



Nudges for all? The effect of power on the efficiency of nudges

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ABSTRACT

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Every day, individuals are faced with thousands of decisions, which can have a small or a large impact in their and others lives. Contrary to the Homo-Economicus, humans behave irrationally and do not always use all the information needed to take a decision having in mind their best interest. Hence, institutions and policy makers often try to steer individuals in specific direction for better outcomes. This is particularly important for high-power individuals, whose cognitive tendencies often impair decision making, and who often decide for others, impacting many with a single decision. However, high power people are not always happy to take in advice from others and seem to like to make their own decisions. A possible solution is to use “nudges”, which are cheap and simple interventions to steer people in a specific direction while conserving their freedom of choice. This thesis studies how power effects the efficiency of a nudge. As high-power individuals are more likely to act in an automatic manner, by default, it is proposed that nudges promoting System 1 are more likely to work well on high-power than other individuals. Yet, the findings did not support the hypothesis, as there were no differences based on power. By observing the relationship between power and nudging, this research enhances the power literature and fulfils a current gap in the nudging literature.

Keywords: social power, nudges, choice architecture, decision-making

ABSTRACT

Título: O efeito do poder na eficiência de um “*nudge*”

Autor: Gabriela Martin

Todos os dias, as pessoas se deparam com milhares de decisões que podem ter um impacto maior ou menor. Ao contrário do Homo-Economicus, o ser humano comporta-se de forma irracional e nem sempre possui toda a informação necessária para tomar a melhor decisão. Consequentemente, é necessário que as instituições e os formuladores de políticas orientem os indivíduos no sentido de os auxiliarem a tomar melhores decisões, especialmente para indivíduos de poder elevado que estão em posição superior para decidir por outros. Uma solução é usar “*nudges*”, que são intervenções simples e baratas para orientar as pessoas numa direção específica, preservando a sua liberdade de escolha. Esta tese estuda como o poder afeta a eficiência de um *nudge*. Como os indivíduos de poder elevado têm maior probabilidade de agir com base em processos automáticos por defeito, propõe-se que o *nudge* de Sistema 1 seja mais eficaz em indivíduos de poder elevado que em noutros indivíduos. No entanto, os resultados não suportam a hipótese. Ao observar a relação entre poder e *nudge*, esta investigação amplia a literatura sobre poder e preenche uma lacuna atual na literatura sobre nudging.

Palavras-chave: poder social, nudge, arquiteturas de escolha, tomada de decisão

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Glossary

α	The probability of making Type I error; Cronbach's index of internal consistency (a form of reliability)
b	Estimated of values (raw) unstandardized regression coefficient
&	And
ANOVA	Analysis of Variance
CI	Confidence interval
df	Degrees of freedom
DV	Dependent variable
IV	Independent variable
M	Sample mean
n	Number of cases per condition
N	Total number of cases
p	p-value
r	Estimation of the Pearson-product moment correlation coefficient
R ²	Multiple correlation squared; measure of strength of association
RQ	Research question
SD	Standard deviation
SE	Standard error

1. Introduction

Each day as soon as we wake up, we have to make thousands of decisions which vary in importance and impact in our daily lives (Krockow, 2018; Hoomans, 2015). From deciding what to wear, how to vote, or to accept a job position or not, the brain takes in billions of bits of daily information and, as a consequence of all that input, it is difficult for individuals to make good choices (Wansink and Sobal, 2007). Verily, people are not necessarily great at making decisions due to this amount of continuously information and are unfortunately led to make bad choices every here and there. Literature on social psychology has affirmed that individual's choices are influenced by their own perceptions of what others on their surroundings are doing. Yet social influence can also lead individuals to act against their own best interests, such as the use of drugs (Seliger & Whyte, 2011). On the grounds of this, there is a requirement to design institutions and systems that can help and orientate people to make better choices about areas as important as health, happiness, and wealth. These is particularly essential when individuals are taking decisions that not only affect themselves but as well others such is the case of high-power people (Briñol, Petty, & Stavraki, 2014). Indeed, individuals with high power have a significant impact on many others and therefore it is crucial for them to take the best decisions for the well-being of all.

Previous research illustrates that power has a noteworthy effect on human behavior and on social interactions. In harmony with most of the social psychological literature, power has been defined as a central motivating force in human action and relationships (e.g., Emerson, 1962; Fiske, 1993; Thibaut & Kelley, 1959). It reflects the capacity to influence the states of other people with or without the need of punishments and rewards (Briñol, Valle, Petty, & Rucker, 2007). Previous experimental and correlational studies have demonstrated that there is a positive correlation between action and power, meaning that power increases the likelihood of individuals operating on whatever is going on their mind at a specific time (Galinsky, Gruenfeld & Magee, 2003). For instance, it has been demonstrated that high power individuals relied on their thought's way more than low-power individuals when making a choice or a judgment (Briñol, Valle, Petty & Rucker, 2007) and that they are more disinhibited (Keltner, Young, Heerey, Oemig, & Monarch, 1998; Keltner et al., 2003; Skinner, 1995; see also Guinote, Judd, & Brauer, 2002). Likewise, studies suggest that powerful people construe their decision founded on temporary subjective experiences and do not automatically rely on prior knowledge from others or on core attitudes (Slabu & Guinote, 2009) leading them to make sometimes irrational decisions. Hence, high power individuals seem to be less likely to be

influenced by others and take less advice from those around them. Regrettably and as mentioned above, people with high power have a dominant position over others and don't appreciate the feeling of being influenced even if the outcome is better for them and also for the society, which can lead to drastic outcomes. In fact, individuals with elevated power do not appreciate to take advice of others even if the person is an expert (See, Morrison, Rothman & Soll, 2010).

One method, which has been contemplated to be very useful in orientating people to make some specific choices is nudging. It differs from alternative ways of adjusting individual's behavior, such as penalties or fines (i.e., taxing alcohol) or increasing the access to information (i.e, displaying calories on restaurants and fast-food menus). Sunstein and Thaler defined nudged as "any aspect of design that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler & Sunstein, 2008, p. 6). Nudges are often perceived as manipulative, however. In these cases, people tend to react against them. Yet, most nudges are not supposed to be noticed. Nudges modify the decision-making process by prompting behavior in a very specific and sophisticated way, out of awareness, operating in our unconscious. Therefore, individuals do not feel they are being influenced. The former United Kingdom Prime Minister, David Cameron, has showed great interest on using nudges to improve the well-being of the citizens. He sees nudging as an excellent mechanism to "persuade citizens to choose what is best for themselves and society" (Basham, 2010, p. 4).

Research suggests than designing nudges in a subtle way, also called "choice-architecture", can facilitate and improve the decision-making of each individual (Selinger & Whyte, 2010). Hence, this technique of nudging is a possible way to overcome the issue mentioned above on how to lead powerful people to make better decisions for them and the ones around them without the feeling of being influenced. However, we question ourselves if nudges are truly viable and effective mechanisms for improving high-power people's lives and societies by orientating them to make better and more rational decisions or if powerful people will still resist the nudge's influence. That is what this thesis is about.

1.1 Problem Statement

This research aims to study the effectiveness of nudges on powerful people in order to find a solution to lead high power people to make better decisions without them feeling like they are being influenced. In order words, by investigating the efficiency of using nudges on high power people, this thesis aims to observe if nudges perform differently on high power

people from a control – power neutral – group. Therefore, this research intends to answer the question “**How does nudging impact high power individuals?**” To demonstrate the problem statement, the following sub-questions will be examined:

RQ1: Do high-power others perceive nudging differently?

RQ2: Is nudging effective on high-power people?

1.2 Relevance

This thesis contributes to the existing literature on influence and power by proposing a new angle of research by studying the effectiveness of nudges on powerful people. Although the importance of influence and power in social psychology is large, there is surprisingly no research and studies available that have looked at the relationship between nudges and power. Therefore, studying the efficiency of nudges on powerful people provides a novel integration of research on influence and power. Additionally, as a practical aspect of this research, I expect to contribute and raise awareness of companies, managers, and salesman for the effectiveness of nudges, nudging them, in turn, to implement nudges in their strategies. Systems and institutions that help people make better decisions have much to gain by knowing and understanding if individuals at different power levels perceive nudging similarly.

1.3 Structure

In order to explore the research question and to accomplish the thesis objective, an experimental study has been conducted. Following this brief introduction of the subject, the relevant literature on power, nudging, and influence will be reviewed. This chapter will cover theoretical research about the main issues raised from the problem statement and the main empirical evidence. Next, in the third chapter, the empirical study will be presented, including the methodology and the research strategy. In the same chapter, results will be presented, analyzed thoroughly and discussed. Finally, in the last section of this thesis and following the results, the main conclusions of this study as well as managerial and academic implications will be provided, as well as the recommendations for future research on this subject.

2. Literature Review

The goal of this following chapter is to analyze the pertinent literatures to the formulated research questions mentioned above. It introduces relevant definitions, concepts, findings and theories from former literature. Predominantly, a complete overview of the literature on

decision making, power, and confidence is delivered. Thereafter, relevant concepts from high-power individuals and their behavior are discussed. Finally, nudges and their impact on decision making are outlined, which lead the hypotheses and the research questions for this study.

