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IZA DP No. 12808

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NOVEMBER 2019

ISSN: 2365-9793

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ABSTRACT

Lessons from Behavioral Economics to Improve Treatment Adherence in Parenting Programs: An Application to SMS

A growing literature shows how insights from behavioral economics can be successfully adopted in simple interventions through SMS or other types of low-cost communications. In this short, note we provide concrete basic guidelines to design behaviorally informed messages, based on theory and our own experience. We provide examples applied to parenting interventions.

JEL Classification: D9, D90, D91, I15, I38, J38
Keywords: behavioral interventions, parenting, child development, poverty

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1. Introduction

As Rabin, 2002 and DellaVigna, 2009 state, the core economic theory is based on a simple model of decision-making: individuals use all available information to make decisions that maximize their utility function given their own preferences. The assumptions are that individuals are rational, processing information is not costly, and preferences are time-consistent and independent of others' feelings or preferences, the framing of the decision, and the context and emotions. An average individual that has access to the relevant information will make a right choice. If so, for instance, rational parents that have the right beliefs on the importance of good parenting in terms of child skill development (and eventually performance in school and in the labor market) should probably invest some time during the day with their children and apply what they learned in a daycare center meeting, during home visits or at health centers, at least when monetary or time constraints are not too binding.

Psychologists and behavioral scientists had shown that some of these assumptions are not completely accurate in every context and that, in turn, sometimes individuals show anomalous behavior in relation to some of these assumptions, in systematic and predictable ways. Just to mention a few, in many cases, individuals are **not time-consistent** (i.e., time preferences change over time and thus decisions seems to be disproportionally affected by what happens in the present, regardless of the future impact of their present decisions; Thaler, 1981), they **do have social preferences** in addition to their individual preferences (i.e., they may be altruist, have preferences for fairness, inequality or reciprocity, Fehr and Gatcher, 2000) and they also care about social norms (Farrow et al., 2017). Moreover, the way individuals process information to form beliefs is not necessarily rational (DellaVigna, 2009; Rabin, 2002) and **their decisions are heavily affected by how options are framed** (Kahneman and Tversky, 1979). **The context in which decisions are made matters** (Yi, 1990), as well as the **transient emotions** experienced by the decision-maker (Loewenstein and Lerner, 2003).

Finally, the **individual capacity to process available information is not unlimited** (Schilbach et al., 2016) and attention is a scarce resource (Gennetian and Shafir, 2015). As a result, we tend to create **shortcuts**, instead of thinking thoroughly, in order to reduce the cognitive burden associated with decision-making (Shah and Oppenheimer, 2008). These shortcuts are sometimes accurate but sometimes biased. Second, we tend to be less affected by information when it is **not salient** and, thus, our decisions end up being disproportionally affected by information when it is salient (Thorndike et al., 2012; Chetty, 2009).

Many of the deviations from the core economic assumptions (in terms of preferences, formation of beliefs or decision-making process) are systematic. Understanding them in the

context of our decision-making process is fundamental to improve the accuracy of how we predict individuals make decisions and therefore improve the effectiveness of our policies.

A strategy in this direction is the use of "nudges," which are designed to address specific biases or anomalies without fundamentally affecting any incentive for the individuals (for instance, a reminder at the right moment may catch the attention of a distracted parent even without adding new relevant information).

Some of the most common biases or "anomalies" follow:

- **Loss aversion**: The pleasure obtained by gaining something is less compared to the displeasure caused when we lose what we already have.[1] When designing a message intervention, framing (this is, the way the message is written) tends to include this principle (although there are some caveats which will be discussed later). This could be thought as an "anomaly" in terms of individual preferences within the core economic model, as it suggests that we do not value goods in absolute terms but relative to a reference point (in this case, the "0").
- **Present bias**: We are more impatient in the present than in the future, which makes us to disproportionally value more immediate satisfaction than future gains; and end up regretting of some of our decisions. For instance, even though we know it is important to save money for when we are old, we prefer to spend it today (when we are impatient), assuming that we would save tomorrow (when we think we will become patient). When tomorrow comes, we become impatient again and end up postponing the decision under the same logic every year, until we are older and regret for not having saved enough. The same happens when we must choose between exercising and resting or between eating pizza or a fruit or, in general, when we must choose between a costly activity today that has benefits in the future. Many interventions, therefore, consist in giving prizes in the short-term in exchange for behaviors that have a present cost (going to the doctor, eating healthy) but the benefits are observed in the future.
- **Status quo bias**: When there are several options available, we tend to stick with the "default", even when it is arbitrary and not necessarily consciously chosen by us.
- **Social preferences:** We do? not only have individual preferences (i.e., what we like or dislike) but we also have social preferences (i.e., we care about altruism, fairness, reciprocity, inequality). For this reason, many interventions are designed to prime altruism or inequality aversion.
- **Social norms:** we generally like to have a positive reward from others but we also prefer to have a positive self-image (Benabou and Tirole, 2002 and 2006). We do not like to act contrary to what we perceive as a social norm in our society, doing so upsets

