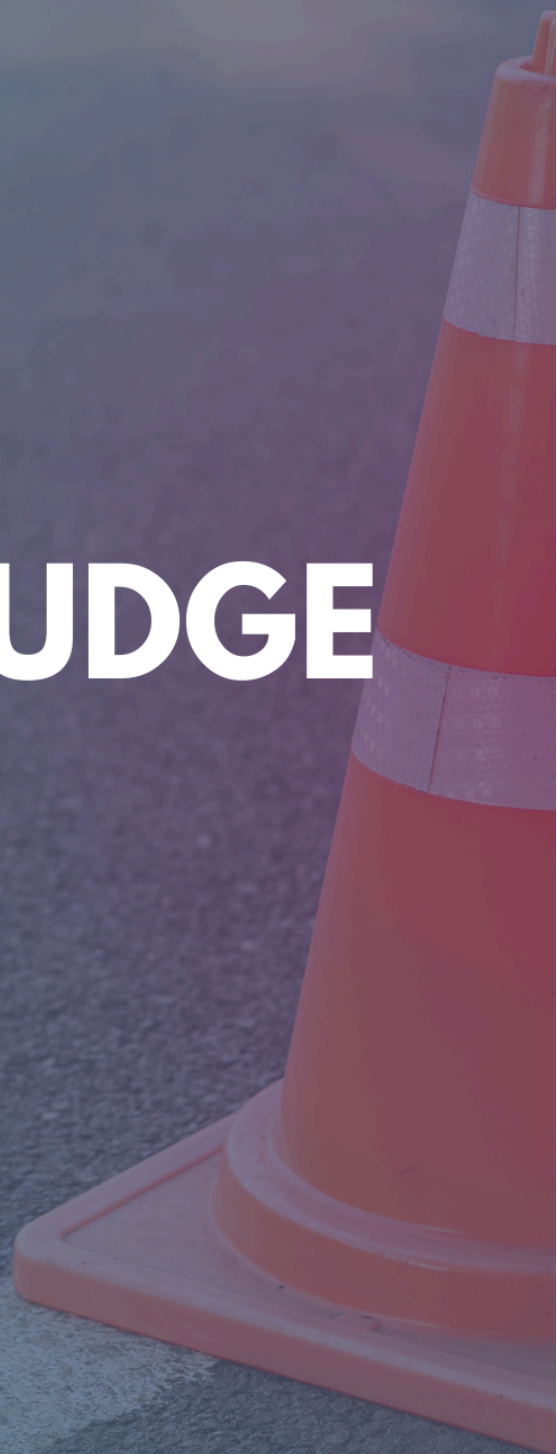


TRAFFIC, FINES AND NUDGE

REDUCING DELINQUENCY



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EXECUTIVE SUMMARY

NudgeRio, at the request of the Rio de Janeiro Traffic Engineering Company (CET-Rio) and the Rio de Janeiro Municipal Transportation Department (SMTR), implemented a nudge intervention to encourage the payment of outstanding traffic fines that are subject to judicial collection, which characterize driver default. The experiment was conducted over 60 days and intervened in the behavior of those responsible for 618,683 independent records (CPFs and CNPJs), of more than 2 million protestable fines, and with pending penalty notices. The target audience was drivers with an email registered on the Carioca Digital platform, who were exposed to stimuli through three different electronic messages, in three different periods, defined as a “reminder” of the debt, the responsibility and the urgency of the need to pay it off under expectation of punishment. Comparing the payment percentage of this group, classified as the treatment group, in relation to the control group, which did not receive the emails, it can be concluded that the intervention was effective.

Keywords: Nudge; experiment; behavioral economics; applied behavioral science; public sector; fines; traffic.

1. INTRODUCTION

The use of Applied Behavioral Science in governments has shown effective results and encouraged better decisions by citizens, preserving freedom of choice and maintaining transparency of information. One of the most widely used tools in this regard is Nudge, a kind of “nudge” that helps reduce actions considered bad based on decision-making processes, thus bringing benefits to individuals and society.

According to the rules of the Brazilian Traffic Code (CTB), the driver is informed of his/her traffic penalties 2 (two) times. The first time is when he/she receives the Notification of Violation, with which he/she can indicate the real driver and present a Defense of the Violation (Preliminary Defense), if he/she disagrees with its application; and the second time, when he/she receives the fine itself, at which time he/she can make the payment by the due date with a 20% discount or file an appeal in the first instance, if he/she does not agree with his/her violation.

Although the fine is due, it is very common for offenders to simply ignore the fine and not pay their debt. Fines that are not paid after five years of being issued are time-barred, and this increases the offender's perception of impunity, which can contribute to recurring behavior.

In this perspective, the Municipal Department of Transport (SMTR) and the Traffic Engineering Company (CET-Rio) joined forces and asked NudgeRio to develop a *nudge* project to encourage defaulting drivers to pay off their debts and, thus, reduce the negative impact of decisions that promote risky pedestrian behavior and, consequently, reestablish the forecast of raising funds for equipment and traffic signs. The project also

had the support of the Municipal Information Technology Company (IPLANRIO) in the operational context stage of the experiment.

This *Nudge* project can still be considered as a pedagogical method, as it encourages the driver to take responsibility for paying the fine issued and also to drive more responsibly.

2. JUSTIFICATION

In the public sector, Applied Behavioral Science has been perceived as an innovative element for public management, especially in the financial and budgetary areas. The existence of the first Nudge unit in Brazilian governments, NudgeRio, demonstrates that, in addition to innovations, there is the possibility of generating benefits for citizens and public servants.

A Nudge project is part of a process that revisits the practice of developing public policies and, thus, rethinking and developing a public service provision that is the translation of a perspective that is not restricted only to the technical capacity of public managers and their experiences, but that these are based on a citizen perspective, based on a reflective process that studies and seeks to understand how the citizen accesses public services based on behavioral aspects and data.

This paper considers methods and tools used in nudge projects. Theoretically, a Nudge is any aspect in the choice architecture that alters people's behavior in a predictable way, without changing their economic incentives, prohibiting choice options, or restricting decision-making freedom. The Traffic, Fines and Nudge – Reducing Default project follows

these principles, preserving drivers' decision-making freedom without altering economic incentives. Stimuli that influence individuals' decision-making process were identified, allowing the creation of approaches to understand the barriers and incentives in defaulters' decision-making model and facilitate payment behavior.

Statistics show that, in the city of Rio de Janeiro, 93% of traffic violations involve fatalities, according to data from CET-Rio. This contributes to the number of approximately 500 deaths per year. In this context, fines can be an important deterrent to curb violent driving. To serve as an educational tool, fines (and their payment) must be mandatory. Drivers and/or vehicle owners must understand that failure to pay them has legal consequences.

Unfortunately, there are many legislative provisions that facilitate non-payment. Some even encourage it, such as: State Law No. 8,269/2018, which establishes that a traffic fine cannot be used as an impediment to obtaining a license; CONTRAN Resolution No. 782/2020, which suspends the sending of notifications since March 20th 2020; CONTRAN Resolution No. 805/2020, which revokes Resolution No. 782/2020 and establishes the deadlines for sending Notices of Assessment to Violators; CONTRAN Ordinance No. 209/2021, which extends the appeal period for an indefinite amount of time.

The annual licensing of vehicles required the vehicle owner to pay off his/her traffic fines. With the suspension of the requirement to pay overdue fines through the enactment of the state law in 2018, the owner is only required to pay off his/her debts when selling the vehicle.

The suspension of the sending of traffic fine notifications for the year 2020, as well as the extension of the appeal period for an indefinite period, were other facts that were detrimental to traffic safety, impacting the revenue that returns as better services provided to the citizen. This is because if the commission of an infraction is not reported to the owner, this fact projects a false reality that there is no inspection and, therefore, becomes an incentive to commit irregularities.

The aforementioned normative acts were detrimental to the municipality mainly because they increase the possibility of drivers' perception of impunity being extended, in addition to the possibility of having created irregular deadlines for paying off debts, which makes them defaulters. This false perception may have led drivers to commit traffic violations, given the "certainty" of impunity due to the fact that they did not receive notifications. The non-obligation to pay off debts related to these penalties for carrying out annual licensing reinforced this mistaken understanding.

Thus, a scenario is created in which the fine received, and due, is ignored or, at the very least, postponed. Which brings us to a new problem: prescription.

Infractions that are more than five years old become time-barred, and this creates a feeling of impunity that resonates with citizens, potentially creating a vicious cycle that encourages non-payment.

Given this information, SMTR and CET-Rio sought out NudgeRio as a way to break this cycle of perceived impunity, through a nudge intervention that would provide defaulting citizens with cognitive stimuli that would be favorable to paying off their debt.

The experiment was conducted among citizens who were in default with traffic fines that had not expired, creating an underlying message that there are consequences for not paying fines. A byproduct of the intervention, which cannot be ignored, is the contribution of resources to the public coffers, especially since the money obtained from traffic violations is a source of funding for maintenance and road safety education actions.

2.1. PROJECT OBJECTIVES

CET-Rio is responsible for, among other things, managing the road and traffic system of the city of Rio de Janeiro; working with traffic operators to ensure the city's mobility; promote traffic education campaigns; implement and maintain vertical, horizontal and traffic light graphic signage on roads, and implement the installation of electronic monitoring equipment.

All these actions aim to comply with the provisions of Law 9503 of 09/23/1997, which instituted the Brazilian Traffic Code, in its article 1, § 2, which establishes that "Traffic, in safe conditions, is a right of all and a duty of the bodies and entities that make up the National Traffic System, and it is up to them, within the scope of their respective powers, to adopt measures designed to ensure this right."

Reducing the number of defaulters also involves reducing the feeling of impunity. The data related to the decrease in the number of defaulters may be evidence of drivers' awareness of their risky behavior, since paying fines may be an act of accepting and agreeing to the infraction. In addition, the amount collected from traffic fines is used to

provide services to the city, which help with signage, road maintenance and measures that reduce the incidence of accidents.

