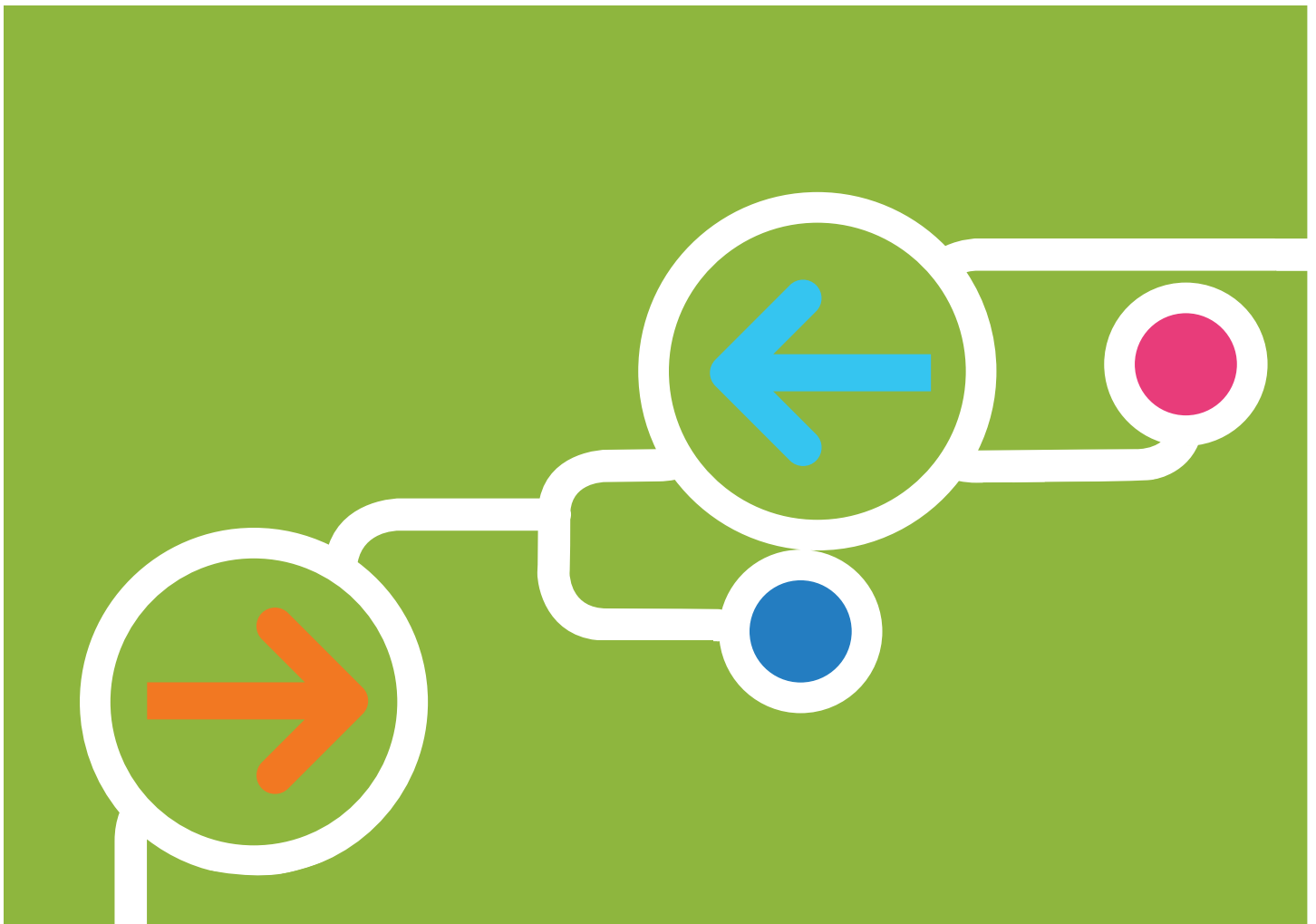