[1] In economic terms, this means that there is a kink at the reference point (0) in our utility function, which is steeper for losses than for gains.

us and thus we try to avoid it. In many cases, it is enough to remind a descriptive norm (what others do) to influence behavior ("9 out of 10 neighbors do this"). In some other cases, it is better to highlight what is perceived to be approved by our peers as a good behavior ("injunctive norm"; see for instance Meisel et al., 2014).

- **Identity**: Many of our decisions are influenced by our self-perception of identity and roles (Kessler and Milkman, 2016; Akerlof and Kranton, 2000). We have multiple possible groups with which we identify ourselves and our actions can be modified depending on which of these groups we have in mind when making decisions. For instance, if STEM careers are not perceived as to be compatible with a women identity, it is less likely for a woman to pursue a STEM career, all else equal. Likewise, if I perceive myself as belonging to a group of generous individuals, I will worry about making charity donations. Acting contrary to the self-perceived identity represents a dissonancy and thus individuals tend to avoid it.
- **Heuristic in decision-making and beliefs formation**: Cognitive capacity is not infinite, and therefore, many times we rely on what is readily available to take shortcuts and avoid making a rational effort (which is costly). This leads to a variety of psychological biases in our decision-making processes and also in how we form our beliefs (see for instance Tversky and Kahneman, 1974). If, for instance, I learned today that a plane recently fell, I will more likely overestimate the probability or aircraft falling had I not learned that happened. Likewise, if the weather is cold this week, I am less likely to believe in the effects of global warming, but if it is very hot, I will be more likely to believe in the effects (Zaval et al., 2014). Likewise, choice avoidance is relevant to explain why sometimes having more options makes us make poor decisions (Iyengar et al., 2000) when it should be exactly the other way around and is also related to the experiments showing how default options or more salient options – such as appearing first in a ballot - are often preferred (Ho et al., 2008).
- **Additional frictions in decision-making (or "hassle factors")**: In some cases, small "obstacles" (i.e., filling out a form, sending an email, making a call) can have negative and disproportionate effects on actions even in situations where the potential gains are very high. An example of this is a classic paper by Bettinger et al. (2012) in which a simple intervention to increase the number of applicants for financial aid - assistance with the application process - had an important effect on financial aid application rates of disadvantaged students.

Some of these anomalies and biases have a root in (or are exacerbated by) the scarcity of our **mental resources. O**ur ability to focus is a scarce resource and this particularly true among the poor: our attentional system is limited and, when the load on the system increases, people needing to shift attention back and forth tend to make more mistakes (Mani et al , 2013;

Gennetian and Shafir, 2015) to reduce their self-control capacity and make people behave more impulsively (Friese, Hofmann, & Wanke, 2008).[2]

The power behavioral economics brings could help the economic and social development of communities across and within Latin America, by inducing individuals to make decisions that are consistent with their long-term intentions but are sometimes hindered by some of the anomalies or biases described above. Given that increased cognitive load is particularly frequent in contexts of poverty, as scarcity makes people to direct their attention too much on daily trade-offs (Mullainathan & Shafir, 2013; Gennetian and Shafir, 2015; Mani et al., 2013), Latin America represents a very suitable setting to apply behavioral insights. To illustrate this, we will discuss specific lessons learned in one of the most suitable fields to apply these insights: parenting practices.

2. Parenting: overcoming biases to enhance child development

2.1 Why are good parenting practices important?

There is a vast literature about the importance of good parenting practices and its long-lasting impact on children (school achievement, Spera (2005); health, well-being, and competence Hertzman and Wiens (1996). However, even though there may be free resources available to help parents (i.e., free vaccinations), they fail to use them, regardless of their good intentions and desire to make rational decisions that maximize the children's utility (Gennetian et al., 2016). Parent's decision-making processes are influenced by diverse biases that prevent them from acting in their kid's best interest. Therefore, we need interventions that can increase the **quantity** and **quality** of time spent with their children by fighting biases.

2.2 What are the main implications of behavioral economics for parents?

Regardless of parental awareness of the importance of having proper parenting practices, there are several biases that interfere between parents' decisions (invest time an effort in their children's development) and actions. As Mani et al. (2013) has shown, this is the case specially if we are in stressful contexts, which tends to be the case among lower-income families and busy parents.

