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INTUITION FOR THE INTUITIVE:
ON THE INTERPLAY BETWEEN LAY CONCEPTIONS OF INTUITION AND THE INFLUENCE OF INTUITION APPEALS IN PERSUASION

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To my family

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Palavras-chave:

Intuição; Conceções leigas; Persuasão; *Matching*

Key words:

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Categorias de Classificação da tese

PsycINFO Classification Categories and Codes:

3100 Personality Psychology

3120 Personality Traits & Processes

3900 Consumer Psychology

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RESUMO

Intuição – outrora vista como uma limitação do raciocínio humano – é hoje reconhecida pelas suas qualidades tanto em contextos populares como na investigação científica. Esta tendência é refletida pelo uso de apelos à intuição em contextos persuasivos. O uso repetido destes apelos sugere a sua eficácia enquanto variável persuasiva. No entanto, nenhuma investigação sistemática examinou *se, quando* ou *para quem* estes apelos à intuição influenciam as atitudes. O objetivo desta tese foi, assim, o de estudar estas questões, introduzindo o estudo da intuição na persuasão. Fê-lo, focando a interação entre conceções leigas de intuição e a influência destes apelos enquanto variável persuasiva.

Usando o *Elaboration Likelihood Model* como modelo teórico, foi proposto que esta influência ocorre em função do *matching* entre características da mensagem, relacionadas com intuição, e do recetor da mensagem, especificamente, o quão válido este perceciona intuição. Para testar esta hipótese, foi necessário responder a questões conceptuais e metodológicas relacionadas com a forma como intuição é concebida e como aceder à sua validade percebida. A resposta empírica a estas questões foi integrada em quatro capítulos empíricos.

Num primeiro conjunto de estudos, conceções leigas de intuição e análise foram avaliadas através de uma abordagem de protótipos. O conhecimento destas conceções leigas, através da identificação dos seus traços mais centrais (tendo também em consideração a influência dos estilos cognitivos), forneceu os meios para operacionalizar intuição e análise em estudos subsequentes, numa forma que refletiu como a pessoa leiga perceciona os dois conceitos.

O segundo conjunto de estudos propôs-se a compreender as preferências explícitas por intuição e análise para decisões diferindo em complexidade, examinando a influência dos estilos cognitivos nestas preferências e o papel de teorias leigas de validade de intuição e análise na explicação destas preferências. Os resultados sugeriram que embora as pessoas exibam preferências intuitivas e analíticas prévias, estas são influenciadas pelo contexto. Adicionalmente, teorias leigas de validade de intuição e análise mediaram os efeitos exercidos pelos estilos cognitivos nas preferências explícitas (sendo este efeito mais evidente para decisões complexas).

Reconhecendo a importância destas teorias leigas de validade, o terceiro conjunto de estudos focou-se em desenvolver e validar duas medidas de diferenças individuais na validade percebida de intuição e análise.

No quarto conjunto de estudos, testaram-se os efeitos de *matching* entre apelos à intuição e análise (operacionalizados através dos traços centrais obtidos) e a validade percebida de intuição e análise nos recetores da mensagem (avaliada através das medidas desenvolvidas), utilizando como contexto persuasivo um anúncio para uma nova marca de automóveis (um produto complexo). Resultados evidenciaram efeitos de *matching* nos quais atitudes mais favoráveis face ao anúncio com apelos intuitivos e analíticos foram observados entre recetores com níveis mais elevados de validade percebida de intuição e análise, respetivamente. Este efeito ocorreu através de um processo relativamente central, no qual o *matching* influenciou as atitudes através da geração de pensamentos favoráveis.

No geral, esta tese fornece uma abordagem sistemática ao estudo da intuição na persuasão, fornecendo evidência preliminar de efeitos de *matching* entre apelos à intuição e teorias leigas sobre intuição.

ABSTRACT

Intuition – once seen as a limitation of human reasoning – is nowadays acknowledged for its strengths in both popular contexts and scientific research. Such a trend has spread to the use of intuition appeals in persuasion contexts. The repeated use of intuition appeals would suggest its effectiveness as a persuasion variable. However, no systematic work has examined *whether, when* or for *whom* intuition appeals influence attitudes. The goal of this work was to empirically address these questions and introduce the study of intuition in persuasion, by focusing on the interplay between lay conceptions of intuition and the influence of intuition appeals as a persuasion variable.

Using the Elaboration Likelihood Model as a theoretical framework, it was hypothesized that such influence should occur as a function of the matching between message intuitive features and message recipients' characteristics, specifically, how these perceive validity in intuition. To test this hypothesis, several empirical questions were first tackled, related with how intuition is conceived by the lay person and how to assess its perceived validity. The answer to these questions was integrated into four empirical chapters.

In a first set of studies, lay conceptions of intuition and analysis were assessed through a prototype approach. The knowledge of these lay conceptions, through the identification of their most central features (while also accounting for the influence of cognitive styles), provided the means to successfully operationalize intuition and analysis in following studies, in a way that reflected how the lay person perceives the two concepts.

The second set of studies aimed at understanding people's explicit preferences for intuition and analysis across decision contexts differing in complexity, examining the influence of cognitive styles in such preferences as well as the role of naïve theories of validity of intuition and analysis in explaining such preferences. Results suggested that although individuals display a priori intuitive and analytic preferences, these are likely context-dependent. Additionally, naïve theories of validity mediated the effects of cognitive styles on explicit preferences (specially, for complex decisions).

Recognizing the importance of these naïve theories, the third set of studies focused on developing and validating two measures assessing individual differences in perceived validity of intuition and analysis.

Lastly, the fourth set of studies aimed at testing the matching effects between intuition and analysis appeals (operationalized through the central features obtained) and message recipients' perceived validity of intuition and analysis (as measured through the developed measures), using an advertisement for a new car brand (a complex product) as a persuasion context. Results evidenced matching effects whereby more favorable attitudes towards an advertisement with intuition and analysis appeals were observed among recipients with higher levels of perceived validity of intuition and analysis, respectively. Importantly, this effect occurred through a relatively elaborative process, in which the matching positively influenced attitudes via a generation of favorable thoughts.

In sum, this thesis provides a systematic approach to the study of intuition in persuasion, and its main findings provide the first evidence for matching effects for intuition appeals and individuals' naïve theories of intuition in persuasion.

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Lay conceptions of intuition and the influence of intuition appeals in persuasion

Intuition has long intrigued and fascinated humans. Once seen as a limitation of human reasoning, intuition is nowadays acknowledged for its strengths in both popular and scientific contexts. Such a trend has spread to persuasion appeals, by advertisements prompting us to, for example, let *instinct take over* with the brand-new Adidas shoes, *follow what you feel* with Optimus communications, and rely on tommee tippee's *simply intuitive* baby products. Recently, intuition appeals have been employed in a considerable amount of car advertisements: Mini invited us to *go with our gut* and *let our instincts take the wheel*, Peugeot launched its 208 *Intuitive* model, before they introduced the new 2018 Peugeot *Instinct* Concept Car, Mercedes welcomed us to the *new era of "intuitive mobility"*, Audi launched their new *"engineered intuition",* and Lexus presented us a new model *"driven by intuition"*.

Clearly, intuition appeals have been repeatedly used in these persuasion contexts. Such a repeated use would suggest its effectiveness as a persuasion variable. However, no systematic work has yet examined *whether*, *when* or *for whom* intuition appeals influence attitudes. It is thus the goal of this work to introduce the study of intuition in persuasion, by focusing on lay conceptions of intuition and approaching the role of intuition appeals as a persuasion variable.

The first step towards this goal was to understand how the lay person perceives "intuition". As such, in Chapter I (Intuition: Theoretical and Lay Conceptions), we focus on the concept of intuition, reviewing how it has been defined in the literature, the existing models of intuitive processing and evidence for how intuition is perceived by the lay person. This allowed for an analysis of existing evidence on how intuition may be perceived by the lay consumer as well as how to operationalize intuition appeals. Because no satisfactory guidance was found in the literature, this question was directly addressed in our empirical approach, performing a prototype analysis (see Empirical Chapter I).