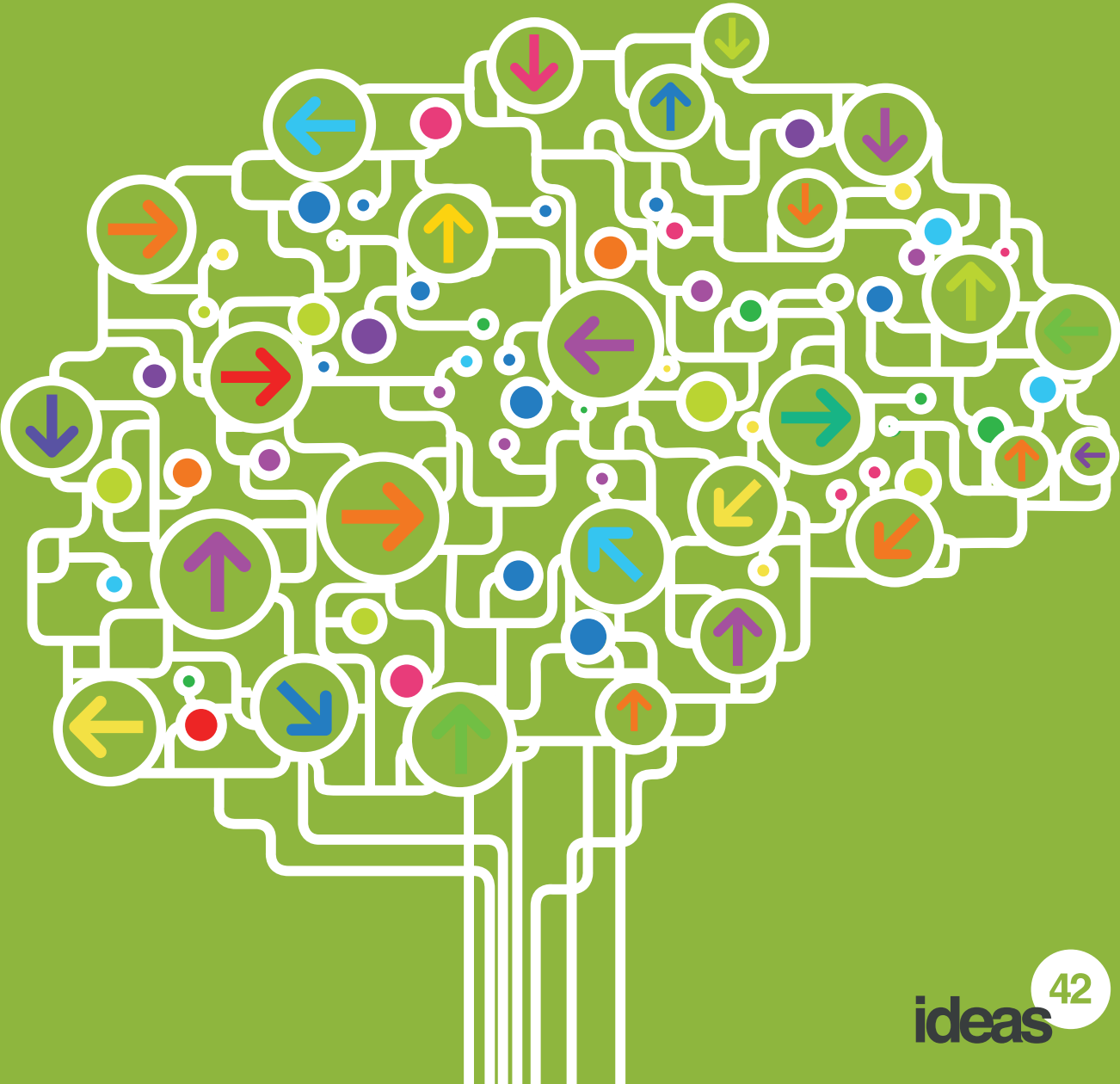