2.1 Decision Making

Human choices are at the heart of plenty of research carried out by neuroscientists, psychologists, and governments, to improve the decision-making of individuals. In a utopic world, people should be able to make perfect decisions, choosing the best for them, and knowing the consequences of each action. In this scenario, a rational individual would select an action that leads to the best outcome (Lorkowski & Kreinovich, 2014). This assumption underlies the idealized (basic) economic model. Yet, in the real world, people's decision is far from perfect and individuals choose outcomes which are not even close to their best interests (Dayan & Bar-Hillel, 2011). Consequently, individuals consume unhealthy food, gamble, fail to exercise, procrastinate, and do many other things that are bad for their health, social status, financial wealth, amongst others.

It has been shown that individuals make irrational decisions which, at first sight, may seem reasonable but which, after a more profound analysis, are irrational, leading them to ethical and physical ruin (Lorkowski & Kreinovich, 2014). These irrational decisions are explained by some sociological and psychological biases linked to decision making. Indeed, for instance people tend to be influenced by the choices of others around them or from their relatives, and following social norms (Asch & Guetzkow, 1951; Cialdini & Goldstein, 2004). Long years of research suggest that humans have very limited ability to process information and limited resources to optimize their decision making, mostly when the decision has to be taken urgently. Decisions are more rational and optimal when individuals are given more time. Yet, most of the time, people, especially decision makers are rushed when making decision or have short deadlines. Studies show that when humans have limited time to access to every information, a natural sense is to use partial evidence which can lead to bad choices (Martino, Kumaran, Seymour, & Dolan, 2006).

Decision-making is full of biases (i.e, the framing effect: a cognitive bias where people take decisions depending on how the options are presented with positive or negative connotations) that interfere in our judgment. For instance, individuals misremember painful memories as good experiences, tend to make decisions depending on their emotions turning a rational choice

into an illogical one or even deciding on a situation they'd otherwise avoid (Goldstein, Johnson, Herrmann, & Heitmann, 2008). Besides, decision-making is a tiring-process and that in itself helps explain why rational individuals keep taking bad decisions. "Decision fatigue" studies suggest that people have a restricted amount of mental energy to dedicate to making choices (Thierney, 2011). Every decision requires our brains to wield energy daily that we are unable to provide without any external help (Cerf, Matz, & Berg, 2020).

2.2 Power

Power is an unavoidable characteristic of human relationships, social life, and structure (Keltner et al., 2003). Research shows that every organization, society, and group of people have a need to cognize and resolve the issue of power to accomplish their objectives or else will be a threat by dysfunction, failure, or even extinction (Turner, 2005). The conventional theory is that power is described by the capacity of influencing others and that influence is founded on the control of important resources and the ability to inflict reprimands and deliver positive reinforcements (e.g., French & Raven, 1959, Anderson & Galinsky, 2006). Powerful people are more independent from others' resources, being easier for them to satisfy their desires and needs, whereas people low on power rely on the powerful individuals to obtain resources such as money or food, or even social resources like friendship, affection, etc (Galinsky et al., 2003; Magee & Galinsky, 2008; Anderson, John, & Keltner, 2012).

At one time or another, most individuals experienced power throughout their life, whether at work, at school, within their families, or friends (Gruenfeld, Galinsky & Magee, 2003). Recently, it has been shown that power was a shared experience among participants with almost half of the participants having experienced a high-power position in the space of 3 days (Smith & Hofmann, 2016). In human interactions and actions, power is acknowledged as a central motivating force (Emerson, 1962; Fiske, 1993; Parker & Rubenstein, 1981; Thibaut & Kelley, 1959), as stated below it is based on coercion, authority, and persuasion (Turner, 2005). The feeling of being powerful or powerless strongly modifies our way of living, exchanging dialogues with others, perceiving and deciding. Indeed, the ways humans act are driven by this feeling without them even noticing it (e.g., Guinote & Vescio, 2010). For example, studies revealed that power has a strong incentive when validating what individuals think about others; meaning that the feeling of being powerful ascertains their beliefs to a greater extent. Hence, power reinforces preconception (Briñol, Petty & Stavraki, 2014).

Apart from the fact that power is acknowledged as a central strength and vitality in individual interactions and social behavior, power is also considerably reviewed for its strong impact and influence on cognitive processes (e.g., Guinote & Vescio, 2010; Briñol, Petty & Stavraki, 2014).

2.3 Power and confidence

The Approach-Inhibition Theory of power by Keltner, Gruenfeld, & Anderson (2003), examines the effect of power on human behavior, and more specifically it influences. Research demonstrates that individuals with elevated-power are related with amplified freedom and rewards which activates approach-related tendencies (Keltner et al., 2003). Whereas individuals lacking power are associated with augmented punishments, social restrictions, and threats, thus activating inhibition-related tendencies. This theory is important as it explains that power has an ability of transforming individuals' psychological states. Power has a role in activating people, increasing their energy, emotion, and drive.

Recent studies have revealed that power has an impact on individuals' confidence. As already stated, the feeling of power can influence the way humans process information when making a decision or even when arguing. Integrating and taking into account other's input could improve and enrich decision quality, nonetheless frequently individuals do not effectively apply the advice and other's insights. It is argued that elevated power increases the tendency to disregard advice (See, Morrison, Rothman & Sol, 2010), the mechanism that elucidates this outcome is greater confidence in one's judgment. Some factors can impact the decision makers to disregard other's opinions, such as if they feel confident (Bonaccio & Dalal, 2006) or if they are facing incidental feelings that give rise to emotion of certainty, like anger (Gino & Schweitzer, 2008). For instance, in cases of low motivation or ability to think, power impacts and influences mindsets by functioning as a signal indicating that the powerful individual is correct or that their opinion has more weight. Elevated power can lead someone to heuristically determine that their opinion and position are more valid than others and should be adopted by the group. On the contrary, lower power people would more easily accept that their position is invalid and must be rejected (Briñol, Petty, & Stavraki, 2014). Results in different studies on power and confidence unfailingly reveal a negative correlation between advice taking and power, and proof of confidence' mediation. Indeed, the authors demonstrated that power could influence one's confidence, which is a fundamental mechanism among human relationships (Gollwitzer, 1996; Moskowitz, Skurnik, & Galinsky, 1999). This latter study validated that when

participants were assigned to an elevated-power role, the perceptions of confidence increased, and vice versa.

Research demonstrates that powerful individuals were less accurate in their final judgments which illustrate that power can thereby intensify the propensity for individuals to overweigh their original pronouncement or idea, in such a manner that the powerful individual taking the decision can likewise be the least precise and correct as they are more likely to follow their own intuition than other's advice (See, Morrisona, Rothman, & Soll, 2011). To come to the point, antecedent experimental and correlation studies have disclosed the relations between action and power, to such an extent that power intensifies the tendency of individuals acting impulsively by following more their intuition. (Gollwitzer, 1996; Moskowitz, Skurnik, & Galinsky, 1999).

Therefore, I hypothesize that:

H1) High-power participants follow more their intuition

2.4 High-Power and Decision Making

“The art of being wise is the art of knowing what to overlook” -William James

As mentioned previously, powerful individuals are the ones taking decisions that decide the consequences of those others lacking power (Fiske, 1993); and research reveals that experiencing power influences the way individuals think (Smith & Trope, 2006). As an example, elevated power people compared to individuals who are powerless, take faster decisions in regard to possible courses of action, as they make decisions in a more automatic way (Keltner et al., 2003). Furthermore, studies reveal they persisted longer, trying to develop and utilize more supple strategies in order to pursue a complex goal (Slabu & Guinote, 2010). In fact, concerning goal pursuit, elevated-power individuals act in a goal-consistent way in all phases (Guinote, 2007). It is demonstrated by the social distance theory of power that accentuates the goal-driven character of power's consequence (Magee & Smith, 2013). A few researchers proposed that being powerful improves a person's executive function compared to low-power individuals (Smith, Jostmann, & Dijk, 2008). Executive functions are simply usual processes that regulate and control human behavior and thought (Diamond, 2013). Working memory/updating, cognitive shifting/flexibility and inhibiting are the three main executive functions, which facilitates complicated practices including problem solving, planning, and decision making (Karr, Areshenkoff, Hofer, Iverson & Garcia-Barrera, 2018). Hence, executive

functions address a crucial key in effectively steering everyday life, from physical and mental health to marital and occupational success (Miyake & Friedman, 2012). Yidan Yin and Pamela Smith (2020) revealed that having power enhances all three principal executive processes which help powerful individuals to abstract information processing.

Despite the above studies, a majority of other studies have underlined the contrary; that feeling powerful augments automatic processing and also decreases controlled processing, thereby leading to undesirable cognitive processes such as stereotyping (Fiske, 1993; see also Keltner, Gruenfeld, & Anderson, 2003). As powerful individuals act automaticity due to their high level of confidence, they take decision in a faster way. It is elucidated by the fact that individuals with elevated-power are much more disinhibited compared to low-power individuals (Keltner, Young, Heerey, Oemig, & Monarch, 1998; Keltner et al., 2003), they effortlessly take action in directions desired meaning they follow easily their intuition without further thinking (Galinsky, Gruenfeld, & Magee, 2003). Thinking fast, in an automatic and effortless way is the work of the System 1 of our brain. Hence, it could be suggested that powerful individuals follow more their system 1 when making decisions.

In November 2002, US president, George Washington Bush stated “I don't spend a lot of time taking polls around the world to tell me what I think is the right way to act. I just got to know how I feel.”. Findings on powerful individuals like the US president reveal that they build their pronouncements established on momentary subjective familiarities, and don't essentially trust on fundamental attitudes or even previous information (Weick & Guinote, 2008). Following that, it has been shown that being in a position of power leads people to discount partially or even totally advice even sometimes from experienced advisors (Tost, Gino, and Larrick, 2012).