The second step of this work consisted of understanding how lay conceptions of intuition influence the conditions under which intuition appeals are likely to influence persuasion. In Chapter II (Intuition appeals in persuasion), we define the process of persuasion and existing evidence on how persuasion appeals have been studied to influence persuasion. The empirical questions concerning the lay beliefs about intuition and the influence of intuition appeals in persuasion are directly addressed in the subsequent empirical chapters.

As such, in Empirical Chapter I, the questions pertaining to the understanding of how both intuition and analysis are perceived by lay person (i.e., the message recipient) were

addressed following a prototype approach. Next, in Empirical Chapter II, people's explicit preferences for intuition and analysis were the target of study, focusing on likely individual and contextual factors that contribute to such preferences. Recognizing the relevance of people's naïve theories of validity of intuition and analysis for subsequent processing, in Empirical Chapter III, we develop and test the psychometric properties of two measures assessing individual differences in perceived validity of intuitive and analytic decision-making. Finally, in Empirical Chapter IV, we directly address the hypothesis that persuasion is more likely to occur when there is a match between message recipients' naïve theories of validity of intuition and analysis and the intuitive and analytic nature of the appeals presented in a message.

In the final section of this thesis, we discuss all the empirical evidence collected, proposing how these data can help to define new avenues and directions for future.

Section I

Literature Review

Chapter I. Intuition: Theoretical issues and lay conceptions

> *"There is probably no cognitive process that suffers from such a gap between phenomenological reality and scientific understanding. Introspectively, intuition is one of the most compelling and obvious cognitive processes; empirically and theoretically, it is one of the processes least understood by contemporary cognitive scientists."* (Reber, 1989, p. 232)

Intuition has long fascinated humans and, for many centuries, was often equated with a magical phenomenon and a divine response. The study of intuition can be traced back to philosophers such as Descartes, who defined it as a knowledge acquired through rational reasoning (Mursell, 1919), and Kant, who referred to it as a basic and immediate representation of the world by means of the senses (Kant, 1999) – two very distinct ways of thinking about intuition. More recently, intuition has become a topic of great research interest in several academic domains: decision-making under uncertainty (e.g., Kahneman, 2003; Tversky & Kahneman, 1974), clinical decision-making (e.g., Berne, 1949; Hamm, 1988), managerial decision-making (e.g., Agor, 1986; Dane & Pratt, 2007), neuroscience (e.g., Lieberman, 2000; Lieberman et al., 2004), and sport psychology (e.g., Halberstadt & Levine, 1999; Johnson & Raab, 2003; Mulligan et al., 2012), among others.

As elegantly put by Reber (1989) in the quote above, although, on a lay level, intuition is a rather obvious cognitive process experienced by most of us throughout the course of our lives, on an empirical and theoretical level – and some decades after Reber's observation – researchers still try to define as well as to understand the mechanisms underlying intuitive decision-making. With regards to its definition, the interest in and discussion of intuition across a wide range of academic (and nonacademic) domains has led to a large number of different definitions. In fact, already in the 1940s, when examining the meaning and use of the term "intuition", Belton (1946, as cited in Andow, 2015) pointed out that no other word was in more critical need of an accepted definition and no other word carried such different meanings. More recently, Epstein (2008) argued that because intuition has been given so many different meanings, we should wonder whether the term has, in fact, any meaning at all. Table 1 illustrates many of the definitions of intuition that may be found in the literature.

Table 1

Definitions of intuition

Source	Definition
Agan (1987)**	Nonrational process, based on a feeling or sensing level of knowing, an awareness that may come from subconscious data.
Bastick (1982)	A felt awareness for a situation as a whole.
Benner & Tanner (1987), Field (1987)	Specific mode of thinking evolved from merger of knowledge, skill and experience.
Bennett (1998)	A daring conclusive leap.
Betsch (2008)	Knowledge stored in long-term memory primarily acquired via associative learning, which is automatically and unconsciously processed, and that leads to a feeling that can serve as a basis for judgments and decisions.
Blackler et al. (2007)	Cognitive process that is often non-conscious and utilizes stored experiential knowledge.
Bowers et al. (1990)*	A preliminary perception of coherence (pattern, meaning, structure) that is at first not consciously represented but that nevertheless guides thought and inquiry toward a hunch or hypothesis about the nature of the coherence in question.
Bunge (1983)	An ill-defined ability to spot problems or errors.
Bruner (1962)*	The act of grasping the meaning, significance, or structure of a problem without explicit reliance on the analytic apparatus of one's craft.
Burke & Miller (1999)*	A cognitive conclusion based on a decision maker's previous experiences and emotional inputs.
Covin et al. (2001)	A subjective feeling based on gained experience.
Crossan et al. (1999)	Preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience.
Dane & Pratt (2007)	Judgment that arises through rapid, nonconscious, and holistic processes and frequently accompanied by strong affect.
Dreyfus & Dreyfus (1986)	Understanding that effortlessly occurs upon seeing similarities with previous experiences.
Epstein (personal communication, 2004)*	The working of the experiential system.
Gardner & Nemirovsky (1991)	The formation of inarticulate, or unconscious, local coherences that emerge as people begin work on a creative problem.
Gerrity (1987)**	Perception of possibilities, meanings and relationships by insight.
Hammond (1996)	A cognitive process that somehow produces an answer, solution, or idea without the use of a conscious, logically defensible step-by-step process.
Hogarth (2001; 2010)	Thoughts that are reached with little apparent effort, and typically without conscious awareness that involve little or no conscious deliberation; and typically correlated with speed and often a sense of confidence.
Isaack (1978)	A physiological function which transmits perceptions in an unconscious way.
Isenberg (1984)	A smooth automatic performance of learned behavior sequences.
Jung (1926)	A primary mode of perception which operates subconsciously.
Kahneman (2003)*	Thoughts and preferences that come to mind quickly and without much reflection.

Klein (2003)	The ability to decide using patterns to recognize the elements in a situation and to recognize the typical action scripts with which to react.
Lank & Lank (1995)	A right hemisphere brain skill.
Lieberman (2000)*	The subjective experience of a mostly nonconscious process—fast, alogical, and inaccessible to consciousness—that, depending on exposure to the domain or problem space, is capable of accurately extracting probabilistic contingencies.
Myers (2002)*	The capacity for direct knowledge, for immediate insight without observation or reason.
Pearson (2013)	An understanding without logic that can be described as a "knowing without knowing how".
Policastro (1999)*	A tacit form of knowledge that orients decision making in a promising direction.
Preitula & Simon (1989)	Sophisticated reasoning acquired by expert after years of learning.
Raidl & Lubart (2000)*	A perceptual process, constructed through a mainly subconscious act of linking disparate elements of information.
Rew (1988)**	Knowledge as a whole, immediacy of knowledge, and independent of linear reasoning; inner knowing, sensing/feeling/perceiving, and strength of feeling that affects perception.
Rorty (1967)*	Immediate apprehension.
Rowan (1986)	A knowledge gained without rational thought.
Sadler-Smith (2008)	An involuntary, difficult-to-articulate, affect-laden recognition or judgment, based on prior learning and experience, which is arrived at rapidly, through holistic associations and without deliberative or conscious rational thought.
Shapiro & Spence (1997)*	A nonconscious, holistic processing mode in which judgments are made with no awareness of the rules of knowledge used for inference and which can feel right, despite one's inability to articulate the reason.
Shirley & Langan-Fox (1996)*	A feeling of knowing with certitude on the basis of inadequate information and without conscious awareness of rational thinking.
Simon (1996)*	Acts of recognition.
Sinclair & Ashkanasy (2005)	Non-sequential information processing mode, which comprises both cognitive and affective elements and results in direct knowing without any use of conscious reasoning.
Schraeder & Fischer (1987)	Immediate knowing of something without using conscious reason.
Wild (1938)*	An immediate awareness by the subject, of some particular entity, without such aid from the senses or from reason as would account for that awareness.
Weick (1995)	Preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience.
Westcott & Ranzoni (1963)*	The process of reaching a conclusion on the basis of little information, normally reached on the basis of significantly more information
Vaughan (1979; 1990)	Knowing without being able to explain how we know; A synthetic psychological function that apprehends the totality of a given situation.

