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**INDUCING LONG-TERM CHANGES IN BEHAVIOR THROUGH INCREASED
SELF-DETERMINATION**

Rio de Janeiro
2019

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SELF-DETERMINATION**

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Para papai e mamãe

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RESUMO

Diversos estudos documentaram como o uso de incentivos é capaz de influenciar o comportamento humano e encorajar o alcance de metas. Contudo, argumenta-se que esses efeitos durem apenas enquanto a oferta de incentivos estiver em vigor; após esse período, os indivíduos costumam retornar ao comportamento que lhes era habitual antes das recompensas. O presente estudo investiga até que ponto um aumento na percepção de autodeterminação – especificamente, do senso de competência e autonomia – dos participantes de uma intervenção que ofereça incentivos consegue fazer com que esta produza resultados duradouros ao promover uma mudança comportamental de longo prazo, isto é, que perdure após o fim da oferta de recompensas. Essa hipótese é aqui testada através de um experimento de campo: um programa de 6 semanas que incentivou indivíduos com sobrepeso ou obesos a mudar seus hábitos alimentares e, conseqüentemente, emagrecer. Como recompensa, esses indivíduos participariam do sorteio de um vale-viagem de R\$1.000,00. Durante o programa, cerca de metade dos participantes foi influenciada a atribuir seu sucesso à recompensa oferecida, enquanto a outra metade foi influenciada a atribuí-lo à sua autodeterminação. Ao final, a perda de peso resultante foi calculada para ambos os grupos. Seis semanas após o término do programa, os participantes tiveram seu peso medido mais uma vez, de forma a verificar se a manutenção da perda de peso variou de acordo com a manipulação a que foram expostos. Os resultados não mostraram nenhuma diferença significativa entre os grupos. Limitações e futuros caminhos para pesquisa são discutidos.

Palavras-chave: Mudanças de comportamento, Autodeterminação, Teoria da Autodeterminação, Incentivos, Recompensa, Perda de peso, Efeitos de longo prazo.

ABSTRACT

Numerous studies have reliably established that rewards hold the capability of influencing behavior and fostering goal attainment, but these effects are argued to hold only whilst the incentive system is operative; afterwards, the behavior tends to return to its pre-reward baseline. This paper investigates the extent to which an increase in participants' self-determination – specifically, one's sense of competence and autonomy – can make a reward-based intervention produce enduring results by promoting long-term behavior changes. This hypothesis was tested through a field experiment: a 6-week program that incentivized overweight and obese individuals to change their eating habits and, consequently, lose weight by offering the chance to participate in a lottery to win a R\$1,000 travel voucher. During the program, about half of the participants was nudged to attribute its success to the reward offered, while the other half was nudged to attribute it to its self-determination. The resulting weight-loss was computed for both groups. Six weeks after the end of the program, participants were weighed once more in order to analyze whether weight-loss maintenance varied depending on the manipulation they were subject to. The results showed no significant difference between the groups. Limitations and future research avenues are discussed.

Keywords: Behavior changes, Self-determination, Self-determination Theory, Incentives, Rewards, Weight-loss, Long-term effects.

Sumário

1 INTRODUCTION	10
2 THEORETICAL BACKGROUND	11
2.1 Short- and Long-term Effects of Incentives	11
2.2 A View of Incentives through the Lenses of Self-Determination Theory	13
2.2.1 Intrinsic and Extrinsic Motivation	13
2.2.2 Influence of Incentives on Self-Determination	16
3 METHOD.....	18
3.1 Overview of the Study.....	18
3.2 Participants	19
3.3 Procedure	19
4 RESULTS.....	23
4.1 Statistical Analyses	23
4.2 Findings	24
5 DISCUSSION.....	31
APPENDIX A – Flow of participants	33
APPENDIX B – Study’s Instructions and Timeline	34
APPENDIX C – Sociodemographic & Motivation Questionnaire	36
APPENDIX D – Health & Eating Behavior Questionnaire	38
APPENDIX E – Nutritional Guidelines	40
APPENDIX F – Messages used in the manipulation	42
APPENDIX G – Schematic Representation of the Manipulation Messages.....	44
REFERENCES	45

1 INTRODUCTION

Over the past decades, researchers from several fields have theorized about how one can successfully induce changes in human behavior. Their experience has shown that sustaining such changes, however, can be particularly challenging. Rewards, for instance, are commonly employed to influence behavior and foster goal attainment, and numerous studies have reliably established their efficacy to that end (e.g. Kosfeld and Neckermann 2011, Volpp et al. 2008a). Nevertheless, this effect only holds as long as the incentive system is operative; afterwards, individuals would return to their pre-reward baseline (Deci et al. 1999). Such a duality is observed because reward contingencies are deemed to weaken self-regulation, i.e. one's ability to motivate and regulate oneself. According to this theory, after being subject to a reward system that exerts control over their behavior, individuals have their autonomy undermined, which in turn leads to the above-mentioned negative long-term consequences. Yet, for this argument to be true, one underlying assumption has to hold: that all types of reward-based interventions act to diminish people's assuming responsibility for their own motivation and regulation.

This paper investigates the extent to which an increase in participants' self-determination – specifically, one's sense of competence and autonomy – can make a reward-based intervention produce enduring results by promoting long-term behavior changes. This investigation is relevant for it adds to an extensive body of research that explores how to make induced behavioral changes sustainable in a longer time frame, one that outlasts controlling incentives. Confirmation of the effectiveness of the proposed procedure could present new, cheaper possibilities for incentive-based programs, which can be applicable in diverse, critical contexts, such as improving workers' performance, promoting weight loss, or increasing savings, for instance.

The remainder of this work is dedicated to showing that increasing the self-determination associated to a behavior can encourage its repetition even after incentives are no longer present. In order to accomplish this task, first, theoretical accounts of the processes through which this phenomenon happens are provided. Second, a detailed description of the proposed field experiment is given, and results are shown. Finally, I conclude by summarizing the main findings, identifying the limitations of this work and highlighting suggested avenues for future research.

2 THEORETICAL BACKGROUND

2.1 Short- and Long-term Effects of Incentives

People routinely fail to maximize welfare (both individual and societal) by both engaging in detrimental behaviors and failing to engage in beneficial ones. Sometimes, such behaviors are even enacted (or not enacted) inadvertently. Many individuals do not donate blood, for instance, because this possibility never crossed their minds (Cohen and Andrade 2018). Similarly, obesity rate is in an all-time high despite people's desire to lose weight (Charness and Gneezy 2009). As a result, scholars from different fields have been trying to develop solutions that will help policymakers and other practitioners induce positive behavioral changes towards such socially-relevant issues. For those solutions to be useful though, they must not only work in the anticipated direction, but also satisfy two requirements of great importance: the feasibility of the intervention and the long-term sustainability of the effect once the intervention period is over.

A tool that has been increasingly employed to encourage behavioral changes are incentives. In the short-term, i.e. while the incentive system is still in place, it has been repeatedly demonstrated that incentives can induce the desired behavioral change in various settings, such as education, contribution to public goods, and lifestyle changes (Gneezy et al. 2011). Specifically, financial incentives have been shown to increase exercise uptake (e.g. Charness and Gneezy 2009, Royer et al. 2015), aid people stop smoking (e.g. Donatelle et al. 2004), improve medical treatment adherence (e.g. Volpp et al. 2008b), promote healthy food purchase (e.g. Mochon et al. 2016), and reduce weight (e.g. Volpp et al. 2008a). In some rare occasions, when agents draw conclusions from the existence and size of the incentive that lead them to negatively update their perception of the target behavior and/or perform poorly, the use of incentives may backfire in the short-term (e.g. Ariely et al. 2009, Gneezy and Rustichini 2000a,b). Still, evidence of such episodes is more uncommon.

A major concern regarding the use of incentives, however, refers to their efficacy in the long-term. After all, if the target behavior is no longer enacted once incentives are terminated (or, even worse, the behavior performance is lower than in the pre-incentive level), the feasibility of the intervention is compromised, since it would imply that incentives would have to be used indefinitely. Although this is a matter of great significance from both a policy and practical perspective, relatively few studies have investigated it. The ones that did it, in turn,

provide mixed evidence of the persistence of effects after the intervention period is over. Across various studies from diverse domains, short-term effects were found to decay in the long-run (e.g. Acland and Levy 2015, Donatelle et al. 2000, Volpp et al. 2006, 2008a,b). Ferreira et al. (2019), for instance, analyzed the effectiveness of a lottery-based incentive intervention to promote the purchase of healthy products in school cafeterias and found that, even though sales of these items increased during the intervention, they soon returned to pre-incentive levels once the intervention was over. Yet, there are some exceptions to this pattern. One is presented by Charness and Gneezy (2009), who found that individuals who received financial rewards to exercise continued to go to the gym even in the post-intervention period. Nevertheless, this effect was small and driven by people who did not exercise regularly prior to the intervention and were encouraged to attend the gym more often. For those who did exercise before, the intervention was “at best a waste of money; at worst [...], it can actually weaken post-intervention exercise habits” (Charness and Gneezy 2009, p.927). Likewise, Mochon et al. (2016) showed that individuals that had committed to a negative incentive program continued to purchase healthy food even in the post-intervention period, a persistent effect that displayed no signs of decay. However, this persistence was again driven by a sub-sample in the study, the highly engaged customers (high-status members).

Considering these findings, a question remains: when do incentives work in the long-term (and, consequently, when do they not)? Although there is no definite answer for this question yet, two explanations have been proposed to try to make sense of such seemingly contradictory results. One is the *crowding-out hypothesis*. According to this hypothesis, the use of an extrinsic motivator to induce a certain behavior may crowd out one’s existing intrinsic motivation to perform the task after the incentives are removed, resulting in an effort level that can be even lower than the initial one employed (Charness and Gneezy 2009, Gneezy et al. 2011). Therefore, when incentives crowd out intrinsic motivation, long-term effects will range from non-existent to lower than baseline. Another explanation is the *habit-formation hypothesis*. According to this hypothesis, “if an intervention causes people to repeatedly perform the same target behavior in the same environment, the individuals could develop a memory-based association between the behavior and the environment in which the behavior is performed” (Rogers and Frey 2015, p.734). Therefore, incentives encourage repetition of a behavior, which under stable contexts promote the transition from outcome-oriented to context-cued responding (Wood and Neal 2009), forming habits. Consequently, when the incentives are over, provided that they have been in place long enough to form habits and perceived reward

contingency is low, the effect of the intervention will remain in the long-term, because it will be activated by the environment, not by the reward itself.

One can draw from these explanations that the persistent efficacy of an incentive-based intervention depends, among other factors, on its resulting psychological effects. This interplay between financial and psychosocial incentives relates to a widely explored field of research in the social psychology literature.