The Power of Heuristics



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Introduction

The world we live in offers us an abundance of options, and the freedom to choose between them. Whether it comes to food, clothes, entertainment, or sport, we are spoiled for choice. Much of the time, this ability to choose enriches our lives. But this plethora of choices has an important implication: every day, and in many different ways, we are called upon to make many very complicated decisions. These decisions require us to acquire, process, and act on a great deal of complex information. This can be stressful. Being called upon to make these decisions can feel like a chore rather than a privilege. The ability to choose—so desirable in the abstract—can feel like a burden when decisions actually have to be made.

Think for a moment of all the decisions involved in managing our personal finances. We struggle to decide how much money we should save for retirement. We find it hard to settle on the right investment mix between mutual funds, stocks and bonds. Decisions about the best mortgage for a family or the right way to finance children's college education are complex and inherently difficult. So are those about how to manage the finances of a business, however small. Neither is such complexity confined to financial decisions. Most of us struggle to find the right diet or exercise regime for our particular health needs.

Not surprisingly, we often make such decisions poorly. Many of us fail to save enough for retirement or to invest in financial products that give us the best returns. We eat in ways that make us unhealthy. We exercise too little to keep ourselves fit. We borrow sums we cannot always afford to repay. These individual mistakes add up. And they have important policy consequences: low savings rates; an epidemic of obesity, heart disease, and diabetes; and young people with a mountain of student debt, to name but a few.

As a result, many policy interventions try to help us make better decisions in areas ranging from health to nutrition to business to finance. The typical program aims to counter the inherent complexity of the decision by providing in-depth information. By providing such extremely detailed and complex information, these interventions try to enable people to make perfect decisions. For example, in the aftermath of the financial crisis in the United States, some policymakers suggested that individual savers should be taught about the

complexities of interest rate models, portfolio allocation, and so on. Others proposed finance classes in high school. Governmental and non-governmental organizations invest hundreds of millions of dollars a year in financial education programs. The approach taken in other areas is similar. In the field of nutrition, such education often focuses on informing people about the nutritional content of various food items on a myriad of dimensions and educating them on how these dimensions interact with their body chemistry. Everywhere, policy seeks to improve complex decisions by providing people with commensurately complex information.

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We argue, based on the research of one of the authors of this article (see Drexler, Fischer and Schoar 2011), that this approach is flawed, since it does not take into account the psychological or behavioral barriers that prevent people from making better decisions. Rather than inundate them with a mass of complex information, we argue that such policy interventions should concentrate on developing, testing and disseminating simple but effective rules of thumb, or “heuristics”. Such heuristics are shortcuts or decision-making aids that enable people to make “reasonably good” decisions without needing to understand all the complex nuances of the situation. The benefits of such heuristics are not only that they reduce complex information to a simple and manageable set of choices, but also that they help people turn an intention into a realized action.

Most of us intuitively resort to such heuristics in many aspects of our lives. To return to the example of eating, the food pyramid is a heuristic designed to guide our nutritional choices and ensure that there is a modicum of balance between the different food groups in our diet. Similarly, farmers all over the world have developed heuristics which guide them about what seeds to plant at what times, when to use fertilizers, or how the patterns of rainfall should affect planting of crops. These can be found in publications like Farmers' Almanacs.

These examples are only the tip of the iceberg. As we will discuss in more detail below, heuristics are starting to be put to use in areas ranging from financial education training to agricultural extension to medical practice. We argue that an approach based on heuristics can revolutionize how we ensure that people have the capabilities they need to make better decisions. Well-designed heuristics give people decision aids that allow them to arrive at better outcomes without their needing to be experts on such diverse areas as finance, nutrition science or agriculture.

The Behavioral Insights Behind Heuristics

The examples above show us that people are already using simple heuristics in some contexts. But why should we believe that this approach could be helpful in situations where people have to make very complex decisions? Our common intuition is that complex situations require complex and very nuanced solutions. However, a large body of research carried out by psychologists and behavioral scientists helps us understand the basis for heuristics-based approaches succeeding where other kinds of information provision or training may fail.

First, psychologists have found that simple information is more easily absorbed and recalled. In a set of influential studies, Kahneman and Beatty measured the effort associated with various cognitive tasks and found that remembering six or seven digits was measurably more effortful than holding one or two digits in memory (see Kahneman 2011). Yet people can increase the length of a string of numbers they remember if they group them into smaller chunks rather than trying to remember them as a series of individual digits. From the point of view of the heuristics-based approach, these studies underscore an important lesson: a single, easy-to-remember rule is more likely to be recalled and thus acted upon than a complex explanation of the underlying theory. Successful students are likely those that realize chunking digits together is a helpful heuristic. But by providing all students with this heuristic from the beginning one can improve the performance on average.

Second, heuristics take less time to implement. They thus reduce the risk that people procrastinate in using them. While one might argue that procrastination ought not to matter when important tasks are involved,

research shows that people are in fact remarkably poor at such planning, putting off anything even slightly effortful for “later”. For example, Bettinger, Long, Oreopoulos & Sanbonmatsu (2009) show that many high school seniors and their families put off filling out financial aid forms due to the complexity of the application forms. Simply being helped to wade through the forms and simplify the task not only increases the likelihood of the forms being filled out, but increases college enrollment by a staggering 25% (!). Such problems also occur in professional contexts. Cadena et al. (2012) find that bank employees in Colombia do very poorly at planning their workload in order to meet their monthly targets, often putting off tasks till the last minute. Therefore, reducing the demands made on people’s abilities to make and stick to plans increases the chances of desirable actions being completed. The prevalence of procrastination thus provides an additional reason to favor the simplification or paring down of the content of literacy or training programs, as is done when these are based on rules of thumb.

