural development. Laypeople could not know its long-term effect on ecological balance. Because people could not "see" what the consequences of climate change are, they would not be able to perceive the risk. But availability could solve the problem. By frequently reporting observable and salient activities related to climate change, people would follow the available heuristic to build strong correlations and react[10].

The government does not only depend on the direct increase of availability from society, it also expects its indirect effect -- the discussion among people[10]. It is reasonable -- when a heated topic is propaganda everywhere, people would automatically discuss it, which is a symbol of changing their original opinions. Why would something that is initially insignificant start to be reported as hazardous? Is it a reliable source to believe or not? The discussion itself requires people to recall more occurrences like deaths from the risk, leading them to estimate the seriousness and respond to the risk management later on[3]. One of the real examples of availability increase by discussion is about HIV transition. Kohler found that there was an increasing amount of concern about HIV through every interaction with people[6].

The government also applies familiarity of availability in risk management strategy. As discussed before, personal experiences would increase risk awareness. Yet not everyone has personal experience of the risk that the government specifically wants to target. Hard data and statistics only impact experts, while having no increase in the availability to laypeople.

One of the choices to increase familiarity is to relate long-term, hidden hazards to the short-term risks that can be easily perceived or are already perceived as hazards. For example, associating climate change with more hurricanes, tsunamis, and infertile land increases the emergency of the risk, and makes the retrieval of climate change more frequent. Because hurricanes are more well-known in daily life, climate change will associate

with people's common knowledge, increasing the availability of climate change accordingly.

Accumulating news reports and short-term risks to increase availability gradually takes time to happen. A shortcut to increase availability in a short time is to apply striking and vivid images that reflect the consequences of risks. These striking images would become stronger examples than others so they can be prioritized and appear more frequent[8].

It can also work with the technique of associating with identified risks to effectively increase availability. A historical example is that President Bush made great efforts in associating catastrophic danger with terrorism through conjuring up vivid images of potential risks[10]. Therefore, if a country intends to expose certain hazards to the public, it could utilize availability heuristic by building associations through vivid images and detailed descriptions, even using moral appeals involving future generations, in order to stimulate people's response[10].

## **5. IMPORTANT CONSIDERATIONS IN APPLYING AVAILABILITY TO RISK MANAGEMENT STRATEGY**

As noted previously, availability heuristic is initially found to explain irrational and biased behaviors due to people's overconfidence about their recalled examples and past experiences. In other words, all risk management strategies that are based on availability usage are taking the advantage of people's bias. Yet, employing bias in public strategy is double-edged when the application is inaccurate or inappropriate. This section will mainly focus on three considerations in applying availability to risk management: 1) overuse of availability, 2) misdirected application, and 3) ineffective strategy.

In section 4, the benefits of the government's availability application on risk management are discussed. However, the government is not the only one who is able to apply availability on social media and risk cascade. Actually, everyone has the access to use a risk cascade. It has been typical for the media to report stories of more suicides during Christmas and New Year due to loneliness and poverty, although it is not the truth[7]. These social media's initial purpose is not to increase availability of suicides, but to create heated topics and catch people's attention quickly -- bad news in an emotional holiday period is dramatic enough for people to discuss. But the unconscious use of availability may foster incorrect information about suicide, leading people, even government, to overestimate the risk level. Activists and politicians may also utilize availability to propagate certain risks that they care about, while the truly emergent risk is hidden behind the uncontrolled use of availability.

Making certain risks stand out from others is an advantage given by availability discussed previously. In this way, the government can target certain problems in order to save costs and maximize effectiveness. However, the government's ability to prioritize risks and anticipate the strength of possible consequences remains weak[2]. Douglas took pollution as an example to explain it: "Usually we find that each danger from mysterious pollution is selected and constructed to give something like automatic judicial authority to the incidence of misfortune[2]". In other words, the government would like to categorize all problems in a simple and fast way based on the domestic law, yet lack the ability to analyze other aspects such as the victim, the cause, and the phenomenon. In addition to that, the overuse of availability would reinforce the misperception. If the perception of risk is incorrect, then the corresponding behavior would be misdirected as well[8].