3. METHODOLOGICAL APPROACH

3.1. METHODOLOGY

The applied nature of this study is given by the search for solutions based on the premise of knowledge retention for municipal public administration. The design of the approach was outlined experimental and used qualitative and quantitative data as a resource for reflection on the objectives, questions posed by the researchers, formulated for the purposes of the investigation and analysis of the environmental and operational context for the evaluation of the experiment. Technically, behavioral scientists and public managers observed variables that could influence the experimental subjects, considering the limitations of the information, data made available and management of changes that do not impact the experiment, but that can occur during an experimentation process. In this sense, the delimitation of context, selection of causal mechanisms, treatment and control groups were coordinated, thus ensuring internal and external validity and outlining the experiment.

The Traffic, Fines and Nudges - Reducing Defaults project was divided into phases, which will be described in this report. The possibilities assessed at each phase sometimes overlap, which is considered positive, since at each stage it is possible to verify what the stakeholders consider relevant to the project, and it is also part of a validation process and documentation of evidence to check the path that is being taken.

Therefore, it is possible to create approaches that have a greater chance of effectiveness, increase the possibilities of isolating variables and present questions that can be tested and modeled statistically.

The understanding of the themes that were related to the problem to be addressed was guided by the MIND¹ Methodology and the Behavioral Stimuli Table, objective models for experimental approaches, which guide behavioral scientists in the design and consequent indication of treatment, both created by NudgeRio, based on experimental practice and the needs in the pre-project and project phases.

These methods also describe and define the experimental question, which would be the main issue of the project, with a view to subsequently creating a storyline for publication and the hypotheses that can be measured and tested, which were validated with theoretical and practical approaches and that effectively impact the analysis of the experiment. Concepts from disciplines such as statistics, psychology, behavioral economics, design thinking and strategic marketing were considered, in an integrative and comprehensive modeling, in a transdisciplinary manner. The analytical set presented is based on evidence and experimentation, and has been defined as Applied Behavioral Science.

A methodological design with temporal dimensions was indicated to increase the possibilities of success in the stimuli, with perceptions about sense of urgency and deadline exhaustion, in order to activate a quick

¹ Acronym for **MEIOS** (means), **INCENTIVOS** (incentives), **NUDGE**. M for Meio (means) as in the mean through which the intervention will be carried out, I for incentivos (incentives) as in the incentives that will be exposed to the individuals during the transmission of the intervention, and ND for Nudge, as in the defined stimulus characterized as such. Technically, this approach is context-driven, increasing the likelihood of encouraging a specific desired behavior to be promoted, which presents clear benefits to citizens. In this case, for example, it helps reduce delinquency and avoid punitive measures.

decision-making process of the driver and present an effect associated with non-extension of decision-making, over the full 60 days, to make payment. The notion of scarcity was also activated by this methodological design, which was stimulated prominently, close to the deadline of the 2-month period.

The experiment approach was based on a choice architecture design considering three periods of incentives via email via text message, key message banners and payment deadline rule, divided into two phases.

The first phase consisted of two systematic shipments over five days, with three working days and one weekend.

The second phase was sent systematically, with less than a month to go until the final payment deadline, considering three business days and no weekends.

Table 1: Representative Scheme

FASE	ID	DATA DO ENVIO	DIAS PARA PAGAR	DIFERENÇA DIAS APÓS ENVIO ANTERIOR	TRATAMENTO MULTAS PAGAS	CONTROLE MULTAS PAGAS
FASE 1	ENVIO 1	24 A 28 DE JUNHO	60 DIAS CORRIDOS	-	10.007*	3.286*
	ENVIO 2	7 A 11 DE JULHO	48 DIAS CORRIDOS	10 DIAS ÚTEIS	15.947**	5.175**
FASE 2	ENVIO 3	2 E 3 DE AGOSTO	20 DIAS CORRIDOS	-	16.383***	5.080***

* Pagas entre 24/06 e 8/07

** Pagas entre 9/07 e 01/08

*** Pagas entre 02/08 e 22/08

3.2. DEFINING THE PROBLEM

The pre-project phase included some contextual analyses, such as bibliographic research to identify data and literature on the project theme or related topics, mapping of secondary data with participating agencies, meetings with public managers for alignments and, finally, identification of the key problem.

The first action assessed involved registering drivers in default with the Municipal Attorney General's Office (PGM). However, due to legal costs, only fines over R\$1,500.00 would be covered. According to this agency, this measure has already been used in other projects without significant success, due to legal costs. This would be an alternative punishment, since it could put a certain group of defaulters at risk of having their debt protested – with credit restrictions with financial institutions – and/or being subject to a tax enforcement lawsuit.

Another consideration was based on the understanding of the strategy of registering defaulters in notary offices and protesting them, as a possible punishment. This understanding tends to create a false idea on the part of individuals that it is difficult to access credit with financial institutions. This alternative is limited to offenders residing in the State of Rio de Janeiro who have committed penalties in the last year, according to an agreement between the SMTR and the notary offices. In this sense, it would leave out a large group of defaulters.

A new possibility would be the registration of the defaulter in credit restriction services by existing private institutions. This strategy would

require time to prepare a bid for contracting this type of service. However, the expectation of punishment was maintained, as there would be the possibility of this alternative being implemented during the project.

After reflecting on the experimental subject, the possibilities of guidance on information that creates expectations of punishment, in addition to the robust literature available that shows success rates in default experiments and NudgeRio's vast experience in these cases, it was decided to carry out a nudge experiment to reduce driver defaults through sending text messages.

In May 2021, a Nudge project was decided upon, based on the registration of defaulters on the Carioca Digital Platform to encourage payment during a certain period, while this group, together with the PGM, developed punishment mechanisms to recover these debts. These defaulters represented approximately 15% of the total number of debtors who made up the group of offending drivers eligible for protest.

After alignment with the competent authorities, it was defined the need to initiate procedures to recover traffic fines, due to several factors, such as: alerting drivers of their risky behavior as a way of reducing the perception of road insecurity, communicating citizens' existing debts with the City Hall and undertaking efforts to recover fines debts to invest in road safety equipment.

In order to encourage payment from defaulting drivers, NudgeRio created messages that influenced the decision-making process to encourage payment of fines associated with traffic penalty notifications. If delinquent drivers receive incentives via email, will they pay late fines and those whose appeal deadlines have expired?

After the necessary discussion about some limitations, it was decided to carry out a campaign, through text messages, to reduce the defaulting of offending drivers who had registered emails in the Carioca Digital system. These drivers would receive incentives through electronic correspondence, in a total of three messages that, together, would form a narrative with social and temporal dimensions in order to maximize adherence by Rio de Janeiro drivers in defaulting.

Some communications were published on the City Hall website publicly informing about the campaign and the sending of messages, in accordance with the premise of transparency in a nudge project, so that people could also confirm the veracity, in case of doubt. This communication began on the day of the first sending. The sending was carried out by IPLANRio.



**RECEBEU E-MAILS SOBRE
MULTAS DE TRÂNSITO?**

▶ [Clique aqui e entenda como quitar seus débitos](#)

Source: Rio de Janeiro City Hall



Source: Rio de Janeiro City Hall

3.3. ANALYZING THE CONTEXT

3.3.1. GOVERNMENTAL STRATEGIC DIMENSIONS

The City of Rio de Janeiro, as an agency belonging to the National Traffic System, has powers to regulate traffic on the roads under its jurisdiction. Federal Law No. 9,503/97, which institutes the Brazilian Traffic Code, establishes that the planning, regulation and operation of vehicle and pedestrian traffic is the responsibility of municipalities.

In carrying out this activity, municipalities act in traffic control through the application of administrative measures and penalties resulting from infractions committed regarding stopping, circulation and irregular parking.

Municipalities must provide structures to act on traffic, developing traffic engineering, inspection, education and statistics programs.

The traffic fine, as an educational and coercive instrument, is the procedure defined by the Brazilian Traffic Code to implement this regulation. Art. 320 of the Brazilian Traffic Code – CTB defines that: “The revenue collected from the collection of traffic fines will be applied exclusively to signage, traffic engineering, field work, policing, inspection and traffic education”.

This revenue represents an important portion of the city's revenue, as it is used to improve road safety and other purposes directly linked to traffic.

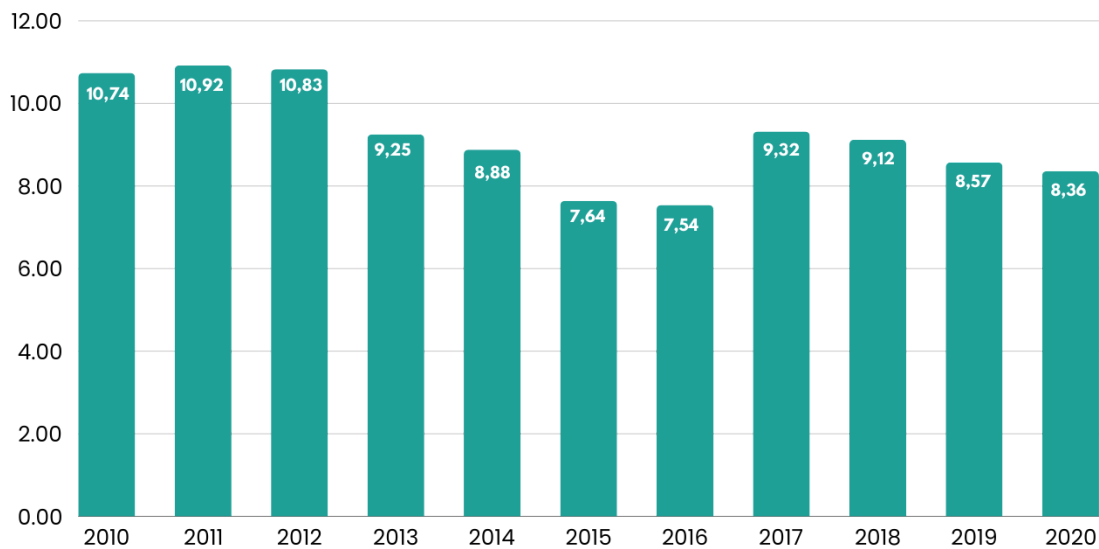
3.3.2. ENVIRONMENTAL CONTEXT

One of the first measures was to diagnose traffic accidents and infractions committed in the city to understand contextual references regarding the problem we want to address with the experiment. In relation to accidents with fatal victims, a worsening of the indicators was identified in recent years.

