Universidade de Brasília – UnB
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Structured and unstructured regulation: Priming induction and effects on task performance.

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Abstract

Self-regulation has been investigated on the past decades in many fields, and even though contributions have enlightened the understanding of a vast array of behaviors, the development of general explanatory models hardly reaches a consensus. Even relatively consensual theories like ego depletion have been recently questioned, and researchers are still in search of better models to describe the self-regulatory processes. A recent contribution on the field suggests that the presence or absence of goals may lead to different self-regulatory states, named as structured and unstructured regulation. No further attempts on this line of research have been made, even though it has potential to give significant contributions. The main objective of this thesis is to develop an explanatory model of self-regulation, based on the suggested self-regulatory states, which is hereby named structured and unstructured self-regulation model (SUSR). To develop the model, a sequence of experiments was designed and executed to test if the model is feasible and which variables are important to the process as moderators (experiments 1 and 2). Also, the information processing and the subsequent responses were investigated (experiment 3), and, as an attempt to verify a practical use of the model, its effects on sports performance were evaluated (experiment 4). Results suggest that the model is feasible, goal presence had different kinds of effects throughout the experiments and some of the moderators need to be further investigated, such as self-control and self-efficacy.

Keywords: self-regulation; goals; performance.

Resumo

A autorregulação tem sido investigada nas últimas décadas em muitos campos, e apesar do fato de que contribuições têm clarificado a compreensão de uma vasta gama de comportamentos, o desenvolvimento de modelos explicativos gerais dificilmente chega a um consenso. Mesmo as teorias relativamente consensuais, como a depleção do ego, têm sido questionadas recentemente, e os pesquisadores ainda estão em busca de melhores modelos para descrever os processos de autorregulação. Uma contribuição recente no campo sugere que a presença ou ausência de metas pode levar a diferentes estados de autorregulação, denominados como regulação estruturada e não estruturada. Não foram feitas outras tentativas nesta linha de pesquisa, embora ela tenha potencial para dar contribuições significativas. O objetivo principal desta tese é desenvolver um modelo explicativo de autorregulação, baseado nos estados autorregulatórios sugeridos, o qual é denominado modelo de autorregulação estruturada e não estruturada (SUSR). Para desenvolver o modelo, foi projetada e executada uma sequência de experimentos para testar se o modelo é viável e quais variáveis são importantes para o processo como moderadoras (experimentos 1 e 2). Além disso, o processamento da informação e as respostas subsequentes foram investigadas (experimento 3) e, como uma tentativa de verificar o uso prático do modelo, seus efeitos no desempenho esportivo foram avaliados (experimento 4). Os resultados sugerem que o modelo é viável, a presença de metas apresentou diferentes tipos de efeitos ao longo dos experimentos e algumas das variáveis moderadores precisam ser mais investigadas, como autocontrole e auto eficácia.
Palavras-chave: autorregulação; metas; desempenho.

Introduction

There is a relatively consensual perception that consciousness is the control axis of our behavior, and therefore, our actions are the result of conscious choices. However, a significant portion of our actions are actually the result of automatic processes, biased and in many ways not yet understood by the scientific community (Bargh, 2014). The effort to understand these behaviors, specifically in the context of automatic cognitive processes, is one of the most important issues in cognitive and social psychology.

Even though the general notion of behavior being consciously controlled is well accepted, the understanding among researchers is that there are at least two levels of consciousness. A basic, primal and automatic one, responsible for some low-level processes, and a more intricate type, responsible for reasoning, sense of self and other complex phenomena. The second type is described as unique to humans, while the first is shared with other types of mammals (Baumeister, Masicampo, & Vohs, 2011).

The literature on social psychology suggests that behavior is a result of situational information processing, through the second type of consciousness, but also affected by automatic and somehow uncontrollable forces and subtle environmental cues (Bargh, Schwader, Hailey, Dyer, & Boothby, 2012; Baumeister et al., 2011; Frith & Frith, 2012). Considering the brain tendency to save energy and automatize, it is argued that most daily and routine behaviors and reactions are automatic, with consciousness modulating the influence and control of automatic responses.

On the other hand, general behavior needs a more consciously controlled approach, which means that daily, individuals are faced with a vast array of situations that demand planned or organized responses. Sometimes situations are characterized with clear goals to be

achieved, for example in work related situations, where standards are defined to be followed or a specific performance milestone guides behavior towards it. Some situations, even though lack a specific goal to be achieved, are necessarily executed in an intentional way, for example, going home after work, when there is not a specific time to be there, but there is a need to get there somehow.

Interestingly, from time to time individuals deal with goals in a striving, motivational way, pursuing goals as a strategy to achieve success and endeavor in many areas, while on other situations, it seems hard to pursuit goals, which generally leads to effort reducing or simply abandoning circumstances. Considering those patterns, it is plausible to hypothesize that individuals regulate behavior differently in situations with or without specific goals, which may be related to different self-regulatory states, with diverse characteristics, that needed to be investigated to clarify the self-regulatory processes in each case and illuminate the understanding on the phenomenon.

Also, the results from the research of variables that affect those plausible self-regulatory states may help individuals to adopt better strategies for each kind of circumstances, having or not a specific goal to achieve. The present dissertation intends to shed light on those questions, developing a self-regulatory model to explain how individuals regulate behavior with and without goals, and how those states may affect general performance.

Conscious and Unconscious Aspects of Behavior

Conscious thought is responsible for behavior in diverse ways, activating motivation, setting goals, overriding automatic responses, controlling impulsive actions or, as an integrative instance, through planned behavior, allowing the individual to deliberate,

prearrange, calculate, strategize and choose a specific behavioral response. Humans are even able to alter behavior as an optimized response to nonpresent contingencies, calculating consequences ahead and evaluating previous experiences, cultural norms and other abstract aspects in order to enhance social performance (Baumeister et al., 2011).

Well debated in recent years, dual-process models are often presented as a derivation of this understanding, describing automatic and reasoned processes as Type 1 and Type 2, respectively. Autonomous processes, generally linked to basic, automatic and default responses are described as being conducted by Type 1 systems, while high order processing, such as reasoning, planning, intentional and goal-directed responses are defined as results of Type 2 processes (Stanovich & Toplak, 2012).

Studies in cognitive psychology, neuroscience and social psychology have been offering sturdy support for dual-process explanations, and even if we consider marginal differences among theorists, the main aspect here is that behavior is understood as a conscious process, even if sometimes affected by unconscious content. Literature on dual-process theories also show that since Type 1 processes are mostly autonomous, thus not requiring conscious control, they involve minimal cognitive requirements, facilitating its usage and aligning with the general resource-optimizing efforts of the brain. On the other side, Type 2 processes have been described as an overriding force, relying on more high level processing to optimize behavioral responses (Evans & Stanovich, 2013).

Even when we consider that studies on automaticity have enlighten the understanding of many behavioral processes, it has been suggested that conscious thought is generally used to integrate information, while automatic processes are more related to how information is taken in (Bargh & Chartrand, 2000; Moors & De Houwer, 2006). A common distinction is made among preconscious, conscious and post conscious processes. Preconscious and post

conscious are both unconscious processes, with the first being based on information that was perceived unconsciously, while the latter is based on information that was perceived consciously (Djiksterhuis, 2010). The conscious processes, on the other hand, are those in which the individual is aware of the various aspects of the process.

Considering the unconscious processes, there is an important distinction regarding goal-dependency between preconscious and post conscious. Preconscious is caused by effortlessly perceived sensory inputs – thus, not goal dependent - which can activate a series of high-level cognitive processes such as those involved in social behavior. Post conscious processes are goal-dependent, since they are based on information consciously perceived, such as a goal. The unconscious feature in this case is that the individual is not aware of the process and can pursue a goal without intention (Bargh et al., 2012).

The consciousness, even though somehow affected by automatic and unconscious processes, is responsible for main social tasks, such as verbal communication, intentional behavior, understanding of social norms and other forms of direct control of actions, which is why it is important to investigate how those kinds of processes affect behavior in general. The general understanding is that consciousness affects behavior in four major aspects.

First, consciousness is responsible to integrate behavioral responses across time, allowing individuals to use information from previous experiences to enhance behavior in the present. Second, the understanding, adoption and adaptation to cultural norms is also conducted as a conscious process. Third, it works as a major instance on decision making, especially in the development and evaluation of alternatives. Finally, as the fourth aspect, consciousness is responsible for integrating unconscious elements with conscious ones, generating a seemingly conscious response, but affected by unconscious processes (Baumeister et al., 2011).

Taking specifically this fourth aspect in consideration, literature on cognitive psychology has established that the responses an individual give are often biased, sometimes even in a counterintuitive way, such as probability assessment, confirmation biases, over projection of own beliefs onto others and unsound framing, just to give some examples (Stanovich & West, 2003).

Recent research has contributed with a clearer understanding on how the individual achieve information from the environment and how this information is processed in order to provide the basis for social interactions and general behavior (Dijksterhuis & Aarts, 2010). Conscious and unconscious aspects considered, the consensual understanding is that, since we are exposed to an overload of information from the context, and it is beyond our brain capacity to process this amount of data, a filtering process takes place, selecting useful information and discarding the unnecessary.

Based on this understanding, it seems plausible to argue that basic, reactive and routine behaviors are mainly automatic and unconsciously driven, while more context-specific, goal-directed and high-level behaviors are controlled by conscious processes - even considering some level of unconscious influence. Thus, the presence of goals could be described as a way in which the process of attaining a specific desired response is designated to a more conscious level, which gives the individual more control and more chances of success.

Goals are generally described as representations of desired states or behaviors which guide our efforts and direct our behavior towards its achievement (Dijksterhuis & Aarts, 2010). Since the achievement of goals are often rewarding experiences, individuals develop strategies to maintain behaviors that are goal-directed (Marien, Custers, Hassin, & Aarts, 2012). In order to achieve goals, it is necessary to adopt and maintain goal-supporting

behavior, through varying periods of time and, sometimes, complex environmental changes, which is made possible through a series of adaptive changes in behavior and cognition, generally described as self-regulatory skills and strategies (Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, 2004).

Self-Regulation

Self-regulation refers to automatic and controlled efforts by an individual in order to alter behavior, cognition, responses and impulse overriding with adaptive and goal-oriented objectives (Luszczynska et al., 2004). Most theories on goal-oriented self-regulation comprise the notion that goals are internal representations of desired states, leading the individual to a process of setting goals, comparing progress against them and adapting cognitive and behavioral responses in order to enhance the chances of success (Koch & Nafziger, 2011).

On the comparing process, two possibilities are experienced, regarding a general sense of approaching or distancing the goal, described as discrepancy reducing and discrepancy enlarging loop. The discrepancy reducing loop is a result of a comparison between the present state and the desired state, in which the individual feels that the goals are getting closer to be achieved. This positive feedback helps the individual to sustain effort towards goal completion, while on the other hand, if there is a sense of distancing, the negative feedback could lead the individual to decrease effort (Lord, Diefendorff, Schmidt, & Hall, 2010).

Different self-regulation theories have been used throughout the years to explain goal pursuit in many aspects, such as long term and short term goals or even in specific areas like work-related and academic performance goals (Latham, 2016). Also, especially since goal theory has been added to the framework, studies on self-regulation have been contributing over the years for a better understanding of social behavior and information processing,

(Koole & Fockenberg, 2011; Shah & Kruglanski, 2003; Vancouver, Weinhardt, & Schmidt, 2010).

Some aspects of self-regulation are important to understand how an individual can proceed towards goal-achievement. For instance, the regulatory focus theory postulates two self-regulatory orientations: prevention (when the individual directs his or her behavior with focus on security needs and loss avoidance) and promotion (when the focus is directed to advancement needs and approaching gains) with measures already validated (Cesario, Higgins, & Scholer, 2008). Promotion and prevention have contributed to understand not only the self-regulation process itself, but specially how individual differences may lead to a more active or passive orientation towards goals.

Neural Basis of Self-Regulation

Self-regulation relies on diverse cognitive processes, which need to be considered and taken into account to better explain the internal events that may affect how the individual controls and regulates behavior. If we consider the evolutionary needs, the beginning of life in groups was decisively marked by how efficient individuals were in reading, understanding and adapting to group standards – an incipient form of self-regulation. To be proficient in such endeavor, it was necessary for individuals to alter their behavior, control impulses, thoughts and actions, to better relate to others and keep themselves as part of the group, leading to better chances of survival, which makes plausible to assume that the brain has evolved to develop specific mechanisms to do so.

The neuroscience literature indicates that some cortical regions are related to self-regulatory processes, mostly the prefrontal cortex (PFC) and its executive functions associated with self-regulation (Heatherton & Wagner, 2011). If we consider, for example, the classic case of Phineas Cage and his damage to PFC, which lead to a radical change in

behavior and personality, most of the transformation was due to disinhibited behavior, lack of compliance of social norms and impulsive actions, all related to an impairment of self-regulatory functions (Heatherton, 2011).

The self-regulatory functions are often linked to three specific areas of the PFC, the ventromedial prefrontal cortex (vMPFC), orbitofrontal cortex (OFC) and the lateral prefrontal cortex (lateral PFC), which, when damaged lead patients to different expressions of self-regulatory problems, such as difficulties in managing social and affective life, as well as antisocial, violent and compulsive behaviors (Suvorov & van De Ven, 2008). An interesting aspect of those cases is that the individuals were still aware of social norms, and even though they were conscious of the socially expected behaviors, they were unable to comply, reinforcing the idea that the PFC is not merely a deposit of social norms, but a self-regulatory instance. Also, the PFC is related to executive functions deeply related to self-regulation, such as decision making, planning, working memory, attentional filtering and response inhibition (Petersen & Posner, 2012).

Damages on the vMPFC, are linked to severe difficulties on primary physiological drives, as well as a general deregulation of different forms of social behavior, while patients with damages on the lateral PFC, although are able to behave accordingly to social norms, report difficulties in initiate and plan behavior, struggling to set and pursuit goals (Heatherton, 2011). Another important region related to self-regulatory processes is the anterior cingulate cortex (ACC) which is responsible for cognitive control and conflict monitoring, with patients with damages to this area generally presenting symptoms such as lack of motivation and difficulty to engage in goal-oriented behaviors. Literature on the field points out that this area could be responsible for signaling the need to self-regulate in a specific situation (Heatherton & Wagner, 2011).

Aligned with those findings in neuroscience, the strength model of self-regulation proposes that self-regulation depends on a general resource, which when depleted, may lead to impoverished self-regulation. Some researchers have found evidence that suggests that even individuals with no damage on those areas, when facing a resource exhaustion, have been reported to fail in self-regulatory processes in diverse domains, such as dieting, alcohol abuse and even sports performance (Baumeister, Vohs, & Tice, 2007; Chan et al., 2015; Hagger, Wood, Stiff, & Chatzisarantis, 2010).

Goals, Goal-setting and Goal-pursuing

Human behavior is often conceptualized as the final step in a process started by an environmental demand, which leads to information processing, planning and then interventions in the social world, which we refer to as an action or a behavior.