2.2 A View of Incentives through the Lenses of Self-Determination Theory

2.2.1 Intrinsic and Extrinsic Motivation

The study of motivation is of great theoretical and practical significance. In short, it concerns understanding what mobilizes people to act and how certain behaviors can be encouraged or undermined through internal and external conditions. Motivation can be broadly classified into two types. One is intrinsic motivation, “which refers to doing something because it is inherently interesting or enjoyable” (Ryan and Deci 2000a, p. 55). The construct is related to human’s innate inclination toward learning and is best observed in early childhood’s tendency to exploration. Although individuals are endowed with intrinsic motivational tendencies since birth, such tendencies tend to fade as they grow older and can be undermined or catalyzed according to contextual factors (Ryan and Deci 2000b). Cognitive Evaluation Theory (Deci and Ryan 1980, 1985), a subtheory within Self-Determination Theory (SDT) devoted to clarifying the conditions that influence intrinsic motivation, states that this type of motivation varies mainly as a function of two factors: one’s sense of competence and one’s sense of autonomy (i.e., the feeling that the behavior was deliberate or, in other words, that it leads to an internal perceived locus of causality; deCharms 1968). As a result, the effect of an external factor, such as a reward, over intrinsic motivation depends on the extent to which the factor impacts the perception of these two factors. As argued by Deci et al. (1999),

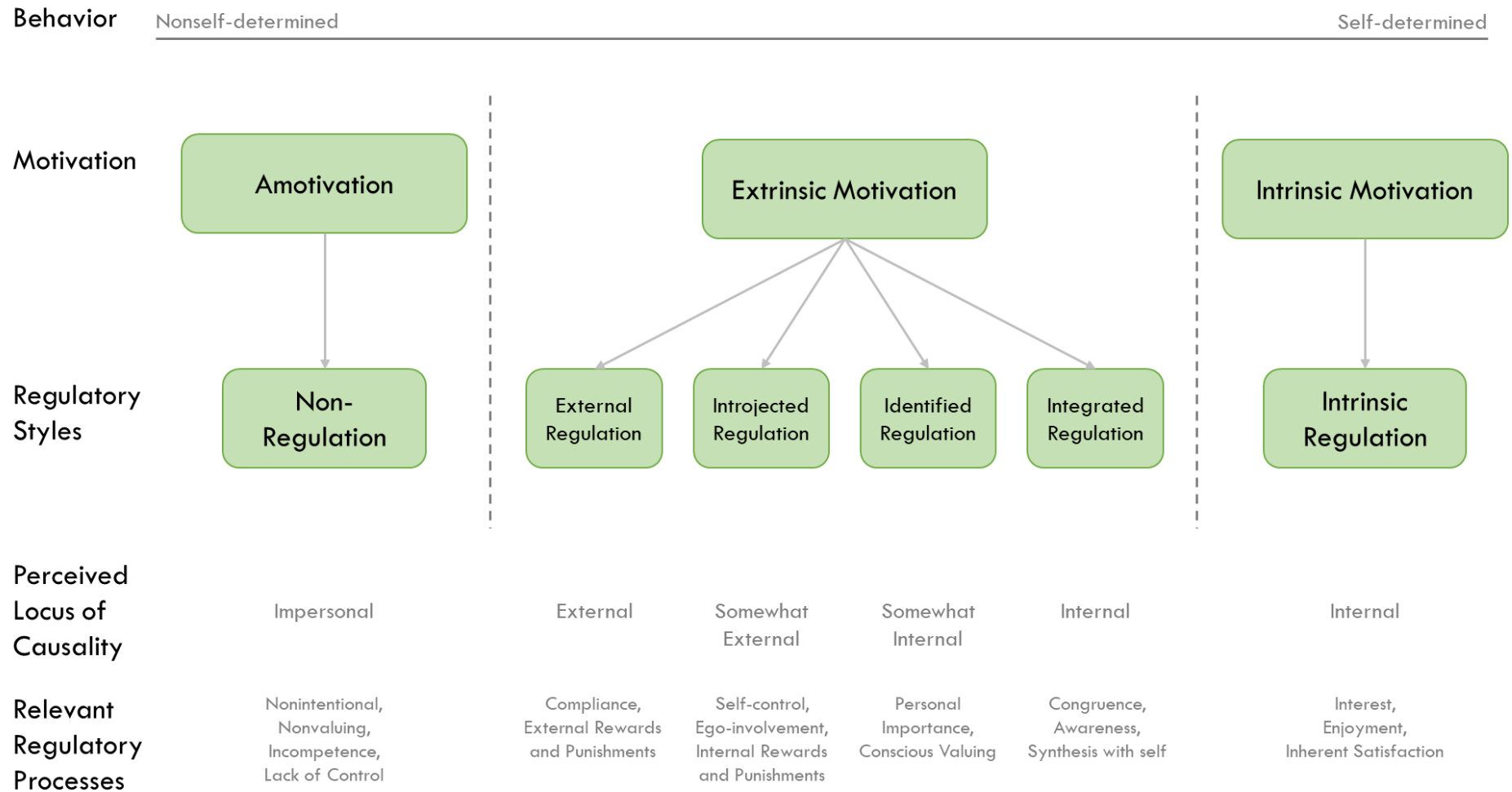
“CET [Cognitive Evaluation Theory] proposes that rewards can be interpreted by recipients primarily as controllers of their behavior or, alternatively, as indicators of their competence. In the former case, rewards are predicted to thwart satisfaction of the need for autonomy, lead to a more external perceived locus of causality (deCharms, 1968), and undermine intrinsic motivation. In the latter case, however, where rewards are positively informational, they are predicted to provide satisfaction of the need for competence and thus to enhance intrinsic motivation” (p.628).

Some activities are fun by nature, such that engagement in such activities is prompted by intrinsic interest. However, much of our daily actions are not intrinsically motivated, especially once we grow up (Ryan and Deci 2000b). Contrasting with inherently enjoyable behaviors, those actions are driven by extrinsic motivation, “which refers to doing something because it leads to a separable outcome” (Ryan and Deci 2000a, p. 55). Contrary to what one might think though, extrinsically motivated activities are not necessarily non-autonomous. In fact, extrinsic motivation can be brought about by different regulatory processes, which reflect various levels of self-determination, i.e., the degree to which the motivation for the behavior stems from oneself. Organismic Integration Theory (OIT; Deci and Ryan 1985, 2000b), another subtheory under the SDT’s umbrella, was developed with the intent of mapping the diverse forms that extrinsic motivation can assume and the factors that catalyze or weaken them. OIT established four types of extrinsic motivation (see Figure 1): external regulation, introjected regulation, identified regulation, and integrated regulation, here listed in ascending order of self-determination. Therefore, whilst externally regulated behaviors are enacted solely in response to external demands and reward contingencies, presenting an integrally external perceived locus of causality, behaviors based on integrated regulation seek a separate outcome while also being in congruence with one’s values and exhibiting an internal perceived locus of causality, being more proximate to intrinsic motivation in terms of self-determination (for a more extensive account of this categorization, see Ryan and Deci 2000b).

As argued before, these four different forms of extrinsic motivation lie in a continuum that depicts the extent to which a given behavior has been self-determined. Self-determination, in turn, reflects the degree of internalization and integration of the behavior by the individual, i.e., the degree to which the regulation was assimilated and turned into his own, respectively. It is this level of internalization and integration that allows us to determine whether people are personally committed to the behavior and remain authentic while also being extrinsically motivated.

OIT affirms that internalization is supported by two key conditions: relatedness and perceived competence. Indeed, the main reason behind people’s performing extrinsically motivated activities is because such activities are “prompted, modeled, or valued by significant others to whom they feel (or want to feel) attached or related” (Ryan and Deci 2000b, p.73). Additionally, people are more likely to adopt a given behavior when they feel more competent to perform it. A third factor that also elicits internalization and is critical for integration is the

Figure 1. Self-Determination Continuum



Source: Ryan and Deci (2000b)

satisfaction of one's need for autonomy. An environment that supports feelings of autonomy gives the individual a sense of freedom and willpower, which in turn favors his integrating the regulation of concern. All in all, the more one experiences feelings of relatedness and competence, the more internalized the values and regulation are, and the more the behavior in question will be experienced as self-determined. However, for one to truly integrate the regulation and exhibit an even higher degree of self-determination, closer to that of intrinsic motivation, the context must be autonomy-supportive (Ryan and Deci 2000b). In sum, any external condition that affects one's sense of relatedness, competence, and/or autonomy will impact the experienced self-determination linked to an extrinsically motivated activity.

2.2.2 Influence of Incentives on Self-Determination

Naturally, one can expect that different types of motivation will lead to different results. It has been well-documented in the literature that greater levels of self-determination are associated with more positive outcomes, "including more behavioral effectiveness, greater volitional persistence, enhanced subjective well-being, and better assimilation of the individual within his or her social group" (Ryan and Deci 2000b, p.73), and this finding holds across many contexts. Consequently, it is of great interest for many real-world settings that we keep uncovering ways of not only boosting motivation, but also of increasing the degree of self-determination related to it. Incentives have been traditionally employed to catalyze motivation, especially to encourage those behaviors that are non-intrinsically motivated. However, as argued in the previous subsection, self-determination is driven by one's sense of relatedness, competence and autonomy, and different incentives tend to influence those factors in different ways.

Financial rewards are perhaps the most popular and researched form of incentive. Performance-contingent monetary incentives can arguably boost short-run performance (Jenkins et al. 1998, Stone et al. 2009) by promoting an externally regulated type of motivation. The focal goal of the behavior becomes then the reward itself, not doing the activity "just for the fun of it". This focus is linked to an external perceived locus of causality, making individuals regard financial rewards as strongly controlling (as opposed to autonomy-supportive) (Deci et al. 1999). In other words, people acknowledge that the performance of the activity is driven by an external incentive, not by their own volition, leading to a lower degree of self-determination associated to the given activity. Although performance-contingent financial rewards can also

provide the individual with a positive competence feedback, which would offset some of the detrimental effects of diminished autonomy (Deci et al. 1999), it could be argued that the net result over self-determination would still be negative because the receipt of the reward is much more salient to the person than the competence information. Therefore, performance-contingent financial incentives can induce a given behavior and promote better performance in the short-run, as exemplified earlier (e.g. Charness and Gneezy 2009, Donatelle et al. 2004, Mochon et al. 2016, Royer et al. 2015, Volpp et al. 2008a,b), but at the expense of one's self-determination. It would, in turn, crowd out intrinsic motivation and decrease performance when incentives are no longer granted.

If the above rationale is correct, we should expect this detrimental effect to be nullified if the perception of self-determination attached to the behavior is increased, even in the presence of an extrinsic incentive. In other words, if we stress that the reward simply symbolizes the acknowledgement of one's successful performance and adopt a speech that evokes feelings of accomplishment, competence, and satisfaction in the individual, we should expect the prize to be seen as a mere by-product of the effort. The reward would present a higher symbolic cue value (Harackiewicz et al. 1984), which makes the self-perception of competence particularly salient.

In short, our hypothesis is that the long-term impact of an incentive is contingent on people's interpretation of the role of the incentive on their performance. More specifically:

Hypothesis: When people are led to attribute their performance to the incentive itself, its positive short-term effect should vanish in the long run (that is, once the incentive is removed). However, when people are led to attribute their performance to their own competence and the reward received is perceived as a by-product of the participant's inherent motivation and skills, then the short-term positive effect of the incentive should persist in the long run.

On the following pages, a field experiment is proposed to test this hypothesis.