Graph 1: Fatal accident rate in the city of Rio de Janeiro

TAXA DE ACIDENTES COM VÍTIMAS FATAIS

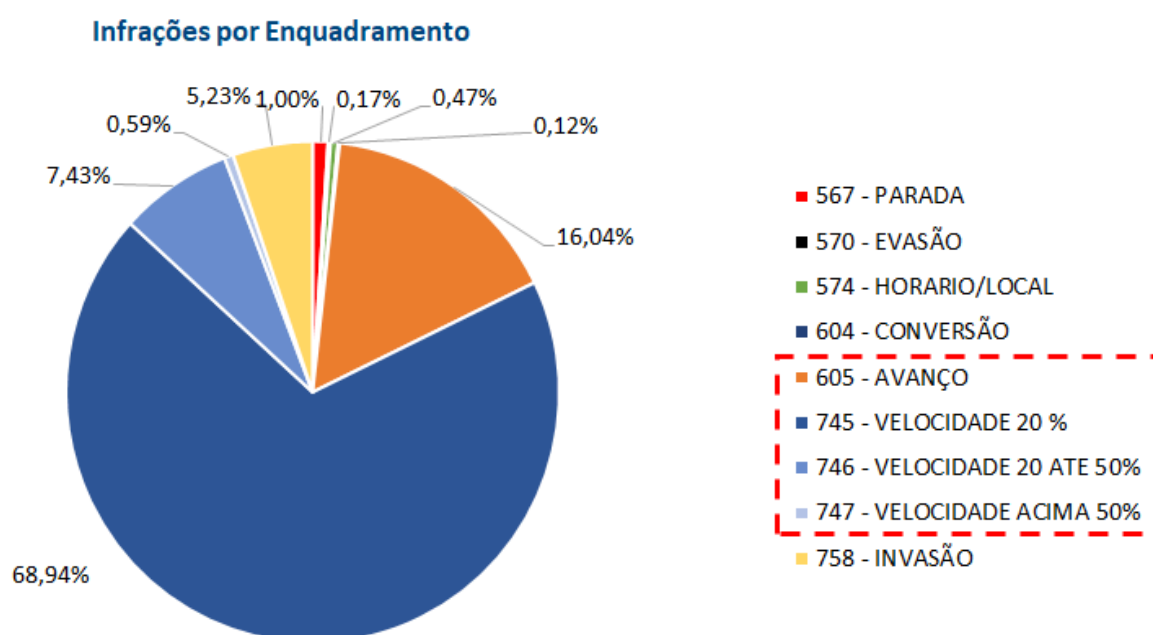
Quantidade de acidentes com vítimas fatais no trânsito a cada 100 mil veículos na cidade



Source: CET-Rio, 2021.

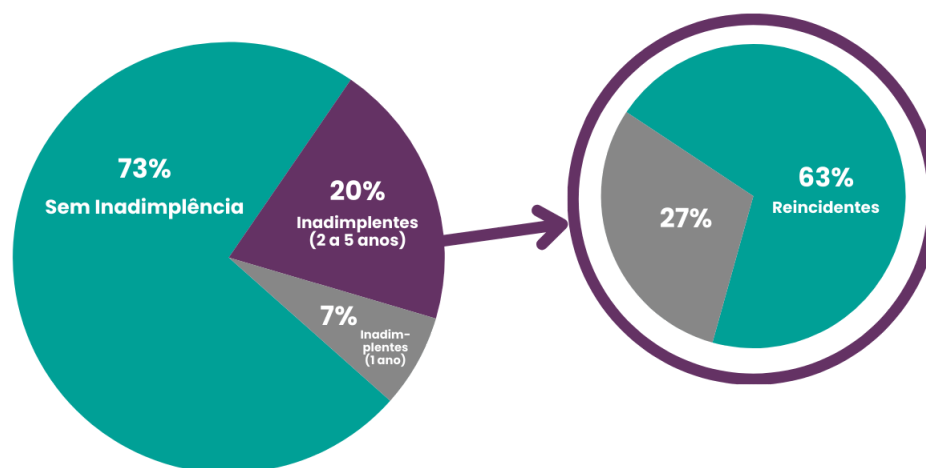
The subsequent analysis was carried out in relation to the number and type of traffic violations, with a focus on those who were in default. It was identified that 93% were related to running red lights and speeding, violations that directly threaten life.

Graph 2: Infractions by Classification (type of infraction)



A third analysis focused on the relationship between offenders and drivers in the city. Of a fleet of 2.2 million vehicles in circulation on weekdays, 7% have some unpaid infraction for up to a year and 20% for between 2 and 5 years. Of these, 63% are repeat offenders. This highlights the need to seek some initiative that could encourage defaulters to pay off their debts and notice their traffic penalties, in order to avoid them.

Graph 3: Percentage distribution of defaulting plates

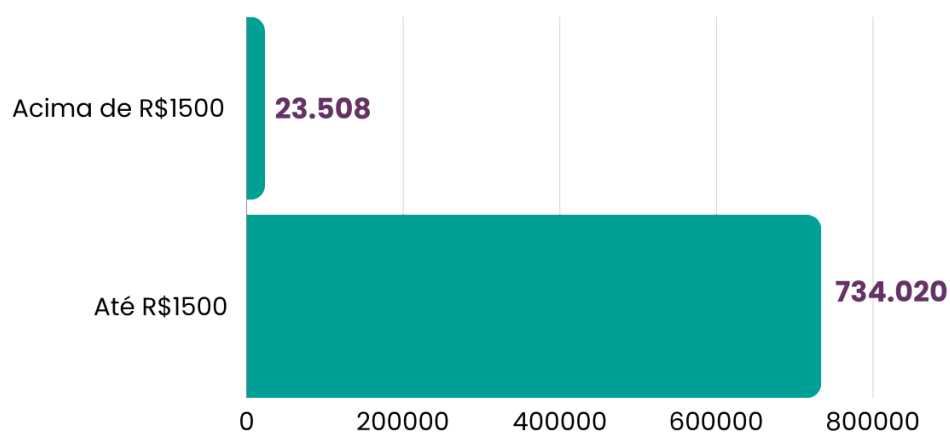


Source: CET-Rio, 2021

In addition, we sought to identify the amounts of unpaid fines, the number of defaulters and the total amount owed to the Municipality. An estimate of approximately R\$300 million was reached, considering only electronic monitoring.

Graph 4: Fine Values by CPF

VALORES ACUMULADO DAS MULTAS POR CPF



Source: CET-Rio

Based on this diagnosis, the need to approach defaulters was reinforced. One of the strategies formulated was to approach defaulters who were registered on the Carioca Digital Platform, since this would be the alternative without issuing fees. It was identified that 15% of defaulters were registered on this platform, totaling 126 thousand registered drivers.

3.3.3. BEHAVIORAL PRINCIPLES

NudgeRio always seeks to develop experiments as an executive project so that processes can be documented and assist in the creation and definition of criteria for choosing one experiment over another, based on what we call the operational context, which is nothing more than the analysis of the capacity of the parties involved in carrying out the experiment and also the technical evaluation to receive the data that will be extracted as the intervention is executed. In this section, we reflected on the specific conceptual model, in which categories and relationships were created to understand the gap between an individual's action and intention.

For behavioral scientists, it is of utmost importance that there are tools that can be used to create nudge classification models, which include, for example, emotional, cognitive and social biases and the dual model of thinking, System 1 or System 2. Another relevant aspect is that this conclusion also considers the execution capacity and restrictions of the project, measurement and experimentation, whether the use of information is clear, the decision structure and what can help the

experimental subject decide to change his/her behavior for his/her benefit and that of society.

The definition of the experimental subjects, associated with the experimental limitations, made possible treatments eligible for this public in the context studied, and also highlighted the relevance of an approach that combined a strategy of emotional stimuli, based on such subjects, and thus activated a fear of undesirable behavior. In this phase of the project, it was defined that the intervention would be the sending of messages to the drivers responsible for the cars registered in the Carioca Digital database, through e-mail transmission. From then on, it was evaluated how the e-mails could be forwarded and, then, the study was carried out and indicated the possible frameworks and emphases, behavioral effects that could be effective in the context of the intervention, function of the intervention, bias, dimension of action in government strategy and the expected conduct from the treatment.

In the present study, emotion is considered an important factor in making choices and our approach was configured based on the expectation that these emotional stimuli, activated by a sense of urgency, result in the operational behavioral practice of paying the fine, encouraged in the decision architecture. The intervention prioritized a combined strategy of stimuli, with positive and negative emphasis, so that emotional biases were activated when sending messages to the experimental subjects. The messages would be sent considering also temporal dimensions as stimuli, based on visual data about the idea of deadline and scarcity of time and is constituted as a function (functional relationship) in the text written in the E-mail.

The present experiment, however, did not aim to measure the difference between the distinct periods that each defaulter presents for requesting debt recourse, nor the difference between defaulters with more or less time of default, the criterion for the base being only having tried all the recourses or having expired the deadlines for applying them.

The behavioral principles were categorized, as can be seen below, a descriptive analytical process allows us to understand how the behavioral effect can produce the appropriate stimulus for behavior change:

- **Governmental Strategic Dimension:** Scope of action of the experiment for the Municipal Department of Transport and the Traffic Engineering Company of RJ (CET-Rio), considering their strategic guidelines for the current public agendas of raising awareness about risky driver behavior and road safety, the vision of public managers responsible for the topic in the two municipal bodies and the implementation of actions, projects and public policies.
- **Behavioral Effect:** Identification and description of behavioral effects, environmental aspects and behavioral functions, acting in the context of the experimental approach.
- **Behavioral Model:** Framework for understanding behavior.
- **Behavioral stimuli:** Behavioral stimuli activated by the treatment to increase the possibilities of enhancing some behavioral effect and encouraging the behavior of interest that will be expressed in the expected conduct.