After processing the environmental demands, and adding preexisting information to the equation, individuals usually are led to establish goals, as mental representations of actions or behavioral outcomes that are desirable or rewarding (Dijksterhuis & Aarts, 2010). Consequently, the target behavior or outcome becomes the present goal, especially considering the expected reward or desirability.

That active goal or goals become then, the main reference for actions, usually guiding most of our cognitive processes such as attention, memory and decision-making. For example, in an experiment, neutral behaviors (doing puzzles, going for a walk) were subliminally paired with positive, negative or neutral words, so as the participants could perceive the valence word, but not the activity. Later, not only participants showed a tendency to engage in the positively conditioned activities, but they also completed a task faster than a control group when promised to engage in the activity after such task. Within those

conditions, not only the activity became a goal, but also it directed the cognitive processes towards goal-pursuit (Custers & Aarts, 2005).

The literature on goal, goal-setting and goal-pursuing distinguish two major perspectives to understand how individuals set goals and pursuit them. One perspective focuses on the content of a goal as the major aspect, as investigated and described in studies on academic goals (Komarraju & Nadler, 2013) and work-related goals (Lord et al., 2010). Another perspective proposes that more than the content, effective use of self-regulatory strategies, is the main aspect regarding goal-setting and goal-pursuing (Oettingen & Gollwitzer, 2010).

When observing general behavior, not only is relatively easy to infer a goal or a set of goals of the observed individual, but most of the time people use this information on interpersonal interactions, offering responses based on the inferred goal (K. Stanovich & West, 2003). Individuals are educated since early childhood to identify goals and behave in order to achieve specific demands, not only in school, but in most domains of social life, being rewarded when successful on this intent and punished when failing (McCarthy, Jones, Harwood, & Davenport, 2010).

It is a relatively consensual understanding that goals serve individuals as tools to engage in volitional behavior, defining what we find rewarding to achieve and influencing the strategies and amount of effort on the pursuit of such goals. Goals are generally described as representations of desired states or behaviors which guide our efforts and direct our behavior towards its achievement (Dijksterhuis & Aarts, 2010). Since the achievement of goals are often rewarding experiences, individuals develop strategies to maintain behaviors that are goal-directed (Marien et al., 2012).

At this point, an important issue arises, which is the consciousness of the goal-setting process, and it is useful to make a distinction between conscious and unconscious goals. A conscious goal could be verbalized and expressed as what we usually describe as volition or intention. Unconscious goals could not be expressed, since the individual is not aware of the process, even though the information processing and some other cognitive processes are functional and affecting behavior. The literature on goals is vast and different taxonomies have been produced over the years, followed by many goal-like concepts. The general understanding is that goals have six major dimensions: (a) importance- commitment, (b) difficulty-level, (c) specificity-representation, (d) temporal range, (e) level of consciousness, and (f) connectedness-complexity (Austin & Vancouver, 1996).

Those dimensions also vary in three main perspectives: person, time, and goals. The person perspective regards the individual interpretations and general differences for a same goal. The time perspective concerns the changes in goals over time, not only in individual level, but in general. The goal perspective focuses on the interaction between goals on an individual.

Those perspectives are mainly individual, but the environment also plays an important role in goal activation, even when we consider unintentional goal-setting or unconscious goals. Goals not only can, but most commonly are activated without awareness of the individual (Marien et al., 2012). If we consider that a person is capable of setting goals to pursue and not being aware of the process, it brings a complex perspective of the phenomena involved in goal-setting and goal-pursuit.

It is usual to perceive behavior as a result of planned and intentional effort, and to pursue goals that are generally consciously defined, with self-agency being a result of conscious choices and planning. However, recent discoveries challenge this notion, with

research, mainly experimental work, showing that the mere activation of a goal representation guides behavior and higher cognitive processes involved in goal-directed behavior in the absence of a person's conscious awareness (Kelley, Wagner, & Heatherton, 2013).

Goals inferred from another person's actions can also be activated in a perceiver and can control subsequent behavior without conscious intent, thus leading to goal contagion (Capa, Cleeremans, Bustin, Bouquet, & Hansenne, 2011). With the establishment of goals, there is a need to adopt strategies to achieve such goals, a process of planning and maintenance of cognitive and behavioral adequate responses that can be described through self-regulation theories.

The general understanding is that conscious decisions are just one way in which goals can influence behavior. For example, the auto-motive model (Bargh et al., 2012) proposes that goals not only can be activated outside of awareness, but also that unconsciously activated goals are effective in providing guidelines for behavior in similar ways that conscious goals do.

On the very idea of a goal, it is reasonable to assume that the objective an individual, conscious or unconsciously adopt, has a significant meaning in terms of rewards and expectations of achievement. Three aspects, that lead recent researches on the subject, will be discussed as significant aspects that affect regulatory dynamics – regulatory fit, regulatory engagement and accessibility. They are commonly related to the goals and affect the establishment and pursuit of them.

First, the notion that the orientation to a goal needs some sustenance strategy, is relatively consensual, otherwise the individual would experience difficulties in keeping aligned with his own goals. A goal can be sustained, or in other terms, have regulatory fit, or

it can be disrupted, in which case there is a regulatory non-fit, which depends not only on the goal itself, but also on the strategy adopted to pursuit that goal (Cesario et al., 2008)

The regulatory fit theory proposes that there is a need for a match between orientation to a goal and the strategies an individual adopt to approach that goal, and that this strategies can produce a state of regulatory fit that not only creates a feeling of rightness about the goal pursuit, but also increases task engagement (Aarts, Custers, & Veltkamp, 2008; Förster, Liberman, & Higgins, 2005). On the same perspective, an important aspect of regulatory dynamics is the regulatory engagement theory, which proposes the presence of a motivational force that can attract to or repulse from a goal, depending on goal attributes, such as values and other hedonic sources of direction (Cesario et al., 2008).

For example, an individual can be attracted to a goal in a relatively weak or strong way (low or high positive value) or can feel repulsion as relatively weak or strong force (low or high negative value). The two forces vary in intensity and direction, even though they are felt as a whole experience. There are direction and intensity aspects that can affect the experience, with value intensity and value direction working independently.

It means that the more strongly an individual is engaged in an activity, the more intense the motivational force experience. In other words, engagement serves as an intensifier of the directional component of the value experience. Consequently, an individual who is more strongly engaged in goal pursuit will experience a positive target more positively and a negative target more negatively (Förster et al., 2005; Murray, Gomillion, Holmes, Harris, & Lamarche, 2012).

To be able to engage and adapt to a goal, some information needs to be available for the individual. Even if the information is to be processed outside of awareness, it needs to be accessible in some way. The notion of accessibility is used to describe the degree in which a

mental representation is currently active, more specifically in terms of information that forms concepts and obviously personal goals, determining social perception, and influencing cognitive processing and therefore, behavior (Förster et al., 2005)

Priming and Self-Regulation

Priming refers to cognitive consequences, motivational, affective and behavioral presentation of certain stimuli, to facilitate access to certain content, modifying subsequent behavior (Molden, 2014). For many years, the ideomotor and self-motivation models were mainly responsible for the general understanding of how the mechanism of priming effects work. According to the ideomotor model, stimuli automatically activate mental representations that determine the individual's behavior, while the self-motivation model suggests that motivational stimuli activate representations, linked to specific goals or objectives, which would then be responsible for the activation of behavior directed at such goals (Wheeler, Petty, & Al, 2014).

Studies regarding the priming of goals have shown that different stimuli can be used in order to enhance the goal-setting and goal-pursuing processes, leading to better self-regulation and increasing the chances of goal-achievement. Stimuli related to the means of goal-achievement, also referred as implementation sets have improved performance (Shah & Kruglanski, 2003).

Some studies also suggest that the goal-pursuing strategies adopted may enhance the salience of the representation of the goal increasing not only the possible ways in which it can be primed but also making it easier to maintain goal-pursuing behavior, facilitating self-regulatory processes (Gollwitzer, Sheeran, Trotschel, & Webb, 2011). A good example is given by the same authors, which suggest that an individual may be more prone to shop after

making a shopping list, because making the list makes the goal of shopping more activated, increasing the number of environmental cues that can prime this behavior.

Priming effects were also investigated in emotion self-regulation, with results indicating that emotional reactions can be more effectively controlled through this kind of effect, depending on some dispositional variables such as state or action-oriented regulation (Koole and Coenen, 2007). In the same study, action-oriented participants were more easily affected, thus mobilizing affect regulation more effortlessly, indicating that subtle priming was enough to affect self-regulation.

Japanese researchers also found interesting results regarding priming and self-regulation, when investigating the priming of goals. Participants were primed with specific goals and then not only the performance on tasks were evaluated, but also the conscious editing of the goal, meaning that individuals intentionally executed slight modifications on the goal to adjust their effort and increase chance of success (Oikawa and Oikawa, 2010). According to them, after a goal is primed, individuals can make conscious or unconscious adjustments during the goal-setting process, and depending on the adjustment, and the task, not only the performance is better but there is less resource consumption.

Those authors also highlight that priming can be used to induce automatic goal pursuit, even when there are factors against that specific behavior, such as dieting, when an individual knows that he or she should eat a salad, but internal triggers are more prone to eating fat and sugar (Oikawa and Oikawa, 2010).

Still on dieting self-regulation studies, Papies and Hamstra (2010) have found that subtle dieting priming evoked an effect on restrained eaters (individuals with the specific goal of avoiding unhealthy food) which they reduced the unhealthy eating behavior in comparison

with unrestrained eaters. Their findings indicate that subtle priming of dieting goals can enhance self-regulation this context.

Another important aspect of self-regulatory process is the validation of the process itself, which means that the individual will regulate behavior more easily when the goals are perceived as important, thus deserving more resources and effort. Priming goal-related concepts, when those concepts are validated, have increased the extent in which the individual regulates the behavior towards goal-achievement (DeMarree et al., 2012).

Recently, despite the contribution of these models, the results of studies with priming have been questioned in the scientific community for replication problems such as absence of previously described effects, lack of cross-cultural replications and even by inconsistencies in the explanation of the phenomenon (Shanks et al., 2013). Recent studies, however, have brought new opportunities to study the effects of priming, especially those who investigate the effect of moderators in the process (DeMarree et al., 2012).

On the above discussed studies, goal-validation and implementation sets were investigated, but more general and broad variables are scarcely discussed as possible moderators on the process. It is important to investigate the effects of not only situational, but also dispositional variables on self-regulation, in order to better understand the phenomenon.

The Structured and Unstructured Self-Regulation Model (SUSR Model)

Fujita and Trope (2014) proposed a model describing two self-regulatory models, based on the presence or absence of goals. According to those authors, when a goal is set, the individual would engage in a structured regulation state, while on absence of a goal, the individual would engage in an unstructured regulation state.

While on the structured regulation state, the individual would work aiming on goal-pursuit, with the mental processing focusing on goal-related information and eliciting behavioral responses towards goal achievement. On the unstructured regulation, the lack of goals would cause the individual to process the most salient information available and show behavioral responses of adaptation to the environment.

If we consider the Fujita and Trope (2014) model, a line of research could investigate how the effects of priming can be used to induce sophisticated self-regulatory processes, leading the individual to function in a specific regulatory dynamic, where goals acting as an important element that can make certain cognitive contents more accessible and certain environment clues more salient, guiding the behavior for these goals (Baumeister et al., 2011).

According to Fujita and Trope (2014), the subjects in a state of structured regulation, when primed, experience the activation of declarative knowledge, which facilitates the subsequent behavior relating to the presented stimulus - which in many cases refers to the individual's perception of the purpose of that specific task, and therefore, the behavior seems appropriate to fulfill the goal (Gollwitzer et al., 2011). In the case of unstructured regulation, priming effects obtained are usually activation procedures, rather than specific content, which lead individuals to act using the procedure mechanism.

The model proposed by Fujita and Trope (2014) describes two stimulation possibilities which can lead to two different types of priming. The goal priming, when the stimuli are related to goals and objectives, leading the individual to a process that the authors describe as high-level construal, where the individual has his attention directed to the established goal, focusing the attention to context elements that are related to the goal, and controlling behavior towards such goal. The procedural priming, occurs when the priming stimuli is directed not to a goal, but to a procedure, form of actuation or technique, leading the

individual to a low-level construal state, in which, not having a specific goal to achieve, makes the individual more susceptible to context clues, and even, as described in some experiments, showing a tendency to repetition of the techniques stimulated via priming (Doyen, Klein, Simons, & Cleeremans, 2014; Fujita & Trope, 2014; Wheeler et al., 2014).

Also, as part of self-regulation, there is a difference regarding cognitive processing when an individual is setting goals or trying to achieve goals. When the goals are being established, the cognitive processing is described as deliberative cognition, and when pursuing those goals, implemental cognition (Gollwitzer et al., 2011). Since goals are the main aspect in the structured/unstructured regulation model, it is necessary to discuss goal-setting and goal-pursuing processes.

As a development of the model proposed by Fujita and Trope (2014), in which priming can be used to induce structured and unstructured regulation states, it is necessary to describe those states accordingly to recent research, and to further discuss how those states can be induced and/or achieved. Since goals are a key element in the model, it is reasonable to start by describing the goal-setting process.

Fujita and Trope (2014) proposed a priming-induced possibility but did not refer to the goal-setting process. This process can be described as the adoption of a specific objective, that motivates an individual toward its achievement (Finkel, Fitzsimons, & VanDellen, 2016). Since the goal is set, and the individual has the resources to attain it, behavior and cognition are going to work towards goal achievement (Locke & Latham, 2006).

As a development of the model, the goal-setting should be the first step of the process, placed between the priming and the regulatory states, meaning that priming can be used to induce the goal-setting, which then induce the states. This proposition deepens the complexity

of the model, with goal-setting processes as a probable mediator in priming induction of regulatory states.

As a second step, if after the goal-setting process the individual successfully establishes a goal, he would then be in a structured regulation state, and if no goal is established, then it would lead to the unstructured regulation state. Considering that the main difference between the states is that the goals can be defined before (structured regulation) or context-related (unstructured regulation), it is plausible to assume that both states are probably affected by moderators, such as self-control, regulatory fit and regulatory focus, present in the process to keep the efforts correctly directed.

As a third step, accordingly to each regulatory state, the cognitive architecture would then be ready to direct information processing, behavior control and other cognitive processes towards goal-achievement (when in regulated state) or contextual adaptation (when in unstructured regulation).

The priming induction as well as possible moderator and mediators are not described in Fujita and Trope (2014) model and are hereby proposed as a development of the model, as represented in Figure 1.