Below are two of the most common biases experienced by parents:

(1) Limited information processing capabilities: Engaged parenting is a complex and cognitive demanding endeavor. Making choices about activities to support child development may be difficult for parents. In the presence of high cognitive load, parents could make suboptimal decisions or avoid making decisions altogether (York et al., 2018).

[2] Several papers have shown how certain abilities (attention capacity, cognitive capacity, executive control, prospective memory, problem solving) are severely affected by cognitive load (see, for instance, Lavie, 2000; Lavie et al., 2004;, Marsch & Hicks, 1998; Kahneman and Frederick, 2002).

This is especially worrisome among lower income households because poverty exacerbates the cognitive load barrier: as there are relatively more preoccupations to take care off, the cognitive bandwidth for the rest (including parenting activities) is reduced (Shah et al., 2012).

(2) Limited attention: Increasing evidence supports the possibility that limits to attention can lead to suboptimal behavior (Karlan et al., 2016). In other words, parents may just forget to do what they really want to do. Given the significant demands of most parents' time, parents likely have particularly limited attention. This is especially true among parents in disadvantage. For instance, think of a single mother who has more than one job, takes care of the house, has to pay the bills, and on top of that has to have in mind to stimulate her kids with different activities (reading a book, playing with them in a particular way).

(3) Present bias: Parents could be time-inconsistent and this is a problem in the context of parenting, because the effects of good parenting practices on child's development are not immediate (or at least, not visible in the short run) and are uncertain, whereas the effort is immediate and tangible. In this case, parents may prefer to substitute paying attention to their kids with more immediately gratifying activities (watching TV, for instance; see Mayer et al., 2018).

2.3 What are potential interventions to counteract biases and limited mental resources?

SMS-reminders can successfully address **limited attention**. Reminders have been successfully implemented in many contexts (from reminding people about voting to reducing missed appointments in hospitals or increasing medication adherence) and work well especially if the timing is right (e.g., if we want a caregiver to read a book to her 6 year-old child, it will be better to send it just after dinner time than at 4 PM). A fundamental challenge of home visits and other interventions seeking to improve parenting practices is to be able to help parents to overcome the potential behavioral barriers they face at home in **key moments** when parenting decisions are critical.

In this regard, the literature of behavioral economics emphasizes not only the content of the messages but also the **timing**, the **framing** and the **messenger**. Literature shows that **how** information is presented to people affects subsequent behavior. For instance, Allcott, 2011, shows that residential consumption of energy is heavily reduced when information about household consumption is framed in a way that is compared to what others do. Similarly, Gerber and Rogers, 2009 show that people are more encouraged to vote when "get out the vote" messages are framed in a way that shows in a social comparison that many other people do vote. On a similar note, Doss et al., 2018, show that the positive effect of text messages on parenting practices is significantly larger when child personalizes the content.

The framing of the text message is particularly important. For instance, reminders typically assume that people are loss averse. This idea has been used to design messages that

encourage women to have a mammography (Banks et al., 1995). Results showed that holding the content of the message constant, many more women decide to have a mammography if the invitation emphasized what she could "lose" in case of getting sick versus emphasizing what she could "gain" from not getting sick. In this regard, a message emphasizing what their child would "lose" if parents don't stimulate him/her would be probably more effective than emphasizing what their child would "gain" if parents do stimulate them properly. Nevertheless, there are some studies showing caveats of loss aversion framing. Rothman et.al., (2006) highlight that sometimes gain-framed appeals are more effective depending on the situation and context. They mention that, in the context of health, gain-framed appeals are more effective when targeting behaviors that prevent the onset of diseases, whereas loss-framed appeals are more effective when targeting behaviors that detect the presence of a disease.

Messages are also useful to attack the bias related to **limited information processing capabilities**. As York et al. (2018) showed, it is possible to reduce the complexity of naturally complex tasks (as certain parenting practices usually are) through text messages. In their design, the authors used three types of messages: "fact" (which provided objective information about development), "growth" (mainly encouragement) and "tip" (short, simple, and highly specific activities for parents). This last type of messages where especially designed to reduce the cognitive load of parents and therefore deal with their limited information processing capabilities.

Finally, messages can be used to address **present bias**. One way this bias could be addressed is by making salient and "bringing to the present" the rewards associated with the intervention (York et al. (2018). This is especially relevant in the case of parenting because the effects of good parenting practices are not visible right away. When we think about the future, our mental representations tend to be vague, which imposes a psychological distance (Trope et al., 2007). Experiments showed that interventions that make the future more vivid are likely to reduce this distance and to increase the amount of time we invest in the present in activities that will have a reward in the distant future. Hershfield et al. (2011) showed in a lab experiment that participants who saw a digitally aged image of them chose to allocate more money for their future (i.e., to save more). Alternatives to this with similar results includes interventions that prompt participants to think more vividly in their own future by writing a letter to their future selves. Rutchik et al. (2018) showed that a future-self intervention improved health and exercise behavior.