- **Behavior to be changed:** Identification and prediction of current behavior patterns that do not benefit the experimental subject in the decision-making process for the expected behavior.
- **Expected behavior:** Expected operational behavior with treatment.
- **Biases:** Mapping the biases involved in decision making.
- **Heuristics:** Mental shortcuts activated by the treatment to increase the possibilities of achieving and/or enhancing some behavioral effect and encourage the behavior that will be presented in the expected conduct.
- **Intervention Function:** Decision architecture strategies.
- **Intervention:** Type of treatment.
- **Message Format:** Type of communication for the expected decision-making, mapped in the functional analysis of behavior.
- **Emphasis:** Framing Type and Valence – Positive and Negative.

Through these steps, it was possible to robustly evaluate the behavioral principles, considering the limitations of experiments of this nature and qualify a design for the intervention and a decision architecture for the context.

3.3.4. BEHAVIORAL CONCEPTS

In this work we use some of the concepts of Behavioral Economics, known as the area of study that performs economic analyses with concepts from psychology observed in experiments. Below is a brief description of the concepts of behavioral science that we use in this work.

HEURÍSTICAS E VIESES

As heurísticas são definidas como atalhos cognitivos ou regras práticas para simplificar decisões. São até chamadas de “regras de bolso” do comportamento. E, na prática, elas representam um processo de substituir reflexões, apontamentos ou questões difíceis por outras mais fáceis.

Nós as utilizamos para julgarmos decisões que envolvem incerteza. E elas, na verdade, nos ajudam muito em nossas rotinas. Pois, com elas, conseguimos reduzir o tempo e o esforço para fazermos julgamentos. Então, as heurísticas reduzem a complexidade das tarefas de escolha.

Esses “atalhos mentais” que tomamos para fazer escolhas simplificam a nossa tomada de decisão. Assim, apesar de serem muito úteis, podem nos levar a respostas imperfeitas, que, quando sistemáticas, chamamos de vieses.

Ou seja, um viés é o que ocorre quando o nosso julgamento se desvia repetidamente do que seria considerado desejável. Ele é caracterizado, entre outras coisas, por acontecer de forma repetitiva e até previsível em circunstâncias particulares.

MODELO DUAL DE PENSAMENTO (SISTEMA 1 OU SISTEMA 2)

Em muitos momentos buscamos soluções intuitivas e fracassamos. Nesses casos, muitas vezes acabamos tendo que parar para refletir sobre a questão a fim de solucioná-la. Nesse momento entramos numa forma de pensar mais lenta, mais concentrada e trabalhosa.

O clássico livro “Rápido e Devagar” de Daniel Kahneman popularizou esses momentos ou tipos de pensamento como Sistema 1 e Sistema 2, que produzem respectivamente o pensamento rápido (intuitivo) e o lento (reflexivo). Assim, o Sistema 1 opera automática e rapidamente, com pouco ou nenhum esforço. E o Sistema 2 aloca atenção às atividades mentais complexas (como cálculos grandes, por exemplo).

DEFAULT (OPÇÃO PADRÃO)

Muitas pessoas tomarão qualquer opção que exigir o mínimo de esforço, ou o caminho de menor resistência. Para uma dada escolha, se houver uma opção padrão – uma opção que será obtida se o tomador de decisão não fizer nada – podemos esperar que um grande número de pessoas acabe nessa opção, seja ou não bom para elas. E essa tendência comportamental que temos para não fazer nada é reforçada se a opção padrão vier com alguma sugestão de que ela representa o curso de ação normal ou até mesmo recomendado.

Se as pessoas forem automaticamente inscritas nos planos de aposentadoria, suas economias podem aumentar significativamente. A inscrição automática em planos de saúde ou em programas destinados a melhorar a saúde pode ter efeitos significativos. Opções padrão podem até promover a proteção ambiental. Em impressoras, por exemplo, a escolha de imprimir frente e verso no papel já vem pré-selecionada.

VIÉS DO PRESENTE E DESCONTO INTERTEMPORAL

O viés do presente também é conhecido como desconto intertemporal, e refere-se à tendência de dar um peso maior a recompensas que estão mais próximas do tempo presente. Então, os eventos do presente recebem pesos maiores do que os eventos do futuro. Ele pode ser explicado pela impulsividade e pela inclinação da gratificação imediata.

VIÉS DO STATUS QUO E INÉRCIA

O efeito de status quo é a preferência que cada um de nós tem por manter o estado atual, mesmo que uma alteração nesse estado proporcione uma melhora no seu bem-estar. Isso pode acontecer inclusive quando os custos de mudar a opção são pequenos.

Isso acontece porque existe uma aversão ao risco em potencial que atribuímos a uma nova situação. Na prática, isso faz com que as pessoas, muitas vezes, escolham opções que não mudam sua situação atual, mesmo quando muitas outras escolhas estão disponíveis, o que deixa seu comportamento na inércia.

DISPONIBILIDADE DA INFORMAÇÃO

A disponibilidade é definida como o processo de julgar a possibilidade de um evento acontecer segundo a facilidade com que as ocorrências desse evento estão “disponíveis” na nossa memória. A lembrança de um acontecimento afeta nossas escolhas mesmo sem que percebamos.

Assim, quando somos confrontados com um problema, nosso mecanismo do pensamento intuitivo tenta resolver da forma mais eficiente possível.

É importante salientar que, se o indivíduo possui uma especialização relevante sobre a questão envolvendo aquela escolha, ele tem mais chance de reconhecer a situação e provavelmente tomar a decisão correta. Mas quando a questão é difícil ou desconhecida, respondemos com base na intuição, ou seja, com base em nossas heurísticas e vieses.

AUTORIDADE

O indivíduo ou instituição que envia a informação ou mensagem tem implicação na força com que a mensagem é assimilada. A efetividade das intervenções aumenta quando os locutores são aqueles que detêm autoridade ou legitimidade sobre o assunto. O mesmo pode ocorrer quando o locutor é ligado à área geográfica ou possui condição socioeconômica similar à dos receptores.

FACILIDADE E SIMPLICIDADE

Existe uma tendência a selecionarmos a escolha que se apresenta mais fácil e, portanto, se o objetivo é incentivar determinado comportamento, reduzir várias barreiras – incluindo o tempo necessário para entender o que fazer – muitas vezes é útil.

A resistência à mudança é frequentemente um produto não de desacordo ou de ceticismo, mas de dificuldade percebida – ou de ambiguidade. Um ponto suplementar: se a escolha fácil também é divertida, as pessoas são mais propensas a fazê-la.

A complexidade pode ser um problema sério. Muitos programas podem falhar, ou conseguir menos beneficiados do que poderiam, devido à complexidade indevida. Como regra geral, a comunicação deve ser de simples navegação e até mesmo intuitiva.

3.3.5. INDICATING TREATMENT

The indication of treatments is the result of the validation of the entire process mentioned in the previous stages and the understanding of the behavioral principles acting in the context studied. Furthermore, this stage is the one that defines how the experimental phase of the project (trial), the treatment groups, the frequency of interventions and the way of approaching the experimental subject will be.

The hypothesis to be tested is the statement: *“Email messages with strategies for combining behavioral stimuli reduce the default of drivers in Rio de Janeiro”*. To test it, the recommended measure was to encourage drivers with risky behavior and defaulters to join the campaign to pay fines, regardless of the amount.

The experimental subjects were profiles of drivers with up to five years of debt, who had also tried all the resources to cancel the infractions or who had expired the deadlines for this attempt.

For the purposes of statistical analysis of the experiment, the dependent variables are:

- reduction in defaulting by monitoring the payment of fines by defaulting drivers, registered on the Carioca Digital electronic portal, who paid their overdue fines, even at different times during the experiment;
- and the increase in the collection rate based on a strategy of combining emotional stimuli for the decision-making process of whether or not to pay the debt due.

The independent variable can be defined as the experimental treatments, namely: sending text messages via email with a banner with time frames highlighting the campaign deadline. The messages are arranged in item 5, “Intervention”.

4. SAMPLING

A Nudge project, designed by NudgeRio, works with a controlled randomized experiment, where part of the population is randomly selected to receive the stimulus and another part functions as a control group. This allows the quantification of results and a better assessment of the effectiveness of the nudge.

The peculiarity of this project led us down another path. We have a universe of protestable fines totaling 2,625,455 violations. Each of them is linked to a CPF (vehicle registered in the name of an individual) or a CNPJ (vehicle registered in the name of a legal entity). This is the first set of data.

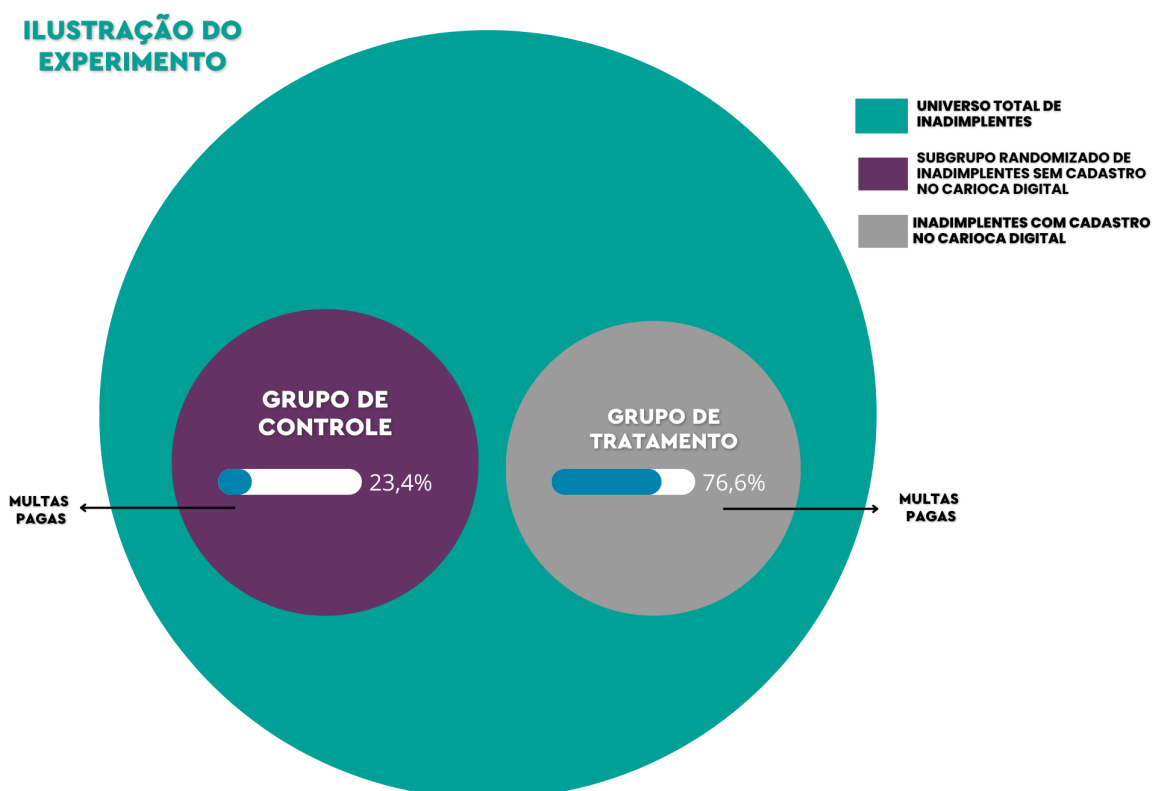
The second dataset is composed of citizens registered on the Carioca Digital platform. Among the many pieces of information required for this registration is the CPF. Thus, a cross-referencing of this registry with the total set of protestable fines returned a total of 588,482 fines. In short: these fines were linked to e-mails registered on Carioca Digital. This was our treatment group, our target.