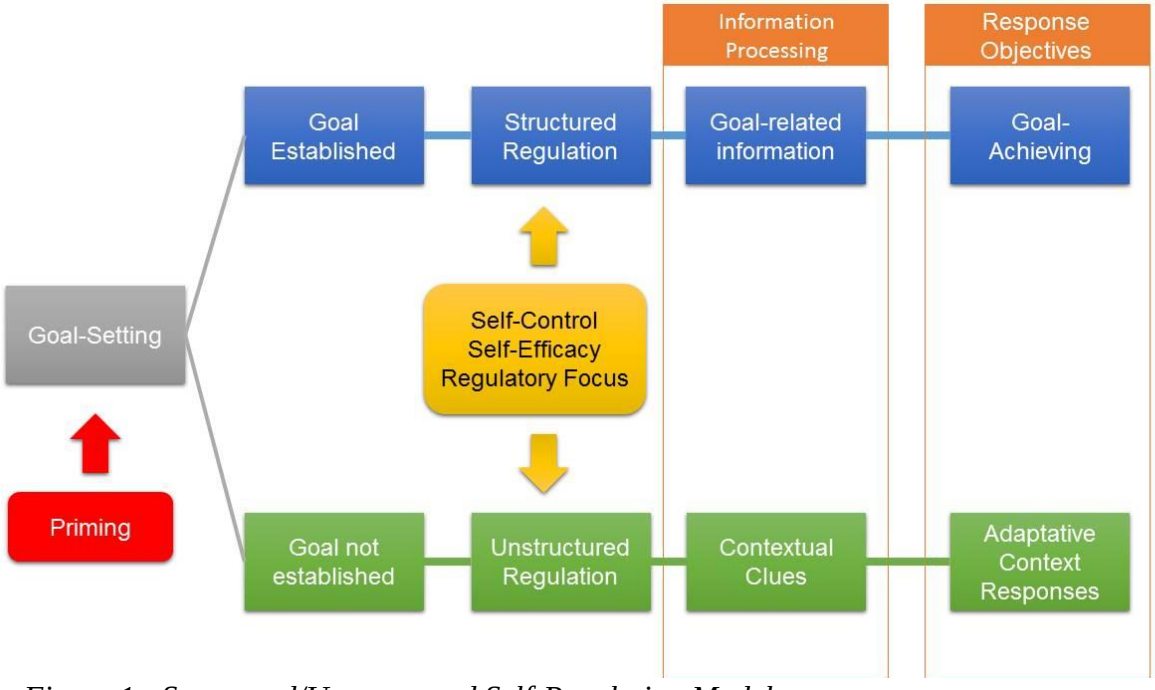

Figure 1 - Structured/Unstructured Self-Regulation Model

If we consider that, in everyday life, several elements of context and even the interpretation of the subject can act as stimuli to trigger effects of priming, it is evident the need to better understand this mechanism and, above all, to investigate their effects on human behavior. Also, the role of the possible moderators will be investigated, beginning with self-control, regulatory fit and regulatory focus.

To describe those states and produce experimental evidence on them is necessary to wide our possibilities to understand how an individual can regulate its own behavior, but firstly, to understand how the presence or absence of a clear goal affects, which can provide empirical knowledge on the subject and improve latter efforts.

The thesis is organized in four experiments to sequentially deepen the understanding of the model, verifying possible moderators and lastly, its applicability. The first experiment had the objective to investigate the goal effects on task performance, and included the first possible moderator variable, self-control. The second experiment, followed the same basic design, but with a different moderator variable (self-efficacy) and a different task.

The third experiment focused on information processing, evaluating possible differences on those aspects on each self-regulatory state and also investigating regulatory focus as a moderator. The fourth and final experiment focused on behavioral responses, testing the model as a whole and evaluating its effects on athletic performance.

Experiment 1

As an initial step to establish the feasibility of the model suggested by Fujita and Trope (2014) the first Experiment was conducted to evaluate if the presence of an established goal has an effect on performance in a task. The Fujita and Trope (2014) model was based on

the assumption that goal presence would lead the individual to a different self-regulatory state, which would influence performance and goal-achievement possibility of success. Considering that this is a cornerstone of the model, it is necessary to investigate this aspect.

In addition, since they have not discussed possible moderators, self-control was measured to evaluate its effect on the performance as well. Literature on the self-regulation has not reached a consensus on the role of self-control on task performance, and recent contributions have failed to replicate commonly reported effects such as the possibility of self-control training (Miles et al., 2016) and even the depletion effect (Carter, Kofler, Forster, & McCullough, 2015). Most of the evidence suggests that there could be a moderator effect of goals in the relation between self-control and performance, with individuals showing an increased capacity of maintaining goal-pursuing behaviors and cognitive processes, which facilitates goal-achievement (Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013; Fan, Meng, Billings, Litchfield, & Kaplan, 2008).

For the present Experiment, the objective was to evaluate the moderation effect of self-control on the relation between goals (presence or absence) and task performance. Self-control was measured by the Brazilian Portuguese version (Victorino & Franco, 2016) of the self-control scale (Tangney, Baumeister, & Boone, 2004) and is the moderator variable. Task performance was the time needed to finish a puzzle (Appendix A), and the manipulated variable was the presence or absence of a goal, as presented in the following figure.

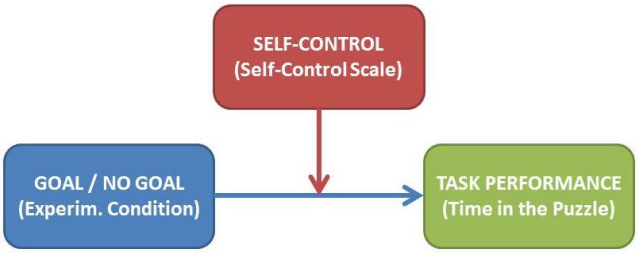

Figure 2 - Experiment 1 Variables

The hypothesis is that the presence or absence of a goal will have an effect on task performance, with individuals on the goal group performing better than individuals in the no-goal group. Also, it is presumed that individuals with higher self-control will be more competent to pursuit the goal, moderating the goal-performance relation.

Method

Participants

122 undergraduate students, 65% female, within an average of 27.23 years old (SD = 10.18) were selected and randomly assigned to groups (Goal and No-Goal). Students were mostly from Psychology (46.7%) and Business Administration (30.8%) courses and were single (60.8%). Sample size has been previously calculated for $\alpha = 0.05$, $\beta = 0.2$ and effect size of 0.5 based on Cohen (1992) recommendations. Two participants were excluded due to task incompletion.

The socio-demographic questionnaire, aside from age, gender and some other basic information, also investigated previous habits on puzzle solving. Only 17.5% of the sample declared to solve puzzles regularly, and 76% had not solved puzzles recently. Regarding the number of pieces usually solved in puzzles, only 9.2% were used to solve puzzles with more than 100 pieces and 94.2% did not remembered when they have solved the last puzzle.

On the debriefing questions, to investigate the information processing during the experiment, the participants were orally argued regarding three issues. When asked about the objective of the experiment, only seven, 5% of the respondents, were able to identify that some sort of relationship between self-control and performance was being investigated. It may be assumed that most of the participants were acting more freely during the experiment, which avoids some possible biases. About the relationship between the tasks (the puzzle and

the self-control scale) again only five, 4% affirmed that they were related, even though they did not know how.

The most important question on the debriefing was regarding the strategies used to solve the puzzle. Beginning with the corners / laterals (22.5%) and looking for identical pieces / colors (20%) were the most regular strategies. In contrast, 55.8% of participants reported not using any strategy at all. There was no significant difference in any of the debriefing questions between the experimental groups, which may indicate that they have not processed information differently.

Materials and Measures

All participants were asked to answer the Self-Control Scale (Tangney et al., 2004) in its Brazilian Portuguese version (Victorino and Franco, 2016), Cronbach´s α = 0.71 (Appendix B), which measures five dimensions of self-control (self-discipline, deliberate/non impulsive behavior, healthy habits, work ethic and reliability), besides a standard inform consent and a socio-demographic questionnaire. For the performance task, a puzzle app named Jigsaw Puzzle, developed by Critical Hit Software and available for free was presented in an iPad2.

Procedures

Participants randomly selected for both groups have followed the same basic procedure individually, which starts with a brief introduction regarding their rights as participants and the signing of the consent form. Participants were asked to go to a classroom in which the researcher was already waiting, with an iPad 2 with Jigsaw Puzzle already opened and ready to start. Then, after signing a standard informed consent, the participant would be asked to solve the puzzle. For the Goal Group, the participants were asked to solve

the puzzle in less than 5 minutes, while in the No-Goal Group, they were only asked to do the puzzle. This time goal was based on pre-tests conducted in order to determine the average solving time, where 54 participants, with no time restraint have reached an average solving time of 336 seconds (*SD* = 107 seconds).

Also, literature on goal theory states that every task has an intrinsic goal, which is to finish the task, described as generic goal. Studies on goals usually are conducted with specific goals, such as performance milestones, that really comprise the notion of goal widely accepted in the field (Locke & Latham, 2006; Shah & Kruglanski, 2003). After the puzzle was solved, the participant answered the self-control scale and was asked some debriefing and socio-demographic questions.

The sequence between the task and the scale was alternated to control for interference effects, with some participants starting with the scale while others started with the task. The debriefing questions regarded the thoughts that participants had on what was the objective of the experiment, and if they believed that the scale and the task were related and if the participant used any kind of strategy to solve the puzzle. The socio-demographic questionnaire, beyond basic questions, also asked about previous experience solving puzzles and habits related to the task, which we refer as debriefing questions.

Results

The initial exploratory analysis showed that there were no missing values and only two outliers in the time variable, which were kept for the analysis. Self-control (*M* = 75.48, *SD* = 15.03) and time (*M* = 348.62, *SD* = 161.76) were normally distributed, but time showed a tendency of positive skewness, which was expected. The direct effect of self-control on time was tested with linear regression for each condition, which on both cases fell short of

statistical significance for the goal group $F(1, 58) = 3.635$, $p = .062$ and also for no goal group $F(1, 58) = 1.046$, $p = .31$, both with small effect´s size, respectively Cohen´s $f^2 = .062$ and 0,018 (Cohen, 1992).

In Table 1, parameter estimates indicate that self-control is not predicting performance, even though the *p* value for the goal group was close to 0.05 ($p = .062$). Data also indicates that self-control does not predict a significant portion different from zero on the dependent variable.

Table 1
Parameter estimates for separate analyses for experimental groups

	Performance on Task		
		Goal Group	
Variable	No Goal Group B	B	95%CI
Constant	556.281*	332.493*	[238.90, 426.08]
Self-Control	-1.39	-1.15	[-2.36, .057]
R^2	.02	.06	
F	1.05	3.64	
ΔR^2		.04	
ΔF		2.59	

Note. $N = 120$. CI = confidence interval. *$p < .05$.

In order to test moderation effects, specifically analyzing changes in the coefficients obtained for both groups of the categorical variable (goal and no goal), it is necessary to calculate the interaction term between the independent variable and the moderator variable. Then, a hierarchical regression with two blocks was conducted, to investigate the differences on the models with and without the interaction term.

The change in F values was significant, which indicates that the moderation is present. Also, there is an expressive change of R^2 from 0.02 to 0.06 showing an increase on the total variance explained by the model when the interaction term is considered. These results are

corroborated with the residuals analysis, with a decrease in residual sum of squares from the model without the interaction term and the model with the interaction term.

Table 2 shows the coefficients, supporting the previous analysis, especially when considering the changes in beta values, which points to a significant moderation effect. The b and beta are statistically different from zero, which means that the model with the interaction term is consistent, while the model which only considers self-control is not.

Table 2
Coefficients of the model with and without the interaction term

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	462.319	75.522		6.122	<.001
	Self-control	-1.506	.981	-.140	-1.535	.127
2	(Constant)	465,558	56.327		8.265	.000
	Self-control	-.508	.739	-.047	-.687	.493
	Interaction_Term	1.516	.155	.670	9.753	<.001

a. Dependent Variable: Time

Figure 3 shows the regression lines for the models, indicating that for the goal group, there is a more expressive effect of self-control on the predicted time. Both relations are negative, indicating that higher levels of self-control are related to faster times on the task

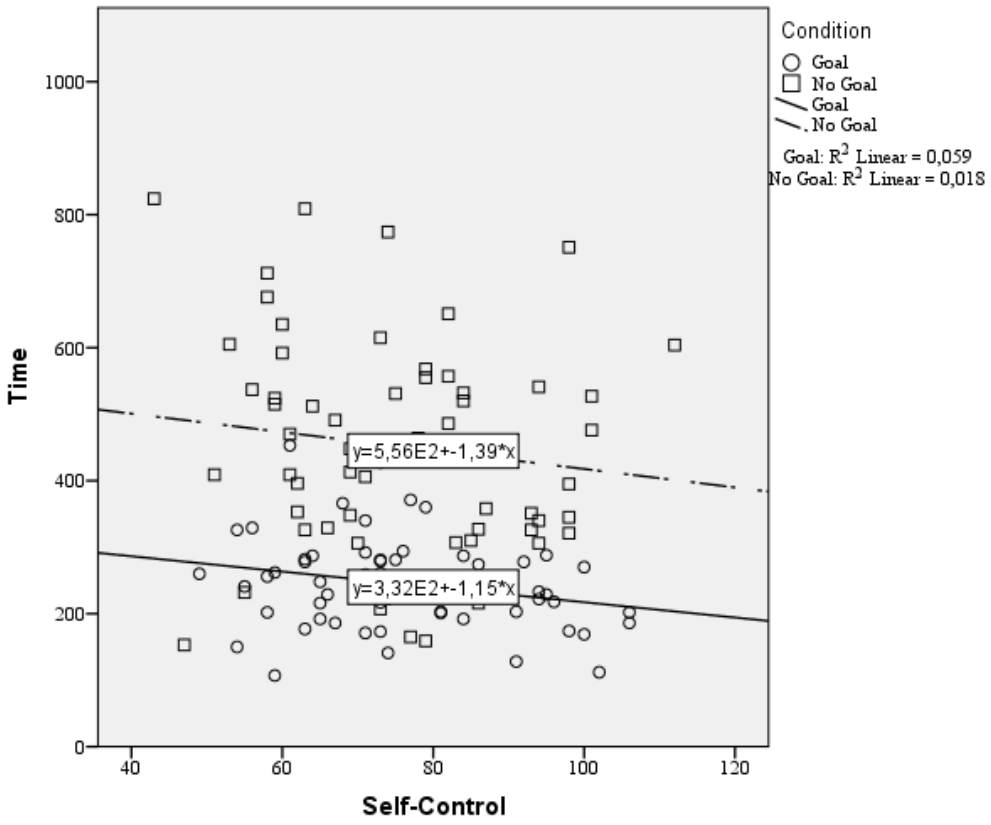

Figure 3 - Simple slopes equations of the regression of time on self-control at condition levels

Discussion

These results show a trend also found in some other studies, that the presence of a goal increases the performance on simple tasks (Gardner, Diesen, Hogg, & Huerta, 2016; Lord et al., 2010; Shantz & Latham, 2009). Considering that self-regulation is responsible for the effort management towards a goal and that the relation between self-regulation and goals is relatively consensual (Kotabe & Hofmann, 2015), as far as the structured/unstructured regulation model is concerned, it is reasonable to assume that the first part of the model seems plausible.