* Based on definitions compiled by Dane and Pratt (2007)

** Based on definitions compiled by Effken (2001)

Based on the analysis of many of these definitions, Dane and Pratt (2007) identified four features that are commonly used when defining intuition and suggested some consensus in defining the process of intuition as (1) unconscious, (2) affectively charged, (3) fast, and (4) holistic. The first aspect relates to a central assumption that intuition is a process that arises from operations that occur in a nonconscious information processing system. This aspect is related with the current notion that humans process information through two distinct cognitive systems – conscious and unconscious – addressed in two paragraphs below. The second aspect relates to the assumption that this nonconscious processing system is imbued with emotionally charged content and operations (Epstein, 2003), and finds support in neurological evidence suggesting a link between intuition and affective states through the activation of basal ganglia and related structures, associated with implicit learning (see Lieberman, 2000, 2007). This nonconscious processing system is also characterized by operating relatively automatically and rapidly (Bargh, 1996; Bargh & Chartrand, 1999; Epstein, 1994; Reber, 1992) – a feature that characterizes the third mentioned aspect. And, fourth, intuitive processing involves holistic associations (Epstein, 1994; Shapiro & Spence, 1997) that may derive from cognitive heuristics (e.g., Tversky & Kahneman, 1974; Gigerenzer & Goldstein, 1996) or patterns developed with training and experience (Simon & Chase, 1973).

Similarly, Shapiro and Spence (1997) proposed that despite the conceptual differences surrounding these definitions, most of them propose that intuitive processes (1) originate beyond consciousness, (2) are frequently accompanied by emotion, and (3) are based on a holistic information processing. Nonconscious processing is usually associated with a more superficial non-elaborative process that contrasts with a highly demanding and more rational type of process, generally integrated in different dualistic views of the human mind (e.g., Chaiken & Trope, 1999; Evans, 2007, 2009, 2011; Evans & Stanovich, 2013; Gawronski & Creighton, 2013). These dual-process approaches treat intuition in opposition to analytic thinking. However, there is not a consensus over the idea that intuition can be simply defined as the opposite of analysis. For instance, intuition can be thought of as one of the multiple types of implicit processes described by different theories in opposition to analysis (J. St. B. T. Evans, 2009). The debate surrounding the nature and functioning of intuitive processes (Glöckner & Witteman, 2010), has led some researchers to argue for the possibility of different types of intuition (e.g., Amit et al., 2016; Hogarth, 2010). To that extent, Pretz and Totz (2007) distinguished between: (1) affective (judgments based on emotional reactions), (2) inferential (judgments based on automated inferences, and decision-making processes that have become

more intuitive over time) and (3) holistic intuition (judgments based on a qualitative process, and decisions made by integrating multiple cues into a whole that might or might not be explicit in nature). Dane and Pratt (2009) distinguished between: (1) moral (affective and automatic reactions to issues with moral/ethical content), (2) problem solving (based on automatic pattern matching and recognition), and (3) creative intuition (processes through which knowledge is combined in novel ways). Miller and Ireland (2005) conceptualized intuition as (1) a holistic hunch (an unconscious synthesis of information from past experience, complexly combined and that results in judgments that feel right) and as (2) an automated expertise (an unconscious application of knowledge gained through past learning to a familiar situation by acts of recognition). And Glöckner and Whitteman (2010) suggested that the use of intuition might result from the activation of four different, albeit overlapping, processes: (1) association (based on simple learning-retrieval processes related to stimulus-response type processes), (2) matching (based on learning of exemplars/prototypes and retrieval processes based on the matching of stimuli to these exemplars/prototypes), (3) accumulation (based on automatic integration of evidence derived from associative or exemplar learning), and (4) construction (based on the activation of related information and the formulation of mental representations). Although no direct overlap can be identified between these different suggestions, they nevertheless make clear that intuition is likely not a homogenous concept but an umbrella term for different cognitive mechanisms (Glöckner & Witteman, 2010).

These divergences, as well as the operationalization of dual-process approaches and different definitions of intuition provided in Table 1, make it evident that, in the literature, intuition tends to be defined not in terms of what it is, but rather in terms of what it is not: a processing that results from rational analytical reasoning (Epstein, 2010). As such, for the purposes of this review and work, we distinguish between intuition and a more analytic way of processing information, and we use the terms “intuitive” and “analytic” to refer to different types of decision processes adopted by people, as addressed by different dualist views of the human mind.

Intuition within a dualistic view of the human mind: Processes and individual differences

A dualistic approach to the human mind assumes that people’s judgments and decisions are made in two distinct but complementary ways: through more deliberate and conscious processes (here addressed as analytic) and through processes more akin with what we have

described as intuition. A similar perspective has been adopted by many and different theories, and comes in "many flavors" (Kahneman & Frederick, 2005, p. 267): "experiential and rational" (Epstein, 1994), "system 1 and system 2" (Kahneman, 2003; Stanovich & West, 2000), "type 1 and type 2" (Stanovich, 2009), "automatic and intentional" (Bargh & Chartrand, 1999), "associative and rule-based" (Sloman, 1996), "intuitive and analytic" (Hammond, 1996), "impulsive and reflective" (Strack & Deutsch, 2004), "tacit and deliberate" (Hogarth, 2001), "holistic and analytic" (Nisbett et al., 2001), "heuristic and analytic" (J. St. B. T. Evans, 1989), or "heuristic and systematic" (Chaiken, 1980). The general assumption of these theories is that information processing is accomplished intuitively (through less deliberate, faster, and lower-effort processes) and analytically (through more deliberate, slower, and demanding processes). The latter hence corresponds to a conscious processing system through which people analyze problems in a deliberate and attentive fashion. For some approaches (for exceptions, see Chaiken et al., 1989) the former corresponds to a nonconscious processing system – believed by some to be the evolutionary oldest of the two systems (see Epstein, 1994; Reber, 1992) – through which people draw from experience developing feelings of knowing without conscious attention (Dane & Pratt, 2007, 2009; Hogarth, 2001).

In some of these theories (Kahneman, 2003; Stanovich, 2009; Stanovich & West, 2000), Type 1 processing is autonomous and even mandatory, whereas Type 2 is subject to voluntary control. For these theories, information processing is largely serial, being one of the functions of Type 2 processing to override the outcomes of Type 1 processing. For this to occur, Type 2 processing needs to have the capability to generate a response perceived by the person as a better response to replace the one provided by Type 1 processing. Although the question concerning the established relation between these types of processing – if sequential or parallel – transcends the focus of this thesis, its importance should be stressed given the impact it may have in how individuals perceive intuition. By equating intuition with a Type 1 processing, within a sequential approach, this would imply that intuition provides individuals with a default response, that they, subsequently, consider whether to use it or to ignore it. If this consideration is under individuals' control, the perceived validity of the intuitive response would be relevant to understanding why individuals engage in Type 1 processes.