A third set of data was provided to us on a regular basis: fine payments. It is important to note that not all fines paid were protestable, so a new data cross-check was necessary. Within the set of fines paid, a

subset of protestable fines was identified, and within this subset there was a natural division between the control group and the treatment group.

In summary: three databases with different origins were crossed: protestable fines, Carioca Digital registrations and paid fines, generating two new sets: protestable fines paid by Carioca Digital registrants (part of the treatment group) and protestable fines paid by non-Carioca Digital registrants (part of the control group). And each of these subsets can be further subdivided into individuals and legal entities, something relevant for planning future actions based on the effectiveness of the suggested intervention. A differentiated message can be designed for individuals and legal entities.

Figure 1: Intersections between data blocks



Prepared by the NudgeRio team

For statistical analysis (presented in section 6, “Data Analysis and Results”), the group of data scientists at NudgeRio randomly generated a subgroup composed of 588,482 infractions that could be protested without registered emails on Carioca Digital. In other words, we randomly created a control group with the exact size of the treatment group. This makes it easier to compare the two groups. In the presentation of the results, the term “Control Group” refers to this reduced universe.

5. INTERVENTION

The Traffic, Fines and Nudge - Reducing Default project was developed in two stages: identification of barriers to the decision-making process and indication of message patterns that could encourage operational payment behavior of citizens/drivers based on behavioral influence and stimulus strategies.

Alignment meetings were held in the pre-project phase, designing an approach considering the operational context, which observes the limitations related to the nudge implementation and execution process and data integrity.

The identification of qualitative barriers was divided into four dimensions: environmental, informational, emotional and behavioral. These barriers acting on the decision-making process of citizens/drivers demonstrated the presence of a narrative or common sense related to the idea of the "Ticket Industry" (figures below).

Figure 2: Examples of media about the "fine industry".



Source: G1

CORREIO DO POVO ASSINE ENTRAR

FEIRA DO LIVRO CORONAVÍRUS VACINA BRASILEIRÃO

JUREMIR MACHADO DA SILVA

Indústria da multa, uma ficção brasileira
 Governo que aumentar a impunidade no trânsito
 17/04/2019 | 8:08

GAZETA DO POVO
 Segunda-feira, 08 de Novembro de 2021.

Rodovias

Briga de Bolsonaro com a Justiça por radares levanta a discussão: existe indústria da multa?

Por Camila Abrão, com agências 11/04/2019 14:00

Source: Correio do Povo

Jusbrasil Todos Pesquisar no Jusbrasil

Para você Consulta Processual Jurisprudência Doutrina **Artigos** Notícias Diários Oficiais Peças Modelos Legislação

Detran Carteira de Habilitação Multa por Infração de Trânsito

Indústria da multa: ela existe?
 Inúmeras pessoas já relataram supostas indústrias da multa que trabalham com essa forma de arrecadação.

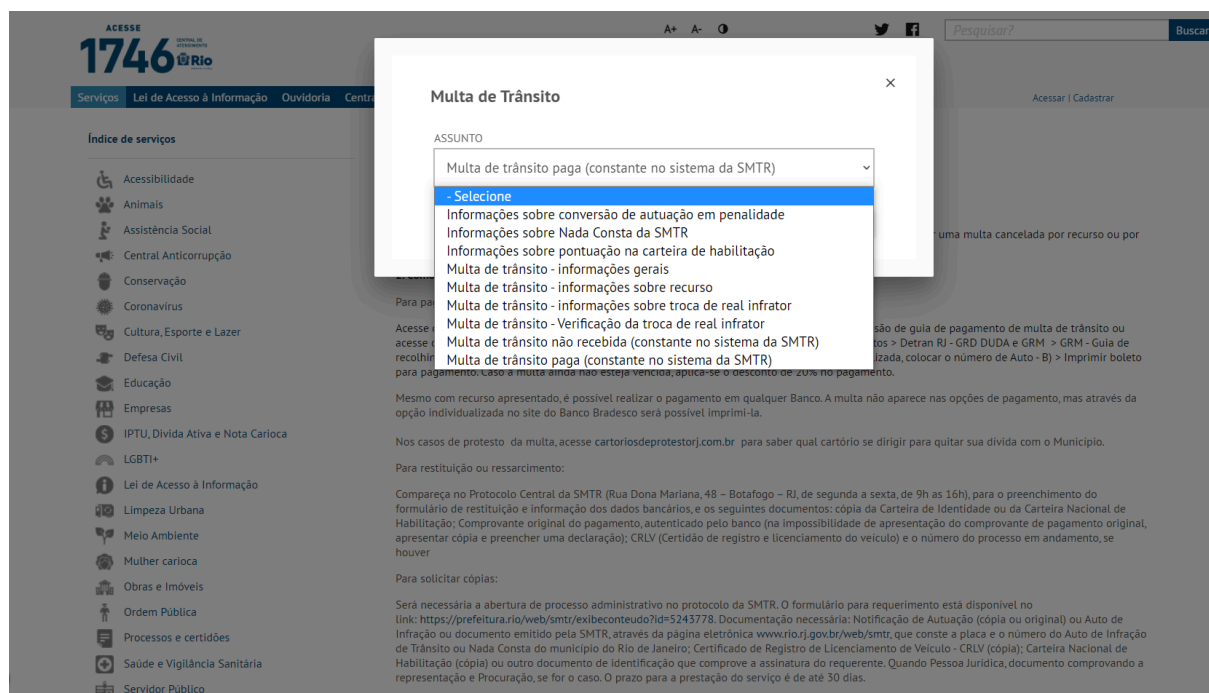
8 COMENTAR | 7 SALVAR

Source: Jusbrasil

Environmental barriers are the aspects, at a macroeconomic and social level, that act in the context of the citizen/driver. Informational

barriers are the signaling of access and search formats for information available to the individual, such as news, decrees, websites and the 1746 portal (figure 3). Emotional barriers are the emotions associated with informational and environmental barriers. Behavioral barriers are the issues that can prevent the citizen/driver from paying the debts resulting from the traffic penalty notification. All barriers are qualitative and evaluated from the perspective of their impact on the individual's decision-making process, considering the MIND Methodology, by NudgeRio, which returned behavioral insights resulting from the previous analytical process to serve as a basis for structuring messages sent to defaulters, originating from the cross-referencing of the CET-Rio/SMTR and Carioca Digital/City of Rio databases.

Figure 3: Possibility of searching for information on the 1746 portal

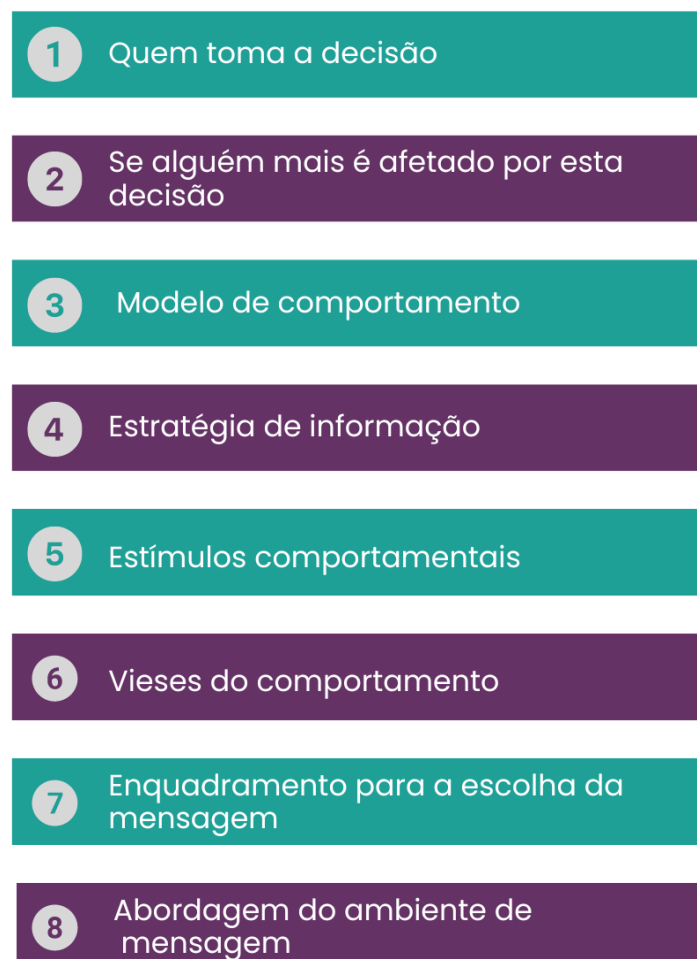


Source: Rio 1746 Portal

The indication of textual messages is the result of the methodological basis of behavioral effects, which we call the Behavioral Stimuli Table, that is, a reflective line of what will make the citizen/driver pay and the expected payment behavior, based on the analysis and input of contextual, behavioral information and implicit biases.

The methodology is procedural and theoretical and framed according to Figure 4.