Another strategy to attack present bias is to use foster goal setting (goals that parents would reach and therefore feel immediately rewarded. See Bandura and Dale, 1981). When goal setting is attached to a commitment, individuals are especially motivated to fulfill their objectives by imposing a psychological cost in case of non-compliance. In the context of parental interventions, the commitment to short-term goals, plus a follow-up with the progress made proved to be very effective (Mayer et al., 2018).

2.4 How to write effective messages?

A package of SMS informed by behavioral sciences should aim at addressing some of the psychological biases presented above (limited attention, limited information processing capabilities and present bias). Parenting interventions applying specific curriculums to home-visits, at health centers or in groups have been successful in improving cognitive and/or language outcomes (Gertler et al, 2014; Chang et.al., 2015). A challenge is how to increase its impact combining the traditional interventions with less-intensive treatment like a package of SMS reminders that could re-direct parents' attention.

Examples of potential alternatives are presented below:

"Tip message". Following York et. al. (2018), a message showing short, simple, and highly specific activities for parents based on a classic parenting curriculum used in home visits or health centers could be effective to reduce cognitive burden. Besides being simple and specific, the message should be **timely** (i.e., the time and day it is sent should be coherent with the content of the message). For example:

Monday 7 PM: *"Hi Maria! Is it time to bathe Martin? Remember what we learned: you can play with him in the tub, point at objects and describe them (the soap, the towel). He will learn new words quicker! Don't let Martin miss the right track!"*

Key points of the message:

- It's concise; it suggests a specific activity. The caregiver just needs to follow instructions.
- It's timely: just at the bathe time.
- It's personalized: referring to "Maria" and "Martin" makes a difference.
- It has a loss aversion framing: "Don't let Martin miss the right track" means that Martin is doing OK and we don't want him to lose the path.
- It tries to highlight the short-term rewards of the activity: learning words quicker. Something tangible, concrete and not so distant in time.

[FUTURE]: Following Hershfield et al. (2011) and Rutchik et al. (2018) an alternative idea is to foster parents to think more vividly in terms of their future and the future of their children. This could be prompted by SMS. Messages that guide parents to envision their future could be a scalable version of the digitally aged image treatment implemented in Hershfield et al. (2011). Examples of potential alternatives are presented below:

"Hi Maria! Thanks for being such a great and caring mother! Martin will have a healthy development and will always be grateful to you. How do you imagine Martin at the age of 10? Which hobbies do you imagine he will have? Close your eyes and try to imagine him as a grown-up kid for a minute!"

Key points of the message:

- It prompts the mother to think of her child at a particular age (when he is 10) doing something in particularly (playing, having a hobby). It is a way of making something abstract (development) more concrete and vivid.
- It reinforces the positive identity of the caregiver ("Thanks for being such a great and caring mother" is a way of saying "you are a caring person, so you should act like that")
- It's encouraging, which is a way of increasing the sense of self-efficacy (i.e.: you can do it).

Parents have a big influence in children's cognitive and non-cognitive development and, even though they want to make decisions and act on the best interest of their kids, they are influenced by biases (limited information processing capabilities, limited attention, and present bias). Interventions in the way of SMS could be successful and low-cost alternatives to attack these biases when done properly. The best way to write these messages is to be concise, timely and as personalized as possible. It's important to highlight short-term rewards, try to bring the future to the present as much as possible, and reinforce positive identity. The type and timing of delivery of SMS should also considering the tension between the "novelty effect" and the forming behavior aspect. There is evidence of a big uptake (i.e. clicking on a link inserted in a SMS) at the beginning of interventions which goes down with time, but the forming behavior aspect will indicate we need to send the SMS regularly at the same time of the day which increases predictability. It's important to remember that there is not a "one size fits all" way to design messages since it depends on the context.

3. Conclusion

Especially in disadvantaged contexts, the decision-making process could be affected by biases (systematic deviations from the core of a standard economic theory), which make human decisions inconsistent with their real intentions. Lab and field experiments show, for example, that many of our decisions are thus affected by contextual factors, inconsistent preferences and non-standard formation of beliefs. In such contexts, insights from behavioral economics have the potential to improve the effectiveness of more traditional interventions.

Understanding how these biases affect the decision-making process in each specific context is crucial to design better strategies to help people overcome them. A growing literature shows that messaging is a useful tool to implement nudges. Simple interventions through SMS or other types of low-cost communications could be very powerful if they are properly designed. In this note we presented some examples for the case of parenting, in which we emphasized the potential biases that potentially affect caregivers (e.g., limited attention, present bias, limited information processing capabilities) and showed how the communication strategy can take them into account.

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