The study of individual differences in the extent to which people seem to rely on intuition or analysis has led to operationalization of two dimensions of cognitive styles, intuitive and analytic (e.g., Allinson & Hayes, 1996; Betsch, 2004; Cacioppo et al., 1984; Seymour Epstein et al., 1996; Scott & Bruce, 1995). Research shows that individual differences in

intuitive and analytic styles influence how people make decisions in a more intuitive or analytic manner, respectively (e.g., Akinci & Sadler-Smith, 2013; Epstein, 1994; Hodgkinson et al., 2009; Pacini & Epstein, 1999). The classification of a cognitive style (see Kozhevnikov et al., 2014) implies the assessment of individual differences with regards to people's tendencies to make decisions in a more intuitive or analytic manner. One of the most widely used instruments to assess individual differences in the tendency to rely on intuitive processing is the Faith in Intuition scale – also operationalized as an experiential dimension of decision-making (e.g., Epstein et al., 1996; Pacini & Epstein, 1999). The Faith in Intuition scale measures one's reliance on and confidence in intuition and includes items such as *"I like to rely on my intuitive impression"* and *"I believe in trusting my hunches"*. Among other findings, higher scores in Faith in Intuition have been associated with greater reliance on heuristic processing (e.g., Alós-Ferrer & Hügelschäfer, 2012; Epstein et al., 1996; Mahoney et al., 2011; Pacini & Epstein, 1999; Shiloh et al., 2002; Toyosawa & Karasawa, 2004) and greater tendency to rely on the subjective ease with which information comes to mind (Danziger et al., 2006).

With regards to the analytic thinking, an instrument widely used in research is the Need for Cognition scale (Cacioppo et al., 1983, 1984), which measures the extent to which one likes to engage in and enjoys effortful analytic thinking. Higher values in Need for Cognition have been positively associated with more thinking prior to decision-making (e.g., Levin et al., 2000), intrinsic motivation (Cacioppo et al., 1996), reasoning ability (Fleischhauer et al., 2010; Hill et al., 2013), complex problem solving (Rudolph et al., 2018), and greater processing and evaluation of advertisements (Batra & Stayman, 1990; Mantel & Kardes, 1999), among several other variables (for a review see Cacioppo et al., 1996; Petty et al., 2009). Additionally, Need for Cognition also influences a range of persuasion outcomes, which will be reviewed in the next chapter, and include the matching between message features and recipients' characteristics (e.g., Haddock et al., 2008; Wheeler et al., 2005).

The Rational-Experiential Inventory (REI; Epstein et al., 1996; Pacini & Epstein, 1999) was originally introduced as a measure to assess the preference for rational versus intuitive thinking, as measured by items adapted from the Need for Cognition and Faith in Intuition scales and is now one of the most widely used measures to assess such individual differences (Betsch & Iannello, 2009). The REI assesses inclinations to rely on intuitive–experiential and analytical–rational thinking styles based on the Cognitive–Experiential Self-Theory (CEST; Epstein, 1994), a dual-process model that proposes that information is processed in two parallel interacting systems, rational (analytical, conscious, controlled, and affect free) and experiential

(intuitive, preconscious, automatic and intimately associated with affect). This parallel view finds theoretical and empirical support (Hodgkinson et al., 2008; Hodgkinson & Sadler-Smith, 2003) and contrasts with a unidimensional, bipolar perspective contrasting intuition and analysis (see Allinson & Hayes, 1996).

The widespread development and use of measures of cognitive styles occurs, however, in parallel with the discussion of what intuition is. For instance, the set of items employed to assess individuals' Faith in Intuition makes a general use of the concept of "intuition", relying on individuals' own lay conception of what intuition is. As such, it could be the case that researchers may be measuring a different construct for different individuals, dependent upon how shared this lay concept is across people. A complete understanding of the lay conceptions of intuition is thus important when we aim to understand what characteristics individuals are endorsing in such measures.

Lay conceptions of intuition

Intuition is not a scientific term. It has been used for centuries and has a semantic meaning that is shared by a community. Lay conceptions are schematic semantic knowledge structures that encompass beliefs about the different attributes that define a concept, influencing our perception, feelings, thoughts and behaviors (Dweck et al., 1995; Ross, 1989; Schneider, 1973). Despite not providing a formal answer to the question of *what intuition is* and what processes underlie intuitive processing, a lay conception perspective offers a clear understanding of how the lay person conceives or experiences intuition.

A complete understanding of the lay conceptions of intuition is important when we aim to understand how people deal with intuition-related pieces of information – such as intuition appeals. Intuition plays an important role in lay psychological reasoning, as people are routinely asked to *"trust their intuition"* or to *"go with their gut"* and as many decisions and behaviors are described by people as unfolding *"intuitively"* (often in contrast to *"analytically"*). The importance of the study of these lay conceptions is further justified by the fact that intuition, besides receiving much scholarly attention, is now the focus of increasing interest by the general public. For instance, a quick Google search will tell you about *"How intuition can take your business to the next level"* or *"Knowing when to go with your gut"* and *"3 easy ways to expand your intuition".* However, the questions of what conceptions of "intuition" people hold when

asked to follow their intuitions, and what processes they describe when referring to their intuitions, do not have a clear answer.

The understanding of lay conceptions, in general, is important not only for its contribution to the development of theory and research about the concept, but also, and just as importantly, for its clear implications for measurement (e.g., Bharara et al., 2019; Kearns & Fincham, 2004; Stringer, 2016; Weigel, 2008). The analysis of lay conceptions of intuition allows researchers to go beyond formal definitions of intuition – that have held rather little consensus – and assesses the concept as generally perceived by people. Because some research is heavily based on self-report measures of use of intuition, understanding its lay conceptions is vital for an accurate interpretation of what participants are reporting. In other words, it is important that we understand what lay people mean by using their "intuition", so that we can understand what these instruments are indeed measuring. This way, the understanding of the lay conceptions of intuition may not only facilitate its operationalization in ways that correspond to how people represent the concept, but also help in the creation or refinement of various types of measures.

Aimed at capturing peoples' lay conceptions of intuition, studies have followed different approaches. Some studies have addressed intuitive processes through interviews. For example, Burke and Miller (1999) interviewed 60 managers in the United States. In this work, 56% of the interviewed participants described their intuitions as experience-based decisions, and 40% described intuition as based on feelings and emotions. Other studies identified especially intuitive individuals and asked them to explain how their intuition worked. For example, Rogers and Wiseman (2005) identified four mechanisms in participants' explanations of their own intuition: the use of gut feelings or instinct (62%), the reflection of a nonconscious or fast method of processing information (30%), the reflection of some sort of extrasensory perception (24%), and the reflection of a form of inner spiritual guide (8%). Other approaches focused on open-ended descriptions of intuition including those from journal content analysis (Morris, 1990), phenomenological inquiry (Petitmengin-Peugeot, 1999), and de-nominalization methods (Sadler-Smith, 2016).

From these approaches, we gain useful insight into how the lay person conceives and experiences intuition; however, it is noteworthy that the findings of the reported studies only partially characterize lay conceptions of intuition. For instance, Burke and Miller's (1999) research did not provide any indication of whether or how these two dimensions overlap or the extent to which they constituted features that were relatively representative (prototypic) or

peripheral to the concept of intuition. This is also the case with Rogers and Wiseman's (2005) approach. It could be that participants' most listed mechanisms would qualify as representative of the concept of intuition, but no data other than mentions in open responses were collected. Also, although the participants in Rogers and Wiseman (2005) were identified as being particularly intuitive, it is not clear whether similar characterizations of intuition would extend to samples that included both relatively intuitive and non-intuitive individuals. In general, these approaches do not provide data that would help identify the relative prototypicality (or centrality) of the identified features of intuition across. Also, by targeting specific populations of participants (e.g., experienced professionals, HR practitioners) these studies overlooked the possibility that, "expert intuitors" might possess different conceptions of intuition than a broader sample of participants. This is highly relevant because intuition may be perceived differently by intuitive and non-intuitive people. For example, the subjective experience of intuition differs across individuals' sensitivities to different bodily states (Dunn et al., 2010) and to different modalities (e.g., as an "inner vision") in which intuition is experienced (Vaughan, 1979, p. 73)

In sum, lay conceptions of intuition are relevant to understanding human experience with implications for theory, research, measurement, and operationalization of intuition. As reviewed, authors have defined intuition based on different processes, and there are also different perspectives with regards to lay conceptions of intuition. This suggests that the lay construct might also be multidimensional – and differences with regards to lay conceptions of intuition might arise between individuals. It is an empirical question whether these lay conceptions distinguish between different types of intuition and, if so, whether individuals who differ in their trait-like predispositions to be more or less intuitive and analytic, conceive and understand intuition differently. Thus far, no systematic work has been conducted to examine these questions.