Figure 4: Steps for Decision Making and Behavioral Analysis



Prepared by the NudgeRio Team.

The result is a set of information, qualified as behavioral insights, which increase the chances of success in paying Traffic Penalty Notices. This project presents behavioral insights as a method to motivate the decision-making process and increase the socioeconomic benefits of drivers who have traffic penalty notices, with up to five years of default and appeals processed.

The temporality of defaults characterizes debts, qualified as indicators, which make it possible to register associated defaulters through the Individual Taxpayer Registry (CPF) in credit protection services (SPC), active debt and/or its protest. The theoretical and methodological framework that outlined the work took concepts from Applied Behavioral Science as a reference and was developed by the NudgeRio unit.

Based on qualified behavioral insights, a combinatorial approach to stimulus and communication strategies was developed:

- Persuasion stimuli with induction of positive and negative feelings.
- Creation of expectations of punishment or cost, associated with the temporal dimension in the decision-making process identified as default and intertemporal discount for sending emails to defaulters.

Table 2: Behavioral Strategies to Encourage Payment of Late Fines

DIMENSÃO	EFEITO COMPORTAMENTAL	ESTRATÉGIA DE ATIVAÇÃO DE ESTÍMULOS	VIÉS	CONDUTA ESPERADA
OPORTUNIDADE	Aversão a Perda, aversão ao arrependimento, compromisso, saliência, facilidade, autoridade.	<p>Incentivo: criação de estratégia de recompensa ao se dar a oportunidade de mais prazo para não ser punido como é possível atualmente.</p> <p>Persuasão: Combinação e indução de sentimentos positivos e negativos para estimular a ação.</p> <p>coerção: Criação de expectativa de punição.</p> <p>Ênfase: Culpabilização e responsabilização.</p>	Procrastinação, viés do status quo, viés do presente, inércia, disponibilidade da informação, desconto intertemporal.	Inadimplentes realizarem o pagamento de suas multas em atraso.

Source: NudgeRio.

- Use of communication to induce feelings of urgency, which trigger operational behavior: pay the due fine;
- Combination of positive and negative stimuli, through the creation of expectations of punishment associated with the opportunity to avoid the punishment presented as possible due to the driver's current default condition;
- Reinforcement of information about your conduct and why you are in this condition, qualifying your attitude as risky and activating a sense of guilt

- Reducing emotional barriers by making it easier to resolve the situation, encouraging the opportunity to commit to a goal in advance and avoid damaging one's reputation. People fear discovering in the future that their decision was wrong. Therefore, encouraging assertive behavior by using a positive message, associated with the indication of a feeling of risk, such as fear and loss, can be useful.

Below are graphic examples of the messages, with the appropriate stimuli highlighted.

Figure 5: Correspondence sent by email, with appropriate contextual explanations



Prepared by the NudgeRio Team

PRIMEIRO ENVIO



Contribuinte Fulano de Tal, você tem as seguintes notificações de penalidade de trânsito associadas ao seu CPF: **BXXXXXXXXX**, **BXXXXXXXXX**, **BXXXXXXXXX**, **BXXXXXXXXX** e **BXXXXXXXXX**.

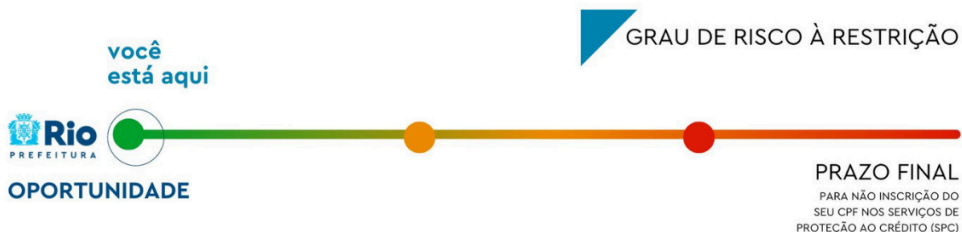
A Prefeitura do Rio tem uma oportunidade especial para a sua regularização: 60 dias de prazo!

É URGENTE que regularize o seu débito. **Você está apto a ser inscrito nos serviços de proteção ao crédito.**

Pague até **23 de Agosto**, fique em dia com as suas obrigações e impeça a inscrição do seu CPF em serviços de proteção ao crédito (SPC), dívida ativa e/ou protesto da sua dívida.

Acesse aqui o link para pagamento das notificações:
<https://www.ib7.bradesco.com.br/ibpfdetranrj/debitoVeiculoRJGrmConsultar.do>

Não corra mais risco de restrições com o seu nome, pague os boletos.



As notificações de penalidade de trânsito identificam o comportamento arriscado do motorista e têm a função de educar para dirigir de acordo com as regras de trânsito.

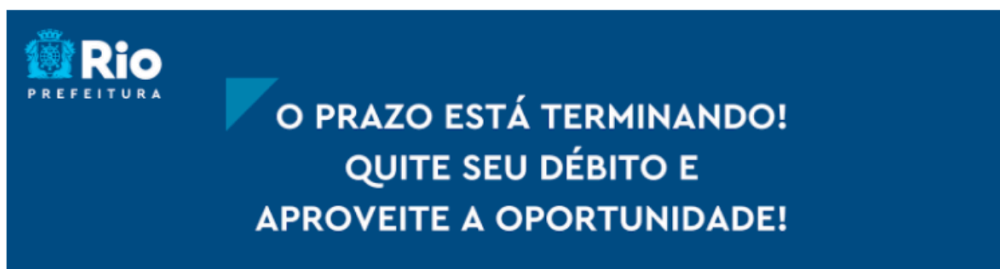
Para consultar seus autos de infração clique aqui:
<http://www0.rio.rj.gov.br/multas/>

Atenciosamente,

Daniel Bucar
Procurador Geral do Município

Obs: Se já pagou, desconsidere. Dúvidas? Acesse www.1746.rio e clique em "trânsito"

SEGUNDO ENVIO



Contribuinte Fulano de Tal,

É URGENTE que regularize o seu débito. **Você está apto a ser inscrito nos serviços de proteção ao crédito.**

As seguintes notificações de penalidade de trânsito associadas ao seu CPF: **BXXXXXXXXX, BXXXXXXXXX, BXXXXXXXXX, BXXXXXXXXX e BXXXXXXXXX.**

Pague até **23 de Agosto**, fique em dia com as suas obrigações e impeça a inscrição do seu CPF em serviços de proteção ao crédito (SPC), dívida ativa e/ou protesto da sua dívida.

A maioria dos cariocas está aproveitando a oportunidade especial de regularização e evitando a inscrição nos serviços de proteção ao crédito.



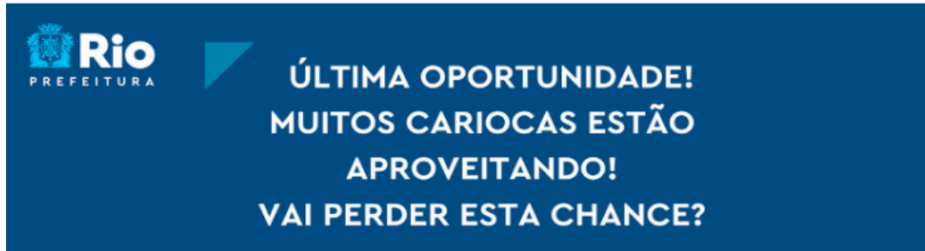
Acesse o link para pagamento das notificações de penalidade de trânsito associadas ao seu CPF:
<https://www.ib7.bradesco.com.br/ibpfdetrarj/debitoVeiculoRJGrmConsultar.do>

Não corra mais risco de restrições com o seu nome, pague os boletos. As notificações de penalidade de trânsito são emitidas quando é praticado comportamento arriscado por motoristas e têm a função de educar para dirigir de acordo com as regras de trânsito.

Atenciosamente,

Daniel Bucar
Procurador Geral do Município

TERCEIRO ENVIO



Contribuinte Fulano de Tal,

É URGENTE que regularize o seu débito. O seu grau de risco à restrição está aumentando e o prazo está terminando. **Você está apto a ser inscrito nos serviços de proteção ao crédito.**

As seguintes notificações de penalidade de trânsito associadas ao seu CPF: **BXXXXXXXXX, BXXXXXXXXX, BXXXXXXXXX, BXXXXXXXXX e BXXXXXXXXX.**

Pague até **23 de Agosto**, fique em dia com as suas obrigações e impeça a inscrição do seu CPF em serviços de proteção ao crédito (SPC), dívida ativa e/ou protesto da sua dívida.

A campanha de regularização está um sucesso, 3x mais cariocas estão aproveitando essa oportunidade especial e evitando a inscrição nos serviços de proteção ao crédito. **Vai perder esta chance?**

Acesse o link para pagamento das notificações de penalidade de trânsito associadas ao seu CPF:
<https://www.ib7.bradesco.com.br/ibpfdetranrj/debitoVeiculoRJGrmConsultar.do>

Não corra mais risco de restrições com o seu nome, pague os boletos. As notificações de penalidade de trânsito são emitidas quando é praticado comportamento arriscado por motoristas e têm a função de educar para dirigir de acordo com as regras de trânsito.



Atenciosamente,

Daniel Bucar
Procurador Geral do Município

Se já pagou, desconsidere. Dúvidas? Acesse www.1746.rio e clique em "trânsito".
Para consultar seus autos de infração acesse: <http://www0.rio.rj.gov.br/multas/>

6. DATA ANALYSIS AND RESULTS

The numbers to be analyzed and compared between the Treatment Group and the Control Group are the percentages of payers. Over the course of the sixty days given to defaulters to pay off their debts, a daily control was carried out, a tally of the protestable fines paid (and duly separated between the Control Group and the Treatment Group).