3 METHOD

3.1 Overview of the Study

Nowadays, obesity is one of the leading health threats around the globe (Caballero 2007) and, as such, imposes several challenges for public policy. This concern resulted in a proliferation of weight-loss interventions in the past years that, although increasingly successful, are still unable to guarantee long-term weight maintenance (Anderson et al. 2001). In our study, we investigate whether a more enduring result can be achieved by manipulating the perception of self-determination related to the success of the diet.

During July and August 2019, one hundred and one adults, either overweight or obese, were recruited to join a weight-loss program: they had an appointment with a nutritionist to receive nutritional orientation and were financially incentivized to lose 1kg every two weeks for the following six weeks. After this meeting on week 0, participants reported their updated weight on weeks 2 and 4 and were reassessed in person by the researcher on week 6, in order to check whether they had achieved the target weight. A subsequent in-person follow-up assessment was scheduled for 6 weeks after the end of the program, i.e. on week 12, with the intent of finding whether participants had managed to maintain their weight-loss now that no goal had been set. In exchange for their participation, subjects were offered the chance to enter a lottery to win R\$1,000 in credits to be spent at Hotel Urbano, an internet-based travel agency. Their likelihood of winning the prize increased depending on their weight-loss during the first 6 weeks. Ensuring that gender and number of obese were balanced across conditions, participants were assigned into two groups, according to the self-determination manipulation they were subject to: half were nudged to attribute the success of the diet to an extrinsic factor (the chance of winning the trip), while the other half were nudged to attribute it to intrinsic factors (competence and autonomy). Theoretically, the latter group should perceive the behavior as more self-determined than the former. Our goal is to assess whether there is a difference in performance between the groups in the long term; more specifically, whether individuals nudged to perceive the behavior as more self-determined will be more likely to maintain the weight-loss achieved during the intervention.

3.2 Participants

The flow of participants through recruitment, intervention and follow-up is displayed in Appendix A. Candidates were recruited through four fronts: 1) a paid Facebook ad; 2) a WhatsApp message; 3) an e-mail targeting universities' staff and students; and 4) a poster hanged on the university's cafeteria. In the reading of all four methods, participants were informed that the study was part of a Master thesis developed by a FGV/EBAPE student to understand the impact of weight-loss on welfare and, if they matched the searched profile and were invited to participate in the study, they would receive free nutritional advice, have their progress assessed for 12 weeks and enter a lottery to win a travel voucher. Since it was disclosed on the ads that selected candidates would participate in the lottery, interest to volunteer for the study could be driven by the desire to lose weight and receive free nutritional advice or simply by the chance of winning the reward. Candidates who agreed to apply were asked to visit the study's website to fill in a form with their contact information, approximate height and weight, and some sociodemographic characteristics. Additionally, candidates were asked whether they had a smartphone, which would be an essential tool for communicating with them during the study. Upon completion of the form, candidates were thanked and informed that they would be contacted soon.

Selection of participants was based on four criteria: 1) whether they resided in Rio de Janeiro; 2) whether they had a smartphone; 3) whether they were at least 18 years old; and 4) whether their body mass index (BMI, a measure based on weight and height) was between 25 and 34.9, an indication of overweight or class-1 obesity. Candidates who met these criteria were contacted and scheduled an appointment with the study's nutritionist and the researcher. In total, this procedure yielded a sample of 101 participants.

Since there is evidence that men (v. women) can lose weight more easily (Williams et al. 2015), and the same is observed for obese individuals (v. overweight individuals) (Keesey and Corbett 1984), it was important that these characteristics were balanced across conditions. Therefore, stratified sampling was employed in order to guarantee that results would not be driven by a concentration of participants with those characteristics in a given group. That was accomplished by using a dummy for gender and another for obesity as stratification variables.

3.3 Procedure

Eligible candidates were invited for a meeting with the nutritionist and the researcher. Upon arrival, participants were individually briefed about the study. They were told that it

concerned the use of incentives for lifestyle changes and would last a total of 12 weeks. For the first 6 weeks, all participants would have a biweekly goal of losing 1kg (~2.2lb), which would ideally lead to a total loss of 3kg by the end of the program (since we wanted most people to attain the goal in order to then assess its lasting effect, we set a relatively low bar). On weeks 2 and 4, on a predetermined day, they would have to inform their updated weight to the researcher through WhatsApp. Also, through this app, the researcher would send a standardized message reminding participants of the day they were supposed to weigh-in along with a congratulatory/encouraging message when it applied (as described in the “Intervention” subsection below). On week 6, participants would have to return for an in-person weigh-in with the researcher to ensure they would have met the goal. Finally, on week 12, subjects would be reassessed to determine whether the intervention’s results lasted in the long run, when there would be no weight-loss goal set. They received these instructions in written, accompanied by a timeline with the dates of all their weigh-ins, both at home and in-person (see Appendix B).

After the briefing, participants were asked to sign an informed consent form and to answer a questionnaire (see Appendix C), in which we assessed their sociodemographic characteristics and motivation. Once they had finished, participants consulted with the nutritionist for dietary counselling. Each consultation lasted about 30 minutes. First, they were asked several questions about their former and current health status and eating behavior (see Appendix D). Then, they were weighed, and the nutritionist took their waist and hip measures. Finally, participants received both general guidelines (see Appendix E) and personalized instructions on how to improve their diets. After that, they were thanked and dismissed.

Incentive. All participants were offered the chance to enter a lottery to win a R\$1,000 travel voucher. As a way to encourage goal attainment in weeks 2, 4 and 6, they were informed they would get additional entries for the lottery whenever they complied with the following: (1) reporting their updated weight to the researcher on weeks 2 and 4 (yields one additional entry each), (2) showing up for the in-person assessments on weeks 6 and 12 (yields two additional entries each), or (3) attaining the weight-loss goal for each biweekly assessment (yields two additional entries on weeks 2, 4, and 6). With regard to the latter, participants would get the entries whenever they achieved the goal, even if it happened after the desired week. However, if they regained the weight before week 6, they would also lose those entries. In sum, the weekly goals were set to encourage continuous engagement in the program, but the main concern was the total weight-loss on week 6, such that this measure was the decisive one to determine the additional entries each subject would get according to the third criterion mentioned above. Also,

we stressed for participants that, after week 6, there would be no more incentives based on performance. They would get extra entries only for attendance on week 12.

Intervention. Participants were divided into two groups, according to which they would be nudged to attribute their success either to intrinsic factors (competence and autonomy) or to an extrinsic factor (the want to win the reward, i.e. the Hotel Urbano voucher). When a participant reported his/her weight (on weeks 2 and 4), he/she received a congratulatory message through WhatsApp attesting individual achievement whenever he/she had met or exceeded the goal and an encouragement message whenever he/she had not met the goal. On week 6, when participants were assessed in person, the ones who achieved the final goal (i.e. lost 3kg or more) received a congratulatory certificate, while the ones who did not received a participation certificate.

In the intrinsic motivation condition, the messages/certificate would stress the importance of competence and autonomy for the person's success. Precisely, they were told, on weeks 2 and 4, either "Congratulations, [*name of participant*]! Your motivation was fruitful. Thanks to your willpower and determination, you met this week's goal. Keep up the good work!", when the goal was met, or "[*name of participant*], unfortunately, you have not met the goal this time. But I am positive that, with your willpower and determination, you will make it next time. Cheer up!", when the goal was not met. On week 6, the reading on the certificate was either "We proudly certificate that [*name of participant*] successfully concluded the weight-loss program and, thanks to his/her effort and determination, lost [*participant's weight-loss*] in 6 weeks and is now closer to his/her ideal weight. Congratulations!", when the goal was met, or "We certificate that [*name of participant*] concluded the weight-loss program and, thanks to his/her effort and determination, lost [*participant's weight-loss*] in 6 weeks and is closer to his/her ideal weight. Congratulations!", when the goal was not met.

In the extrinsic motivation condition, the messages/certificate would highlight the importance of the reward (the desire to win the travel voucher) for this achievement. Precisely, they were told, on weeks 2 and 4, either "Congratulations, [*name of participant*]! The financial incentive worked. You met this week's goal and now have a greater chance of winning the Hotel Urbano's R\$1,000.00 voucher. Keep up the good work!", when the goal was met, or "[*name of participant*], the financial incentive did not work this time. But I am positive that you will make it next time and will increase your odds of winning the Hotel Urbano's R\$1,000.00 voucher. Cheer up!", when the goal was not met. On week 6, the reading on the certificate was either "We proudly certificate that [*name of participant*] successfully concluded the weight-

loss program and, thanks to the incentive, lost [*participant's weight-loss*] in 6 weeks and is now closer to winning the prize. Congratulations!”, when the goal was met, or “We certificate that [*name of participant*] concluded the weight-loss program and, thanks to the incentive, lost [*participant's weight-loss*] in 6 weeks and is now closer to winning the prize. Congratulations!”, when the goal was not met. To see the original messages, in Portuguese, please refer to Appendix F. Also, a schematic representation of the messages is presented in Appendix G.

The expectation was that, by pointing out the importance of different regulatory styles for each group, they would perceive their motivation as arising from a different locus of causality. That, in turn, would result in different levels of self-determination. Thus, the expectation was for the results observed in the long-term to be different between the groups, such that participants under the intrinsic success attribution condition would show, on average, a better performance (i.e. greater weight-loss maintenance).

Measures. To assess the relative persistence of effects under each condition, the outcome of greatest interest is the weight-loss maintenance in kilograms, measured as the body weight at the follow-up assessment (week 12) minus the body weight at week 6. For robustness, I tested three additional specifications of this variable: weight-loss maintenance as a percentage of the absolute value of the initial weight-loss (as measured on week 6); weight-loss maintenance as a percentage of initial body weight; and total weight-loss (body weight at week 12 minus body weight at week 0).

Self-determination was assessed through participants' self-reported ratings of autonomy and competence. These ratings were measured using adapted versions of the Treatment Self-Regulation Questionnaire (TSRQ), which allows us to compute one's Relative Autonomy Index by measuring how one perceives a given behavior as either autonomous or controlled; and the Perceived Competence Scale (PCS), which measures the competence one believes to have concerning a certain activity. These questionnaires have been repeatedly validated as instruments to assess constructs from Self-Determination Theory. In this study, they were applied at three points in time: before the beginning of the experiment (on week 0), to assess how autonomous the motivation for entering the program was and initial perceived competence; and on weeks 6 and 12, to assess how perceived autonomy and competence evolved throughout the study. Additionally, comparing how these ratings changed between the groups should allow us to evaluate whether the manipulation worked.

4 RESULTS

4.1 Statistical Analyses

Both groups were compared for their initial similarity with regard to the stratification variables (sex and obesity) and other baseline characteristics. For that, the covariates were analyzed by employing Person's χ^2 test or Fisher's exact test (for categorical variables), one-way ANOVA, t test for unequal variances or Mann-Whitney U test (for continuous variables), as appropriate.