The presence of a goal led individuals to a different self-regulation state, which was responsible for the performance differences found. As for the self-control, even though the observed effects were not significant, with self-control explaining only.06% of the total variance in the group with goals and.02% of the total variance in the no-goal group. Even though the *p* value for both groups was not significant, for the goal group it was close to.05,

and based on recent critics to a sole dependency on *p* values it is adequate to consider some other information on the analysis (Kline, 2013).

The results of the moderation tests were significant, supporting the hypothesis that the self-control acts as a moderator on the relationship between the presence of goals and task performance, with significant changes in F and R^2 when the model considered the interaction term. If those results were not strong enough to be detected by the *p* value, it may be due to other causes.

Additionally, the task may not have been a good measure of performance, as some participants reported difficulties in using the tablet and the applicative. Moreover, the goal-setting process may have not been clear enough, reducing the engagement and commitment of the participants to the task. On the debriefing questions, asked after the experiment, some participants did raise some questions towards the goal-setting process or their inability to use the iPad, which may have affected their performance.

Nevertheless, given the complexity of self-regulatory processes, it is reasonable to find low explaining power from the variables, indicating the need to further investigate different variables to explain the differences in performance observed in the first Experiment.

Experiment 2

Considering the results discussed above, to deepen the moderating variables investigation on the structured/unstructured regulation model, the objective for the Experiment 2 was to investigate the effects of self-efficacy on task performance in a goal/no goal condition. Self-efficacy is a variable frequently reported for its effects on self-regulation processes (Fan et al., 2008; Gilson, Chow, & Feltz, 2012; Lee, Locke & Phan, 1997) and the inclusion of this variable in the model seems evenhanded.

Self-efficacy is a construct thoroughly explored in different fields, as it is a multidimensional social-cognitive phenomenon, described as a personal sense of control or agency, based on the perceived capability of responding to environmental demands through adaptive action (Schwarzer, 2014). Applications of self-efficacy have been studied in the past decades, and one of the most investigated areas is the relation between self-efficacy and performance.

The literature on self-efficacy has been increasingly gathering data that indicates a significant relation not only with performance, but consequently with self-regulation and goal-oriented behaviors (Komarraju & Nadler, 2013; Zuffianò et al., 2013). Some studies suggest that positive or negative self-efficacy feelings could be predictive of performance for college students (Huang, 2016) and that individuals with higher self-efficacy perform better in many goal-oriented fields (DeNoyelles, Hornik, & Johnson, 2014; Huang, 2011; Komarraju & Nadler, 2013; Zuffianò et al., 2013) indicating that this variable is important in self-regulation processes. If we consider the presence or absence of goals, it is reasonable to suppose that this effect will be more strongly present in a goal situation.

After setting a specific goal, individuals will experience positive or negative feelings, depending on the outcome of their efforts, which can increase or decrease their personal

competence beliefs. The repeated positive outcomes may increase the self-efficacy, which can lead to more confidence and consequently, a better chance of performing. The opposite is also true, with repeated negative experiences affecting the performance. This process was already described in many fields, especially academic performance.

Students with successful or unsuccessful experiences are more prone to developing positive or negative feelings of self-efficacy, which was reported as a good predictor of academic performance (Gore, 2006). Some studies deepen this understanding, arguing that positive or negative feelings of self-efficacy are a motivational element, affecting the academic performance (Valentine, DuBois, & Cooper, 2004; Zajacova, Lynch, & Espenshade, 2005).

Considering the structured/unstructured regulation model, self-efficacy can be linked to self-regulation if we consider that an individual need to manage external and internal environmental demands, and if after the behavioral outcomes, positive or negative feelings are experienced, a general sense of confidence can be increased or decreased, affecting future experiences. The discrepancy reducing/enlarging loop theory, which explains self-regulation, have already highlighted the importance of the positive and negative past experiences as an input for future self-regulating processes (Lord et al., 2010).

Considering those aspects, the main hypothesis for this Experiment is that performance will be better as self-efficacy increases, especially in goal condition. In the no-goal condition, the same pattern is expected, even though with a weaker effect.

For this Experiment, the performance task was replaced by the Tower of London task (Keith Berg & Byrd, 2002) (Appendix C), a more simple task, commonly used for scientific purposes, in order to avoid the problems reported on Experiment 1. On that Experiment, the specific app was not design for scientific purposes, therefore there was no previous evidence

that it could work properly. Using a well-known and tested task seems a better strategy to fix this issue. Also, to increase the engagement of the participants in the task, a reward will be offered for those in the goal condition, since studies regarding goal-oriented self-regulation indicate that the presence of rewards can be useful in this sense (Dijksterhuis & Aarts, 2010; Marien et al., 2012).

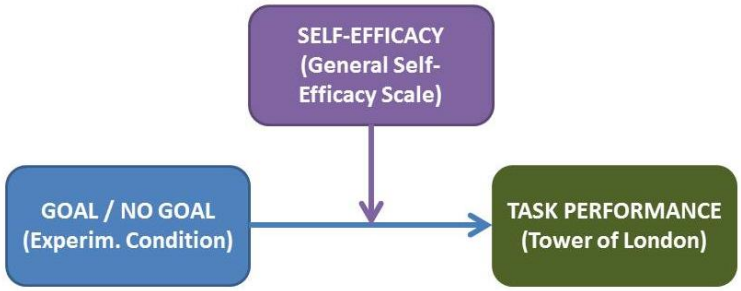

Figure 4- Experiment 2 variables

Method

Participants

204 undergraduate students were selected and randomly assigned to three groups (Goal/Reward, Goal/No Reward and No-Goal/No Reward). The age average was 20,55 years old (*SD = 9,19*), being mostly psychology undergraduates (61,71%) and women (52,09%). %). Sample size has been previously calculated for $\alpha = 0.05$, $\beta = 0.2$ and effect size of 0.5 based on Cohen (2012) recommendations

Materials and Measures

Participants answered the General Self-Efficacy Scale (Schwarzer & Jerusalem, 2010) in its Portuguese version (Araújo & Moura, 2011),Cronbach´s $\alpha = 0.87$, which is a self-report measure of the general sense of efficacy, with 10 items in a unidimensional structure, along

with an informed consent and a socio-demographic questionnaire, all through the Millisecond Inquisit software. The performance measure was the Tower of London Task (Keith Berg & Byrd, 2002), also presented through the aforementioned software.

Procedures

Undergraduates were invited to participate in the research and conducted to an individual data collection room at LIPSI (Integrated Laboratory of Postgraduate and Experimental Research in Psychology with Humans) were they were informed about the procedures.

Due to software license restraints, it was not possible to randomize the groups, with data collection being conducted with each condition at a time, and the next condition only starting when the previous was fully completed. The data collection started with Goal/No Reward Group, then No Goal/No Reward Group and finally Goal/Reward Group. The reward group was chosen to be the latter to avoid participant contamination, since a participant could spread the information that there will be a reward, when sometimes was not the case.

In all groups the procedure was the same, starting with a short summary of the experiment, and then proceeding to the computer. On the aforesaid software, participants would agree with the consent form and start with the scale or the task. The order was randomized for interference effects, but in all cases, the last part was the socio-demographic questionnaire and the debriefing questions. On the debriefing, questions regarding strategies used and engagement in the task were asked, and the purpose of the experiment was explained.

For the Goal/Reward Group, participants were told that their goal was to score among the top 25%, and that there was a reward of R$ 5,00 if they succeed. Since they did not know exactly how many points were necessary, participants would strive to commit the minimum

number of mistakes possible. As noted in Experiment 1, when given a specific number there was a risk that, after making too many mistakes, participants would disengage and lose motivation to keep trying their best. After the experiment, disregarding their performance, participants were told that they have succeeded and received the reward.

The Goal/No Reward group followed the same procedure, but without the reward, with participants being told that their goal was to score among the top 25%. For the No Goal groups, participants were only asked to do the task.

Results

Exploratory analysis showed that no variable presented more than 3.4% of missing values, and the 11 outliers found were kept because their scores were due to honest intent to finish the task and not distraction or lack of effort. When a participant voluntarily abandoned or gave up the task, he or she was automatically excluded. Self-Efficacy (M = 25.47, SD = 4.85) was normally distributed and the score on the Tower of London Task (TOL Score) (M = 30.69, SD = 5.71) displayed a trend of positive skewness, which was anticipated.

Prior to the moderation analysis, different tests were conducted, to verify the direct effects of Goal presence/absence on the TOL Score (independent of the Self-Efficacy) and the effects of Self-Efficacy on the TOL Score (independent of Goal presence/absence). For the first analysis, 2 independent-samples t-test were conducted to compare TOL Scores in Goal/Reward and No Goal conditions, then Goal/No Reward and No Goal conditions. There was a significant difference in the scores for Goal/Reward (M = 32.56, SD = 4.50) and No Goal (M = *30.35*, SD = *4.71*) conditions; t (131) = 2.617, p = .010, with an effect size of r = 0,6, considered a large effect (Cohen, 1992).

For the Goal/No Reward and No Goal comparison, the t-test was not significant (Goal / No Reward M = 29.09, SD = 6.72; No Goal M = *30.35*, SD = *4.71*); t (129) = -1.243, p = .216. A third test was conducted to investigate both Goal/Reward and Goal/No Reward groups (N = 134) against No Goal group (N = 65). Due to the different sample sizes on each group, the Mann-Whitney U test was adopted and indicated that the TOL Score was not significant different for Goal/Reward-No Reward group (Mdn = 104.37) in comparison with No Goal group (Mdn = 91.00), U = 3.770, p = .123.

These results suggest that the presence/absence of a goal only influence the TOL Score when there was a reward. Without a reward, the presence of a goal did not lead participants to a better performance. Henceforth, the analysis will consider only the Goal / Reward group, and the relationship between goals and rewards will be addressed in the discussion of this experiment.

For the second analysis, a Spearman's rho correlation was conducted (due to the outliers on the sample) to investigate if Self-Efficacy and TOL Score were correlated, independent of the presence or absence of a goal. Results have shown that those variables were not correlated r_s = .81, p = .26.

These preliminary tests indicate that Self-Efficacy alone cannot explain the TOL Score, but the presence of a goal and a reward can. With the moderation analysis, it is possible to determine is Self-Efficacy changes the strength or direction of this effect, thus working as a moderating variable.

To test for moderation effects, the changes in the coefficients obtained for both groups of the categorical variable (goal/reward and no goal) are evaluated. After an interaction term between the independent variable and the moderator variable is calculated, a hierarchical

regression with two blocks was performed to examine the changes on the models with and without the interaction term.

The moderation analysis was conducted using Hayes PROCESS (2012), a SPSS macro for mediation, moderation and conditional analysis. The analysis indicated that changes in *F* values was significant, which points out to a moderation effect being present. Even though the change in R^2 was small, from 0.01 to 0.02 when the interaction term was considered, the total variance explained has increased. Also, a decrease in the residual sum of squares from 3085.37 to 114.491 gives support to the moderation effect being present, and the model with the interaction term better fitting the data.

On Table 3 are the parameter estimates for each experimental group, where it is possible to verify the changes in R^2 and *F*. However, the confidence interval for self-efficacy contains zero, suggesting that the direct effect of self-efficacy could not be present.

Table 3
Parameter estimates for separate analyses for experimental groups

	Performance on Task		
		Goal Group	
Variable	No Goal Group B	B	95%CI
Constant	29.579*	31.552*	[24.253, 38.850]
Self-Efficacy	.33	.39	[-.242, .321]
R^2	.002	.001	
F	.103	.078	
ΔR^2		.001	
ΔF		.025	

Note. $N = 137$. CI = confidence interval. *$p < .05$.

The coefficients of the model with and without the interaction term are presented in Table 4, which supports the initial analysis, not only through the differences in beta values,

but also with b and beta being different from zero. The model with self-efficacy alone was not significant, but when the interaction term was considered, there was a significant result.

Apparently, individuals were only truly engaged in the task when a reward was presented, even though the responses on the debriefing questions showed differently. On a scale from 1 to 10, when asked if they were engaged on the task, individuals did respond positively (*Mdn* = 8.00, *SD* = 2.77). Probably the social desirability lead individuals to state a false engagement, even though the scores on declared motivation and attention were a bit worse (*Mdn* = 6.00, *SD* = 3.83 and *Mdn* = 5.00, *SD* = 3.93, respectively).

Table 4 - *Coefficients of the model with and without the interaction term*

Coefficients[a]					
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	29.747	2.101		14.162	<.001
	Self-efficacy	0.0702	0.0832	.073	.843	.401
2	(Constant)	31.069	.397		78.165	<.001
	Self-efficacy	-1.278	.028	-1.339	-46.351	<.001
	Interaction_Term	.041	.001	1.719	59.499	<.001

a. Dependent Variable: TOL Score

Figure 5 presents the regression lines for the models, indicating that even though there was a better overall performance of the goal group, in terms of total variance explained, the model was not successful, with extremely low R^2 values, and even lower on goal group. There are indication of a suppression effect on this results, firstly because both relations are positive, indicating that higher levels of self-efficacy are related to better TOL Scores, but also suggesting the abovementioned effect.

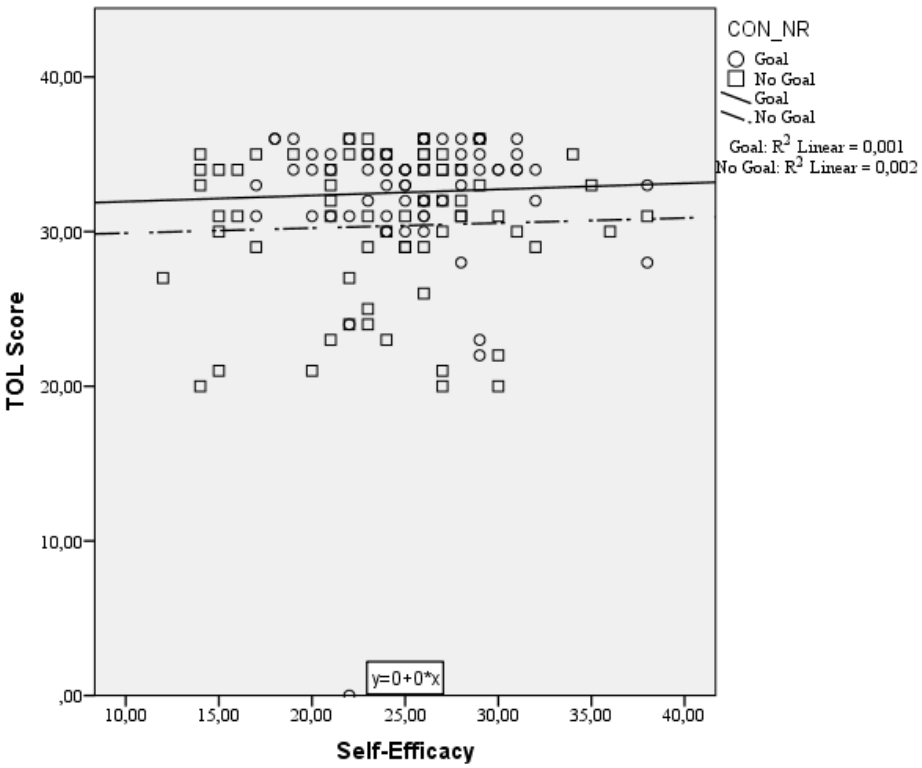

Figure 5 - Simple slopes equations of the regression of TOL Scores on self-efficacy at condition levels

Further analysis revealed a suppression effect, when one of the predictors steals variance from other variables, thus suppressing their effect. According to Tabachnik and Fidel (1996) to characterize a suppression effect, one of the predictors must have a strong correlation with the dependent variable, which is the case between self-efficacy and the TOL Score $r(202) = .75$, $p < .01$. Also, besides the correlation itself, the B value must be of a different sign than the correlation, which also applies to the present case, with a B of -1.278. Further consequences of this effect will be addressed in the next discussion section.