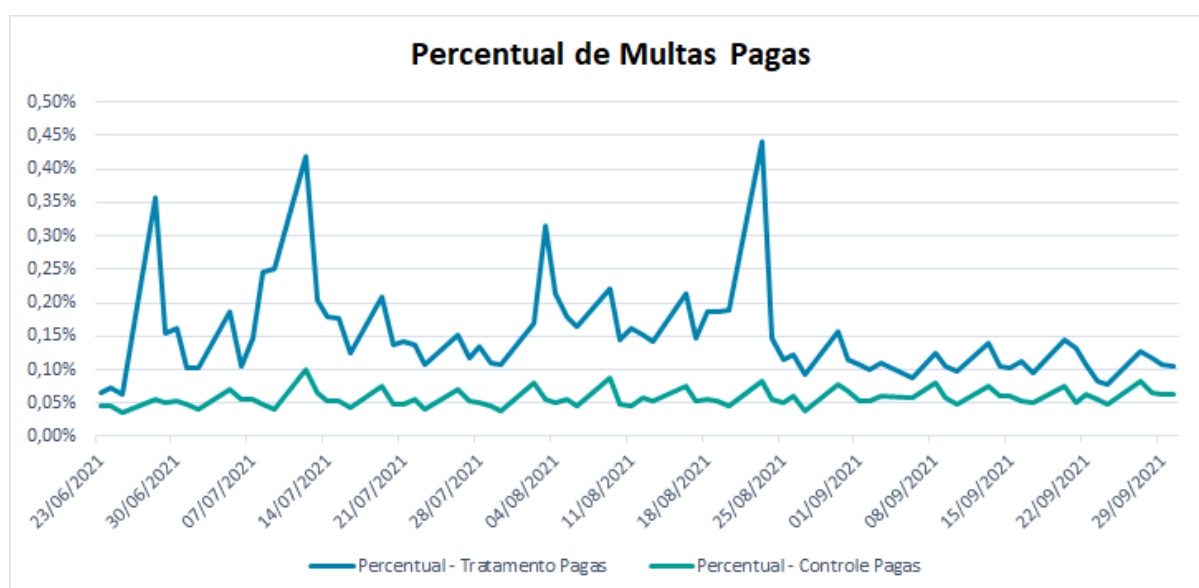
In the period of influence of the first mailing (6/24/21 to 7/8/21), 0.55% of fines were paid in the Control Group, against 1.70% in the Treatment Group. A difference, in favor of the Treatment, of 207%!

In the period of influence of the second sending (7/9/21 to 8/1/21), the numbers were as follows: 0.86% of fines paid in Control and 2.71% in Treatment (difference of 214%). And for the third sending (period from 8/2/21 to 8/23/21), we had 0.92% (Control) and 3.23% (Treatment), with a difference between them of 251%!

Consolidating the data for the total period of the nudge experiment, within the Control Group we had 2.63% of fines paid, while in the Treatment Group it was 8.27% (215% more).

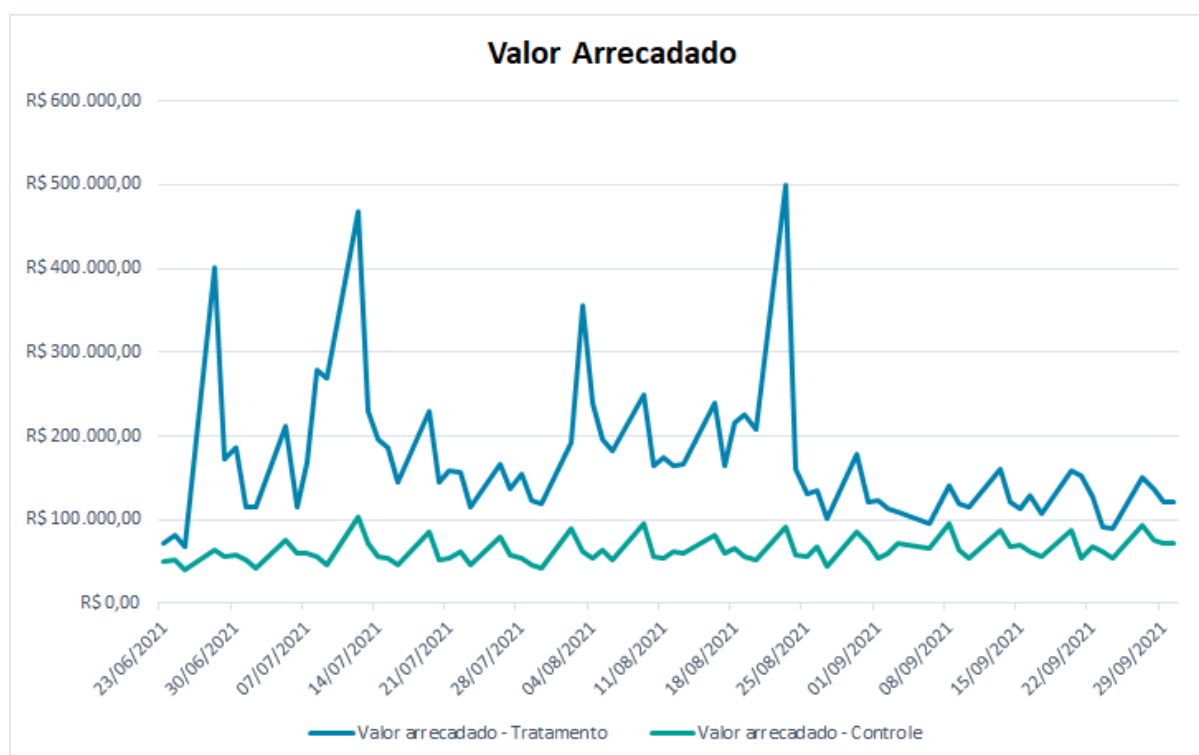
In terms of absolute numbers (total amount of fines paid and cash amounts), in the Control Group, 13,756 fines were paid, raising a total of R\$2,579,446.13. In the Treatment Group, 44,939 fines were paid, or R\$8,554,149.38 raised. The following graphs illustrate these daily differences:

Graph 5: Percentage of fines paid over the intervention period



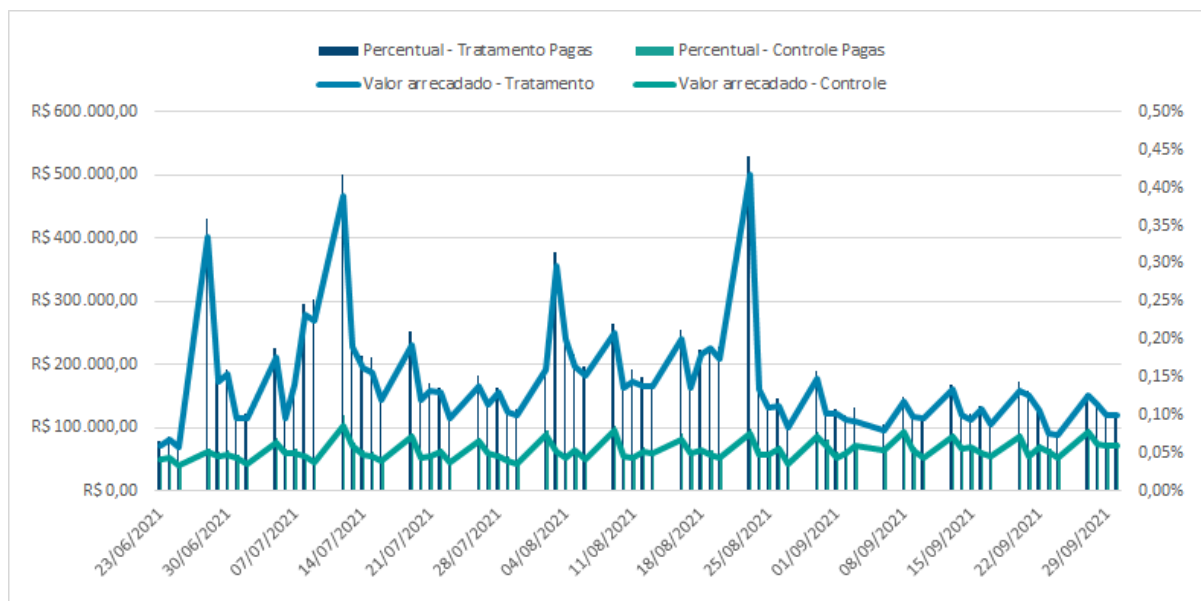
Source: NudgeRio

Graph 6: Total collected throughout the intervention period



Source: NudgeRio

Graph 7: Percentage of fines paid and total collected throughout the intervention period



Source: NudgeRio

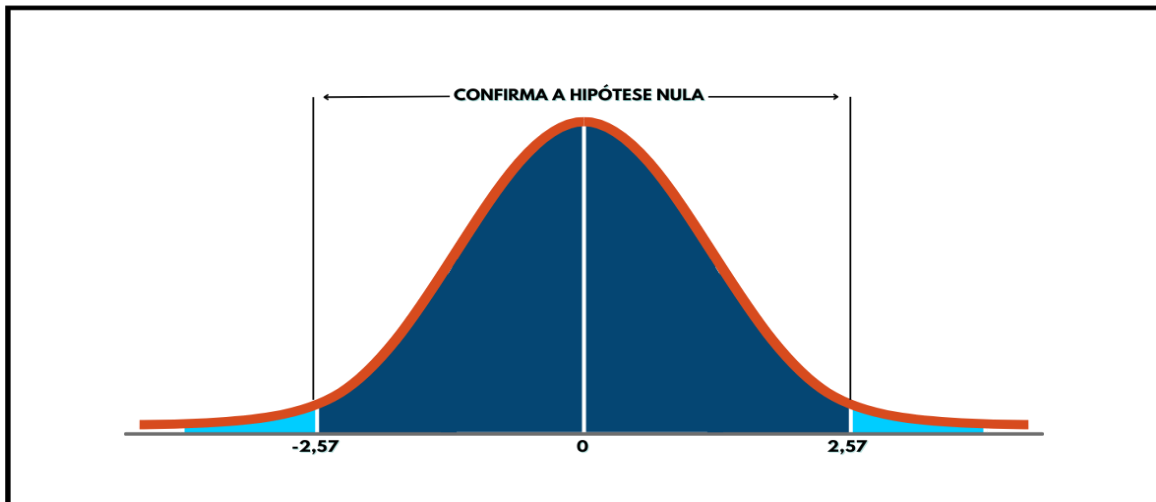
It is interesting to note the series of payment peaks. They correspond to Mondays. Since the banking system does not work with payments on weekends, on Mondays the payment for three days accumulates.