Hence, scholars have argued that feeling powerful lead individuals to a high level of certainty enhancing them to underweight others' advice and in contrary overweigh their own judgments as they perceive their own perspectives and opinions better in all level than others (Krueger, 2003; Yaniv, 2004; Yaniv & Kleinberger, 2000).

Therefore, I hypothesize that:

H2) High-power people are more likely to engage in system 1

If high-power people are more confident and tend to follow more their gut than others advice even for better outcomes, then it is necessary to find a solution to influence them for better decision making.

2.5 Nudges and original theories

As the concept of nudging is still emerging (Hansen, 2016), limited theories have been established around the topic. Nevertheless, nudging is founded on social psychology and behavioral economics theories, which are disclosed in the following chapter. First, an introduction of the dual-process theory is discussed, as it is the foundation of the nudge’s concept. Thereafter, the concept of nudge is extrapolated further in order to gain deeper insights into nudge theory with its related concepts such as choice architecture and libertarian paternalism.

2.5.1 Dual Process Theory

A core model supporting nudging is Dual-Process Theory of information and cognition processing (Hanse, 2016). This latest theory advocates that the human brain functions in two specific and distant cognitive modes (Kahneman, 2011). It stipulates that some of the human mind processes operate in automatic and intuitive manner whereas others in a more reflective and rational way (Kahneman, 2011), which can be presented as two basic modes: “automatic” and “reflective”. The first process is driven by emotions and fast reactions depending on the environmental stimuli while the second process is a cognitive process (Bucher et al., 2016). Table 1 describes each mode of thinking depending on the process. The two distant modes continuously conflicting in nature and human behavior is an outcome of one of these two modes of thinking. This theory states that reflective thinking is relying on automatic processes whereas automatic thinking acts only independently (Hansen & Jespersen, 2013). Every action that an individual takes, whether automatic or reflective will conduct a specific behavior, which is the outcome of different possible choices (Hansen & Jespersen, 2013). Individuals frequently depend on the automatic mode especially when they have an urge to act quickly, information are missing, they lack relevant feedback or experience.

Automatic thinking	Reflective thinking
Uncontrolled	Controlled
Effortless	Effortful
Associative	Deductive
Fast	Slow
Unconscious	Self-aware
Skilled	Rule following

Table 1: Two Cognitive Modes of Thinking

Source: Thaler & Sunstein, 2008

2.5.2 Nudging, Choice Architecture, and Libertarian Paternalism

Very often, the three terms, choice architecture, libertarian paternalism and nudging are confounded and used interchangeably, which may cause a few confusions in literature and also when applying them. Therefore, some clarifications are given in the next paragraph.

Libertarian Paternalism is described by Thaler and Sunstein (2003) as a way to maintain individuals' liberty of choosing yet offering at the same time a designed help for them to take decisions themselves. The main idea is that it is legitimate and possible for public and private institutions to influence people's behavior while also preserving their freedom of choice, along with the fulfillment of that idea (Thaler and Sunstein, 2008). In fact, paternalism consists of a nudge itself, while libertarianism is the freedom that no or little cost occur when individuals do not "pursue" the nudge. Hence, the concept of libertarian paternalism desire to make it easier for individuals to go in their own direction; "they do not want to burden those who want to exercise their freedom" (Thaler and Sunstein, 2008, p.5). These authors suggest that through the concept of libertarian paternalism, individuals are still entirely free to choose their own decisions, no freedom is taken away from them. Along with it, choice architecture mentions to the presentation of the choice or the framing of the options (Thaler and Sunstein, 2008), yet also defines the interventions of behavior that do not necessarily require regulation (Bucher et al., 2016).

The third concept, nudging, which is the core of this research, can be defined as a combination of both concepts described above: libertarian paternalism and choice architecture. Across multiple organizations and disciplines, nudges have been at the heart of many considerable research articles at numerous levels of analysis. These influential nudges are intended to steer individuals in a specific direction simultaneously preserving their freedom of choice (Sunstein, 2014). Nudges are most often cheap and easily implementable; they are designed to affect the appeal of different proposed options. (Dayan & Barh-Hilled, 2011). By altering the presentation of choices to individuals (Wilson, Buckley, & Bogomolova, 2016), they influence human's automatic mode of thinking. Many governments believe nudging is an excellent method to develop new policies and a great tactical implementation (French, 2013).

The author French (2011) has created a matrix including nudges and three other tactics to modify individual's behavior, which are smack, shove, and hug (See Figure 1). This matrix is helpful to understand the differences between nudges and the other social interpositions and

also how do they interact with us: passively (unconscious and automatic) or actively (conscious). The horizontal continuum represents the incentives (rewards) or the contrary, the punishments.

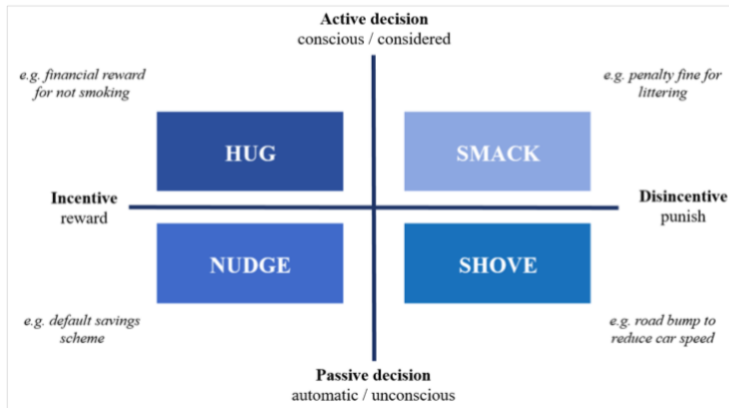


Figure 1 : The Exchange Matrix: Four Forms of Exchange

Source: French, 2011

As the matrix demonstrates, nudges are presented as an incentive-based, passive option in order to tackle human behavioral challenges (French, 2011). Nevertheless, nudges do not only have a positive reputation among individuals such as scholars and public opinion. In fact, some authors defend that nudges manipulate people's choices (Goodwin, 2012; Hansen & Jespersen 2013) instead of maintaining their liberty of choice. Hertwig (2016) underlines that nudges use human flaws to reach goals (i.e., economic goals) and that individuals are not aware that their choices are being manipulated by someone else. He believes that individual should be cautious when using nudges on citizens for State matters and that there is a crucial need of transparency.

According to Reisch et al., (2017), nudges have the ability to target human both cognitive systems, some promote deliberation and reflection which are the System 2 nudges, they are rarer, and less research and literatures exist on them. Whereas some others target more the automatic systems which are System 1 nudges, multiple research and literature have been done on this type of nudge.

To sum up, nudges are an effective soft way to steer individuals toward better desired outcomes such as eating better, living healthier, and having more fulfilling lives without depriving them of their choice's freedom.

2.6 Nudges and Power

There are no existing papers on studies on nudge and power. Nevertheless, as presented above in the section 2.3, low and high-power individuals behave, think, perceive and act differently (Keltner et al., 2003). Those alterations can be elucidated by the effect of power on

both interpersonal and psychological processes (e.g., Guinote, 2007; Anderson & Berdahl, 2002). Due to their high level of confidence, and the fact that they engage more the automatic process when taking decision (Keltner, 2003), high power individuals are more likely to take faster decision without advice of others (see section 2.2). Hence, we may believe that nudges can be more effective on them as System 1 nudges target human's automatic systems.

Therefore, I hypothesize that:

H3) System 1 Nudges are particularly effective on high-power individuals in comparison to the control group.

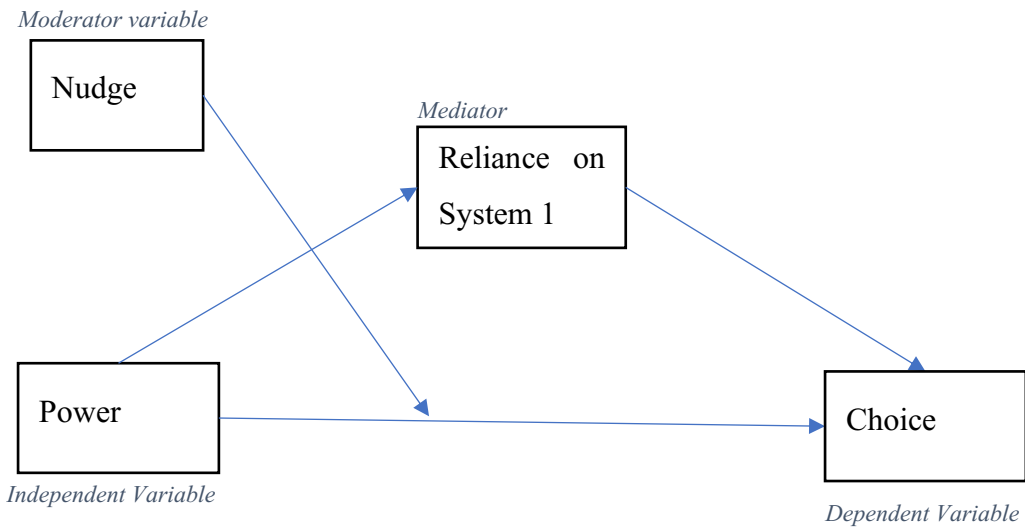
2.7 Nudges, power, and decision making

As mentioned earlier, individuals face thousands of choices every day and occasionally do not have enough or adequate resources (such as time or information) to be capable to take the best decision with the most promising outcomes. For instance, insights from psychology and behavioral economics studies have demonstrated that even though individuals are often well-informed, they regularly fail to use this information to achieve the goal they prefer when taking a decision (Hansen & Jespersen, 2013). In contrary with the hyperrational Homo Economicus, boundedly and real rational people are inconsistent, fallible, myopic, ill-informed, and unrealistically optimistic (Sunstein, 2014; Thaler & Sunstein, 2008; see also Halpern, 2015). Hence, many policy makers and behavioral psychologists acknowledge the potential value of using nudges to steer individuals in a specific direction for better rational outcomes while preserving entirely their freedom of choice (Hertwig & Grüne-Yanoff, 2017). Research has showed that the way options are presented influence human choices when taking a decision (Martino, Kumaran, Seymour, & Dolan, 2006) – the so called “framing effect” -, this influential bias is considered by many authors as a nudge to steer people in a specific direction (Martino, Kumaran, Seymou, & Dolan, 2006). These nonregulatory and nonmonetary interventions have revealed huge effectiveness for people to take better rational outcomes while conserving their freedom of choice (e.g., Alemanno & Sibony, 2015; Halpern, 2015). For instance, they permit individuals to save more, to eat healthier, to buy better, and so on. A classic example includes default (automatic) enrollment in organ-donation unless people precisely select to opt out (see Cialdini & Goldstein, 2004). As the majority of nudges promote the System 1, which is guided by automatic processes, individuals do not perceive that their decision making are being influenced. Indeed, nudges are influential biases that are small, and very hard to perceive. Thus,