In conducting such a work, it should be taken into account that lay concepts are frequently characterized by features varying in centrality (e.g., Cantor & Mischel, 1977; Rosch, 1978; Rosch, 1975). Hence, the same should be expected to occur with lay conceptions of intuition: some features of intuition should be perceived as more central (i.e., as more representative of intuition) and others as more peripheral (i.e., as less representative of intuition). The assessment of these features should allow us to understand whether a unitary concept of intuition exists or not (i.e., whether individuals with different cognitive styles share the same lay conceptions, even if differing in their tendencies to rely more or less in intuition).

Additionally, besides possible differences in how individuals conceive and understand intuition, we can also assume that they might differ in how much they explicitly evaluated it as a valid pathway for their decisions and judgments.

Perceived validity of intuition

One feature regarding people's lay conceptions of intuition – that has been rather under-examined in the literature – relates to its perceived validity. Across the literature, through different approaches, there seems to be a general theoretical assumption that intuition is less reliable and valid than analysis (e.g., Chaiken et al., 1989; Simon, 1955, 1957, 1972). Not only is the representation of intuition likely to vary between individuals, but also the relation between these representations and their perceived validity is likely to vary. Perceived validity of intuition and analysis is thus likely a relevant feature of individuals' naïve theories of intuition, and these perceptions might impact the degree of their reliance on intuition. As emphasized by Wegener and Petty (1998), naïve theories play a relevant role over individuals' reactions to specific situations, determining how contextual factors might influence individuals' perceptions of target objects (e.g., Nisbett & Wilson, 1977; Wilson et al., 1982). Although there seems to be a common assumption that people perceive intuition as less valid than analysis, this is still an empirical question, as is the question of whether individuals differ in such perceptions.

Chapter II. Intuition appeals in persuasion

The concept of intuition has been extensively used as a persuasion appeal. From product names (e.g., Peugeot's 208 *Intuitive* model, Estée Lauder's *Intuition* perfume, and Wilkinson Sword's *Intuition* razor blade) to slogans (e.g., *"Welcome to the era of intuitive driving"*, *"Intuition, the essence of a woman"*) and product characteristics (e.g., *"Audi's engineered intuition"*, *"Tommee Tippee, Simply Intuitive"*) intuition, as an appeal, might exert several types of influence over attitudes. In this chapter, we define attitudes and the process of persuasion (attitude change) and review how persuasion variables related to source, message, recipient, and context influence attitudes, in order to understand the conditions under which intuition appeals might influence persuasion.

Attitudes and persuasion

Attitude refers to an overall evaluation of a particular target, such as people (which can include oneself), objects, issues, or ideas (e.g., Petty & Wegener, 1998a; Petty et al., 1983, 2007). The term persuasion is used quite broadly to refer to any procedure capable of changing a person's mind. Even though persuasion can be used to change several aspects such as a person's beliefs, emotions or behaviors, psychological research has focused on people's attitudes as the most common target of persuasion (Petty & Briñol, 2008). This is the case because attitudes guide people's choices and actions, meaning that, under equal conditions, people will vote for the candidate they evaluate most favorably or buy the product they like the most (Petty & Briñol, 2008). The aim of persuasion is to exert an influence on attitudes, generally to make them either more favorable or unfavorable, but potentially also to change their strength (Blankenship et al., 2012; Petty & Krosnick, 1995; Raden, 1985).

To exert such an influence, persuasive strategies must account for several attitude features. For instance, while some approaches conceptualize attitudes as temporary constructions formed anew in response to contextualized demands and each time an evaluation is needed (e.g., Schwarz & Bohner, 2001; Schwarz, 2007; Wilson & Hodges, 1992), most scholars in the field agree that many attitudes are represented in memory in some way (e.g., Eagly & Chaiken, 1993; Fazio, 1995; Petty & Cacioppo, 1981, 1986). One possibility is thus that, although some attitudes might be computed online, there are at least some attitudes (possibly strong attitudes) that are stored in memory (Wegener et al., 2019; Wegener &

Carlston, 2005). These strong attitudes are highly accessible and held with high certainty (Petty et al., 2019).

A persuasive attempt has also to deal with the fact that attitudes can vary in several ways. *Valence* is perhaps the most prominent and most researchers conceptualize attitudes as evaluations that occur along a positive to negative continuum (e.g., Eagly & Chaiken, 1993; Fabrigar & Wegener, 2010; Petty et al., 2007). In other words, some attitudes are positive, some are negative, and others are relatively neutral. This feature entails that attitudes can also differ in how *extreme* they are, that is, the extent to which they deviate from neutrality – or their degree of positivity and negativity (Briñol et al., 2019). Attitudes can also differ in their *strength:* how durable and impactful they are in their influence over thoughts, feelings, and behaviors (Petty & Krosnick, 1995). Stronger attitudes are, in nature, more accessible (i.e., they come quicker to mind; see Fazio, 1995) and more certain (Tormala & Rucker, 2007; perhaps because it is based mostly on positive or negative information as opposed to ambivalent, both positive and negative, information; Priester & Petty, 1996). Additionally, attitudes can also vary in the extent to which they are based on affect or cognition (e.g., Rosenberg & Hovland, 1960; see Maio et al., 2019).

Before proceeding, it is also useful to distinguish between different types of variables known to influence attitudes in persuasion contexts. Specifically, a typical persuasion situation can be characterized in terms of the specificities associated with four categories of communication or persuasion variables: recipient (i.e., an individual or a group of people), message (i.e., the communication, such as an advertisement, composed of appeals and/or arguments), source (i.e., an individual or a group of people or company that is presenting the message), and context (i.e., the specific setting in which the persuasion attempt occurs) (Hovland et al., 1953). To understand how these variables relate in explaining the success of a persuasion attempt, several theories of attitude change have been developed over the last century (see reviews by Eagly & Chaiken, 1993; Petty & Wegener, 1998a).

Intuition as a persuasion variable in the scope of the Elaboration Likelihood Model

The Elaboration Likelihood Model (ELM; e.g., Petty & Cacioppo, 1986) is the most influential contemporary theoretical approach to persuasion (e.g., Kitchen et al., 2014; Teng et al., 2015) providing a general framework to understand the multiple effects, processes and consequences encompassing the use of a communication that intends to promote changes in

attitudes (see also the Heuristic Systematic Model[1] from Chaiken et al., 1989). The ELM accounts for persuasion effects both under high- and low-thinking conditions, by holding that the processes through which they occur, and their consequences, are different. In its essence, the ELM specifies a number of mechanisms through which a variable, such as an intuition appeal, can affect attitudes at different points along an elaboration continuum: through relatively low-thought mechanisms (i.e., a peripheral route) and through relatively high-thought mechanisms (a central route; see Petty & Cacioppo, 1986; Petty & Wegener, 1998a, 1999). Importantly, the ELM posits that attitudes based on high-thinking mechanisms are stronger than attitudes based on low-thinking mechanisms. Specifically, attitudes based on a high level of elaboration are more stable and accessible, resistant to counter-persuasion and, ultimately, predictive of behavior (see Petty et al., 1995). The described mechanisms are represented by a set of specific roles that variables of the persuasion context can adopt in producing persuasion.