Discussion

Experiment 2 brought a better understanding of the structured and unstructured self-regulation, shedding some light in grey areas such as the role of reward and the effects of other dispositional variables on the process. Considering the development of the SUSR model, it is plausible to affirm that there were major advances. Maybe due to the experimental situation, the goal-setting process needed the reward to boost the engagement of the individual in the task. The literature on goal-setting and goal-pursuing corroborates this notion with a vast array of studies showing the connection between goal-setting, goal-pursuing and variables such as emotional attachment and identification with the goal (Burnette et al., 2013; Elliot et al., 2012; Gardner et al., 2016; Gaudreau, Carraro, & Miranda, 2012; Latham, 2016).

Transposing this idea to real life situations, it is not hard to understand that an individual need to accept and fell connected to a goal to raise and maintain the necessary efforts. The SUSR model does not deny the importance of the goal-setting process, but simply starts from the premise that the goal-setting process is precisely what determines the self-regulation state – structured when it happens or unstructured when it does not.

The next studies need to keep the reward for experimental reasons, even thought for the model, the individual will or will not set a goal, which will direct him to one of the two self-regulatory states, the literature on the relation between goal-related behaviors and rewards is vast and excluding this variable is not recommended Maybe, due to experimental design or methodological decisions, the reward worked in some cases but not in others, probably a matter of adjusting the amount or the inner nature of the reward itself.

As for the effects of self-efficacy, this variable could not explain alone the performance on the task, which was expected not only considering the SUSR model itself but

also the literature on the area (Huang, 2016; Komarraju & Nadler, 2013; Phillips & Gully, 1997). The significant result here is that self-efficacy affected the task performance, as shown before on the slopes graph (Figure 5) and therefore should be included in the SUSR model.

Even though this effect was not large in terms of variance explained, recent literature has shown that this is a common finding with variables in the *self* field and small effects could have significant societal repercussions (Asendorpf et al., 2013; Combs, 2010; Greenwald, Banaji and Nosek, 2015). To support the importance of these results, the moderation tests were significant, indicating that self-efficacy acted as a moderator on the relationship between the presence of goals and performance on the Tower of London task, with changes in F and R^2 when the model considered the interaction term.

As for the suppression effect found, authors suggest that it indicates complex relations between the variables and must be further investigated (Tabachnik and Fidel, 1996; Abbad and Torres, 2002). A general guideline is to simply discard the suppressing variable and investigate how it affects the regression, but since this experiment is part of a major effort to develop a model, it seems plausible to keep self-efficacy in the model and investigate how this variable will affect the final model. Abbad and Torres (2002) also highlight that methodological issues such as inner characteristics of the measures (perceptual, self-reported, etc.) and psychometric differences may contribute to the suppression, which can be the present case. On Experiment 4 this variable was measured again and the results then were discussed to help to shed light on the matter.

With these results, the SUSR model advanced to its next step, which was information processing, and on the next experiment, focused not only on this matter but also included a different variable - regulatory focus.

Experiment 3

As a development of the results from Experiments 1 and 2, Experiment 3 advanced in the proposed model and focused on information processing. According to the SUSR model, individuals in structured regulation will focus on information that is goal-related, while individuals on unstructured regulation will focus on information that is more salient in the environment. Hence, the objective of this experiment was to investigate the effects of goal presence on information processing. The effects of regulatory focus (promotion vs prevention) on the relation between goal presence and performance were investigated as well.

The regulatory focus theory is relatively well investigated and literature on self-regulation is often concerned with the effects of promotion and prevention on regulatory processes (Kurman, 2011; Vieira & Ayrosa, 2015). Initially proposed by Higgins (1997) the theory is based on the idea that individuals can regulate their own behavior towards increases in gains or to avoid losses, which was described as promotion and prevention, respectively. An individual can have positive feelings when achieving gains or when avoiding losses, therefore, behaving differently in similar situations.

This framework is intrinsically related to a motivational perspective, as it describes desired and undesired states. Higgins (1997) proposes that a promotion or prevention dominance is usually found, as it develops as a trait, based on education and previous experiences.

As far as self-regulation is concerned, it is plausible to assume that individuals with different traits will behave differently in the presence of a goal. The goal-setting process and the subsequent goal-pursuing will probably be affected by the promotion or prevention focus, which justifies the addition of this variable in the SUSR model.

This experiment main focus was to investigate the moderating effect of prevention/promotion on the relation between the presence/absence of a goal and performance on the attentional bias task, based on the idea that the presence of a goal will move the attentional focus to a goal-related image, improving the performance on those situations of the task. Also, a cognitive load manipulation was introduced to verify the strength of the attentional focus. The literature on the field suggests that the cognitive load is a variable worth investigating, not only because it is associated with attentional focus in many studies (Luszczynska et. al. 2004; Petersen et. al. 2012; Silvia and Phillips, 2012) but also for its role in determining how focused the individual was. Based on the notion that attention as a resource-based process, it is expected that if the attentional focus is strong, even with the cognitive load to use some of that resource, the individual will maintain the focus.

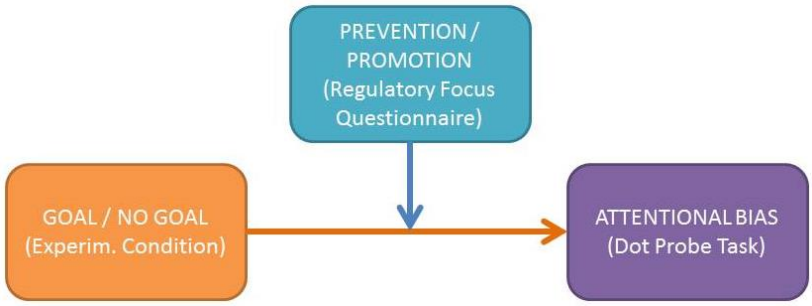

Figure 6 - Experiment 3 variables

Method

Participants

304 undergraduate students, which averaged 25.6 years old (*SD* = 8.74), being mostly female (74%) psychology graduates (49%) were randomly assigned to eight groups based on the following experimental conditions: Goal/No Goal, (G/NG), Reward/No Reward (R/NR) and Cognitive Load/ No Cognitive Load (L/NL). Sample size has been previously calculated

for $\alpha = 0.05$, $\beta = 0.2$ and effect size of 0.38 based on Van Yperen, Blaga and Postmes (2014) recommendations.

Materials and Measures

Participants in the three conditions answered the Regulatory Focus Questionnaire (RFQ) in its Brazilian Portuguese version (Vieira e Ayrosa, 2015) (Appendix F), Cronbach´s $\alpha = 0.69$, which is an adaptation of the original instrument (Higgins, 2001). Also, a socio-demographic questionnaire and a dot probe task (DPT) (Appendix G) were used to investigate attentional bias towards goal-related stimuli (images). On this task, two images are presented at the same time, then they disappear, and an "X" appears where one of the images was. Studies with adult alcohol drinkers showed that the latency is usually lower when the "X" is on the side where an alcohol-related image was, indicating that there is an attentional bias towards those images (Miller & Fillmore, 2010). The task was the same, but the images were adapted to the Brazilian culture, more specifically with the images of alcoholic beverages being changed to Brazilian brands, more recognizable to the participants.

After the presentation of the cross, which serves as a fixation stimuli, 2 pictures from two categories are presented (alcohol and neutral). The position is randomly assigned on the left or right side and for all trials and both categories were presented in both sides the same amount of times. Also, both the duration of the fixation cross (500ms) and the pictures (1000ms) were the same for all trials. The minimum latency accepted is 100ms to avoid automatic or repetitive pressing of the buttons.

Each participant answer a total of 80 trials, being 40 Alcohol trials (alcohol-neutral pairings) and 40 Neutral trials (neutral-neutral pairings) of randomly presented pictures based on a library of 10 alcohol and 10 neutral images, with each image being presented 4 times.

Participants are asked to press one key if the probe is left and another if the probe is right. and the objective was to check for attentional biases towards goal-related images, as an indication of goal-related predominance in cognitive processing, when there is a goal. All materials were presented through the Millisecond Inquisit software on a computer.

Procedures

After a short introduction regarding the consent form and general instructions, participants were asked to complete the questionnaires and the task on the computer. All groups answered the RFQ, the DPT, the socio demographic questionnaire and the debriefing questions, with the first two being randomized among participants. Before the beginning of the DPT, the Goal groups were told that their goal was to be fast and accurate, especially when alcoholic beverages appear on the screen, pressing the button on the side were the "X" was as fast as they can. For the Reward groups, the instruction was that if they got in the 25% top scores, they would be rewarded R$5.00 at the end of the experiment. Since the reward was a strategy to keep participants engaged in the task all of them were told that they were right and received the money. In the Goal/No Reward group, the same procedure followed, except for the payment, even though the goal was the same. For the No-Goal groups, participants were only asked to complete the task.

The cognitive load was manipulated by asking participants in this condition to count how many beer cans appeared in the screen during the test. All participants answered some debriefing and socio-demographic questions, using the Millisecond Inquisit software.

We have investigated the effects of Goal presence / absence in the latency times on the DPT test, specifically when goal images were on the screen, a measure hereby referred to as Goal Latency Time, or GLT. The variable is calculated automatically by the software as the time between the "X" appears on the screen and the individual presses the button when the

goal image was on, with faster times indicating attentional bias towards goal images (Miller & Fillmore, 2010). The RFQ result is calculated and generates a dichotomous classification of Prevention or Promotion, depending on which trait is more salient in the individual, thus indicating his or hers general regulatory focus (Vieira and Ayrosa, 2015).

Results

Initial analysis indicated that no variable presented more than 1.6 % of missing values, and from the 11 outliers found, 8 were excluded, because as further investigated, those cases were due to software malfunction, therefore not included in the final sample, with 296 participants. The variables were normally distributed, as checked with histogram plots and KS tests, also confirmed with bootstrap.

Preceding the moderation analysis, the direct effects of Goal, Regulatory Focus, Reward and Cognitive Load on the GLT were investigated to examine if they would have an effect. First, A one-way ANOVA was conducted to compare the effect of Goal/No Goal, Promotion/Prevention and Cognitive Load/No Cognitive Load conditions on the GLT.

There was a significant effect of Goal/No Goal on GLT level for the conditions, $F(1, 294) = 3.862$, $p = .05$, $\eta^2 = .13$, considered a medium effect (Cohen, 1992). For Regulatory Focus (Promotion / Prevention) and Cognitive Load/ No Cognitive Load, there was no significant effect ($p = .724$ and $p = .973$ respectively). Those results suggest that Regulatory Focus, Reward or Cognitive Load, when considered alone, cannot explain the GLT, but the presence of a goal can.

To examine the moderation effects, an interaction term between the independent variable and the moderator variable was calculated, and then a hierarchical regression with two blocks was performed to examine the changes on the models with and without the interaction term.

The change in F was not significant, $p = .119$ and even though between the models, R^2 changed from .003 to .011 with the interaction term, the results suggest that the model with the interaction term has not showed a better explanation than the model without it. Furthermore, the residual sum of squares remained basically the same between the models, supporting the result. Also, the effect size of $f^2 = .02$, is considered a small effect (Cohen, 1992), backing up the abovementioned results.

The parameter estimates for Goal and No Goal groups is presented on Table 5, indicating the results previously described and also corroborating them with the confidence intervals for the parameters.

Table 5
Parameter estimates for separate analyses for experimental groups

	Performance on Task		
		Goal Group	
Variable	No Goal Group B	B	95%CI
Constant	422.959	426.698	[402.1 - 451.3]
Regulatory Focus	5.723	-3.507	[-25.74 - 18.73]
Reward/No Reward	17.295	-1.903	[-23.86 - 20.05]
R^2	.012	.02	
F	.601	.085	
ΔR^2		-.011	
ΔF		-.516	

Note. $N = 296$. CI = confidence interval. $^*p < .05$.

The small difference in B values, alongside with the insignificant changes in R^2 and F indicate that Regulatory Focus does not improve the model, since offers no increase in explanation power, and even when the interaction term is considered, as displayed in Table 6, it is not enough to be statistically significant. The p values for both models were not significant with ($p = .378$) and without the interaction term ($p = .904$).

Table 6
Coefficients of the model with and without the interaction term

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	423.772	10.155		41.729	.000
	Regulatory Focus	2.656	8.872	.019	.299	.765
	Reward/No Reward	7.830	8.547	.058	.916	.360
	Cognitive Load/ No Cognitive Load	-.182	7.959	-.001	-.023	.982
2	(Constant)	423.851	10.130		41.839	.000
	Regulatory Focus	9.679	9.924	.069	.975	.330
	Reward/No Reward	8.174	8.529	.060	.958	.339
	Cognitive Load/ No Cognitive Load	-.799	7.949	-.006	-.100	.920
	Interaction_Term	-17.64	10.066	-.104	-1.564	.119

a. Dependent Variable: GLT

Discussion

The results of Experiment 3 were important considering the improvement of the SUSR model, for two main reasons. First, the direct effect of Goal presence in Goal Latency Times, indicates that individuals were faster in pressing the buttons when the "X" was on the goal-related images, which is an indicator of attentional bias towards the goal. According to the SUSR model proposition, the information processing on individuals in structured regulation is directed to goal-related contents, such as goal-related images on the Dot Probe Task.

Obviously, it is important to take in consideration the limitations and artificialities of the experimental setting, but considering the null effect of the cognitive load, it is plausible to say that even when the attentional resources were being overloaded, individuals kept performing better in goal-related situations. Those findings strengthen the idea that when the goal was present, individuals were faster, as an indication of attentional bias towards those images.