In relation to the outcome of interest, primary analyses were intent-to-treat analyses, testing for differences between the intrinsic and extrinsic success attribution groups in terms of weight-loss maintenance 6 weeks after the end of the intervention. Among the different specifications used for the dependent variable, all but one (namely, weight-loss maintenance as a percentage of the absolute value of the initial weight-loss) complied with the assumption of normality. For those cases, I used F tests. As an insurance, since one of the specifications of the dependent variable did not pass the normality test and the final sample size was too small to ensure that the other normality tests were reliable, I also conducted Mann-Whitney U tests for all specifications. Participants lost to follow-up were dropped from the sample, since I could not infer either their weight-loss on week 6 or their weight-loss maintenance on week 12. Additionally, participants whose weight-loss maintenance were 3 SDs either below or above the mean were considered outliers, such that I conducted two analyses: one with them and another without them.

Nine participants gained weight by week 6 and were heavier than at the beginning of the study. Since the reading on the certificate aimed at acknowledging the participant's total weight-loss during the intervention, those who gained weight did not receive it, which implies that they were also not subject to the manipulation on week 6. Handling this issue as a problem of non-eligibility would not be ideal, because the weight gain could be linked to the treatment and, therefore, it was not a typical case of non-eligibility. At the same time, excluding observations based on the outcome would not be a suitable solution either. As a result, I decided to consider those individuals as non-compliers and the analyses above-mentioned were repeated without them, in order to compute the complier average causal effect (CACE).

The data was analyzed using Stata Statistical Software v14.1 (StataCorp LP, College Station, TX).

4.2 Findings

In terms of baseline characteristics, Table 1 shows that the sample was predominantly female, overweight (as opposed to obese), highly educated and most participants had already attempted to diet in the past. The sample also presented a mean Relative Autonomy of 3,23 and a mean Perceived Competence of 4,19 (both on a scale from 1 to 7).

Table 1. Characteristics of the Study's Initial Sample

Participant Characteristics	Initial Sample (n=101)	Intrinsic Success Attribution (n = 49)	Extrinsic Success Attribution (n = 52)	P-value
Age, mean (SD)	35,78 (11,67)	35,79 (12,7)	35,77 (10,74)	0,610 ^a
Women, N° (%)	74 (73,27)	36 (73,47)	38 (73,08)	0,964 ^b
Obese, N° (%)	30 (29,7)	14 (28,57)	16 (30,77)	0,809 ^b
Civil State, N° (%)				
Single	53 (52,48)	23 (46,94)	30 (57,69)	0,629 ^c
Married/Stable Union	36 (35,64)	20 (40,82)	16 (30,77)	
Divorced/Separated	9 (8,91)	5 (10,20)	4 (7,69)	
Widowed	3 (2,97)	1 (2,04)	2 (3,85)	
Education, N° (%)				
Elementary or Middle School (Incomplete)	2 (1,98)	1 (2,04)	1 (1,92)	0,949 ^c
Middle School (Complete)	1 (0,99)	1 (2,04)	0 (0)	
High School (Complete)	20 (19,80)	10 (20,41)	10 (19,23)	
Bachelor's Degree	37 (36,63)	17 (34,69)	20 (38,46)	
Post-graduate Degree	41 (40,59)	20 (40,82)	21 (40,38)	
Ethnicity, N° (%)				
White	61 (60,40)	30 (61,22)	31 (59,61)	0,128 ^c
Pardo	20 (19,80)	13 (26,53)	7 (13,46)	
Black	19 (18,81)	6 (12,24)	13 (25,00)	
Yellow	0 (0)	0 (0)	0 (0)	
Indian	1 (0,99)	0 (0)	1 (1,92)	
Full-time Employed, N° (%)	53 (53)	24 (48,98)	29 (55,77)	0,520 ^c
Made a diet in the past, N° (%)	83 (82,18)	43 (87,75)	40 (76,92)	0,155 ^b
Controlled Regulation, mean (SD)	2,54 (1,04)	2,78 (1,1)	2,32 (0,94)	0,025** ^d
Autonomous Regulation, mean (SD)	5,77 (0,99)	5,87 (0,85)	5,67 (1,1)	0,511 ^a
Relative Autonomy Index, mean (SD)	3,23 (1,12)	3,09 (0,86)	3,36 (1,32)	0,041** ^a
Perceived Competence Scale, mean (SD)	4,19 (1,11)	4,22 (1,09)	4,15 (1,13)	0,768 ^d
Initial Weight in kg, mean (SD)	79,33 (11,01)	78,44 (10,09)	80,18 (11,84)	0,397 ^a

Abbreviation: SD, standard deviation.

^a Mann-Whitney U test.

^b Two-tailed χ^2 test.

^c Fisher's exact test.

^d One-way ANOVA.

When comparing those baseline characteristics between the groups, two analyses were conducted: one with the initial sample and another considering only those who actually attended all three meetings. In the first case, no significant initial differences were found in most of the characteristics, as shown on Table 1. However, the intrinsic success attribution group presented a significantly higher controlled regulation ($Mdn_{intrinsic} = 2.75$, $Mdn_{extrinsic} = 2.12$, $U = 2.196$, $p = 0.028$) and a significantly lower Relative Autonomy score ($Mdn_{intrinsic} = 3.08$, $Mdn_{extrinsic} =$

3.71, $U = 2.042$, $p = 0.041$) than the extrinsic success attribution group. This unbalance is a source of concern, since it means that the intrinsic success attribution group is less autonomous from the beginning and, for us to see the hypothesized results, the manipulation should be strong enough for this group's autonomy not only equate the other's, but also surpass it.

Fifty-six participants were lost to follow-up, either on week 6 or 12, leaving a final sample size of 45 participants (see flow of participants on Appendix A). No significant difference regarding observable characteristics was found between those who dropped out and those who continued to participate in the study, except in terms of education: 15 out of the 20 participants who had studied up to high school were lost to follow-up. When comparing baseline characteristics between treatment conditions only for those who finished the study, the intrinsic success attribution group was again found to present a significantly higher controlled regulation ($Mdn_{intrinsic} = 2.83$, $Mdn_{extrinsic} = 1.92$, $U = 2.966$, $p = 0.003$) and a significantly lower Relative Autonomy Index (RAI; $Mdn_{intrinsic} = 2.71$, $Mdn_{extrinsic} = 3.67$, $U = 2.180$, $p = 0.029$). Therefore, the initial difference between the groups remained (see Table 2).

Table 2. Characteristics of the Study's Final Sample

Participant Characteristics	Final Sample (n=45)	Intrinsic Success Attribution (n = 22)	Extrinsic Success Attribution (n = 23)	P-value
Age, mean (SD)	34,07 (11,04)	33,54 (10,59)	34,56 (11,67)	0,547 ^a
Women, N° (%)	30 (66,67)	14 (63,64)	16 (69,56)	0,673 ^b
Obese, N° (%)	14 (31,11)	5 (22,73)	9 (39,13)	0,235 ^b
Civil State, N° (%)				
Single	26 (57,78)	13 (59,09)	13 (56,52)	1,00 ^c
Married/Stable Union	16 (35,56)	8 (36,36)	8 (34,78)	
Divorced/Separated	1 (2,22)	0 (0)	1 (4,35)	
Widowed	2 (4,44)	1 (4,54)	1 (4,35)	
Education, N° (%)				
Elementary or Middle School (Incomplete)	2 (4,44)	1 (4,54)	1 (4,35)	0,956 ^c
Middle School (Complete)	0 (0)	0 (0)	0 (0)	
High School (Complete)	5 (11,11)	3 (13,64)	2 (8,70)	
Bachelor's Degree	20 (44,44)	9 (40,91)	11 (47,83)	
Post-graduate Degree	18 (40)	9 (40,91)	9 (39,13)	
Ethnicity, N° (%)				
White	25 (55,56)	10 (45,45)	15 (65,22)	0,313 ^c
Pardo	12 (26,67)	8 (36,36)	4 (17,39)	
Black	8 (17,78)	4 (18,18)	4 (17,39)	
Yellow	0 (0)	0 (0)	0 (0)	
Indian	0 (0)	0 (0)	0 (0)	
Full-time Employed, N° (%)	21 (46,67)	10 (45,45)	11 (47,83)	0,670 ^c
Made a diet in the past, N° (%)	38 (84,44)	19 (86,36)	19 (82,61)	0,526 ^c
Controlled Regulation, mean (SD)	2,52 (1,00)	2,93 (0,95)	2,13 (0,90)	0,006*** ^d
Autonomous Regulation, mean (SD)	5,67 (0,97)	5,72 (0,82)	5,62 (1,11)	0,724 ^d
Relative Autonomy Index, mean (SD)	3,15 (1,06)	2,79 (0,75)	3,48 (1,21)	0,026*** ^e
Perceived Competence Scale, mean (SD)	4,12 (1,04)	4,08 (1,09)	4,15 (1,01)	0,818 ^d
Initial Weight in kg, mean (SD)	79,67 (10,79)	78,26 (8,95)	81,01 (12,35)	0,399 ^d

Abbreviation: SD, standard deviation.

^a Mann-Whitney U test.

^b Two-tailed χ^2 test.

^c Fisher's exact test.

^d One-way ANOVA.

^e T-test for unequal variances.

Comparing how these measures for autonomy and competence evolved throughout the study for those who continued to participate helps us elucidate whether the manipulation worked and, if so, whether it was strong enough to overcome the challenge posed by this initial unbalance. Controlled regulation was no longer significantly different between the groups on week 6 ($Mdn_{intrinsic} = 3.06$, $Mdn_{extrinsic} = 2.87$, $U = 1.557$, $p = 0.119$) and this movement was driven by an increase in the controlled regulation experienced by the extrinsic success attribution group ($M_{week0} = 2.13$, $M_{week6} = 2.64$, $t(22) = 2.53$, $p = 0.02$). On week 12, however, the difference reappears and the intrinsic success attribution group presents a higher controlled regulation once again ($Mdn_{intrinsic} = 3.19$, $Mdn_{extrinsic} = 2.25$, $U = 2.443$, $p = 0.015$). At the same time, the autonomous regulation of both groups increased on week 6, but no significant difference was found between them ($Mdn_{intrinsic} = 6.4$, $Mdn_{extrinsic} = 6.4$, $U = 0.962$, $p = 0.336$).

The extrinsic success attribution group experiences a decrease in its autonomous regulation on week 12 ($M_{\text{week6}} = 6.4$, $M_{\text{week12}} = 6.03$, $t(22) = 2.92$, $p = 0.008$), but still no significant difference was found between the groups ($Mdn_{\text{intrinsic}} = 6.4$, $Mdn_{\text{extrinsic}} = 6.2$, $U = 0.343$, $p = 0.732$).