individuals cannot perceive that there are being steered up in a specific direction. That being the case, high power resistance to influence should not apply here.

To sum up, nudges alter the environment and the way we perceive options, so that during the process of decision-making the resulting choice is a more desired rational outcome for the individuals and the society. Hence by nudging individuals through small changes in the environment within which people take decisions, we improve their process of choosing. Hence, nudges seek to improve people’s decisions with simple yet powerful changes in the environment (Schmidt, 2017).

2.8 Conceptual Model



3. Methodology

The following chapter highlights the research methodology engaged to test the research questions mentioned previously. It will offer an explanation on the research design and strategy, as well as the procedure for the experiment. Additionally, the variables and their relationship will be characterized.

3.1 Research strategy and design

The goal of this following research was to examine the effectiveness of nudges on individuals with high-power. Specifically, it sought to understand if high-power individuals perceive nudging differently and hence do choose the desired outcome. The following study is

exploratory, as this topic at hand is relatively new (Cooper & Schindler, 2008). As such, to test causality, it is appropriate to do an experiment design (Malhotra, Nuna, & Birks, 2017). These experiment methodologies allow one to analyze the cause-and-effect relationships among multiple variables. Participants were assigned randomly to all treatment conditions to control for superfluous effects before the event, consequently increasing and improving internal validity (Malhotra et al., 2017). This research was conducted online with Qualtrics, a well-established professional online survey tool, which permits personal customization. A good visual presentation is needed to respondents, it should be attractive to encourage participants to fill in all the questions, and return a completed questionnaire (Malhotra et al., 2012). In this experiment, participants were told that this study aimed at analyzing “Decision-Making”, therefore they would have to recall a specific moment in time and answer a cognitive reflection test. Participants were arbitrarily assigned to one of the two power conditions (control or high-power) and also one of the two nudge conditions (with nudge and without nudge) in a “between-subjects design” (Budiu, 2018). Thus, different participants of the study are assigned to different conditions corresponding to a variable. By doing a between-subjects design, it decreases the probability of carry-over effects and sensitization that can happen with a within-subjects design, where participants might behave differently due to practice from other treatments (Charness et al., 2012).

3.2 Participants

Given the project’s limited financial resources, this study was distributed via social networks (i.e Facebook and LinkedIn) and email. These platforms were chosen to gather data because they provide information in a functional and fast way and to avoid costs.

For an experimental study, the minimum sample size is recommended to be 30 participants per cell (Voorhis & Morgan, 2007). Nevertheless, with the intention to have more statistically significant results, the number of participants was increased to a minimum of 50 participants per cell. In total, 229 responses were collected within 4 months, given the total amount of 4 cells [2 (power: high power, control) x 2 (nudges: no nudge, nudge)], consequently this results in approximately 50 participants per cell. From the 229 responses and after data cleaning, 187 answers were further processed for the analysis. Considering the validated sample of 187 participants, 50,8% were male, 47,6% were female, and 1,6% preferred not to say. The mean age of participants is 29,31 (SD = 10,3), with the youngest participants aged 18 and the oldest participants aged 69. This study was limited to French participants in order to prevent any

cultural differences in regard to the meaning and perception of power influencing the results. Research and findings studying the effect of power do not always generalize through all the cultures (Zhong, Magee, Maddux & Galinsky, 2006), hence it was considered wise to consider only one nationality in order to have more significant results and no differences resulting from culture. All participants that had a different nationality were omitted for the data analysis, thus the participants were all French.

A detailed sample description can be found in Appendix 2.

3.3 Procedure

The study started with a brief description, explaining the reason of this questionnaire and all relevant information (i.e., time and language) about the study and also the informed consent form for the participants to take part in the study. Participants were not informed of the actual purpose of the research to prevent any bias when responding the questionnaire. As a cover story, they were told that the aim of this research is about people's choice, and hence they will be asked to remember a past event and answer a cognitive test as well as a choice task. Following the introduction, contributors were randomly allocated to one of the two power conditions: high power and control. Specifically, participants allocated to the high-power condition were asked to recall one particular moment in which they experienced power over another individual or even individuals. They were asked to include all relevant details of the situation (i.e how they felt and so on). This induction is a proficient and a usual procedure to stimulate transitory feelings of power (e.g., Galinsky, et al., 2003; Rucker & Galinsky, 2008). In order, to verify whether the manipulation worked as envisioned, participants answered 4 questions, which operate as manipulation check. Then, participants were led to answer a cognitive reflection test to measure the participant's tendency to override an incorrect "gut" answer. Following this test, they were asked if they had already answered one of the previous questions and also how much they rely on their own intuition (trust their gut feeling) when making decisions. Following, participants were randomly allocated to one of the two nudge conditions: nudge or without nudge. The purpose of this manipulation was intended to check if the nudges have equally or better worked on the power manipulation group in comparison to the control group. For both conditions, a book project scenario was presented, and participants were asked to imagine buying the book and hence to choose the best reward option for them (the choice). Finally, participants concluded with demographic questions including their age,

sex and nationality. The study ended by explaining the real purpose of the study as well with a short explanation of “nudges”.

The full version of the experiment can be found in Appendix 1.

3.4 Measurements of variables

3.4.1 Dependent Variables

Choice: Participants were required to read a fictitious book scenario and choose the best option for them as if they would purchase the book in reality. Participants in the “No nudge” condition, only had the choice between two answers, whereas the Nudge group had 3 possible options. The nudge was adapted from a former online experiment that analyses the efficiency of a digital nudge to steer individuals to a specific choice with the use of a decoy nudge. This study managed a single-factor repeated-measure experimental design through two conditions: a decoy condition (which represent the nudge) and a baseline condition (Tietz, Simons, Weinmann, & Brocke, 2016), both conditions had the same scenario of a book presentation. Hence, in this study we recreated the exact same experiment. This experiment is a hypothetical thought experiment; thus, participants are requested to pick up their best funding options as if it is a real-life matter. In the “No nudge” condition, the choice consists of a competitor, a decoy and the target. In both conditions, the competitor option is a cheap digital reward, whereas the more expensive target options comprise a digital reward as well as a physical version of the book. The decoy has an equal price to the option yet do not include the digital-download reward. Table 2 provides the exact overview of the choice sets for the book scenario that participants encountered.

Option	Baseline Condition	Decoy Option (Nudge)
Competitor	PAY 10€ - GET an eBook	PAY 10€ - GET an eBook
Decoy	-	PAY 20€ - GET a hardcover book
Target	PAY 20€ - GET an eBook and a hardcover book	PAY 20€ - GET an eBook and hardcover book

Table 2 Choice sets for the book scenario

Participants could choose only one option, in the “No nudge” condition participants had to select between the cheap reward or the expensive target options. Whereas in the “Nudge” condition, participants could choose either the competitor (cheap) and the target (expensive),

or also the decoy option (also expensive). In fact, the choice of having the decoy and the target choices into an expensive reward is according to previous research from Huber et al. (1982).

CRT: Participants were asked to answer the cognitive reflection test (CRT; Frederick, 2005), in order to measure their tendency to override an intuitive and incorrect answer and come to a more correct and deliberate answer. This performance measure indicates the tendency of an individual to rely more on his System 1 (automatic process) than on his system 2 (Reflection process). The test is comprised of 7 questions (see Appendix 1), for example: “A bat and a ball cost \$1.10 in total. The bat costs \$1 more than the ball. How much does the ball cost?” When answering this problem, individuals recurrently show a characteristic that is frequent to multiple reasoning failures. In fact, individuals behave like “cognitive misers” (Dawes, 1976; Simon, 1955, 1956; Stanovich, 2009; Taylor, 1981; Tversky & Kahneman, 1974) and give rapidly the first response that comes to mind, 10 cents, without even thinking further (following system 1). Humans habitually do not think and process information deeply enough to recognize their errors, and thus cognitive capability is no guarantee against making errors. Frederick (2005) found out that even highly select university students from the best university such as Harvard, MIT and Princeton were cognitive misers and responded incorrectly, showing that they relied more on their intuition and followed their gut. Participants of the study are required to answer all seven questions. The score is measure by the sum of correct answers divided by 7 in order to see on average how many good questions the respondent had. In order to check if participants had already answer one or more of this Cognitive Reflection Test, participants were required to answer a yes-no question if they had already answered one of this seven question in a previous experiment. Participants that had already answered one or more questions of the CRT test were taken out of the data set on the cognitive reflection test survey as it skewed the result.