Otherwise, individuals without goals consequently would have no attentional bias towards any specific content, being more sensitive to salient contextual information, as suggested by the SUSR Model. There are plenty of examples of this kind of attentional focus processes in many fields, for instance, in anxiety and addiction studies, where individuals become more prone to contextual cues related to their anxiety or addiction triggers (Luijten et. al. 2011; Stippekohl et. al. 2012), and even neuroscientific evidence showing the same pattern through insular and orbitofrontal cortices activation (Stawarczyk and D'argembeau, 2015).

The second main reason is the findings on the regulatory focus role in this process. Apparently, the dispositional tendency to promotion or prevention does not affect the information processing of the individual. It makes sense if we consider that promotion or prevention are different approaches to goal-achievement and not necessarily would lead the individual to a better performance through attentional bias. Differences in goal achievement and performance are found in the literature, and also vary depending on the specific domain, such as work, sports or education (Van Yperen, Blaga and Postmes, 2014; Vohs and Baumeister, 2016).

An important difference from the results of Experiment 2 is that the reward had no effect whatsoever. On one side, it may be due to improvements on the experimental control, specially reinforcing the importance of the commitment of the participants in the task, which may have led them to engage more seriously on the task even when there was no reward. On the other side, this task was shorter and more automatic-driven than the Tower of London, which may have helped to keep individuals engaged.

Bringing those findings to real-life situations, it makes sense that individuals with goals will be more aware and sensitive of goal-related content, which may help them to achieve those goals and also corroborates with the notion that the brain tries to be more

efficient through automatization (Bargh et. al. 2012, Toplak et. al. 2014). In terms of resource efficiency, the attentional focus directed to goal related content helps the individual to achieve goals, saving resources on information processing, since the information needed is more easily found due to this focus.

Thereupon, an improved SUSR model could be described as previously discussed, with two clear states, but without Regulatory Focus as a moderator, and as earlier proposed, with information processing being directed to goal-related information or contextual clues depending on the state.

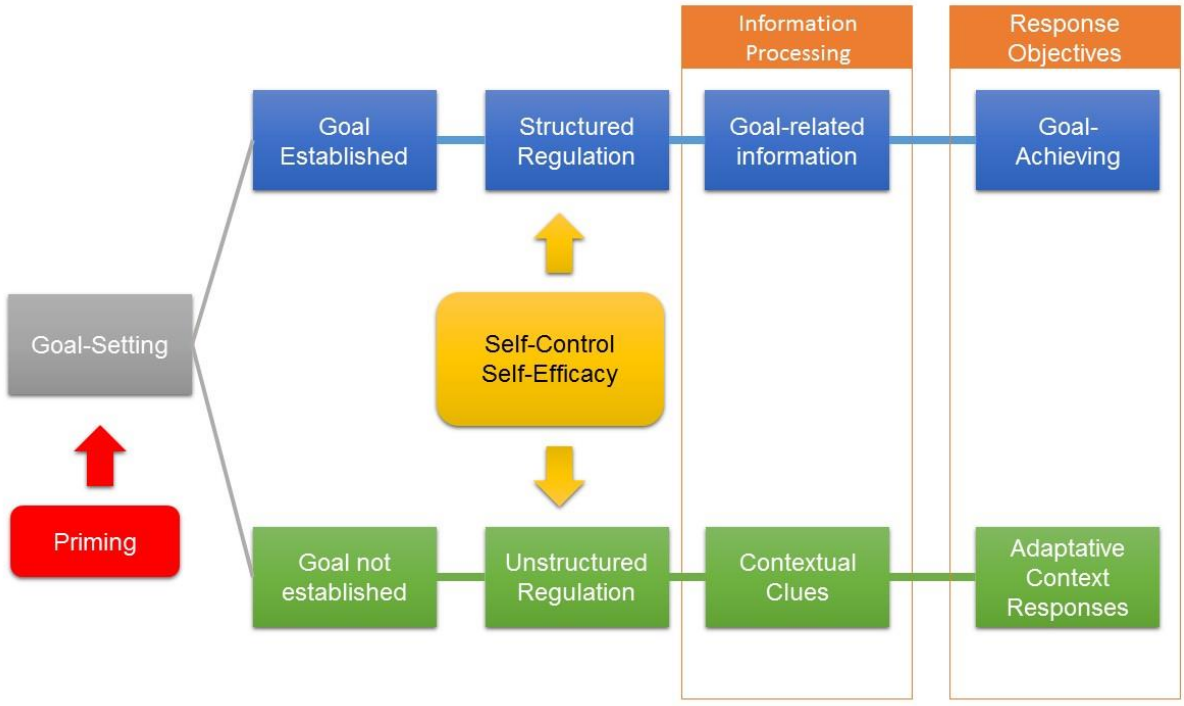

Figure 7 - SUSR Final Model

The next and final Experiment of the present dissertation tested the SUSR model in our of lab, with American football athletes, to not only put the model to test, but also to contribute to the application of the academic and scientific findings on the real world.

Experiment 4

Based on the findings of the first three experiments, an updated model was developed, as Figure 7 shows, including the variables investigated earlier and based on their contribution to the model. The fourth experiment had the objective to test this updated model in a real-life situation, more specifically, in sports performance, being conducted outside the laboratory, among American football athletes in Brasilia.

From the three variables previously studied (self-control, self-efficacy and regulatory focus), only regulatory focus was excluded from the model, based on Experiment 3 findings. Self-control and self-efficacy were then measured among the athletes and the relation between the presence of a goal and the performance on a specific football test was investigated.

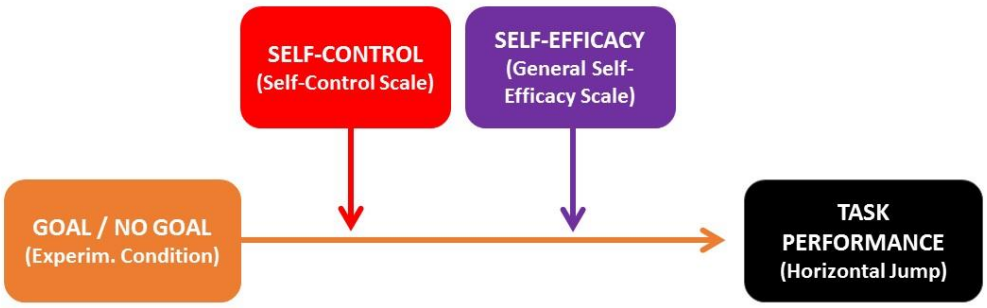

Figure 8 - Experiment 4 variables

For this Experiment, the performance task was the horizontal jump, a simple but effective test used in a variety of sports to predict athletic performance (Dobbs, Gill, Smart, & Michael, 2015; Loturco et al., 2015). The test consisted on the participant standing in a line and jumping forward, above a measure tape, where the distance jumped was measured in centimeters (appendix H).

Method

Participants

143 American football athletes, from three different teams, averaging 24,25 years (*SD* = 5,90), mostly male (89%) were randomly assigned to two groups (Goal and No Goal), following the same procedure of previous experiments. Since the national championship began during the data collection, there was some data loss, specifically 23 participants because of injuries and other reasons. The sample size was previously calculated considering α =.05, and effect size of.15 based on Cohen (1992) recommendations.

Materials and Measures

Participants in the two conditions answered the Self-Control Scale (Victorino & Franco, 2016; Tangney, Baumeister, & Boone, 2004) and the General Self-Efficacy Scale (Moura, 2011) presented via Google Forms. A socio-demographic questionnaire and debriefing questions were asked, and the performance task was the horizontal jump (HJ).

Procedures

This experiment was conducted in two moments, with the online questionnaires being answered previously to the performance task (HJ). Weeks after the questionnaires were sent online to the athletes, the horizontal jump test was conducted. The HJ was evaluated on the training field, by one researcher and one team coach. Each participant had two jumps to execute and the difference between the last jump and the first one, hereby referred to as HJ Delta was considered the task score. This value gives a measure of improvement (when positive) or diminishment (when negative) between the jumps, as is the standard procedure for this kind of task (Loturco et al., 2015).

Participants on the Goal Group were told to achieve a specific performance goal, which was to increase the performance achieved in the first jump. In the No Goal group, the same procedure follows, except for the goal with participants being only asked to complete the task. Before a team training session, the athletes were informed of the test and given specific instructions, depending on the experimental group. Then the athletes proceeded to do the jump, with a one-minute rest between the trials, as usually done in this kind of test.

Results

Exploratory initial analysis indicated that there were missing data on the sociodemographic questionnaire, but since all those cases were complete on the main variables for the analysis, those subjects were kept. There were 5 outliers in the horizontal jump measure, which were also kept because they were due to the natural performance of the athlete. Considering that American football athletes have all kinds of body compositions, it is natural that those outliers would occur.

All the variables were normally distributed, as checked with histogram plots and KS tests, except for the Self-efficacy, which KS test failed (p = .340). However, the values for kurtosis (-.031) and skewness (-.869) were within normality range.

The direct effects of goal presence and self-control on HJ Delta were tested through independent samples t-test. For goal presence, there was a significant difference between Goal (M = .112, SD = .089) and No Goal groups (M = -.138, SD = .118); t (142) = 14.523, p < .001, with and effect size of r = 0.89, considered a large effect (Cohen, 1992). On the other side, the direct effects of self-control on HJ delta, were not significant for Goal (M = 104.39, SD = 7.279) and No Goal groups (M = 104.18, SD = 6.385); t (142) = .190, p = .849.

Since self-efficacy failed the KS test, a Mann-Whitney U was used to test its direct effects on experimental groups. Again, there was no direct effect of this variable on Goal (*Mdn* = 74.94), and No Goal (*Mdn* = 69.77), *U* = 2.769, *p* = .457.

For the moderation analysis, the PROCESS macro for SPSS was used (Hayes, 2012), which automatically creates the interaction terms for both moderator variables, and the hierarchical regression, first introducing the independent variables and then the interaction terms from both moderators, to test if Self-Control and Self-Efficacy moderate the relationship between Goal presence and the HJ delta.

Table 7
Parameter Estimates for separate analyses for experimental groups

	Performance on Task		
		Goal Group	
Variable	No Goal Group B	B	95%CI
Constant	.134	.054	[-.297, .405]
Self-Control	-.003	.001	[-.002, .004]
Self-Efficacy	.001	-.001	[-.006, .004]
R^2	.023	.011	
F	.768	.392	
ΔR^2		.12	
ΔF		.376	

Note. *N* = 142. CI = confidence interval. *$p < .05$.

The overall model was significant, $R^2 = .605$, F (2, 139) = 42.27, $p < .001$, with multicollinearity checked and VIF values within an acceptable range (1.46 and 2.04). First, the model summary indicates that the model was statistically significant, with changes in *F* (*p* <.001) and a diminution in R^2, from 0.023 to 0.11 showing an decrease on the total variance when the interaction terms were included, even though the effect size of $f^2 = 0.011$ is

considered a small effect (Cohen, 1992).

These results are substantiated with the residuals analysis, with a decrease in residual sum of squares from the model without the interaction term and the model with it. Table 8 indicates the coefficients, and corroborates the results, with changes in beta values, also a sign of a moderation effect. However, only one interaction term was significant (Self-Control) and even though the B and β values are different from zero, it means that the model with this specific interaction term is consistent, but not with Self-efficacy interaction term.

Table 8
Coefficients of the model with and without the interaction term

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.027	.233		-.115	.909
	Self-control	.000	.002	-.010	-.113	.910
	Self-Efficacy	.001	.003	.036	.427	.670
2	(Constant)	.091	.149		.613	.541
	Self-control	-.002	.002	-.104	-1.639	.104
	Self-Efficacy	.001	.003	.022	.293	.770
	Interaction_Term 1 - SC	.003	.001	1.018	2.714	.007
	Interaction_Term 2 - SE	-.002	.004	-.244	-.639	.524

Dependent Variable: HJDelta

Figure 9 shows the regression lines for the model with self-control only, and for goal group, as self-control increases, the HJ delta increases as well. For the No Goal group, the effect is the opposite, because HJ delta values can go below zero, and actually higher scores of self-control were related to lowest HJ Deltas.

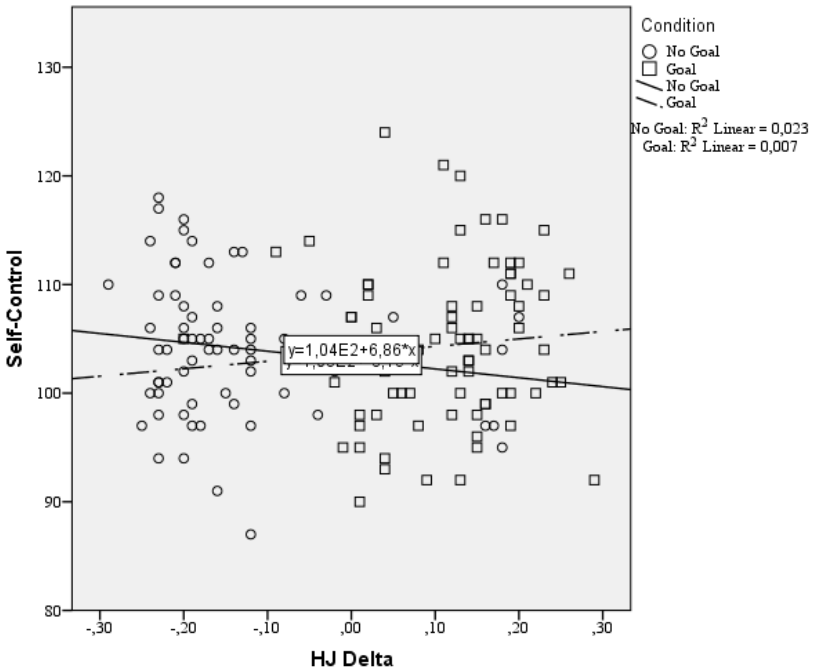

Figure 9 - Simple slopes equations of the regression of HJ Delta on self-control at condition levels

Figure 10 follows the same rationale for Self-efficacy, with regression lines for the models. This figure indicates that for the Goal group, as self-efficacy decreases, the HJ Delta increases, meaning that individuals with lower scores of self-efficacy actually performed better in the Goal group.