In sum, those results provide evidence that the manipulation worked in the way it was expected: after the intervention, the intrinsic success attribution group felt more autonomous, while the extrinsic success attribution group felt more controlled. However, these changes were not strong enough to promote an effect on the RAI, in which case the initial unbalance persisted on week 6 ($Mdn_{\text{intrinsic}} = 3.01$, $Mdn_{\text{extrinsic}} = 3.92$, $U = 2.68$, $p = 0.007$) and on week 12 ($Mdn_{\text{intrinsic}} = 2.9$, $Mdn_{\text{extrinsic}} = 3.5$, $U = 2.157$, $p = 0.031$). Furthermore, even though the extrinsic success attribution group experienced a significant increase in their perceived competence between weeks 0 and 6 ($M_{\text{week0}} = 4.15$, $M_{\text{week6}} = 4.75$, $t(22) = 2.3$, $p = 0.031$), no significant difference was found between the groups, neither on week 6 ($Mdn_{\text{intrinsic}} = 4.75$, $Mdn_{\text{extrinsic}} = 5$, $U = 0.603$, $p = 0.546$) nor on week 12 ($Mdn_{\text{intrinsic}} = 4.75$, $Mdn_{\text{extrinsic}} = 5.25$, $U = 1.048$, $p = 0.294$). All these changes are illustrated in Figures 2, 3, 4 and 5.

Figure 2. Controlled Regulation (weeks 0 to 12)

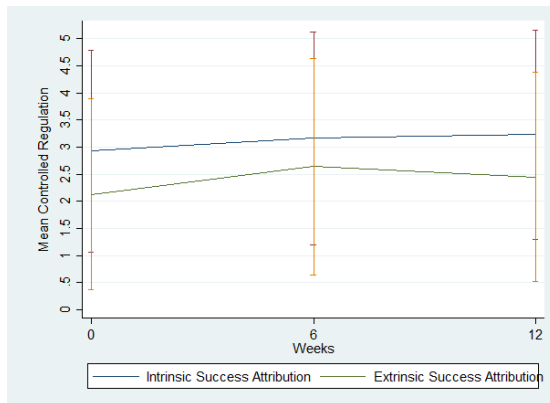


Figure 3. Autonomous Regulation (weeks 0 to 12)

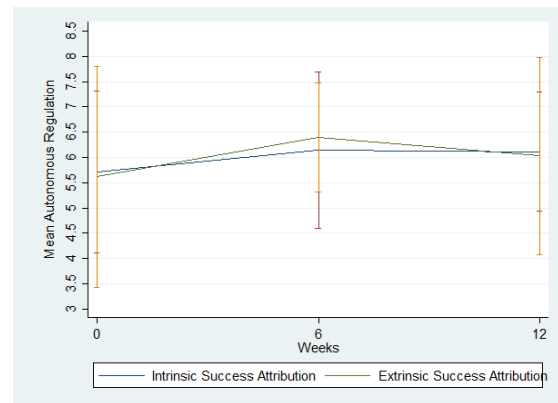


Figure 4. Relative Autonomy Index (weeks 0 to 12)

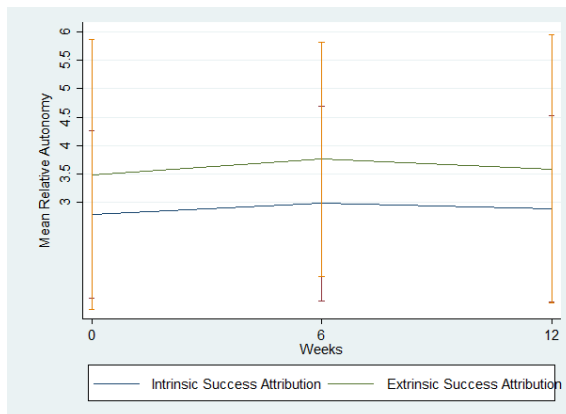
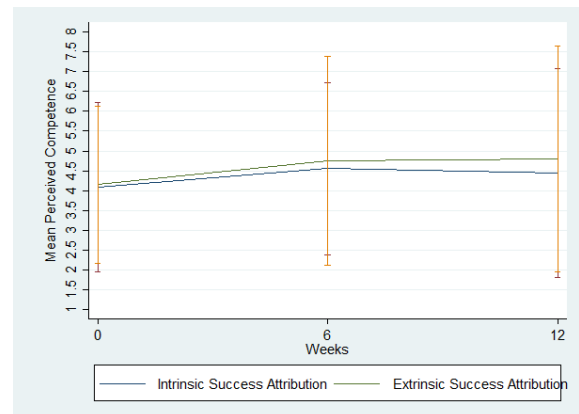
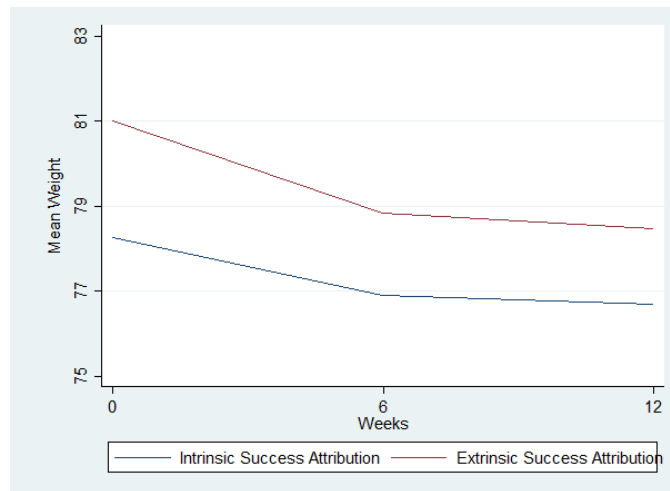


Figure 5. Perceived Competence (weeks 0 to 12)



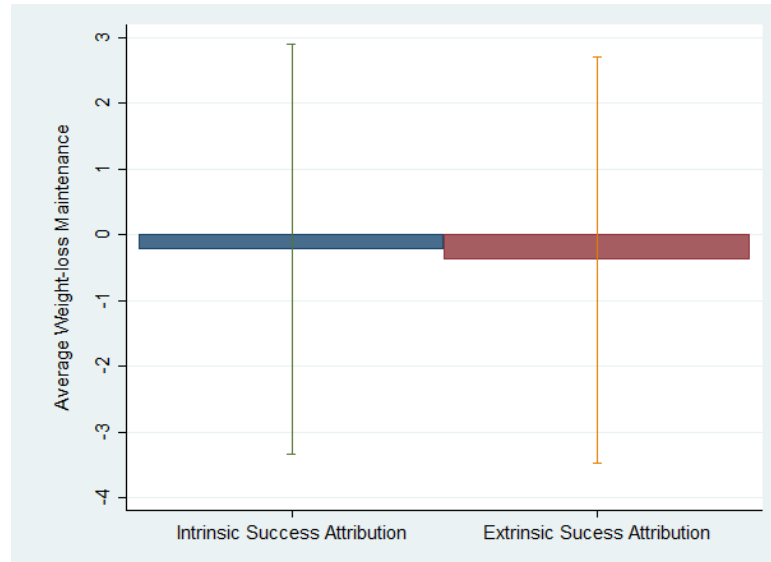
Seventeen of the 22 participants (77.27%) in the intrinsic success attribution condition showed some weight-loss at week 6, of which 5 (22.73%) managed to lose 3kg or more. The average (SD) weight-loss was 2kg (1.55) and the median was 1.8kg (interquartile range = 2.3). Of those, 12 (70.59%) managed to either maintain some weight-loss or even lose more weight by week 12. In the extrinsic success attribution condition, 19 of the 23 participants (82.61%) showed some weight-loss at week 6, among which 7 (30.43%) managed to lose 3kg or more. The average (SD) weight-loss was 2.69kg (1.49) and the median was 2.7kg (interquartile range = 2). Some weight-loss maintenance or increase was observed in 18 of those participants (94.74%) by week 12. Figure 6 shows how the average weight progressed throughout the study for each treatment group.

Figure 6. Average weight from enrollment to 12-week follow-up



No significant difference regarding weight-loss maintenance (in kilograms) was found between the conditions, as shown in Figure 7. This result holds when using a one-way ANOVA ($M_{\text{intrinsic}} = -0.218$, $M_{\text{extrinsic}} = -0.378$, $F(1, 43) = 0.12$, $p = 0.736$) or a Mann-Whitney U test ($Mdn_{\text{intrinsic}} = -0.3$, $Mdn_{\text{extrinsic}} = -0.5$, $U = 0.534$, $p = 0.593$). To ensure this outcome is robust, we tested for other specifications, namely weight-loss maintenance as a percentage of the absolute value of the initial weight-loss (as measured on week 6) (Mann-Whitney U test: $Mdn_{\text{intrinsic}} = -0.125$, $Mdn_{\text{extrinsic}} = -0.250$, $U = 0.125$, $p = 0.901$); weight-loss maintenance as a percentage of initial body weight (one-way ANOVA: $M_{\text{intrinsic}} = -0.003$, $M_{\text{extrinsic}} = -0.004$, $F(1, 43) = 0.06$, $p = 0.8$; Mann-Whitney U test: $Mdn_{\text{intrinsic}} = -0.004$, $Mdn_{\text{extrinsic}} = -0.007$, $U = 0.465$, $p = 0.642$); and total weight-loss (one-way ANOVA: $M_{\text{intrinsic}} = -1.573$, $M_{\text{extrinsic}} = -2.539$, $F(1, 43) = 1.23$, $p = 0.273$; Mann-Whitney U test: $Mdn_{\text{intrinsic}} = -0.65$, $Mdn_{\text{extrinsic}} = -2.8$, $U = 1.02$, $p = 0.307$). As shown on Table 3, the conclusion was the same: we could not find any significant difference between conditions.

Figure 7. Average Weight-loss Maintenance by Treatment Condition (in kg)



Outliers were found only when we calculated weight-loss maintenance as a percentage of the absolute value of the initial weight-loss. Those two observations were disregarded, and the analysis was repeated without them. Again, no significant difference was found between the conditions (Mann-Whitney U test: $Mdn_{intrinsic} = -0.125$, $Mdn_{extrinsic} = -0.25$, $U = 0.134$, $p = 0.894$).

Nine participants failed to lose weight at week 6, such that we cannot guarantee the intervention worked for them. Therefore, we repeated the analyses, now leaving them out. Once more, no significant difference was found. All analyses are summarized in Table 3.