Lisa Grow Sun analyzed how the government of New Orleans misperceiving the Katrina hurricane and overreacting to it due to availability. After the hurricane, Mayor Nagin misperceived the risk of robbery and violent behaviors by believing in exaggerated reports. He then delivered 1500 police officers from rescue missions to New Orleans to deal with the robberies. Because of his misdirected behavior, food and other resources were all delayed to the shelters[9]. The numbers of exaggerating news made the government believe that criminal behavior was the most emergent event. As a consequence, the government took action based on false perception and left the real problem unsolved. This is the direct effect of misdirected behavior due to availability. Moreover, the government's behavior would create a false perception that the Katrina survivors were all criminals, which caused difficulty for survivors to get employed[9]. Therefore, if the government itself is biased by availability, the corresponding negative social impacts are influential.

However, even the accuracy of risk perception can be ensured by the government, the choice of strategies is another significant consideration. Availability is not a panacea in risk management. The way to implement it determines the effectiveness. The common misunderstanding of availability application is that increasing the frequency of risk is enough to make people perceive the danger. In some cases, availability reacts in a different way from the government's expectation. For example, due to the increasing weather in London in 2013, the government developed heat protection interventions to warn people about the danger of heat waves. The availability should enhance people's awareness about danger. However, the qualitative interview found out that many people perceived it as unnecessary intervention -- they even loved the weather[1]! The lack of strategies that connect the hazard with citizens' personal experience makes availability

heuristic ineffective. Although the frequency of heat wave news was increased in people's minds, they could rarely relate the abstract consequences to their personal safety[8]. Therefore, the ineffective use of availability is not only time-consuming, it may also lead counter reactions.

## 6. RISK AND ECONOMY

Risk perception and management strategies are inseparable from behavioral economics as previous sections discussed. Yet, a nation's economic development also correlates closely to its risk perception and arrangement of resources. In this case, applying availability to gather public attention on specific one or two risks would be an optimal choice for the government. When people were aware of the seriousness of waste classification, the government then promoted "Universal Zero Waste Ordinance" with detailed regulations on the waste. By 2018, "the recycling rate and compost rate have tripled to 35 percent and 21 percent."(Bouldercolorado.gov) The citizens were also highly cooperative with the strategy. There were voter-approved waste taxes on households. Boulder's success fulfilled every requirement of good risk management discussed above -- specific target, availability heuristic applied in risk perception, and following operations that bond citizens together. As a result, the government received more taxes from the citizens and reached economic development. From this aspect, effective risk management and the economy are mutually beneficial.

## 7. CONCLUSION

It is surprising to find out that the actual fatality rate does not play a significant role. Instead, how often it is exposed in the public's view and how it is portrayed matter. A higher exposure rate of risk will increase its availability in people's minds, biasing us to believe that it is an easier memory to retrieve, so it happens more frequently. The degree of shock shown through detailed descriptions and vivid images is another effective tool to increase availability for lay people in a short time, compared to hard data and statistics.

Although the danger of biased opinion and behavior is well-known by the public, as long as people are aware of the existence of bias, it is possible for us to take the advantage of bias by utilizing its characteristics in risk perception and risk management.

Nevertheless, this paper does not suggest the unregulated application of availability in risk perception. A few concerns are pointed out. Because availability cascade is a low-barrier that every social media, politician, activist, and individual could utilize and make an impact, unnecessary panic may be easily appealed to due to the overestimation of certain risks.

Therefore, although effective risk perception is inseparable from the use of availability heuristic, the government should issue related laws to regulate availability usage, and invest more in the department of risk estimation. It is also needed to raise people's awareness of availability bias in case they are misled by false information.

Moreover, because availability is a double-edged sword used by the government, it directly affects the whole society rather than individuals. As a result, it is suggested that more research needs to be conducted so that the government can assimilate the essence and reject the dross to master availability heuristic in risk perception.

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