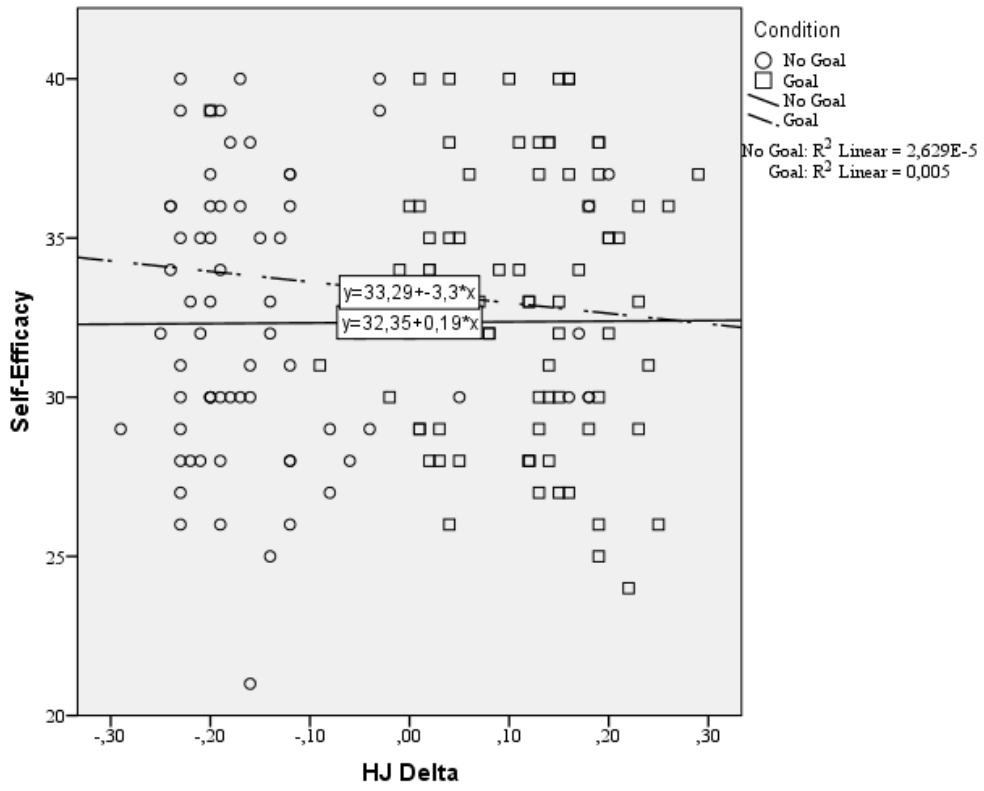

Figure 10 - Simple slopes equations of the regression of HJ Delta on self-efficacy at condition levels

Discussion

Apparently, Self-efficacy does not belong to the SUSR model, even though previous experiments indicated differently. These results are intriguing because it seemed plausible that individuals with high self-efficacy would have an advantage in self-regulatory processes and consequently perform better. Considering the findings of experiment four, this variable should not be included, but there is a possible explanation. Maybe, individuals with high self-efficacy

would feel more confident since the first jump, having a goal or not, engaging confidently in the task from its very beginning.

Additionally, there was no direct effect of self-efficacy in the HJ Delta, as reported earlier, which was a first indication of this possibility. Even though self-control did not have a direct effect as well, when its interaction term was included it increased the R^2, thus improving the explanation power of the model. Lack of direct effect and presence of effect with the interaction term are indicator of moderation effect, more specifically a cross-over interaction.

Self-control results actually make sense, since higher scores on self-control were related to higher HJ Deltas, meaning that individuals were able to regulate their behavior to increase performance, which was their goal. For the No Goal group, since there was no clear goal, just the need to jump and finish the task, a decay in HJ Delta was seen, maybe due to natural decrease after the first jump, or plain lack of effort to improve.

Literature on the field suggests that in sports domain, natural competitiveness and social comparison usually lead to a positive relation between performance goals and actual performance (Van Yperen, Blaga and Postmes, 2014), and the fact that athletes were in line, thus watching and being watched during the tests, could help to explain our findings. According to the same authors, unlike domains such as education and work, in sports the need to achieve performance goals tend to motivate individuals, while on the first two domains, goals may lead to anxiety, decrease in task focus and even persistence and effort.

General Discussion

Establishing and achieving goals is a key function in human behavior, and its effects extend through a variety of fields and applications, from (in some ways primal) adaptation to the environment, through complex and specific contexts such as work, sports, health and education. In many of those fields, failure to set and complete goal-based actions have been an everyday struggle, with students trying to reach academic performance indicators, athletes trying to improve and get ahead of competitors and workers striving to perform better in order to be recognized and develop their careers.

The literature on goals and self-regulation is vast and through continuous scientific effort, theories and models have been developed, tested, worked for some time, and then disproved, with only a few passing the test of time and replication. The SUSR model is a contribution for the field but does not intend to solve the long-time gaps that self-regulation science still must fill.

Starting from the beginning of the model, throughout the four experiments, the goals were always set for the individuals with simple stimuli, a direct instruction, sometimes enhanced with the possibility of a reward, but in most cases, it was enough for the individuals to engage in goal-pursuit. Even though the goal-setting process was not the focus, the priming induction successfully establish along the experiments supports the idea that goal can be established that way. Obviously, more data on the specifics of goal-setting processes need to be gathered, but the literature is vast on this matter and improvements could be made in this part of the model.

Regarding the moderators, regulatory focus was excluded from the model, based on the findings of Experiment 3, and even with a good support from the literature to include it on

the model, some reasons why it does not influence the self-regulatory process can be discussed. For instance, promotion and prevention are different ways to achieve goals, but they differ in efficiency depending on the specific context in which the individuals are. Sometimes, a more conservative preventive posture is more adequate, and in some other times, a more proactive, aggressive promotion behavior leads to a better performance. In a recent meta-analysis, the results indicated that when the individual focus on not doing worse than others, or worse than himself, there is a negative relation to performance attainment (van Yperen, Blaga and Postmes, 2014).

Self-control on the other hand is directly linked to the capacity of the individual to regulate himself, engaging in some behaviors, controlling impulses and planning strategies to enhance goal-achievement possibilities. In Experiments 1 and 4, its role in structured and unstructured self-regulation was consistent, and the fact that those experiments were in different contexts makes the case for this variable to be included as an important moderator.

Self-efficacy variated in this matter, with peculiar results for Experiment 2, especially considering the suppression effect found. The most plausible explanation is the one discussed earlier, that when the task is new for the individual, the basic confidence that self-efficacy generally gives to the individual may have a reduced effect. In experiment four, with individuals arguably more competitive, since are voluntarily engaged in a sport and competing nationally, the self-efficacy had no specific effect. If we add the social comparison due to the data collection context in this case, the results are not surprising.

Evidence on the field suggests that when individuals need to perform better than they have performed before (mastery-approach goals) or better than others (performance-approach goals), self-regulation tends to lead to better performance (van Yperen, Blaga and Postmes, 2014). Maybe, considering evidence from the field, excluding self-efficacy from the model

could be a precipitated decision, and more data on different domains should be gathered. In work, education or other context, with new or well-known tasks, results may vary, but within limits of this thesis findings, the exclusion of the variable seems a safe verdict. Maybe an experimental design within-subjects could help to shed some light in this matter, considering that individual differences would be treated differently than the experimental design used in the present work.

Moving forward to information processing, the results support the proposal of the SUSR model, because even with cognitive load, individuals in structured regulation had faster latency towards goal-related information. As discussed before, it is a good strategy if we consider cognitive resource management, and it actually helps the individual to achieve goals more easily, giving the brain the right information to process.

On unstructured regulation, the attentional focus would be more sensitive to contextual clues, based on the individual's previous experiences and on the salience of the information itself. The findings of Experiment 3 support this idea, especially if we consider that the data was collected through a software in milliseconds, which in this case made possible to detect minimal differences in latency times.

The last part of the model was tested in Experiments 1, 2 and 4, with the performance measures. In all three experiments, individuals performed better, supporting the proposition of the SUSR model, which is the response objectives for structured regulation being directed to goal-achieving behavior and on unstructured regulation, the common context-adaptative responses. The final result of a structured or unstructured self-regulation state should definitely be related to the presence or absence of a goal, which was the case throughout the experiment, with direct effects of goal on the dependent variables being found in all the cases.

Henceforth, it is plausible to say that the SUSR model contributes to the better understanding of self-regulatory processes and subsidizes further investigation on some aspects brought by the model itself, and some others indicated by the literature. First, the domain in which the individual needs to regulate their own behavior, as pointed out before. Secondly, what kind of interventions could be designed to help individuals engage in one or another self-regulatory state. If we consider that most of the times our performance is evaluated based on comparisons with others, interventions to mastery-approach goals should be incentivized (Senko, Hulleman, Harackiewicz, 2011).

On Experiment 2, when self-efficacy was firstly inserted in the model, the task individuals were performing were new to them, which may have influenced the self-efficacy itself, bringing a sense of insecurity or anxiety towards the task, therefore affecting their performance. That was not the case in Experiment 4, where the horizontal jump is not only a common task, but also a common exercise that American football athletes practice every now and then, sometimes as an indicator that would lead them to be benched or chosen as starting player.

Literature states that this kind of goals usually show better results in many fields, such as prosocial behavior (Darnon et. al., 2006) and competence-based contexts (Elliot, 2005; Van Yperen and Orebek, 2013). Also, individuals tend to be more motivated (Durik, Lovejoy and Johnson, 2009), interested in the tasks (Elliot and Murayama, 2008), and even more agreeable and conscious (Cheng and Mathieu, 2008; McCabe, et. al., 2013).

Another important issue is that we developed the model based on an individual approach, which does not mean that it could not be used in group goals for example. When in groups, individual will need to regulate their own behavior, which makes the case for the SUSR model to be used from an individual perspective, but without losing focus on group

goals. A meta-analysis conducted by Kleingeld, van Mierlo, and Arends (2011) suggested that goals intended at make the most of individual performance produced a negative group-performance effect, but individual goals aimed at empowering the group resulted in a positive effect on performance.

An important issue to be addressed is that in three of the four experiments, the size of the effects were always small: Cohen's f^2 = .062 for Experiment 1, f^2 = .002 for Experiment 3 and f^2 = .001 for Experiment 4. On experiment two, the effect size was large (Cohen´s f^2 = .056) but there was the suppression issue. As previously discussed, it could be due to the very object of Experiment, which is a very complex construct and literature on the field is vast on the matter of complex concepts generating small effects (Asendorpf, et. al. 2013; Burnette et. al., 2013; Combs, 2010; Hagger et.al. 2010; Van Yperen, et. al. 2014).

The SUSR model obviously need to be tested in exhaustion, varying on the tasks, domains, goals and mainly with different moderators. Some of these possibilities were discussed above but some others will be added from now on, which is not only a usual development of any model, but a necessity in a collective effort aiming to science progress and field advance. In times of replication debates and open science discussions, it is natural that new propositions such as the SUSR model are put to test, and it is our objective with this work to be the first movement in this path.

There are limitations to the present thesis, some of them already discussed in each experiment, and sometimes fixed for the next one, but some others are worth presenting, more specifically: the goal-setting process; history of performance on the task and; self-reported moderators. Regarding the goal-setting process, it can be influenced by variables that were not controlled throughout the four experiments, such as motivation and cost of effort, for example. An individual will only apply a certain amount of effort in a task, and probably,

without real-life rewards such as a work promotion, there is a possibility that the SUSR model would need changes, especially regarding the moderating variables.

Similarly, in real life, the history of performance may affect how the individual approaches a goal and the subsequent behavior towards it. The negative loop theory (Lord, Diefendorff, Schmidt, & Hall, 2010), described earlier in this thesis, is a major theory in the field and it states that the inputs from previous experiences affect self-regulation towards goals, and this variable was not added to the model.

A last limitation, among less relevant others that were not discussed, lies on the fact that all the moderators were self-reported, and there is a possibility of biases with this kind of measures, instead of implicit ones. It was a matter of methodological choice, noticeably based on the literature, but brings limitations to our findings.

Future research should focus on some trends that have been gaining space on the field recently, such as the developments of the multiple-goal pursuit model, which has the advantage of trying to explain self-regulatory processes when the individual deals with different goals at the same time, which is closer to everyday situations. Lately, advances in this theory have incorporated the knowledge from DFT (decision field theory) and should be investigated.

The SUSR model goes in a different direction, which is more prone to basic science, investigating the core processes with simplified ideas that help us understand the psychological mechanisms involved in complex processes such as self-regulation. Basic science is usually criticized for its distance of real-world problems, but it is inspired by those, and that was the case for the present thesis. With Experiment 4, we have tried to give at least an initial contribution in this sense.

To understand and explain complex processes such as self-regulation is a difficult goal to achieve, and even with all those years of scientific production on this field, we are still struggling with a multifaceted, difficult and thought-provoking object of study. We believe the four years of consistent effort put in this thesis are part of this steadily made progress towards a goal that is hard to achieve - but progress has been made and we hope our findings could be a worthy contribution.

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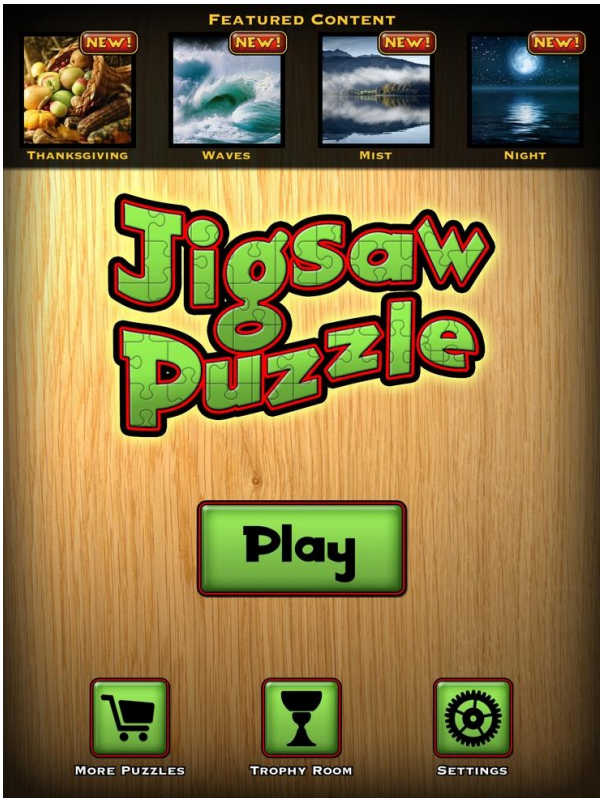
Appendix A