Table 3. Analyses of Weight-loss Maintenance between Treatment Conditions

		Outcome Variable											
		Weight-loss Maintenance in kg			Weight-loss maintenance as a percentage of the absolute value of the initial weight-loss			Weight-loss maintenance as a percentage of initial body weight			Total weight-loss		
Formula	weight _{week12} - weight _{week6}			$\frac{\text{weight}_{\text{week12}} - \text{weight}_{\text{week6}}}{ \text{weight}_{\text{week6}} - \text{weight}_{\text{week0}} }$			$\frac{\text{weight}_{\text{week12}} - \text{weight}_{\text{week6}}}{\text{weight}_{\text{week0}}}$			weight _{week12} - weight _{week0}			
	Intrinsic	Extrinsic	p-value	Intrinsic	Extrinsic	p-value	Intrinsic	Extrinsic	p-value	Intrinsic	Extrinsic	p-value	
ITT													
ANOVA, mean	-0,218	-0,378	0,736		n/a		-0,003	-0,004	0,800	-1,573	-2,539	0,273	
ANCOVA, mean ^a	-0,218	-0,378	0,732		n/a		-0,003	-0,004	0,823	-1,573	-2,539	0,458	
Mann-Whitney Test, median	-0,3	-0,5	0,593	-0,125	-0,25	0,901	-0,004	-0,007	0,642	-0,65	-2,8	0,307	
Mann-Whitney Test, median (no outliers)		n/a		-0,125	-0,25	0,894		n/a			n/a		
CACE													
ANOVA, mean	-0,447	-0,637	0,726		n/a		-0,006	-0,007	0,798	-2,453	-3,326	0,323	
ANCOVA, mean ^a	-0,447	-0,637	0,676		n/a		-0,006	-0,007	0,781	-2,453	-3,326	0,369	
Mann-Whitney Test, median	-0,3	-0,7	0,526	-0,13	-0,286	0,496	-0,004	-0,009	0,590	-2,6	-3	0,303	
Mann-Whitney Test, median (no outliers)		n/a		-0,13	-0,268	0,668		n/a			n/a		

^a ANCOVA controlling for Initial Controlled Regulation

^a ANCOVA controlling for Initial Controlled Regulation

5 DISCUSSION

Through a 12-week field experiment, I have attempted to compare how individuals nudged to use different success attribution strategies performed in terms of weight-loss maintenance in the long run. The hypothesis was that individuals nudged to attribute their success to intrinsic factors, namely their autonomy and competence, would maintain the weight-loss achieved during the intervention for a longer timeframe than individuals nudged to attribute it to extrinsic factors (the possibility of winning a travel voucher). After several tests, no significant difference was found between the treatment conditions. These results hold even when using different specifications of the outcome variable, accounting for outliers, and computing both the ITT and the CACE.

Despite the unexpected results, we cannot refute the initial hypothesis, since this study had a few limitations. First, the treatment conditions were not initially balanced in terms of perceived autonomy relative to dieting and entering the study. The intrinsic success attribution group experienced a significantly higher controlled regulation and, consequently, a lower relative autonomy. In other words, this means that individuals in this group had a tendency to be very harsh on themselves and were very self-conscious, often claiming to experience feelings of disappointment, anger/hate, guilt and shame when it comes to dieting. Since our manipulation depended on making this group more autonomous than that of extrinsic success attribution to be considered effective, it had to be much stronger than it actually was. As a result, we did not achieve the desired effect and could not properly test our hypothesis.

Second, it might be that the manipulation was not strong enough because participants were not very attentive to it. We have attempted to nudge their success attribution three times: two through WhatsApp messages, when they reported their weight on weeks 2 and 4, and one through a certificate, on week 6. In the latter case, few people read the certificate before putting it away; in the former, we cannot guarantee its performance, but some participants reported having paid little attention to it. Even though we have spotted an increase in the controlled regulation experienced by the extrinsic success attribution group and an increase in the autonomous regulation experienced by the intrinsic success attribution group – which were the results expected from an effective manipulation –, this was not large enough to promote a change in the relative autonomy score of either group.

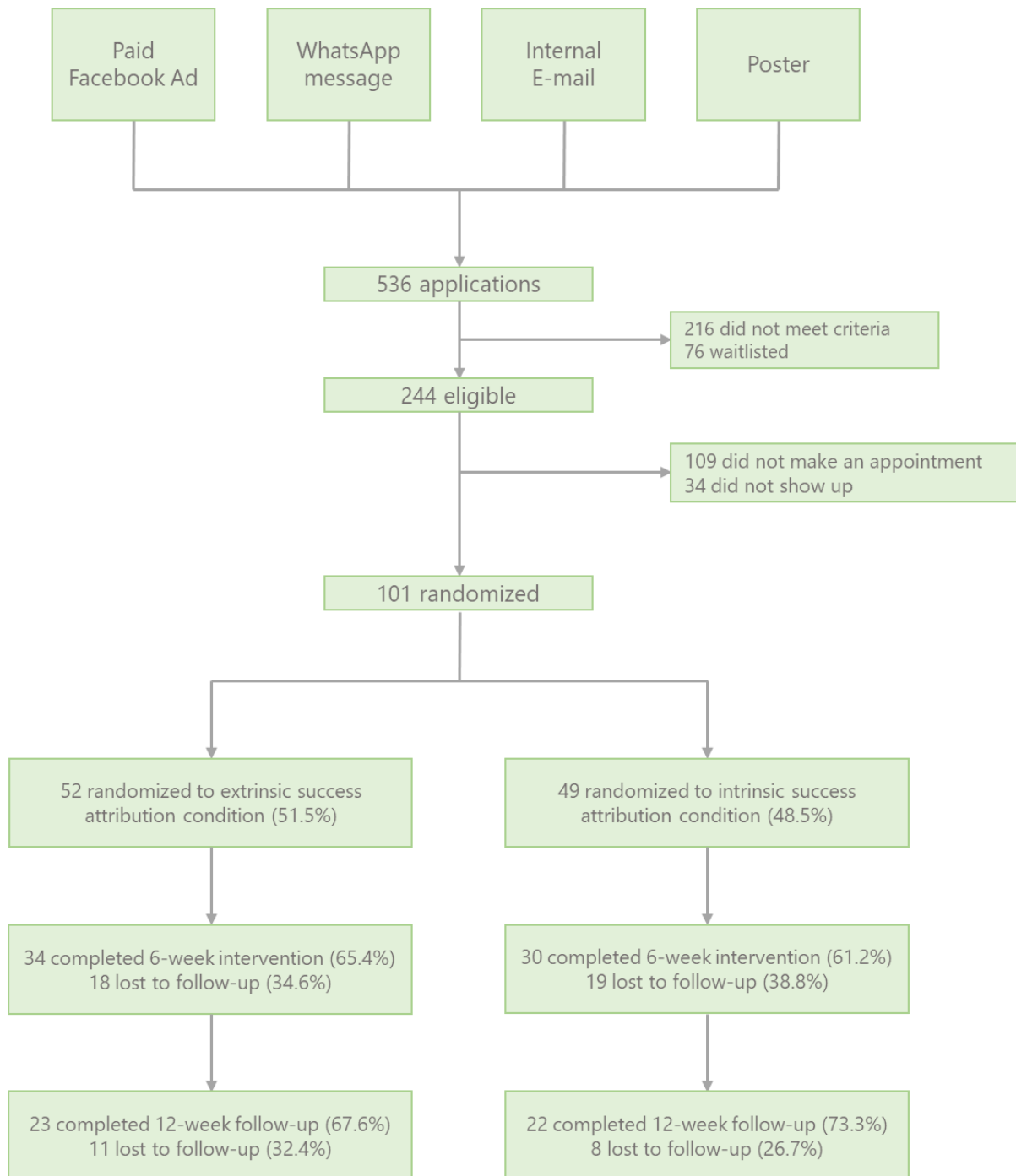
Third, the pointing system used to define the number of lottery entries was deemed confusing by many participants. Even though we have explained it upfront, given them a folder

with all the rules and instructions, and left an open channel for questions that could possibly arise, many individuals reported, during the follow-up weigh-ins, not knowing whether they were still eligible for the lottery. Some thought that only those who met the 3kg goal were eligible, while others thought that the biggest loser would be the winner. This confusion might have discouraged some people to remain in the study or to lose more weight, interfering in our results.

Fourth, the attrition rate was much higher than anticipated. A possible explanation is that, as mentioned before, participants who were not able to lose weight during the first six weeks felt demotivated to return or thought they were no longer eligible for the lottery, so they decided to drop out. Another possible reason is that some participants were more interested in getting the free nutritional counseling than in the prize itself, so they had no reason to return to the follow-up assessments. Finally, some participants lived far from the university and possibly thought that it was not worth returning for the mere possibility of winning a prize, such that the incentive was not good enough for them.

Lastly, the questionnaire employed to compute participants' relative autonomy (RAI) did not explicitly mention the extrinsic reward, i.e. the travel voucher. Since the reward is expected to directly impact how participants perceive their dieting behavior as arising from an external locus of causality, it could be argued that the RAI observed for the participants under the extrinsic success attribution condition was potentially overestimated. Therefore, we cannot confidently state whether the manipulation worked or not, since the instrument used to measure it was incomplete.

Considering all the factors mentioned above, there is a lot of room for improvement, such that future studies addressing these limitations should be more fruitful in confidently testing for the effect of success attribution on weight-loss maintenance.

APPENDIX A – Flow of participants

APPENDIX B – Study's Instructions and Timeline

DESAFIO Cuide-se Bem

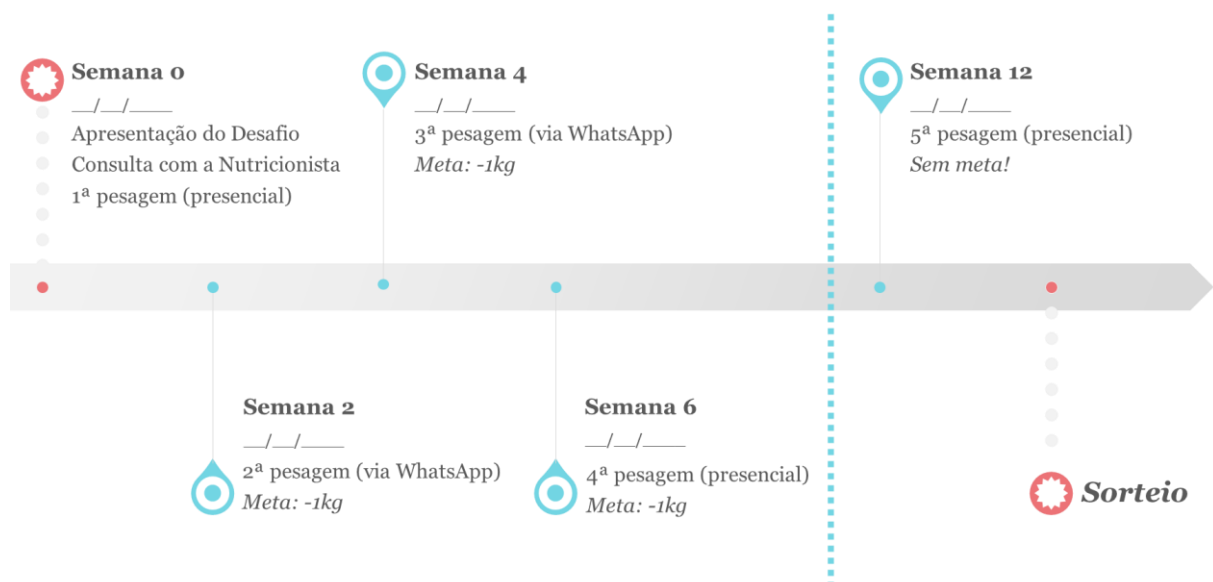
Olá!

Seja bem-vindo(a) ao Desafio Cuide-se Bem. Ele foi elaborado com muito carinho para te ajudar a dar o primeiro passo em direção a uma vida mais saudável. Esta cartilha contém as informações sobre como funcionará o desafio. Caso tenha alguma dúvida, você pode entrar em contato conosco através do e-mail (desafiocuidesebem@gmail.com), Facebook (página @desafiocuidesebem), ou telefone/WhatsApp (21 97284-9464).