The continuum of elaboration

According to the ELM, persuasion occurs along an elaboration likelihood continuum, with central and peripheral routes of persuasion at the two ends of high and low elaboration, respectively. The position of message recipients in this continuum is determined by their degree of motivation and ability to engage in effortful thinking. When motivation and ability to think about the persuasive proposal are relatively low, people rely on a variety of simple cues from the source, message or context that utilize relatively simple processes, leading the cue to become associated with the attitudinal object (e.g., a product) or serve as input to a simple decision (see Petty & Briñol, 2012; Petty & Wegener, 1998a; Teeny et al., 2017). When motivation and ability to think are relatively high, however, people are more likely to engage in a careful assessment of the merits of all available information. In such conditions, the characteristics of the available information, such as its quality, is an important determinant of persuasion effectiveness – with greater quality leading to greater persuasion. Thus one characteristic of high-thinking conditions is that they tend to enhance persuasion if presented

[1] Similar to the ELM, the Heuristic Systematic Model (HSM) posits that, in some instances, persuasion can result from effortful thinking, whereas in other cases persuasion can result from a low-effort reliance on simple heuristics (Chaiken, 1980). Although the ELM and the HSM make similar predictions, the mechanisms (as well as terminology) of each theory differ (see Eagly & Chaiken, 1993; Petty & Briñol, 2012; Petty & Wegener, 1998a, 1999, for further discussion).

arguments are strong but reduce persuasion if the arguments are weak (i.e., argument quality effects; see Petty & Briñol, 2012; Petty & Wegener, 1998a; Teeny et al., 2017).

In conditions of high elaboration, there are additional ways through which variables can influence persuasion as well as the content of individuals' thinking and, consequently, their attitudes. Specifically, when thinking is high, persuasion variables can function as an argument if these are perceived as related to the central merits of the attitudinal object (for example, a source's attractiveness and its relevance for the evaluation of a beauty related product; e.g., Kang & Herr, 2006). Variables can also bias the nature of the thoughts generated (i.e., thoughts can be biased by factors within or outside of the message itself). For example, being put in a positive mood prior to receiving a message or having that persuasive message delivered by an expert source can lead people's thoughts to be biased in favor of the message (e.g., Chaiken & Maheswaran, 1994; Petty et al., 1993; Wegener et al., 1994). Another way in which variables can influence persuasion in conditions of high elaboration is by affecting metacognitive processes. This happens when variables affect how people think about their own thoughts, such as how much confidence people have in them, how much they like them, or how desirable or undesirable people perceive them to be (Briñol & DeMarree, 2012; Petty et al., 2007). These processes have also been described as a means of thought validation (Teeny et al., 2017). The self-validation hypothesis (Petty et al., 2002) holds that influencing the confidence in one's thoughts when elaboration is high can lead to increased or decreased persuasion depending on the dominant direction of thoughts. Evidence provided by Briñol, Petty and Tormala (2004) supports this idea, by showing that increasing confidence in the validity of one's favorable thoughts towards an advertisement leads to higher persuasion; however, increasing doubt in their validity decreases persuasion. On the other hand, when thoughts are unfavorable, increasing confidence in their validity reduces persuasion, but decreasing confidence increases persuasion.

Finally, when elaboration is not constrained be either high or low, variables can also affect persuasion by increasing or decreasing the motivation or ability to think. With regards to motivation to think, perhaps the most important factor that contributes to a careful assessment of available information is its perceived relevance for the recipient (Petty & Cacioppo, 1979, 1990). In an early demonstration of this effect, Petty, Cacioppo and Schumann (1983) manipulated participants' interest in an advertisement for a razor blade by telling them that they would receive a razor for their participation in the study (high relevance) or a toothpaste (low relevance), and presented this advertisement with either strong or weak arguments. Results

showed greater argument quality effects in conditions of high as opposed to low relevance. Motivation to think can also be increased through the presentation of instructions that make people individually accountable for the message evaluation (Petty et al., 1980), by summarizing key arguments as questions rather than assertions (Petty et al., 1981), or linking the message to an aspect of the recipient's self, such as his or her important values, identity, goals, and outcomes (Blankenship & Wegener, 2008; Fleming & Petty, 2000; Petty & Cacioppo, 1990). People's individual differences also affect motivation to think, such as one's *need for cognition*, that is, how much one likes to engage in thoughtful cognitive activities (Cacioppo et al., 1984; Cacioppo & Petty, 1982). Typically, people high in Need for Cognition tend to form attitudes on the basis of an effortful thinking of available information thus being more influenced by the quality of a message, whereas people low in Need for Cognition tend to rely more on simple cues (see Cacioppo et al., 1996; Petty et al., 2009).

Recipients' ability to think can also impact levels of elaboration. Factors such as accompanying a message with distraction (e.g., by having recipients engaging in a distracting secondary task; Petty et al., 1976), having a speaker talking faster than normal (Briñol & Petty, 2003; S. M. Smith & Shaffer, 1995), increasing the complexity of a message (Ratneshwar & Chaiken, 1991), and other factors that disrupt thinking about the message, will lead people to fail to distinguish strong from weak arguments, and hence weaker argument quality effects will be observed. Individual differences might also relate to recipients' ability to think about the message. For example, the higher the amount of knowledge (Wood et al., 1995) and the more experience one has about a topic (Wu & Shaffer, 1987) the more one will be able to think about the issue-relevant information.

In sum, a central notion of the ELM is that variables, such as an appeal to intuition, are likely to exert multiple roles in persuasion (Petty & Cacioppo, 1986; Petty & Wegener, 1998a, 1999), postulating that any given variable can influence attitudes through different processes at different points along the elaboration continuum. Specifically, the same variable that exerts a simple cue effect in low elaboration conditions could, in conditions of high elaboration, serve as an argument, bias and/or validate the thoughts that come mind, or affect the amount of elaboration when left unconstrained. Bellow, we detail how different variables can assume these different roles, focusing also on intuition appeals as one such variable.

Multiple roles for persuasion variables

Evidence for multiple roles in persuasion is provided for several persuasion variables such as source expertise and attractiveness, recipients' mood and message features. Here, we illustrate the processes through which intuition appeals are also likely to assume such multiple roles.

Considering source expertise, under low elaboration conditions, such as when a message deals with an unimportant issue, it is likely that a source's expertise serves as a simple positive cue to persuasion, leading expert sources to produce more persuasion than non-expert sources, regardless of the merits of the message, i.e., the quality of its arguments (Petty et al., 1981; see Chaiken, 1980). When elaboration is unconstrained, expertise has been shown to affect how much people think about the message, in that expert sources promote higher scrutiny of the message in comparison to non-expert sources (e.g., Heesacker et al., 1983). Under high-elaboration conditions, expertise has been found to influence persuasion through multiple processes. For example, in conditions of high elaboration, expertise can bias the processing of information. Specifically, research by Chaiken and Maheswaran (1994) demonstrated that when recipients under high elaboration were exposed to an ambiguous message, source expertise positively influenced the valence of the thoughts generated; however, when elaboration was low, expertise did not influence recipients' thoughts and simply acted as a cue. Similarly, Tormala, Briñol and Petty (2007) found that, under high elaboration, the effect of source expertise on persuasion was mediated by recipients' favorable thoughts about the message (when source information preceded the message). Also, in conditions of high elaboration, expertise can influence persuasion through self-validation processes (Petty et al., 2002). Evidence also shows that presenting information about a source's expertise, after a persuasive message, can lead to greater confidence in people's favorable thoughts about the message, leading to greater attitude change when the source was an expert and thoughts had been favorable (Briñol et al., 2004; Tormala et al., 2006). This suggests that under high-elaboration conditions, source expertise can influence attitudes through different processes depending upon whether source information precedes or follows the message (Tormala et al., 2006).