Reliance on System 1: Following the cognitive reflection test and on another page, participants were asked to answer this following question “How much would you say you normally rely on your intuition (trust your gut) when making decisions?” and were presented with a seven-point Likert-scale ranging from 1 (Far too little) to 7 (Far too much). The goal of this question is to measure how likely participants believe they trust on their own intention (follow their gut while taking a decision) meaning how confident they are when taking a decision. The purpose of this question is to have a second and different measure of use of the system 1. We are asking participants how much to they think they make decisions in an automatic and intuitive manner.

3.4.2 Independent Variable

Power: In order to manipulate power in individuals, an episodic recall tailored from Galinsky et al. (2003) was used. This well-established method of an autobiographical recall of a specific situation is very common and has proven successful results for manipulating power on human in various studies (e.g., Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008; Magee, Galinsky, & Gruenfeld, 2007). As a matter of fact, the recall of an event of power activates power and also associating behavioral tendencies and concepts (Galinsky et al., 2003). In this research, all participants were arbitrarily assigned to one of the two conditions which are high power and a control condition. The control group serves as a baseline condition against which the effect of the elevated power treatment group can be paralleled to. Consequently, it acknowledged whether the observed effect (the nudge) was successful by the high-power treatment condition compared with the control condition. It is crucial to include a control condition to verify and analyze if an effect of the independent variable happens (Schaerer, du Plessis, Yap, & Tau, 2018). For the high-power condition, contributors received the following question: “Please recall a moment of your life where you felt powerful or in which you had power over someone. Power means a situation in which you controlled the capacity of one or more people to obtain something they desired or in which you were in a position to evaluate them. Please, describe this moment in which you had power - how you felt, what happened, etc. Try to relive this moment as if it were happening now and write in a vivid way, as you felt in the situation, letting all emotions contaminate this moment. As a reminder, this study is anonymous, and we have no way of identifying who lived this experiment. We ask you to try and write at least 400 characters, so we have sufficient information on the situation.”.

In order to have the answer validated, participants were required to write at least 400 characters, so that they could be immersed in a high-power state. Furthermore, participants from the treatment were asked to report when the event described occurred.

Whereas, in the control condition participants had the following instruction “Please recall your day yesterday. Describe how you felt, what happened, what you did, etc. Try to relive this day as if it were happening now and write in a vivid way. As a reminder, this study is anonymous, and we have no way of identifying who lived this experiment. We ask you to try and write at least 400 characters, so we have sufficient information on the situation.” (Galinsky et al., 2003). Once again, participants were told to write at least 400 characters to continue on the questionnaire. Adapted from Guinote and Wolpin (2015), the power manipulation check is used to measure if participants obeyed along with the assignment by reporting an event about an

elevated-power position where they had power on someone or felt powerful. Participants in both conditions were asked the two following questions in the past and the present tense “How influential did you feel during the situation described?” and also “How in control did you feel during the situation described?”. All four-questions were rated on a 7-point increasing scale from 1 (Very little) to 7 (Very much). The aim of these four questions is to identify their state when the event occurred and after writing the assignment during the study.

3.4.3 Moderator Variable

Nudge: To measure how the nudges worked on the high-power group in comparison to the control group and therefore analyze its effectiveness on high-power individuals, participants were randomly assigned to one of the two nudge conditions (nudge and no nudge). This manipulation is necessary in order to analyze the effect of power and nudge on the choice bundle in comparison to the control group. Hence, participants in the “Nudge” and the “No nudge” conditions had the exact same fictitious book scenario yet didn’t have the same number of options in order to buy the book. Indeed, as mentioned above, individuals in the “No Nudge” group had to choose between two options whereas the “Nudge” group had three possible outcomes.

4. Results

In this chapter, a focus on the results of this study will be disclosed. All pertinent results and analyses will be displayed with a description of the statistical methods used to test the hypotheses. In order to carry out all relevant analysis, both R studio and SPSS 26 have been used.

4.1 Data preparation and cleaning

From a total number of 229 participants, 42 were excluded for further analysis. From these, 21 were excluded as they failed to finish the survey and left many questions unanswered and 3 of the 42 respondents excluded did not comply with the instructions for the power manipulation essay. 3 respondents did not comply with the cognitive reflection test and have answered with random letters in order that his answer be validated to go to the next page. Similarly, 9 other participants were omitted because they responded untrustworthily fast to the

questionnaire (less than 4 minutes for an expected 9-minute survey). Also, 6 participants were excluded as they did not comply with the nationality required (e.g., French).

Thus, the total valid sample for the analysis consisted of 187 participants.

Also, multi-items scales variables were merged using the means.

4.1 Scale reliability

Even though, the set of scales that were used in this research were confirmed and tested as trustworthy by the literature, Cronbach's alpha was still administered in this study to test the consistency of the scales. The goal is to measure internal reliability, by measuring how a set of items are as a group related. The power manipulation check presented an alpha of 0.937. Considering the authors Gliem and Gliem (2003), a coefficient above 0.9 is contemplated as excellent, and a coefficient above 0.8 is seen as good. Hence, this alpha coefficient in this study is excellent and therefore highlight relevant consistency for this experiment.

4.2 Manipulation check

With the aim to evaluate the efficiency of the manipulation applied, a manipulation check has been conducted.

4.2.1 Power

To measure and test if the power manipulation had affected power feelings of the participants, two one-way analysis of variance (ANOVA) were conducted with power condition group as the independent variable and the manipulation check questions as the dependent variables (one for the present and another for the past moment).

As predicted, a main effect of power existed in both power manipulation checks, for the past situation; $F(1, 185) = 79.07, p < .001$, showing that participants in the High-power group revealed a superior level of felt power ($M = 5.60, SD = 1.20$) in comparison with the control group ($M = 3.63, SD = 1.71$). In the present situation, individuals in the High-power group also have a superior level of felt power ($M = 5.13, SD = 1.19$) in comparison with the control group ($M = 3.58, SD = 1.50$), $F(1, 185) = 58.95, p < .001$.

All results are presented on Appendix 3.

4.3 Hypotheses testing

With the aim to test the three hypotheses disclosed in the literature review, multiple statistics tests have been computed. As a first, two one-way ANOVAs were conducted to analyze the effect of power on Self-assessed reliance on system 1 and on the Cognitive Reflection Score. Further, a two-way ANOVA was processed to understand whether the effect of the Nudge on the Choice Bundle is dependent on the level of power. Finally, the PROCESS macro by Hayes (Hayes, 2013) was used in order to test for moderated mediation hypothesis.

4.3.1 The effect of power on following intuition (self-reported)

Hypothesis 1 predicted that power would positively influence the individual's level of confidence and hence follow more their intuition when making a decision. This states that powerful individuals are more likely to follow their intuition in comparison with the control group. This can be verified by investigating the difference in mean between both groups, the treatment and the control condition. Therefore, with the aim to investigate the relationship between power and intuition, another one-way ANOVA was conducted with power in the independent variable and confidence in the dependent variable. The results revealed that there is a marginally significant effect of power on intuition, $F(1,185) = 3.56$, $p = 0.061$, such that participants in the high-power condition reported a superior level of confidence ($M = 4.87$, $SD = 1.479$) than those in the control condition ($M = 4.45$, $SD = 1.55$).

See Appendix 4 for the complete analysis.

4.3.2 The effect of power on the cognitive reflection test

Hypotheses 2 predicted that high-power individuals are more likely to engage with their System 1, the automatic process, when making a decision in comparison to the control group. In other words, it means that high-power people tend to follow more their gut and therefore are more likely to act in a fast, instinctive, and emotional way. In order to test this hypothesis, a one-way ANOVA with power as the independent variable and the CRT as the dependent variable was conducted. The variable CRT represents the sum of the correct answers of the test (minimum being 0 and maximum being 7). This analysis highlights a significant effect of power on the overall score of the cognitive reflection test, $F(1,185) = 16.89$, $p < .001$ indicating a significant difference in the scores between both groups. Results revealed a lower mean score for the treatment group ($M = 2.89$, $SD = 1.85$) in comparison with the control group ($M = 4.04$, $SD = 1.95$). Higher values indicate that individuals are more likely to rely on their system 2, more

thoughtful and more logical, thus high-power individuals had a worse score in this measure, reflecting higher use of system 1.

See Appendix 5 for the complete analysis.

4.3.3 The effect of power on the effectiveness of nudges

Hypothesis 3 predicted that power makes one more permeable to nudges, meaning that nudges work better with high-power individuals as they are more likely to process with an automatic and fast system, and hence nudges should be used to steer them in a specific direction for better rational outcomes. In order to investigate this hypothesis, which is the aim of this study, a two-way ANOVA with power (Power group and control group) and nudge (no nudge and nudge) as independent variables and Choice as dependent variable was conducted. The results show a significant effect of power on the choice, $F(1, 187)_{\text{power}} = 4.08, p = .008$. Results reveal that in the “No nudge” condition the high-power group was more likely to choose the cheaper option ($M = -0.03, SD = 0.95$) than the control group ($M = 0.05, SD = 1.01$). Whereas when the nudging was introduced the high-power group ($M = 0.41, SD = 0.91$) and the control group ($M = 0.43, SD = 1.01$) were both more likely to choose the third option, the expensive one. The test also demonstrates significant effect of the nudging on the Choice, $F(1, 187) = 6.55, p = 0.11$; such that the group with the nudging chose more the expensive option ($M = 0.23, SD = 0.97$) compared to the group with no nudge ($M = -0.96; SD = 1.001$). Yet also significant effect of the interaction between power and nudge on the choice $F(1, 187) = 6.879, p = 0.009$. When analyzing the decomposition of the interaction with the two level of our independent variable (power and “nudge”), we notice that for the independent variable Power, the choice is not significantly different $F(1, 187) = 0.02, p = 0.965$. Yet, there is a significant difference in the Choice for the independent variable “Nudge” $F(1, 187) = 6.55, p = 0.011$; that is where the significant interaction is coming from. Hence, as expected, in both groups’ individuals tend to be more sensitive to the expensive option once the nudge introduced, yet the nudging has worked equally on both groups. Results do not reveal that nudge worked better with high-power individuals.