A final reason to value simplicity in decision rules comes from a number of studies that show the context in which information is provided matters for people’s ability to process it correctly. Having a lot of secondary information (“clutter”) around key information can make people less likely to absorb the key messages. This effect has even been shown to be important even for experts such as financial professionals. Townsend and Shu (2010) find that the format of how information is presented influences the investing judgments and decision-making of trained financial professionals. Indeed, format changes had bigger effects than variables like firm profits or past returns, which subjects themselves had upfront believed to be more important in their decisions. Similar effects have been shown in a large literature on visual illusions. These studies therefore provide another reason for valuing simplicity and for trying to boil information down to the truly essential. Instead of improving decision-making, providing a lot of information or context around the central piece of information can make people process it incorrectly.

Behavioral science thus suggests that in order for training to be effective, it needs to translate complex structures into simple heuristics, and concentrate on disseminating these. Such heuristics make it easier to respond well when there is little time to deliberate, weigh up all the relevant information, and then reach a decision about

what to do. They side-step many of the psychological dead-ends activated by more in-depth and “rigorous” training techniques, ranging from the limits of memory to the tendency to procrastinate or to be distracted from the key information by less relevant (but more salient) information. The ultimate goal of any such intervention is to help people take better action and not to make them sound more informed about the problem.

Existing Applications: Financial Education, Agricultural Extension, and Medicine

In this section, we look at three different areas where heuristics are already being applied to help people with decision choices: financial education training for microentrepreneurs, agricultural extension services, and the use of checklists in medicine.



Financial education

Microentrepreneurs often lack the financial skills required for the complex financial decisions they face, and may end up taking decisions that are not in their own best (business) interest. Usually, such entrepreneurs are given accounting-based training which emphasizes giving entrepreneurs the knowledge base they need to make the best decisions for their businesses. But it is not clear whether such training improves their decision-making and the performance of their businesses, and whether alternative financial capability programs could do better (for a review, see McKenzie and Woodruff 2012).

A randomized control trial with a bank in the Dominican Republic allowed us to measure the impact of a standard accounting training and to compare it to a simplified rules of thumb based training that teaches basic financial heuristics (see Drexler, Fischer and Schoar 2011). The goal of the study was to assess whether there are advantages to reducing the complexity of training programs. In particular, we were interested in knowing whether the simpler rules of thumb training is a better fit for less educated or less financially sophisticated clients.

The standard accounting program closely followed a standard approach to small business training, which is designed to teach microentrepreneurs the basics of double-entry accounting, working capital management, and investment decisions. The rules of thumb training focused on very simple heuristics or routines for financial

decision-making without aiming to provide comprehensive accounting knowledge. For example, the rules of thumb training gave entrepreneurs a suggestion for physically keeping their money for business and the household separate, by placing it in two separate drawers. At the end of the month they could then count the money in the business drawer to figure out what their profits were.

There were big differences in the impact of the two approaches. People who were offered rules of thumb based training showed significant improvements in the way they managed their finances and in the accuracy and internal consistency of the numbers they reported. They were more likely—as much as 10 percentage points more, compared to the baseline—to keep accounting records, calculate monthly revenues, and separate their home and business books. In contrast, there were no significant changes for those in the standard accounting training. Overall, it appears that the microentrepreneurs in our study were more likely to implement what they learned in the rules of thumb training.

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And the differences were not restricted just to business practices. Rules of thumb training led to a statistically significant and economically meaningful improvement on weekly revenues. In particular, it led to an almost 7% increase in the level of sales during bad weeks. This is likely because they allowed microentrepreneurs to diagnose periods of bad sales more quickly and thus respond to them proactively by doing things like increasing opening hours or changing the product mix offered.

In contrast, the standard accounting training produced no significant effects. Interestingly, heuristics were particularly effective for those whose initial levels of financial literacy were low, as well as those who said that they were not interested in training. This makes such training a particularly useful way to reach those who are most resistant to or hard to affect using traditional training methods.



Agricultural extension

A recent evaluation of a mobile-phone-based agricultural extension service in India by Cole and Fernando (2012) provides an interesting example of a situation where targeted information provision acts very much like a rules of thumb based approach to education. The study evaluated a service where farmers in western India could both receive weather and input information on their mobile phones. They could also call with specific queries about planting and input use decisions on their especially with regard to the use of particular kinds of pesticides, without any strong evidence of corresponding increases in knowledge and understanding. One way to interpret these findings is to see the information being provided very much in the mode of rules of thumb. Farmers were told about the right thing to do in their conditions without necessarily the full rationale and thinking that lay behind the recommendations being explained explicitly. That they nevertheless took better decisions is a testament to the power of the approach.