Source attractiveness has also been shown to serve multiple roles in persuasion. Attractiveness can serve as a simple cue in conditions of low elaboration, with attractive sources promoting greater persuasion than unattractive sources (see Chaiken, 1987). When elaboration is unconstrained, attractiveness can also affect how much people think about a message, with

attractive sources promoting higher scrutiny of the message in comparison to unattractive sources (e.g., Puckett et al., 1983). When elaboration is high, attractiveness can also influence persuasion through multiple processes. For instance, people can scrutinize whether the attractiveness of a source is a relevant component for the advocated position and whether it provides evidence for it. This way, when advertising a beauty product (e.g., a skin cream) or a product whose central features are related to attractiveness (e.g., the public image of a restaurant), a physically attractive source can be more persuasive than an unattractive source by providing visual evidence (i.e., by serving as an argument; Kang & Herr, 2006; Miniard et al., 1991; Shavitt et al., 1994). Recent evidence (Mello et al., 2020) shed new light on this finding by exploring the influence of attractiveness on self-validation processes. Much in line with prior research on source expertise (Tormala & Petty, 2004), higher attitude confidence was promoted by attractive sources – when attractiveness was relevant to the message – and mediated attitude change. Interestingly, when attractiveness was irrelevant to the message, attractive sources reduced attitude confidence in comparison to unattractive sources and undermined subsequent resistance to counter-attitudinal messages.

Similarly, message recipients' mood can serve multiple roles in persuasion (Petty et al., 1991, 1993; Wegener & Petty, 1996, 2001). When likelihood of elaboration is low, mood should impact attitudes through conditioning or simple inference processes in which there is a misattribution of the cause of the mood to the persuasive message or attitude object (e.g., Petty et al., 1993; Schwarz, 1990). When elaboration likelihood is left unconstrained, mood can also impact the extent of elaboration. Typically, negative mood states tend to increase elaboration by signaling that something is wrong and needs to be addressed (Schwarz et al., 1991). However, by applying a hedonic contingency view of mood – the idea that individuals in a happy mood are interested in maintaining their positive emotional state and hence scrutinize the hedonic consequences of their actions; Wegener & Petty, 1994) – to message processing, Wegener, Petty and Smith (1995) found that happy mood states (as opposed to neutral [Experiment 1] and sad [Experiment 2] mood states) lead to greater processing of proattitudinal messages (i.e., non-mood threatening [Experiment 1], and uplifting [Experiment 2] messages), but lower processing of counterattitudinal messages (i.e., mood threatening and depressive). In this research, people in negative mood processed the messages to the same extent, regardless of their framing. When message processing is not viewed as capable of affecting mood, however, mood-consistent expectancies can enhance processing of counterattitudal messages when feeling happy and of proattitudinal messages when feeling sad (Ziegler, 2013; Ziegler et

al., 2013). Additionally, when elaboration likelihood is high, mood states can influence persuasion by serving as an argument (Martin et al., 1997), biasing the favorability of recipients' thoughts (Petty et al., 1993; Wegener et al., 1994), or the confidence in one's thoughts (Briñol et al., 2007).

Message features can also play multiple roles in persuasion. For example, the number of arguments presented in a message, in conditions of low elaboration, can act as a simple peripheral cue, as people might simply count the arguments in a message, regardless of their quality (Petty & Cacioppo, 1984). Similarly, making each argument longer can increase persuasion regardless of its quality (Wood et al., 1985). When elaboration is high, message arguments will not be processed by their mere quantity but, instead, for their quality. Evidence for this comes from research showing that while in conditions of low elaboration adding weak arguments to a message increases persuasion, in conditions of high elaboration, adding weak arguments reduces persuasion (Alba & Marmorstein, 1987; Friedrich et al., 1996; Petty & Cacioppo, 1984). This implies that the positive impact of a variable that might serve as a peripheral cue in conditions of low elaboration can be enhanced, attenuated, reversed, or remain the same (although explained by other processes) as elaboration likelihood increases (Petty, 1994).

Message clarity and complexity (e.g., use of complex vocabulary, sentence structure) can also influence persuasion through multiple processes. When elaboration is low, message recipients directly associate message complexity with source credibility. Research shows that a disorganized message lowers the credibility of a credible source, whereas an organized message increases the credibility of a less credible/moderately credible source (McCroskey & Mehrley, 1969). When elaboration is unconstrained, message complexity can affect recipients' amount of thinking, depending on individual differences, such as one's Need for Cognition. Specifically, people high in Need for Cognition might feel challenged by a complex message, but those low in Need for Cognition might avoid processing such a message by perceiving it as difficult (See et al., 2009).

The presented evidence for the multiple roles adopted by several persuasion variables suggests that intuition appeals are also likely to assume different roles in persuasion. Consider, for example, an advertisement for a car. Under low-elaboration conditions, an intuition-related piece of information such as the name of the car model (e.g., Peugeot 208 *Intuitive*), a slogan (e.g., *"Welcome to the era of intuitive driving"*) or characteristic (e.g., *"intuitive technology"*) might have a positive impact on attitudes by serving as a simple positive cue to persuasion,

regardless of the merits of the car or its features. This can result from a process that might characterize a peripheral route, such as a simple rule of thumb or association like "*I like intuitive things!".* As the likelihood of elaboration increases, intuition-related information could be processed for its merits with regards to the product. If, in high-elaboration conditions, the car is presented as intuitive or possessing intuitive features or technology that enhances one's driving ability, for example, then the impact of this feature on attitudes might be increased because of its perceived relevance for the merits of the car, as people might reason *"If these intuitive features enhance my driving ability, then I like it!"* – or, as reviewed, might have a similar impact on attitudes as a result of other processes. For example, the presentation of an intuition appeal, such as a slogan or the name of the car, in conditions of high elaboration can also bias the nature of the thoughts generated about the car, leading people's thoughts to be favorably biased in favor of the characteristics of the car (whether these are intuitive or not).

A multiple roles approach would also suggest that if this ad would be presented in conditions in which elaboration is not constrained to be either high or low, the presence of intuition appeals could lead to greater elaboration (e.g., if these appeals make the ad seem more interesting), making a person more willing to engage in a careful assessment of the merits of the car. In this case, the quality of the car features would be an important determinant of persuasion effectiveness. This would also imply that the positive impact of intuition appeals could be reversed if the car features were perceived as weak by the recipient.

However, the multiple roles approach does not guarantee the effectiveness of the use of intuition appeals in persuasion, nor that these will work as an effective persuasive tool for all individuals. For instance, evidence provided by DeBono and Harnish (1988) suggested that individuals can vary in the type of information they regard as relevant persuasive evidence. Specifically, a source's expertise is more likely to be regarded as relevant evidence for individuals low in self-monitoring than for those high in self-monitoring (i.e., individuals who are more motivated to be consistent with their own beliefs and values [low self-monitors] than individuals who are more oriented towards social approval [high self-monitors]; Snyder, 1974). People high in self-monitoring give greater importance to image dimensions, whereas people low in self-monitoring give greater importance to quality dimensions. Consistently, attractiveness is more likely to be regarded as relevant evidence for high self-monitors than for low self-monitors. In line with such evidence, it is thus possible that the effect of intuition appeals in persuasion depends on individual differences in intuitive and analytic cognitive

styles. Such a hypothesis is supported by evidence suggesting that matching persuasion appeals to recipients' characteristics is of high relevance for persuasive efficacy (Teeny et al., 2021).

The role of naïve theories

Perceptions of the world drive people's reactions, regardless of whether those perceptions reflect reality or not. We hold naïve theories about our cognitive and surrounding environments, which include theories about factors that might influence or have influenced our attitudes and behaviours (e.g., Nisbett & Wilson, 1977; Wilson et al., 1982), independently of their effective influence (Nisbett & Wilson, 1977). A few sets of studies have addressed how these naïve theories might influence persuasion. For instance, Briñol, Rucker and Petty (2015) demonstrated that naïve theories about the meaning of persuasion influence how people respond to persuasive attempts. In the second experiment of their paper, the researchers assessed the extent to which individuals' naïve theories about persuasion (i.e., how persuasion is perceived as something that is good or bad) predicted information processing and attitude change. Results showed that those who were most negative towards persuasion were most likely to scrutinize the persuasive information presented. Other research explored a variety of naïve theories related to consumer inference (e.g., Labroo & Mukhopadhyay, 2009; Yorkston et al., 2010). Results obtained within these studies suggest that consumers make use of these naïve theories to support their judgments and their purchase intentions, leading the same persuasion setting to have different impacts on different individuals (see Deval et al., 2013).