See Appendix 6 for the complete analysis.

4.3.4 Moderated mediation model

Following the previous results on the effect of nudges on power, a moderated mediation model was computed with SPSS's model 5 of PROCESS macro. This regression path analysis macro gives us estimated coefficients that are generated in mediation and moderation models (Preacher & Hayes, 2013) with the use of nonparametric bootstrapping procedure. By doing this, it allows us to make inferences about the conditional indirect effect of the nudge on the choice bundle moderated by power. For the following analysis, the significance level was 5% (corresponding to a 95% confidence interval) and the number of bootstrap samples used was 5 000 (Hayes, 2013). The model 5 of PROCESS macro was chosen and was run twice with different mediators. Firstly, the model was run with Power (X) as the independent variable, Nudges (W) as the moderator, Choice (Y) as the dependent variable and reliance on system 1 measured via self-assessment (M) as the mediator (see Figure 2 below). Secondly, the model was run with the CRT (M) as the mediator, all other parameters were kept the same.

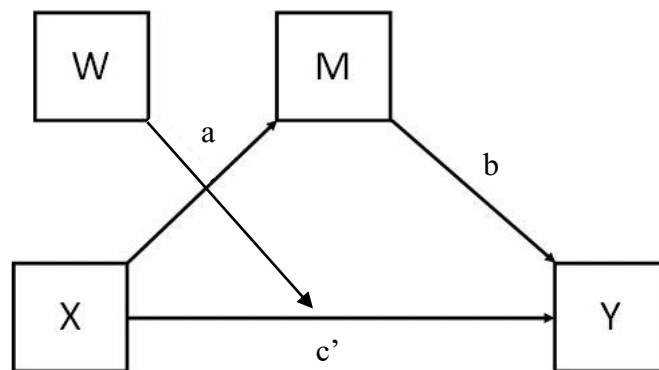


Figure 2: Conceptual Diagram of model 5 for the PROCESS macro

When computing the first moderated mediation analysis, the overall process was significant ($R_2 = .018$, $F(1,187) = 3.56$, $p = .067$). First and foremost, we start by analyzing the key part of the output, the indirect effect of X on Y, which tests whether we have an indirect effect of the reliance on system 1 measured via self-assessment on the relation between power and the Choice bundle, reveals that there is no significant effect of it on the choice bundle as the confident interval is the following ($b = 0.03$, $SE = 0.03$, $95\% CI = [-0.12, 0.15]$). Thus, we don't

have significant results of indirect effect of reliance on system 1 measured via self-assessment that effect the relation between power and the choice bundle. When looking for the moderated effect, the results reveal marginally significant results ($b = 0.42$, $t(187) = 2.68$, $p = .0072$, 95% CI = [0.11, 0.73]). Furthermore, when analyzing the conditional direct effect at different values of the moderator, nudges (treatment condition or control group), the results confirmed a significant effect of nudges on the dependent variable control group for the control group ($b = -0.45$, $SE = 0.22$, $p < 0.0425$, 95% CI = [-0.90, -0.15])] yet only marginally significant effects for the treatment group ($b = -0.38$, $SE = 0.21$, $p = 0.078$, 95% CI = [-0.04, 0.81]). This highlights a positive correlation between power, nudge and choice, which means that participants were more likely to choose the third option (the expensive one) once the nudge was introduced to them. However, it didn't not work better for the high-power group, it has marginally worked the same for both, treatment and control group.

Next, concerning the regression model for the direct a-path (the outcome variable being the mediator, reliance on system 1 measured via self-assessment), the analysis's results demonstrate significant results, a marginally significant direct effect of power ($b = -0.21$, $t(187) = 1.88$, $p = .0607$, 95% CI = [-0.01, 0.43]) on the mediator. Then, looking at the regression model of b-path, the results reveal marginally significant results for the b-path ($b = 0.17$, $t(187) = 1.74$, $p = .0813$, 95% CI = [-0.02, 0.38]).

Finally, we computed another moderated mediation model using the CRT (M) as the Mediator. Again, the model 5 of PROCESS macro was chosen with Power (X) as the independent variable, Nudges (W) as the moderator, Choice (Y) as the dependent variable and CRT (M) as the mediator. The overall process was significant ($R_2 = .28$, $F(1,187) = 16.89$, $p = .001$). I begin by analyzing the indirect effect of X on Y, which tests whether if we have an indirect effect of the CRT on the relation between power and the Choice, reveals that there is a significant effect of it on the choice bundle as the confident interval is the following ($b = 0.10$, $SE = 0.06$, 95% CI = [0.01, 0.24]). Thus, we have significant results of indirect effect of CRT that affect the relation between power and the choice.

Next, concerning the regression model for the direct a-path (the outcome variable being the CRT), the analysis's results demonstrate significant results, so we do have a direct effect of power ($b = -0.57$, $t(187) = -4.11$, $p = .0001$; 95% CI = [-0.85, -0.30]).) on the mediator. Then, looking at the regression model of the b-path, the results reveal significant results for the b-path ($b = -.18$, $t(187) = -2.21$, $p = .0264$; 95% CI = [0.35, 0.02]). Next, looking at the interaction,

the results reveal significant results ($b = 0.42, t(187) = 2.68, p = .0073; 95\% \text{ CI} = [0.11, 0.73]$). The conditional effects of the focal predictor for the no nudge condition is statically significant ($b = -0.53, t(187) = -2.28, p = .0224; 95\% \text{ CI} = [-0.99, -0.07]$) yet not significant for the nudge condition ($b = 0.31, t(187) = 1.41, p = .1590; 95\% \text{ CI} = [-0.12, 0.75]$). Consequentially the interaction can explain the variance between the independent variable and the dependent variable. Again, the results reveal that both the high-power group and the control group were more likely to choose the expensive option. Yet, the positive coefficient shows that it has marginally worked equally on both groups. Hence, we reject hypothesis 3 as the nudge has not worked better for the treatment group compared to the control group.

5. Discussion

This study aims to identify the effect of power on the effectiveness of nudges. The following section discusses and concludes the main results and findings as well as draws conclusions built on these. Further, managerial and academic implications are deliberated, followed by all the limitations presented in this study as well as advices and suggestions for future research in this topic. Thus, this research primarily implies that nudges are effective independently of the power feeling, meaning that power do not have an effect on the effectiveness of a nudge.

5.1 Research findings and conclusions

Today, the use of nudges is more and more common and appreciated by different institutions with the aim to steer individuals to take better decision regarding their health, wealth and well-being. The use of nudges has spread across organizations and within different functions as numerous studies have revealed the authentic potential of nudging individuals (Forberger, Reisch, Kampfmann, & Zeeb, 2019). Simultaneously, a countless amount of research has studied power and its effect (Robertson, 2012). However, no study has been made in regards the effect of power on the effectiveness of a nudge. Consequently, they were a need to understand if a nudge could or not also be applied for high-power individual and how efficient it will be. Therefore, in this research, the study ought to understand how power effects the efficiency of a nudge, by exploring the mediating effect of reliance on system 1 and the CRT.

Firstly, the research's results have supported hypothesis 1, which forecasted that high-power individuals follow more their own intuition compared to the control group. Indeed, participants in the treatment group had a higher mean for the reliance on system 1 measured via self-assessment than the control group. This result was expected as different literatures have highlighted the fact that high-power people are likely to have a high-level of confidence and hence tend to rely easily on their gut feeling and intuition, which leads us to hypothesis 2. This latest predicted that high-power people are more likely to engage their system 1, the automatic process, when taking a decision. The study's results supported this hypothesis, as the treatment group had again a higher mean than the control group, highlighting that the individuals with higher power are more likely to process their thoughts in a fast, emotional, and instinctive way. Regarding the complete moderation model that was computed, it displayed that the relationship between power and the results of the choice bundle was mediated by the nudging, revealing that once the nudging was introduced both, control and treatment, groups were choosing the expensive option. However, it didn't reveal that it worked better to the high-power group compared to the control group. So, finally, the complete moderation model did not support the hypothesis 3, which predicted that nudge can be more effective for high-power individuals. Indeed, the results show that the nudging has worked equally in both groups as both groups had a close similar mean. Hence, we cannot conclude that system 1 nudges are particularly more effective on high-power individuals in comparison to the control group.