It is particularly striking that the behavioral change that resulted from this simpler approach was much larger than that from many decades of more traditional agricultural extension in the same part of India. In particular, whereas only 1% of farmers reported using government extension services as their primary source of agricultural information, over 60% of the farmers given access to the mobile-based service used it, and it replaced the advice farmers were previously getting from input sellers. The simplicity of rules of thumb based education or literacy programs means that they are more likely to be adopted and used than more traditional approaches.



Checklists in medicine

Checklists are lists of action items, behaviors or tasks arranged sequentially so that they can be ticked off as they are performed (or noted if they are missed out). Fields such as the airline industry or the military have long used checklists in order to ensure that protocols are carefully followed and tracked, and to reduce errors of omission. Most recently, checklists have been widely applied to ensure a consistent standard of care in medicine, especially in areas such as anesthesiology and emergency medicine, for diagnosing brain death, for the withdrawal of end of life support, and so on. Their use has been shown to improve the quality of medical care, including adherence to evidence-based best practices (including

routine but often neglected hygiene practices, such as hand-washing and sterilization), contributing to large improvements in patient safety, and helping cut infection rates at hospitals.

Checklists are usually thought of as being aids to memory. But as Hales et al. (2008) note in their survey of the evidence about the use of checklists in medicine, they are like rules of thumb in that they are “important tools to condense large quantities of knowledge in a concise fashion”. In particular, checklists—like rules of thumb—are oriented towards ensuring that the right actions are taken, rather than increasing knowledge or information about when the action is appropriate. In this case, note that the people in question often already “know what they need to” but fail to act on it as often or with the regularity needed. This suggests that heuristics might be particularly useful in situations where appropriate actions are not taken even though people know what those actions are and even understand why they are important.

The way forward, and a health warning

Realizing the full potential of heuristics will require us to do a number of important things. Some of these relate to how we ourselves think, while others relate to the way we go about disseminating knowledge.

First, we should recognize the importance of heuristics by striving to learn heuristically wherever possible. Translating complex structures into simple rules of thumb can help all of us learn more effectively.

Second, one of the key advantages of heuristics is that their simplicity allows them to be easily disseminated using new technologies and channels, such as text messaging, phone applications, or the internet more generally. Testing the efficacy of providing heuristics through such new technologies emerges as an important goal for anyone interested in providing solutions in a sustainable and scalable way.

Thirdly, heuristics-based education should be treated as the default for most short-term adult learning programs. In other words, using more in-depth, complex, classroom modules should require explicit justification based on the specifics of the situation rather than being the automatic approach. It is almost certain that there are some

situations where more in-depth training is needed—but the tendency so far has been to assume that it always is, whereas it is reasonable to believe that the truth is closer to the opposite. If those tasked with designing training programs would think long and hard about whether in-depth, complex training is really needed, such programs would be used only when they are appropriate and really needed. This would also ensure better use of the resources devoted to these programs.

Finally, a health warning. It is true that many useful heuristics have emerged endogenously. But it is important to remember that such heuristics can sometimes be misleading. In particular, a rule of thumb that is useful in the vast majority of situations may be misleading in a minority of others that may appear to be similar. For example, treating sore muscles with a cold compress is not always the right approach (though it may often be useful); similarly, saving a certain percentage of one's income is a useful heuristic for most people—but not for those who are carrying a large amount of credit card debt, who may be better advised to first pay it off.

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This leads to our final recommendation: the set of useful heuristics can and should be tested and expanded. It is important to understand that a good heuristic is not just an abbreviated version of a longer class. Testing existing and new rules of thumb rigorously will help to create a set of heuristics that we know work and are useful. It will also help us to understand what the common features of “good” heuristics are—thus aiding us when designing new ones.

Conclusion

The best heuristics are those that encapsulate useful information in a way that is intuitive to remember and act upon but that are also specific to their context. Their power lies in their ability to induce people to take better actions. By carefully testing and vetting heuristics, we have an opportunity to create better ways to get knowledge and skills to those who need them, but which are designed to ensure that they are not misleading (as some that have developed over time can be), and that they encapsulate reliable science.

This process has the chance to transform the decision capabilities of individuals without needing them to devote significant chunks of their lives to acquiring in-depth knowledge of complex phenomena—but rather by giving them ways to act in ways that serve them well.

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