Sobre o Desafio:

O objetivo do desafio é te incentivar a adotar hábitos de vida mais saudáveis, começando pela alimentação. Para isso, ao começar o programa, você terá uma consulta com a nossa nutricionista, que te mostrará como se alimentar corretamente, e terá a meta de perder 3kg ao longo de 6 semanas. Seu progresso será reavaliado a cada 2 semanas, sendo de forma remota (via WhatsApp) nas semanas 2 e 4 e de forma presencial (nas dependências da FGV) na semana 6. **Após esse período, você não terá mais uma meta de perda de peso.** Seis semanas após o fim do programa, isto é, na semana 12, você será convidado a fazer uma última avaliação presencial, de forma que possamos checar se a sua perda de peso se manteve.

Cronograma:



Premiação:

Ao final do desafio, todos os participantes irão concorrer ao sorteio de R\$1.000,00 (mil reais) em créditos no site de viagens Hotel Urbano. Para isso, cada participante receberá os seus “números da sorte”. A quantidade de “números da sorte” de cada um irá depender do cumprimento das seguintes condições:

- a) comparecer ao primeiro encontro presencial, na semana 0 (vale 1 “número da sorte”);
- b) reportar o peso, via WhatsApp, para os pesquisadores nas semanas 2 e 4 (vale 1 “número da sorte” cada);
- c) comparecer às avaliações presenciais nas semanas 6 e 12 (vale 2 “números da sorte” cada);
- d) atingir a meta de perda de peso (1kg) das semanas 2, 4 e 6 (vale 2 “números da sorte” cada).

Como queremos sempre te incentivar a completar o desafio com sucesso, iremos dar os “números da sorte” do item (d) também aos participantes que conseguirem atingir a meta com atraso (e retirar os números daqueles que ganharem peso novamente). Por exemplo, se você não conseguiu perder 1kg na semana 2, mas perdeu todos os 3kg propostos ao final da semana 6, você receberá todos os 6 “números da sorte” possíveis segundo o item (d). Da mesma forma, se você bater a meta na semana 4, isto é, tiver perdido 2kg até então, mas depois ganhar peso novamente e chegar à semana 6 tendo perdido apenas 1kg no total, você ganhará apenas 2 “números da sorte” segundo o item (d).

Assim, quanto mais ativa for a sua participação no desafio, **maiores são as suas chances de ganhar!** Mas fique atento: caso você não compareça às avaliações presenciais das semanas 6 e 12, entenderemos que você desistiu do desafio e, portanto, **não estará elegível a participar do sorteio.** Então, certifique-se de que poderá vir nas próximas avaliações presenciais ou entre em contato conosco para remarcar-las. Do contrário, você não poderá participar do sorteio e não concorrerá ao prêmio.

Todos os participantes serão avisados por e-mail e/ou WhatsApp sobre a data em que o sorteio ocorrerá e poderão estar presentes para assisti-lo, caso queiram.

Um abraço e boa sorte! 😊

Beatriz Fialho
Mestranda, EBAPE-FGV

APPENDIX C – Sociodemographic & Motivation Questionnaire

DESAFIO *Cuide-se Bem*

FORMULÁRIO DE DADOS SOCIODEMOGRÁFICOS:

Código do participante: _____

Idade: _____

Sexo:

() FEMININO

() MASCULINO

Estado Civil:

() SOLTEIRO

() CASADO/UNIÃO ESTÁVEL

() DIVORCIADO/SEPARADO

() VIÚVO

Educação:

() ENSINO FUNDAMENTAL INCOMPLETO

() ENSINO FUNDAMENTAL COMPLETO

() ENSINO MÉDIO COMPLETO

() GRADUAÇÃO COMPLETA

() PÓS-GRADUAÇÃO COMPLETA

Etnia:

() BRANCO

() PARDO

() NEGRO

() AMARELO

() INDÍGENA

Ocupação:

() EMPREGADO EM TEMPO INTEGRAL

() EMPREGADO EM TEMPO PARCIAL

() PRESTADOR DE SERVIÇOS

() APOSENTADO

() DESEMPREGADO

() DONA DE CASA

() OUTRO

Você já fez alguma dieta antes? () SIM () NÃO

A participação em programas de perda de peso e bem-estar, como este, pode se dar por diversas razões. Numa escala de 1 a 7, onde 1 representa “discordo totalmente” e 7 representa “concordo totalmente”, assinale o quanto você concorda com as afirmações abaixo:

1 2 3 4 5 6 7

Discordo
Totalmente

Concordo
Totalmente

Eu decidi participar do Desafio Cuide-se Bem porque...

1. Eu não vou gostar muito de mim mesmo(a) até perder peso.

1 2 3 4 5 6 7

2. As pessoas vão gostar mais de mim quando eu for magro(a).

1 2 3 4 5 6 7

3. É muito importante para mim ser mais magro(a).

1 2 3 4 5 6 7

4. Eu quero muito fazer algumas mudanças na minha vida.

1 2 3 4 5 6 7

Se eu continuar no Desafio, provavelmente será porque...

5. Eu me sentirei um fracasso se não continuar.

1 2 3 4 5 6 7

6. As pessoas vão me achar fraco(a) se eu não continuar.

1 2 3 4 5 6 7

7. Eu me sentirei muito mal comigo mesmo(a) se eu não continuar.

1 2 3 4 5 6 7

8. As pessoas vão ficar bravas comigo se eu não continuar.

1 2 3 4 5 6 7

9. Eu sinto que essa é a melhor maneira de me ajudar.

1 2 3 4 5 6 7

Eu pretendo perder peso porque...

10. Eu terei vergonha de mim mesmo(a) se eu não perder.

1 2 3 4 5 6 7

11. Eu vou me odiar se não conseguir controlar meu peso.

1 2 3 4 5 6 7

12. Meus amigos/familiares não gostam da minha aparência.

1 2 3 4 5 6 7

13. Estar com sobrepeso torna mais difícil fazer muitas coisas.

1 2 3 4 5 6 7

Eu concordei em seguir todas as orientações do programa porque...

14. Tenho medo de ter problemas com os pesquisadores se eu não fizer tudo corretamente.

1 2 3 4 5 6 7

15. Eu vou me sentir culpado(a) se eu não seguir todas as orientações.

1 2 3 4 5 6 7

16. Eu quero que os outros vejam que eu realmente estou tentando perder peso.

1 2 3 4 5 6 7

17. Eu acredito que isso realmente vai me ajudar a resolver o meu problema.

1 2 3 4 5 6 7

18. É importante para mim que meus esforços deem frutos.

1 2 3 4 5 6 7

Eu tenho confiança na minha habilidade de perder peso.

1 2 3 4 5 6 7

Eu consigo lidar com o meu peso hoje.

1 2 3 4 5 6 7

Hoje eu me sinto capaz de atingir meu peso ideal sozinho(a).

1 2 3 4 5 6 7

Eu me sinto capaz de lidar com o desafio de controlar o meu peso.

1 2 3 4 5 6 7

Data: __/__/__

Rubrica: _____

APPENDIX D – Health & Eating Behavior Questionnaire

DESAFIO *Cuide-se Bem*

FORMULÁRIO DE ANAMNESE - NUTRICIONISTA:

Código do participante: _____

- | | |
|--------------------------------------|---|
| 1) O que você busca nessa consulta? | 4) Quantas refeições costuma fazer por dia? _____ |
| | 5) Quantos copos de água bebe por dia? _____ |
| | 6) Em que horário costuma ter mais fome? _____ |
| 2) Já foi em um nutricionista antes? | 7) Quando tem vontade de beliscar, qual tipo de alimento costuma comer? |
| () Sim () Não | |
| 3) Já fez dieta antes? | 8) Você costuma planejar as suas refeições? _____ |
| () Sim () Não | 9) Você costuma preparar/cozinhar as suas próprias refeições? _____ |

10) Comportamento alimentar:

- | | |
|--|--|
| a. Mastigação
() lenta () rápida | f. Como “sem pensar”
() Sim () Não |
| b. Como demais
() Sim () Não | g. Comedor noturno
() Sim () Não |
| c. Dependo de itens de conveniência
() Sim () Não | h. Como fazendo outra coisa (celular, TV, lendo...)
() Sim () Não |
| d. Pulo refeições
() Sim () Não | i. Comedor emocional (quando está triste, cansado, deprimido, ansioso...)
() Sim () Não |
| e. Belisco muito
() Sim () Não | |

11) Exercícios:

- | | |
|---------------------------------------|------------------------|
| a. Faz exercícios?
() Sim () Não | b. Qual(is)? |
| | c. Com que frequência? |

12) Saúde Física:

- a. Peso:
 - ☐ ioio ☐ estável
 - ☐ aumento gradual
- b. Costuma ingerir bebidas alcoólicas?
 - ☐ Sim ☐ Não
- c. Qual(is)? Quantas vezes por semana? Quantidade?
- d. Fumante? ☐ Sim ☐ Não

13) Evacuação e digestão:

- ☐ Normal ☐ Obstipado ☐ Diarreico
- ☐ Irregular ☐ Gases ☐ Desconforto
- ☐ Sensação de esvaziamento completo
- ☐ Distensão abdominal

14) Quais medicamentos ou suplementos costuma tomar?**15) Saúde mental e emocional:**

- a. Quantas horas de sono costuma ter? _____
- b. Tem dificuldade para dormir?
 - ☐ Sim ☐ Não
- c. Você se sente frequentemente...
 - ☐ triste?
 - ☐ deprimido?
 - ☐ agitado?
 - ☐ estressado?
 - ☐ ansioso?
- d. Tem ronco/apneia?
 - ☐ Sim ☐ Não

- Recordatório de 24h
- Outras questões de saúde?
- Medidas:
 - ✓ Peso:
 - ✓ Altura:
 - ✓ Percentual de gordura corporal:
 - ✓ Medida da cintura:
 - ✓ Medida do quadril:

APPENDIX E – Nutritional Guidelines

DESAFIO

Cuide-se Bem

Guia para te ajudar a planejar suas refeições



Atenção ao tamanho das porções:

- Carne = tamanho da palma da sua mão (sem os dedos)
- Peixe = tamanho da sua mão (incluindo os dedos)
- Verduras = tamanho das suas duas mãos juntas
- Carboidratos = tamanho do seu punho fechado
- Oleaginosas = tamanho da sua mão em concha
- Chocolate = tamanho do seu dedo indicador

Sugestões de desjejum/lanches:

- Vegetais em palitos + pastinha (ex.: homus)
- Iogurte natural/grego + Frutas
- Mix de oleaginosas
- Salada de frutas
- Smoothies



Prefira sempre o que vem da natureza!

RECONHEÇA E ENTENDA OS ULTRAPROCESSADOS

IN NATURA	PROCESSADO	ULTRAPROCESSADO
Milho verde	Milho em lata	Salgadinho de milho
Peixe fresco	Peixe em lata	Empanado de peixe (nuggets)
Abacaxi	Abacaxi em calda	Suco de abacaxi de caixinha

- 1 Faça dos alimentos IN NATURA a base da sua alimentação.
- 2 LIMITE o consumo de alimentos PROCESSADOS.
- 3 EVITE o consumo de alimentos ULTRAPROCESSADOS.