5.2 Academic and managerial relevance

The present study contributes to new insights and findings concerning the implementation of nudges in our society and the effect of power on their efficiency, which has not received attention by researchers before this date. These findings are relevant for both managerial and academic contexts for different reasons. Firstly, while many studies have focused on the efficiency and the implementation of nudging itself, to measure if nudges are working in their environment, no particular studies have been made to study the effect of a specific feeling or social concept on the efficiency of nudging. This study, on the contrary, studies and focus on the efficiency of a nudge on powerful people as most of individuals have already experienced power at one time or another in their lifetime and also, some individuals are in powerful positions every single day (Galinsky, Gruenfeld, & Magee, 2003). Furthermore, as individuals have to process with countless information each day and has to take numerous decisions per hour, nudging can be an efficient way to help and assist humans take better and

more rational decision to improve their well-being (Chriss & James, 2015). This latest is even more important for powerful individuals as they decide and take decision for others, which can be a small group as well as a whole nation (Anderson & Galinsky, 2006). Hence, the present research brings new findings and insights on the use of nudge that can be beneficial for policy makers and businesses who consider nudge as an effective way to steer individuals for a better outcome to them. The first and foremost crucial implication of this research is that a “one fits all” nudging (Fahrlaender, 2017) can be applied regardless of how powerful the individual is. In other words, it means that it is conceivable to apply the same nudging¹ among individuals who encounter different level of power. It is essential for policy makers and marketing managers to understand how nudges, engaging system 1, can efficiently work in order to steer individuals in a specific direction. The findings revealed no significant effect of power on the efficiency of the nudge, implying that nudge do not work better with powerful people in comparison with the control group. Nevertheless, despite the results of the mediation process, further and deeper analysis should be conducted with a larger sample size. Furthermore, results could differ with another type of nudge, for instance with the use of nudges engaging system 2, as mentioned in the literature reviews high-power individuals are more likely to engage in the system 1 when taking decision (Fast, Sivanathan, Mayer & Galinsky ; 2011).

Furthermore, this research has brought more findings on the relationship between power and intuition that can be added to the existing literature. It has revealed and provide relevant evidence that high-power people rely more on their system 1 (follow more their gut) in comparison with the control group. Indeed, the results revealed that high-power individuals had a higher mean than the control group for the self-assessment on how they rely on their own intuition. Additionally, this study’s results highlight that high-power individuals process information more intuitively, meaning they engage more with the System 1 when taking a decision or when processing information. This has been confirmed with the CRT, where high-power individuals had a lower mean for this 7-question compared to the control group. It confirms that individuals feeling powerful have a more automatic and intuitive approach, which implies that their brain act fast when taking a decision (Kahneman’s model, 2012). This study’s results help us understand how powerful individuals’ minds process information and bring more findings to this relationship between power and self-reliance, which can be explained by a

¹ It is important to note that we are only referring to nudge engaging with the system 1. Hence, when we refer to nudge, we only consider nudge processing system 1.

higher level of confidence that have been studied by different authors such as Keltner (2003). Finally, despite having no significant results on the moderation process that revealed that the nudging has worked similarly for both groups and not better for the high-power individuals, it is already a first step towards understanding the impact of power on the efficiency on a nudge.

5.3 Limitations and future research

This study suffers from an amount of limitations that should be considered but which leads to future potential research. First and foremost, resource and time constraints of the study noticeably limit its generalizability. Future studies should be conducted with a higher, representative sample in order to increase the chance to obtain significant results and which can be generalizable to other contexts as the small sample size studied in this work limits the power of the statistical tests yet also statistical difference within both groups. Furthermore, concerning the population studied, cultural differences have been avoided to limit external variables as the study was limited to French participants, yet leading to drawbacks. This specific focus limit again the generalizability of the results towards other nationality and culture. Precisely, in the Western Cultures, the perception and vision of power vary from Eastern cultures. This could lead to different outcome of this research with other nationalities or cultures (Zhong et al., 2006). Hence, it is essential for future research to obtain sample with other demographic characteristics. Additionally, social networking sites have been used to gather data for this research which bring some limitations as members of social networks sites are not perfectly representative of the population (Leng, 2012), which leads to limitation in generalizing the findings to the current population. Thus, future research should also focus in gathering representative data of the population without using social networks or using also additional sites to social networks such as professional data collection websites.

Secondly is that the artificial setting of the study should be considered, as participants 'choices might not always reflect their actual choice during a "*real life*" purchase situation. This demonstrates a general issue of experimental studies, in which respondents are faced with the requirement to decide on *which* product to purchase, whereas in reality individuals would be choosing between buying or not (Lusk & Tonsor, 2015). Indeed, in this following research participants were obliged to buy the book, no other option was given than buying. This limitation could be resolved with incentivized studies with the aim to improve the reality of the study and to obtain more relevant findings representative of the reality. For instance, for the same study, participants could also be proposed not to buy the book as additional option so it

can reflect better a real-life situation. Also, participants were required to fictitiously decide between options to buy a book after reading a scenario, yet the described product could have biased the participants choice. Indeed, for instance a participant who doesn't appreciate to read, might have chosen the cheapest option yet if another product was presented, he might have chosen the most expensive options. Additionally, when answering the choice bundle question participants didn't invest real money, they didn't have to be concerned about their real financial situation which could led to different results than in a real-life scenario. Hence, future research, analyzing the relationship between a specific nudge and power, should also exploit and propose different products or service scenarios such as buying a game for instance or a necessary product (i.e., Covid-19 masks). Furthermore, in this research participants in the nudge group had the option between 3 rewards yet it could be also interesting to have a similar study yet with more options for choice, as that would be more similar to many real life situations. Likewise, concerning the experimental study two issues exist, the first one is that no attention check question has been included in the study, consequentially we failed to verify if each participant were deeply concentrated to answer the required tasks. Secondly, even though the targeted population was French, the study was made available only in English, which can impact the comprehension of exercise for the participant. This has been seen as some participants have answered to the essay question in French. Thus, future research should avoid these issues to limit external variables and also verify if the participant has been distracted by another task during the experiment.

Thirdly, besides the need of tests related to the outlined limitations, another important matter that should be considered for future research is the exploration of the effect of power on other type of nudges. Indeed, in this study participants faced a digital decoy nudge that engage system 1, the automatic process. This decoy nudge corresponds to the basic definition of a nudge – cheap, easy to implement, and imperceptible (Hertwig & Grüne-Yanoff, 2017). Yet, other types of nudges exist and should also be considered for further analysis on the relationship between power and nudging. Future research could exploit and test a combination of different nudges and also nudges that engage with the system 2, the reflective processes. As mentioned earlier, high-power individuals tend to have a high level of confidence and therefore act in a more automatic and intuitive way. Hence, using a nudge that engage with system 2 might result with other findings with powerful individuals. Also, with the countless number of researches on nudges which continues to increase, this concept of influence is growingly becoming known by individuals. Consequently, some humans are being aware of potential nudges around them

aiming to modify their decision making (Moseley & Stoker, 2013). Yet, as previous research has shown that powerful individuals do not appreciate being advised and prefer to follow their first opinion (Briñol, Petty, & Stavraki, 2014), it could be noteworthy for future research to exploit the relationship between power and more obvious nudge, as the outcome could be different for this study. Likewise, despite the actual opportunity of using nudge to help individuals to take better decision, existent issues related to the ethics of this technique are raised (Sunstein, 2015). Future research could exploit the high-power's acceptability of being nudged., and hence study if they agree of the use of imperceptible nudge in their environment without their knowledge.

Finally, future research could also exploit diverse mediators and variables that might also influence the efficiency of a nudge on high-power individuals. Indeed, other variables could also impact the relationship between power and the efficiency of a nudge. For instance, if a nudge is used to steer individuals to spend a specific number of euros on a certain product, the income could have an influence on the outcome of the study. Hence, other variables could be added to the conceptual model for deeper and further analysis.

Hence, this study can serve as foundation for future, larger scale research projects to explore the relationship between power and nudges.

6. References

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7. Appendix

Appendix 1: Survey Questions

Note: All elements in italic and in bold were not disclosed to the respondents and is only provide information to the reader.

1. Introduction

Welcome to my master's study.

This study is about people's choice. You will be asked to remember a moment from the past as well as answering a cognitive test and a choice task.

This survey will take about 10 minutes. All answers will be treated anonymously and confidentially. The data collected will be used for research purposes only.

For further questions regarding this study, please contact me, Gabriela Martin, at 152119152@alunos.lisboa.ucp.pt.

By continuing you agree to participate.

Thank you!

2. Power Manipulation

Power Condition

Please recall a moment of your life where you felt powerful or in which you had power over someone. Power means a situation in which you controlled the capacity of one or more people to obtain something they desired or in which you were in a position to evaluate them.

Please, describe this moment in which you had power - how you felt, what happened, etc. Try to relive this moment as if it were happening now and write in a vivid way, as you felt in the situation, letting all emotions contaminate this moment.

As a reminder, this study is anonymous, and we have no way of identifying who lived this experiment. We ask you to try and write at least 400 characters, so we have sufficient information on the situation.

Control condition

Please recall your day yesterday. Describe how you felt, what happened, what you did, etc. Try to relive this day as if it were happening now and write in a vivid way.

As a reminder, this study is anonymous, and we have no way of identifying who lived this experiment. We ask you to try and write at least 400 characters, so we have sufficient information on the situation.

3. Power manipulation check

How influential did you feel during the situation described?

Very little Moderately little Slightly little Neither too much
nor too little Slightly much Moderately much Very much

How in control did you feel during the situation described?

Very little Moderately little Slightly little Neither too much
nor too little Slightly much Moderately much Very much

How influential do you feel now?

Very little Moderately little Slightly little Neither too much
nor too little Slightly much Moderately much Very much

How in control do you feel now?