Puzzle Task



Appendix B

Self-Control Scale

Escala de Autocontrole

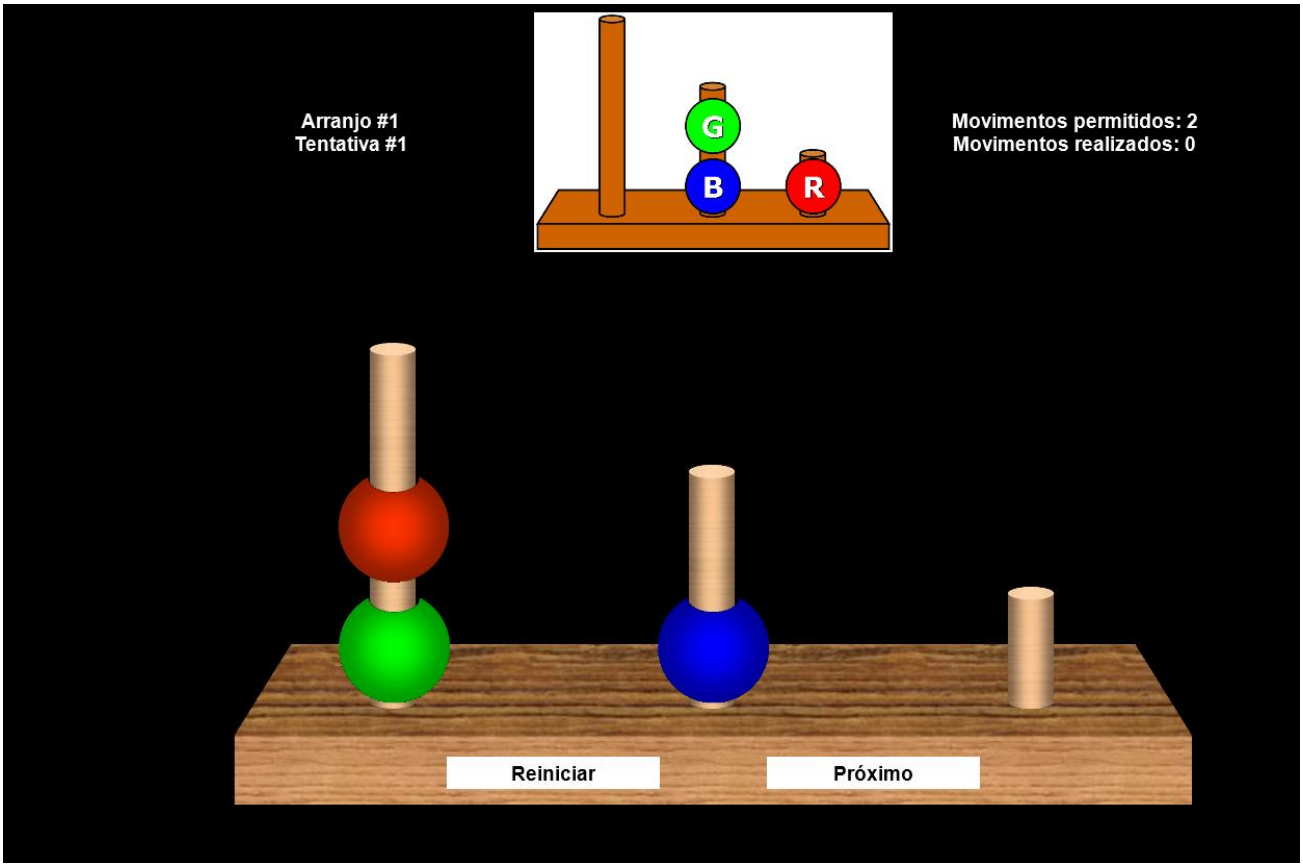
Utilizando a escala fornecida, indique o quanto você se identifica com as seguintes declarações.

		Pouco				Muito
1	Sou bom em resistir a tentações.	1	2	3	4	5
2	Tenho dificuldade em mudar hábitos ruins.	1	2	3	4	5
3	Sou preguiçoso.	1	2	3	4	5
4	Digo coisas inapropriadas.	1	2	3	4	5
5	Nunca me permito perder o controle.	1	2	3	4	5
6	Faço coisas que são ruins para mim, se forem divertidas.	1	2	3	4	5
7	Pessoas podem contar comigo para manter as coisas dentro do programado.	1	2	3	4	5
8	Acordar cedo é difícil para mim.	1	2	3	4	5
9	Tenho dificuldades em dizer não.	1	2	3	4	5
10	Mudo de ideia com certa frequência.	1	2	3	4	5
11	Digo o que penso.	1	2	3	4	5
12	As pessoas me descreveriam como alguém impulsivo.	1	2	3	4	5
13	Eu recuso coisas que são ruins para mim.	1	2	3	4	5
14	Gasto muito dinheiro.	1	2	3	4	5
15	Deixo tudo muito arrumado.	1	2	3	4	5
16	Às vezes me permito me exceder.	1	2	3	4	5
17	Gostaria de ter mais disciplina.	1	2	3	4	5
18	Sou confiável.	1	2	3	4	5
19	Eu me deixo levar por meus sentimentos.	1	2	3	4	5
20	Faço muitas coisas no calor do momento.	1	2	3	4	5
21	Não sou muito bom em guardar segredos.	1	2	3	4	5
22	As pessoas diriam que possuo uma forte autodisciplina.	1	2	3	4	5
23	Já trabalhei ou estudei a noite toda no último minuto.	1	2	3	4	5
24	Não sou facilmente desencorajado.	1	2	3	4	5
25	Eu deveria pensar mais antes de agir.	1	2	3	4	5
26	Eu me envolvo em atividades saudáveis.	1	2	3	4	5
27	Como comidas saudáveis.	1	2	3	4	5
28	Prazer e diversão às vezes me impedem de fazer o que eu realmente preciso.	1	2	3	4	5
29	Tenho dificuldades em me concentrar.	1	2	3	4	5
30	Sou capaz de trabalhar de forma efetiva na busca de metas de longo prazo	1	2	3	4	5
31	Às vezes não consigo evitar fazer algo, mesmo que saiba que é errado.	1	2	3	4	5
32	Frequentemente ajo sem pensar em todas as alternativas.	1	2	3	4	5
33	Perco a cabeça muito facilmente.	1	2	3	4	5
34	Interrompo pessoas com frequência.	1	2	3	4	5
35	Às vezes bebo ou uso drogas em excesso.	1	2	3	4	5

36	Sou sempre pontual.	1	2	3	4	5

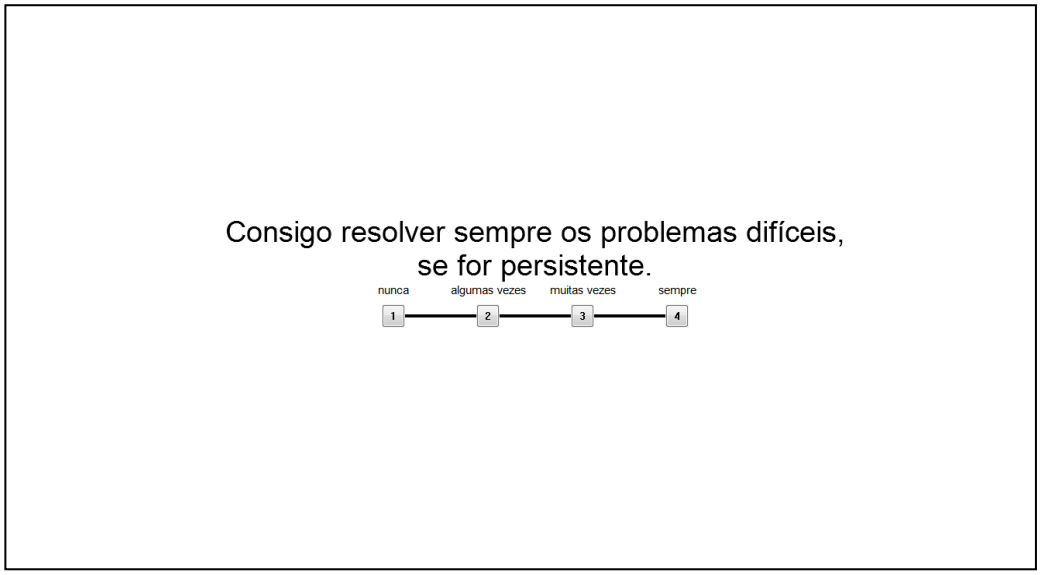
Appendix C

Tower of London Task



Appendix D

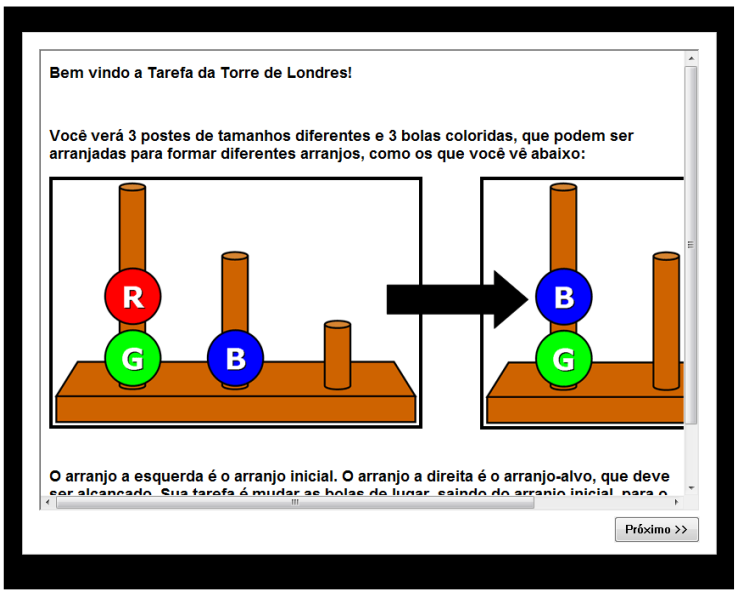
General Self-Control Scale on Inquisit Software

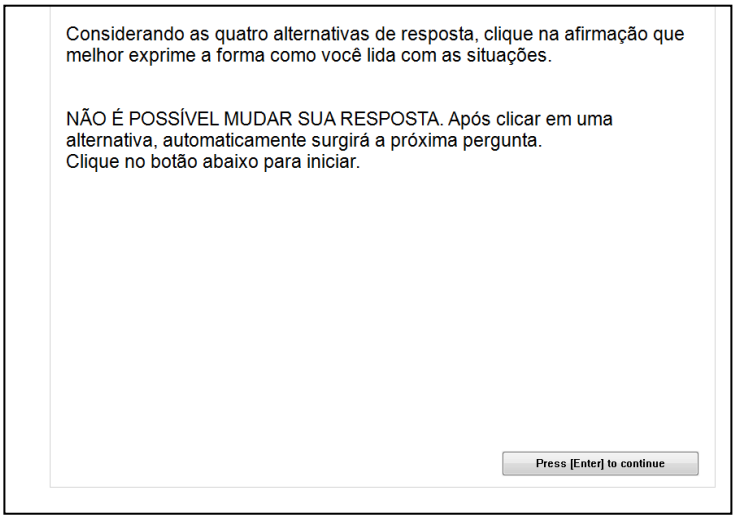


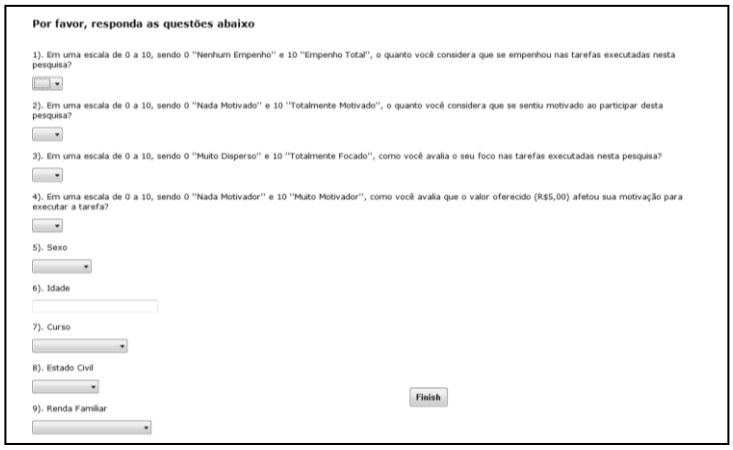
1	Consigo resolver sempre os problemas difíceis se for persistente.
2	Se alguém se opuser, consigo encontrar os meios e as formas de alcançar o que quero.
3	Para mim é fácil agarrar-me às minhas intenções e atingir os meus objectivos.
4	Estou confiante que poderia lidar eficientemente com acontecimentos inesperados.
5	Graças aos meus recursos, sei como lidar com situações imprevistas.
6	Consigo resolver a maioria dos problemas se investir o esforço necessário.
7	Perante dificuldades consigo manter a calma porque confio nas minhas capacidades.
8	Quando confrontado com um problema, consigo geralmente encontrar várias soluções.
9	Se estiver com problemas, consigo geralmente pensar numa solução.
10	Consigo geralmente lidar com tudo aquilo que me surge pelo caminho.

Appendix E

Screenshots from Inquisit Software







Appendix F

Regulatory Focus Questionnaire

Por favor, indique a sua resposta para cada pergunta assinalando à alternativa mais apropriada.

Comparada com a maioria das pessoas, você é incapaz de conseguir o que quer da vida?	Nunca ou raramente 1 ☐	2 ☐	As vezes 3 ☐	4 ☐	Muito frequentemente 5 ☐
Durante a sua infância, você costumava "passar dos limites" ao fazer coisas que seus pais não toleravam?	Nunca ou raramente 1 ☐	2 ☐	As vezes 3 ☐	4 ☐	Muito frequentemente 5 ☐
Com que frequência você realizou coisas as quais ficou "empolgado" a se dedicar ainda mais?	Nunca ou raramente 1 ☐	2 ☐	Algumas vezes 3 ☐	4 ☐	Muitas vezes 5 ☐
Você irritava seus pais com frequência durante a sua infância?	Nunca ou raramente 1 ☐	2 ☐	As vezes 3 ☐	4 ☐	Muito frequentemente 5 ☐
Com que frequência você obedecia às regras e normas estabelecidas pelos seus pais?	Nunca ou raramente 1 ☐	2 ☐	As vezes 3 ☐	4 ☐	Sempre 5 ☐
Durante sua infância, alguma vez você agiu de tal forma que seus pais reprovaram sua atitude?	Nunca ou raramente 1 ☐	2 ☐	As vezes 3 ☐	4 ☐	Muito frequentemente 5 ☐
Durante sua infância, alguma vez você agiu de tal forma que seus pais reprovaram sua atitude?	Nunca ou raramente 1 ☐	2 ☐	As vezes 3 ☐	4 ☐	Muito frequentemente 5 ☐
Você frequentemente se da bem nas diferentes coisas que experimenta?	Nunca ou raramente 1 ☐	2 ☐	As vezes 3 ☐	4 ☐	Muito frequentemente 5 ☐
Não sendo suficientemente cuidadoso me colocou em dificuldades algumas vezes.	Nunca ou raramente 1 ☐	2 ☐	As vezes 3 ☐	4 ☐	Muito frequentemente 5 ☐
Quando se trata de realizar coisas que são importantes para mim, eu acho que eu não desempenho tão bem quanto eu gostaria.	Nunca é verdade 1 ☐	2 ☐	As vezes é verdade 3 ☐	4 ☐	Frequentemente é verdade 5 ☐
Eu sinto que tenho feito progresso no sentido de ser bem sucedido em minha vida.	Certamente falso 1 ☐	2 ☐	3 ☐	4 ☐	Certamente verdade 5 ☐
Eu encontrei pouquíssimos passatempos ou atividades na minha vida que me despertaram interesse ou motivação a me dedicar a eles.	Certamente falso 1 ☐	2 ☐	3 ☐	4 ☐	Certamente verdade 5 ☐

Appendix G

Dot Probe Task Sequence Screenshot on Millisecond Inquisit Software

Appendix H

Experiment 4 Performance Task

Broad Jump