UMA ALIMENTAÇÃO SAUDÁVEL VAI ALÉM DOS ALIMENTOS QUE VOCÊ COME!

- 1 – Prefira porções menores.
- 2 – Não tenha pressa. Aprecie o alimento. Comer é mais do que matar a fome.
- 3 – Evite eletrônicos e outras distrações durante a refeição. Mantenha sua atenção plena no ato de se alimentar.
- 4 – Preste atenção a como você se sente depois de comer. Isso ajudará a promover novos hábitos.
- 5 – Planeje refeições rápidas e fáceis e organize um cardápio semanal (ou até mensal). Isso torna mais difícil “cair em tentação”.
- 6 – Faça versões caseiras e mais saudáveis dos salgadinhos e guloseimas que você mais gosta.
- 7 – Sempre dê preferência a alimentos in natura ou minimamente processados (veja quadro ao lado).
- 8 – Prepare as suas próprias refeições sempre que possível. Dessa forma, você tem maior controle sobre o que está colocando no prato.
- 9 – Beba água!

DESAFIO

Cuide-Se Bem

ORIENTAÇÕES NUTRICIONAIS

O que comer:

- ✓ Coma alimentos naturais. Alimentos que vem dentro de embalagens, como sacos e caixinhas, devem ser evitados;
- ✓ Consuma leite e derivados desnatados ou com baixo teor de gordura (como ricota e cottage);
- ✓ Prefira os pães integrais, de centeio, aveia ou trigo. Eles possuem um maior teor de fibras, que favorecem o bom funcionamento do organismo;
- ✓ Procure comprar frutas, verduras e legumes da época. Eles costumam ser mais baratos e nutritivos;
- ✓ Evite salgados de padaria (joeiho, pasteis, pão de queijo, folhados, etc.) e alimentos congelados (hambúrguer, lasanhas, almôndegas, quibe, batata-frita, nuggets, etc.);
- ✓ Evite ao máximo consumir embutidos (linguiça, presunto, mortadela, peito de peru, salsicha, salaminho, etc.) e carnes gordurosas (dobradinha, costela, rabada, língua, etc.);
- ✓ Evite ao máximo o consumo de refrigerantes e bebidas açucaradas (Coca-cola®, Pepsi®, Guaraná®, Fanta®, guaraná concentrado, suco em pó / de caixinha, etc.);

Como comer:

- ✓ Coma em ambientes apropriados (locais limpos, confortáveis e tranquilos) e não realize outra atividade enquanto come (assistir TV, mexer no celular, ler jornal...);
- ✓ Sempre que possível, prefira comer em companhia, com familiares, amigos ou colegas de trabalho ou escola;
- ✓ Não coma até se sentir "cheio". Procure dividir seu estômago em quatro partes e, quando sair da mesa, 1 dessas partes deve estar vazia;
- ✓ Coma em horários regulares e não deixe passar muito tempo entre as refeições;
- ✓ Evite beliscar entre as refeições;
- ✓ Troque refrigerantes e bebidas açucaradas por sucos de fruta e por água e busque ingerir líquidos 30 minutos antes ou uma hora depois das refeições;
- ✓ Use pouco açúcar ou adoçante. Procure sentir o sabor natural das frutas e preparações.

Como fazer:

- ✓ Abuse das ervas aromáticas (salsinha, cebolinha, orégano, manjeriço, etc.) e dos temperos naturais (alho, cebola, limão, etc.) na hora de temperar seus alimentos;
- ✓ Prepare os alimentos GRELHADOS, COZIDOS, REFOGADOS, ASSADOS ou NO VAPOR;
- ✓ Retire a gordura aparente das carnes e a pele das aves antes da preparação;
- ✓ Prepare o feijão sem carnes, afinal, a gordura delas passa para o caldo;
- ✓ Retire o saleiro da mesa e use pouco sal no preparo dos alimentos;
- ✓ Não use temperos prontos (Knorr®, Aisco®, Sazón®, Maggi®, etc.);
- ✓ Atente para a quantidade de óleo usado no preparo dos alimentos. Utilize óleo de soja nas seguintes proporções:

01 xícara de arroz cru (200g)	—————→	1 c. sobremesa
01 xícara de feijão cru (180g)	—————→	2 c. sobremesa
700g de frango, carne bovina ou peixe cru	—————→	2 c. sobremesa
01 escumadeira cheia de legumes (100g)	—————→	1 c. sobremesa

Estilo de vida:

- ✓ Beba água! Filtrada ou fervida, procure beber, pelo menos, 8 copos por dia;
- ✓ Mexa-se! A prática de atividade física é essencial para uma vida saudável;
- ✓ Durma bem! As horas de sono também são fundamentais para sua saúde e qualidade de vida;
- ✓ Planeje-se! Pense sobre seus lanches e refeições com antecedência, assim, na hora da fome, você não comerá qualquer besteira.

APPENDIX F – Messages used in the manipulation

WEEKS 2 AND 4:

Text messages for the intrinsic motivation condition:

When the goal was met/exceeded: “Parabéns, [*nome do participante*]! Sua motivação deu frutos. Graças à sua força de vontade e determinação, você atingiu a meta dessa semana. Continue o bom trabalho!”

When the goal was NOT met: “[*nome do participante*], infelizmente, você não atingiu a meta. Mas tenho certeza que com a sua força de vontade e determinação, você conseguirá atingir a meta na próxima semana. Não desanime!”

Text messages for the extrinsic motivation condition:

When the goal was met/exceeded: “Parabéns, [*nome do participante*]! O incentivo financeiro funcionou. Você atingiu a meta dessa semana e agora tem mais chances de ser sorteada(o) com o voucher de R\$1000,00 do Hotel Urbano. Continue o bom trabalho!”

When the goal was NOT met: “[*nome do participante*], o incentivo financeiro dessa vez não funcionou. Mas tenho certeza que na próxima semana você atingirá a meta e aumentará suas chances de ser sorteada(o) com o voucher de R\$1000,00 do Hotel Urbano. Não desanime!”

WEEK 6:

Message in the certificate for the intrinsic motivation condition:

When the goal was met/exceeded: “Orgulhosamente certificamos que [*nome do participante*] concluiu com êxito o programa de perda de peso e, graças ao seu empenho e determinação, perdeu [*perda de peso do participante*] em 6 semanas e está mais próximo(a) do seu peso ideal. Parabéns pela conquista!”

When the goal was NOT met: “Certificamos que [*nome do participante*] concluiu o programa de perda de peso e, graças ao seu empenho e determinação, perdeu [*perda de peso do participante*] em 6 semanas e está mais próximo(a) do seu peso ideal. Parabéns pela conquista!”

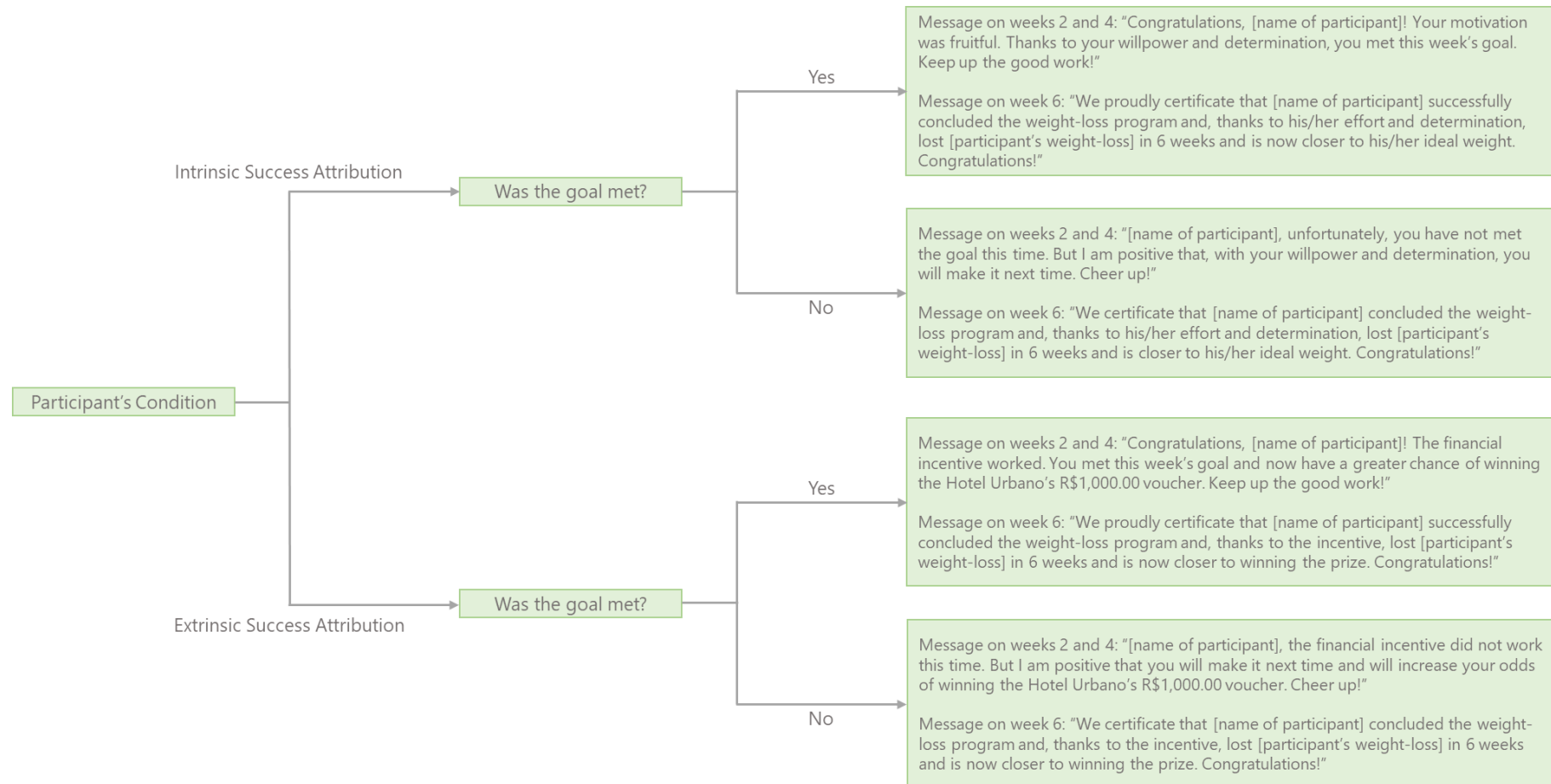
Message in the certificate for the extrinsic motivation condition:

When the goal was met/exceeded: “Orgulhosamente certificamos que [*nome do participante*] concluiu com êxito o programa de perda de peso e, graças ao incentivo,

perdeu [*perda de peso do participante*] em 6 semanas e está mais próximo(a) do prêmio. Parabéns pela conquista!”

When the goal was NOT met: “Certificamos que [*nome do participante*] concluiu o programa de perda de peso e, graças ao incentivo, perdeu [*perda de peso do participante*] em 6 semanas e está mais próximo(a) do prêmio. Parabéns pela conquista!”

APPENDIX G – Schematic Representation of the Manipulation Messages



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