Very little Moderately little Slightly little Neither too much nor too little Slightly much Moderately much Very much

How long ago did this event occur? (*Control condition excluded*)

Less than a month Between 1 to 5 months Between 5 months and 1 year Between 1 and 2 years More than 2 years

4. Cognitive reflection test

A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball.

How much does the ball cost? _____ cents. Please enter a digit number (i.e 1,2,3 ...)

If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes. Please enter a digit number (i.e 1,2,3 ...)

In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days. (Please enter a digit number (i.e 1,2,3 ...))

If it takes 2 nurses 2 minutes to measure the blood pressure of 2 patients, how long would it take 200 nurses to measure the blood pressure of 200 patients? _____ minutes. Please enter a digit number (i.e 1,2,3 ...)

The book “Allen and the Wolf Pack” tells the story of Allen, a nine-year old boy who is trying to discover the reason for an unnaturally long winter. Although it is end of May, spring has not come, winter storms continue to bluster, and the winds carry the voices of howling wolves. When Allen goes to the forest to find the reason for this confused state, he gets lost but he survives with the help of wolves.

The book is full of adventure, mystery, excitement, and great characters.

Imagining that you were looking forward to buying a book and this book caught your interest, which of the following reward options do you prefer?

- PAY 10€ - GET an eBook.
- PAY 20€ - GET a hardback of the book. *(No nudge condition excluded)*
- PAY 20€ - GET an eBook and a hardback of the book.

6. Demographics

Please indicate your age

Gender

- Female
- Male
- Other (specify, if you wish to)

Nationality

- French
- Other

7. End of the study

Thank you for your participation!

In this research we want to study the effectiveness of nudges on high power individuals. Nudges are positive reinforcement and indirect suggestions as ways to influence the behavior and decision of groups or individuals. In this research, we study if these influential biases have the same effect whether the individual feel powerful or not. For that, we manipulated power by assigning half participants to a high-power condition, and the other half to a control condition (recalling your day of yesterday).

Individuals feeling powerful have the tendency to follow more their gut, hence the purpose of the cognitive reflection test in this study is to measure the participant's tendency to override an incorrect "gut" response.

Appendix 2: SPSS output Demographics

Table 1: Gender

		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	Male	95	50,8	50,8	50,8
	Female	89	47,6	47,6	47,6
	Prefer not to say	1	,5	,5	,5
	Other	2	1,1	1,1	1,1
	Total	187	100,00	100,00	

Table 2: Nationality

		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	French	187	100,0	100,0	100,0

Table 3: Age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	187	18	69	29,31	10,353
N valid (list)	187				

Appendix 3: SPSS output manipulation check

Table 1: Descriptive Statistics Power Manipulation Check – Past

Power Condition	Mean	Std. Deviation	N
Control	3,6359	1,71383	103
Power	5,6071	1,20759	84
Total	4,5214	1,79667	187

Table 2 : Descriptive Statistics Power Manipulation Check – Present

Power Condition	Mean	Std. Deviation	N
Control	3,5825	1,50016	103
Power	5,1310	1,19517	84
Total	4,2781	1,57097	187

Table 3: ANOVA Power Manipulation Check - Past

	Sum of Squares	Df	Mean Square	F	Sig	Partial eta-square
Corrected model	179,782 ^a	1	179,782	79,070	,000	,515
Constant	3952,819	1	3952,819	1738,503	,000	,924

Power	179,782	1	179,782	79,070	,000	,514
Condition						
Error	420,633	185	1,632			
Total	4423,250	187				
Corrected total	600,414	186				

a. R-squared = ,299 (Adjusted R-squared = ,296)

Table 4: ANOVA Power Manipulation Check – Present

	Sum of Squares	Df	Mean Square	F	Sig	Partial eta-square
Corrected model	110,932 ^a	1	110,932	58,954	,000	,515
Constant	3512,836	1	3512,836	1866,876	,000	,924
Power	110,932	1	110,932	58,954	,000	,514
Condition						
Error	348,108	185	1,882			
Total	3881,500	187				
Corrected total	459,040	186				

a. R-squared = ,242 (Adjusted R-squared = ,238)

Appendix 3: SPSS output for Hypothesis 1

Table 1: Descriptive table for Confidence

Cond_Pow_Con	Mean	Std. Deviation	N
Control	4,45	1,558	103
Power	4,87	1,479	84
Total	4,64	1,533	187

Table 2: Test of variance (ANOVA) on Intuition

	Type III Sum of Squares	III ddl	Mean Square	F	Sig	Partial eta-square
Corrected model	8,257 ^a	1	8,257	3,561	,061	,051
Constant	4015,145	1	4015,145	1731,409	,000	,901
Power Condition	8,257	1	8,257	3,561	,061	,051
Error	429,016	185	2,319			
Total	4457,00	187				
Corrected total	437,273	186				

a. R-squared = ,019 (Adjusted R-squared = ,014)

Appendix 5: SPSS output for Hypothesis 2

Table 1: Descriptive table for the cognitive reflection test

Power Condition	Mean	Std. Deviation	N
Control	4,05	1,957	103
Power	2,89	1,856	84
Total	3,529	1,993	187

Table 2: Test of variance (ANOVA) on Cognitive reflection test

	Type III Sum of Squares	III ddl	Mean Square	F	Sig	Partial eta-square
Corrected model	61,795 ^a	1	61,795	16,892	,000	,198
Constant	2229,303	1	2229,303	609,376	,000	,793
Power Condition	61,795	1	61,795	16,892	,000	,198
Error	676,793	185	3,658			
Total	3068,000	187				
Corrected total	738,588	186				

a. R-squared = ,084 (Adjusted R-squared = ,079)

Appendix 6: SPSS output for H1

Table 1: Test of Between Subjects (MANOVA)

	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected model	11,674 ^a	3	3,891	4,083	,008
Constant	0,366	1	0,366	,384	,536
Power Condition	0,002	1	0,002	,002	,965
Nudge Condition	6,244	1	6,244	6,552	,011
Power Condition * Nudge Condition	6,557	1	6,557	6,879	,009
Error	174,422	183	0,953		
Total	187,000	187			
Corrected total	186,096	186			

a. R-squared = ,063 (Adjusted R-squared = ,047)

Table 2: Descriptive table of the dependant variable Choice

Condition Power		Mean	Std D.	N
Control Group	No Nudge	0,0526	1,007	57
	Nudge	0,435	1,0109	46
	Total	0,0485	1,003	103
Power group	No Nudge	-,0333	0,956	36
	Nudge	0,4167	0,918	48
	Total	0,0952	1,001	84
Total	No Nudge	-,0968	1,00	93
	Nudge	0,234	0,977	94
	Total	0,695	1,00	187

Appendix 7: PROCESS Output of the Moderated Mediation Analysis with Self-reliance on system one as mediator.

Table 1: Direct effect for the a-path

Path		Index	BootSE	BootLLCI	BootULCI	
	Constant	4.658	0.1119	4.4370	4.8787	
a	Direct effect power on self-reliance	Power Condition	.2112	.1119	-.0096	.4321

Table 2: Indirect effect of power condition

Conditional direct effect of Power on Choice

Nudge condition	Effect	BootSE	BootLLCI	BootULCI
-1	-.4593	.2264	-.9031	-.0156
1	.3839	.2184	-.0441	-.8120

Table 3: Indirect effects of power on Choice.

	Effect	BootSE	LLCI	ULCI
Self-reliance on System 1	.0378	.0327	-.0124	.1157

Table 4: Model Summary for the outcome variable Reliance on system 1

R	R-squared	MSE	F	Df1	Df2	p
.1374	.0189	2.3190	3.5605	1	185	.0607

Table 5: Moderated interaction of nudge, b-path and c-path (with mediator Self-reliance)

	Coeff	Se	t	p	LLCI	ULCI
Constant	-.7375	.5032	-1.4655	.1428	-1.7238	.2488
Power	-.038	.1576	-.2392	.8110	-.3467	.2713
Condition						
Self-reliance	.1788	.1026	1.7434	.0813	-.0222	.3798
Nudge condition	.3893	.1561	2.4943	.0126	.0834	.6951
Interaction	.4216	.1569	2.6872	.0072	.1141	.7292

Appendix 8: PROCESS Output of the Moderated Mediation Analysis with CRT as mediator.

Table 1: Direct effect for the a-path

Path		Index	BootSE	BootLLCI	BootULCI	
	Constant	3.4707	.1406	3.1933	3.7481	
a	Direct effect power on CRT	Power Condition	-.5778	.1406	-.8552	-.3005

Table 2: Indirect effect of power condition

Conditional direct effect of Power on Choice

Nudge condition	Effect	BootSE	BootLLCI	BootULCI
-1	-.5315	.2327	-.9877	-.0753
1	.3133	.2225	-.1227	.7494

Table 3: Indirect effects of power on Choice.

	Effect	BootSE	LLCI	ULCI
CRT	.1064	.0603	.0087	.2447

Table 4: Model Summary for the outcome variable CRT

R	R-squared	MSE	F	Df1	Df2	p
.2893	.0837	3.6583	16.8916	1	185	.0001

Table 5: Moderated interaction of nudge, b-path and c-path (with mediator CRT)

	Coeff	Se	t	p	LLCI	ULCI
Constant	.7396	.3320	2.2279	.0259	.0889	1.3902
Power	-.1091	.1644	-.6636	.5070	-.4313	.2131
Condition						
CRT	-.1842	.0830	-2.2197	.0264	-.3468	-.0216
Nudge	.4301	.1584	2.7153	.0066	.1196	.7405
condition						
Interaction	.4224	.1575	2.6818	.0073	.1137	.7311