Both the graphs above and the direct comparison between the numbers (percentages of payers within each group) indicate the success of the experiment. But thanks to the BILATERAL TEST, we can attest to this success within good statistical practices.

To perform the bilateral test, we start from the NULL HYPOTHESIS (“the results of the Treatment Group are identical to the results of the Control Group”), which can be proven or rejected. The effectiveness of the intervention occurs when the null hypothesis is REJECTED. In the specific case of the project in question, the null hypothesis can be described as “the percentage of payers within the Treatment Group is equal to that within the Control Group.”

Graph 8: Bilateral test to confirm the hypothesis.

DISTRIBUIÇÃO NORMAL (OU GAUSSIANA)



Prepared by the NudgeRio Team

Graph 8 shows how the validity of the null hypothesis is assessed. The initial assumption is that the population is distributed along a Gaussian curve. The green area under the graph represents 99% of the total area. This region CONFIRMS the null hypothesis. The red area under the graph REJECTS the null hypothesis.

With this in mind, and based on the results obtained experimentally, the so-called “test statistic” is calculated, usually described by the letter z . If the value of z is between -2.57 and 2.57 (green area in the figure), the null hypothesis is confirmed, with 99% confidence. If the value is less than -2.57 or greater than 2.57 (red area in the figure), the null hypothesis is rejected.

Rejecting the null hypothesis means that the treatment and control groups behaved differently, and this is what is aimed for in a nudge experiment.

In our experiment, when calculating the test statistic (z), we obtained the value 136.82, which is much higher than 2.57. In other words, with a 99% confidence level we can reject the Null Hypothesis, that is, the result of the treatment group was statistically different from the result of the control group.

The error calculated in our experiment was only 0.05%. The success of the interventions is, therefore, undeniable.

7. EXPERIMENT LIMITATIONS

Given the peculiarity of the problem to be addressed, it was decided to use all defaulters registered with Carioca Digital as the Treatment Group. Thus, a random sample was not created. This may have created some underlying bias, since it is possible that residents of Rio de Janeiro registered with Carioca Digital are more agile in interacting with electronic media and are more likely to respond to stimuli received through these media.

We conducted a comparative test between the Control Group and the Treatment Group after the end of the nudge intervention. After all, daily control of the fines paid continued to be carried out, as it is a standard procedure at CET-Rio. Thus, in the period between 8/24/21 and 9/13/21, we conducted the analysis comparing the two groups (treatment and control). In this post-experiment period, we had 0.84% of fines paid by the Control Group and 1.62% by the Treatment Group. The difference is 93%, lower than during the experiment, which was 215%.

Another setback faced was the lack of information regarding the email opening rate. It is unrealistic to assume that all emails sent have been opened by their recipients. But that was the number we worked with. The success percentages in the Treatment Group would change a lot if we had access to the number of emails opened. If we admit that only 50% of the emails sent were opened, the success rate (8.27% of fines paid within the Treatment Group) doubles; if the assumption is 20% of emails opened, the success rate increases fivefold! However, in the same way there may be biases among citizens who open the email sent, as well as bias among citizens who regularly access their email boxes.

8. FINAL CONSIDERATIONS

Fines are a standard tool in our society to force citizens to behave in a desired way. The rules are made clear and the threat of punishment is openly stated. But fines are not only punitive instruments. Fines also have a pedagogical purpose. The potential of a traffic fine is to inhibit undesirable behavior; thus, failure to collect payment undermines this legal correction. With this in mind, a reminder to pay sends a message to promote a change in mentality, which encourages operational behavior regarding this debt that needs to be paid.

This is what the current nudge intervention promotes: a reminder that citizens have a debt, not only to the government, but also to society. As a public policy, it was found that these messages served the purpose of alerting citizens to their public responsibilities and avoiding disruptions. Just as many services currently do. Once the punishment procedure is

developed, this preliminary warning can be implemented more routinely. It will not be necessary to wait for a special campaign to do so.

Some specific considerations deserve to be addressed in this conclusion:

- The graphs presented in section 6 (and the corresponding numbers) show that with each new email sent (there were three sends) the gap between the percentage of payers in the Treatment Group compared to the Control Group increased. This may indicate a cumulative effect of the nudge, but the peak in payments on the last day of the campaign (8/23/2021) also suggests a “dam” effect, where some of the recipients affected by the first send (and subsequent sends) may have scheduled the payment for the last day of the deadline established in the email sent.
- In the absence of a reliable indicator of the email opening rate, we work with the unlikely hypothesis of 100% (all emails received were opened, that is, all members of the Treatment Group had contact with the intervention); information about this email opening rate will affect the final result of the experiment, always in terms of improving the numbers, since the number of fines paid remains the same and the total universe on which the percentage is calculated decreases.
- We do not recommend a direct projection of total numbers (value in reais) for the collection, since there is an intrinsic difference between the Treatment Group and the Control Group (presence in the digital world, since the Treatment Group is formed precisely by those who already have a registration on the Carioca Digital platform). This

difference was, to a certain extent, proven in the post-intervention analysis, when both groups were already out of reach of the nudge and, even so, the Treatment Group presented a higher percentage of payment, in relation to the Control Group. The difference, however, was much smaller than the difference obtained during the intervention (93% post-intervention versus 215% during the intervention).

In summary, we can state that the intervention suggested by NudgeRio achieved its objective, which was to encourage citizens to pay their fines. The test statistics, the graphs presented and the comparative figures make the success of the nudge experiment indisputable.

ANNEX I – BODIES PARTICIPATING IN THE PROJECT

A.1 NudgeRio

NudgeRio is the first Nudge unit in government in Brazil, with the objective of developing projects in collaboration with departments of the City of Rio, using the Nudge tool of Behavioral Sciences. This approach aims to positively influence the decisions of citizens and municipal managers/public servants, benefiting both the individual and society.

NudgeRio's objectives, as set out in the OrdinanceCVL/SUBSC/FJG No. 72/2018, are:

- Disseminate the concept of Applied Behavioral Science within the scope of the City Hall of Rio de Janeiro – PCRJ;

- Promote and accelerate the incorporation of Applied Behavioral Science, mainly through the Nudge methodology, in structuring initiatives of the bodies of the City Hall of Rio de Janeiro – PCRJ;
- Advise Cross-Cutting Work Groups (GTTs) that wish to use the Nudge methodology in their projects;
- Promote training in the Nudge methodology for managers of the City Hall of Rio de Janeiro, in partnership with the Management Training Coordination, of the Technical Coordination of the Training Programs for Rio de Janeiro Leaders and Managers, of the João Goulart Foundation Institute.

Behavioral Science explores cognitive processes that involve systematic analysis of human behavior through observation, controlled experiments, and mathematical modeling. When applied directly to Choice Architecture (nudges), it can increase the effectiveness of public policies and initiatives at low cost and with high potential results for citizens.

NudgeRio works with various City Hall bodies, ideally creating low-cost, high-impact interventions.

A.2 Municipal Department of Transportation

The Municipal Department of Transportation — SMTR was created in 1986, by Law No. 886, of July 11, 1986. In addition to managing the public transportation system in the City of Rio de Janeiro, the SMTR is responsible for exercising the functions of executive traffic body of the Municipality, coordinating the use of the Municipal Guard, and the actions of the Departments, Companies and Autarchies in the operation, maintenance of

roads and signaling, according to the designation of Decree No. 16,444, of January 15, 1988.

The powers related to the role of being the executive body for traffic in the municipality are provided for in article 24 of the Brazilian Traffic Code, among which we highlight the execution of traffic inspections on the roads; the citation and application of the applicable administrative measures and the penalties of warnings and fines for traffic, parking and stopping violations; notification to offenders; and the collection of the fines applied.

SMTR's vision is to achieve excellence in transport and traffic management in the City of Rio de Janeiro, through the use of values related to technique, commitment to the public, professionalism, respect, recognition, competence and commitment to legality.

A.3 Traffic Engineering Company

The Rio de Janeiro Traffic Engineering Company — CET-Rio's mission is to promote ideal mobility conditions in the city of Rio de Janeiro on a daily basis, which means maximizing fluidity, comfort, order and safety for pedestrians, cyclists, passengers and drivers in their travels, in addition to ensuring adequate coexistence between traffic and urban space. Its vision is to be a nationally recognized and respected company, through its services, using innovation, technology and interactivity aimed at improving the lives of citizens.

CET-Rio is responsible for, among other things, managing the road and traffic system of the city of Rio de Janeiro; working with traffic operators to ensure the city's mobility; promote traffic education

campaigns; implement and maintain vertical, horizontal and traffic light graphic signage on roads, and implement the installation of electronic monitoring equipment.

All these actions aim to comply with the provisions of Law 9503 of 09/23/1997, which instituted the Brazilian Traffic Code, in its article 1, §2nd which says that “Traffic, in safe conditions, is a right for everyone and duty of the bodies and entities that make up the National Traffic System, which are responsible, within the scope of their respective powers, for adopting measures designed to ensure this right.”

A.4 IPLANRIO

IPLANRIO is the municipal company responsible for managing Information and Communication Technology resources in the city of Rio de Janeiro.

Created by Law No. 140 of 11/14/1979, its current organizational structure is composed of Directorates and Technical Advisors, in addition to Functional Units, called Sectoral IT Technical Managements, which work in a personalized manner with clients: municipal bodies and entities.

A.5 Municipal Attorney General's Office

The Municipal Attorney General's Office (PGM) is the managing body of the Municipal Legal System, responsible for the judicial and extrajudicial defense of the Municipality of Rio de Janeiro, for legal consultancy of municipal bodies, as well as for the registration and collection of municipal active debt.

Municipalização do Trânsito: Orientações básicas para a Organização da estrutura nacional e a integração ao Sistema Nacional de Trânsito. Confederação Nacional de Municípios. Brasília: CNM, 2013. Retrieved from: [https://www.cnm.org.br/cms/biblioteca_antiga/Municipaliza%C3%A7%C3%A3o%20do%20Tr%C3%A2nsito%20\(2013\).pdf](https://www.cnm.org.br/cms/biblioteca_antiga/Municipaliza%C3%A7%C3%A3o%20do%20Tr%C3%A2nsito%20(2013).pdf) on Oct. 2023.

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