One of naïve theories' most studied roles is how they support correction processes. Wegener and Petty (1995) showed that individuals' attempts to remove or avoid biases in persuasion are guided by naïve theories about how a factor might constitute a potential source of bias as well as the direction and magnitude of such potential bias. Several studies have shown that the effects of naïve theories over correction processes occur especially under high-elaboration conditions (e.g., DeSteno et al., 2000; Isbell & Wyer, 1999; Petty et al., 2008) and that the use of naïve theories in correction are less likely to occur under low-elaboration conditions (see Chien et al., 2014). This line of research suggests as a relevant factor for the outcome of a persuasive attempt whether intuition might be perceived or not as a source of bias – namely, through recipients' perceptions of validity of intuition.

Matching effects in persuasion

Matching is a procedure whereby specific factors of the persuasion setting (source, message, recipient, and context) are combined with one another. Like other variables, matching can influence persuasion through different processes depending on elaboration likelihood: by serving as a cue in conditions of low elaboration, by biasing the direction of thoughts when elaboration is high, by enhancing message processing when elaboration is unconstrained, and through self-validation processes (Briñol & Petty, 2006, 2015; Teeny et al., 2021). Although matching can be operationalized through the combination of any category of persuasion variables, one of the most common forms of matching is the combination of a characteristic of the recipient's individuality to some aspect of the message (Teeny et al., 2021). This form of matching has been repeatedly shown to be an efficient persuasive strategy and, as such, has been regarded as one of the most reliable ways to enhance persuasion (e.g., Carpenter, 2012; Noar et al., 2007; Rothman et al., 2020; Teeny et al., 2021) and will be the type of matching focused on in this work. There are several ways through which a message can be matched to recipients, which include a matching with their personality (e.g., Aaker, 1999; Hirsh et al., 2012; Wheeler et al., 2005), gender (e.g., Fleming & Petty, 2000; Meyers-Levy & Sternthal, 1991), ethnic identity (Forehand et al., 2002), culture (e.g., Han & Shavitt, 1994; Herek et al., 1998), or self-schema (Branković & Žeželj, 2010; See et al., 2009; Wheeler et al., 2002, 2005), among other characteristics (see Briñol & Petty, 2005; Petty et al., 2000; Teeny et al., 2021).

In conditions of low thinking, matching can influence persuasion as people might accept the message position simply because of an underlying sense that associations with the self (or their values) is good. Congruently, in a study conducted by DeBono (1987), high-self-monitoring undergraduate students reported more favorable attitudes toward a message appealing to a social-adjustive function, and low-self-monitoring participants reported more favorable attitudes toward a message directed at a value-expressive function, even though no actual arguments were presented. In further evidence for matching effects in conditions of low thinking, Lammers and Baldwin (2018), manipulated participants' capacity to process information and showed that matching politically conservative participants to past-focused communication only influenced message endorsement under conditions of peripheral processing.

Matching a message to a recipient in conditions of high elaboration is also likely to influence persuasion, but through different mechanisms, such as by biasing the direction of thoughts. In two studies, Lavine and Snyder (1996) matched high and low self-monitoring

participants with messages appealing to image and values (respectively) and, consistent with previous research, observed greater persuasion and thought favorability in matched compared to mismatched conditions. Furthermore, the impact of matching on attitudes was mediated by participants' thoughts and perceptions about the message, thus providing evidence that matched messages produce greater persuasion because of a biased processing of the content of the messages. This is an important point because, although the attitudinal outcome is the same for matching as a cue and as a biased processing, the mechanisms behind them are different. Further supporting that these biasing influences tend to be enhanced when the message is somewhat ambiguous in quality (Chaiken & Maheswaran, 1994), Ziegler and colleagues (2005) matched high and low self-monitors with messages appealing to quality or image, containing arguments that were strong, weak, or ambiguous in quality, and observed that only for the ambiguous arguments did biased processing lead to more agreement when the appeal matched participants' self-monitoring.

In conditions in which thinking is not already constrained by other variables to be high or low, and if a person is unsure about how much to process the persuasive communication, matching can also prompt recipients to effortfully think about the message. For example, Petty and Wegener (1998b) presented high and low self-monitors with messages appealing to image (e.g., how the product makes you look) or quality (e.g., how efficient the product is) that had strong or weak arguments. Results showed greater argument quality effects in matched compared to mismatched conditions suggesting that matching increased thinking about the message quality (for similar results, see DeBono & Harnish, 1988; Wheeler et al., 2005). Additional evidence comes from Haddock et al. (2008) who matched affective and cognition-based persuasive messages about a fictional animal (i.e., messages either designed to induce positive emotions [e.g., "It then made a beautiful sound that reminded me of a kitten's purr"] or based on a description of factual information about the animal [e.g., "A remarkably adaptive animal, lemphurs can be found in ocean waters as far north as Alaska and as far south as Antarctica"]) with participants' Need for Cognition and Need for Affect (Maio & Esses, 2001; i.e., a general motivation for people to pursue or avoid emotions). Consistent with previous results, the affective message promoted more positive attitudes among participants high in Need for Affect and low Need for Cognition, and the cognitive message promoted more positive attitudes among participants low in Need for Affect and high in Need for Cognition. Of further interest, participants in matching conditions correctly later recognized a greater amount of information about the presented message in comparison to participants in mismatching

conditions, suggesting that matched information was processed with greater depth than mismatched information.

Matching with regards to individuals' thinking styles was studied by Wheeler, Briñol and Petty (2002), in conditions of low elaboration, by matching recipients' Need for Cognition (Cacioppo et a., 1984) and Assessment levels (i.e., a person's tendency to judge the quality of entities or states by considering its merits and demerits concerning alternatives; Kruglanski et al., 2000) of a series of novel products and services, that varied in brand name and attributes reflecting two types of "brand personality" (Aaker, 1997). Participants with high Need for Cognition evaluated more favorably the brand when it was described as "intelligent, technical, and corporate" than when it was described as "glamorous, upper-class, and good looking", due to these individuals preferring complex stimuli and enjoying careful thinking. On the other hand, high assessment individuals preferred the latter, since these tend to evaluate others on dimensions such as looks, achievements, social status, and clothing (Kruglanski, et al., 2000).

Similar effects should be observed for matching conditions using intuition appeals. Based on the reviewed literature, we expect that intuition appeals can promote more positive attitudes when matched with recipients' naïve theories about intuition. Taking for instance such matching in conditions of low elaboration, evidence suggests that participants who perceive validity in intuition might be the ones to use simple associations or heuristics that would lead them to adopt the rule of thumb that *"I like things related to intuition!"*, in comparison to participants who do not share the same beliefs. In case these participants were to be engaged in high thinking, such a matching could promote more positive attitudes through a biased processing of the content of the ad.

The interplay between lay conceptions of intuition and the influence of intuition appeals in persuasion

No previous evidence was yet available to define the role that intuition appeals exert in persuasion, nor the likely matching effects that could be expected. Our goal in the reported work was to understand how individuals' lay conceptions of intuition influence their reactions to intuition appeals in persuasion. In other words, our ultimate goal was to approach matching effects with regards to intuition. As stated above, we expected to find evidence of such matching effects, such that intuition appeals should promote more favorable attitudes among those who perceive validity in the use of intuition. We hypothesized that these effects occur independently

of processing conditions. However, although the attitudinal outcome would be same for the matching in high- and low-thinking conditions (i.e., matching as a cue), the mechanism behind it should be different. In high elaboration, matching should influence attitudes through a biased generation of thoughts elicited by the previous car advertisement, that is, the impact of matching should be mediated by participants' favorable thoughts and perceptions about the ad. The biasing influences promoted by this match should be stronger the more ambiguous the description of the car in terms of its quality. Also, for conditions of high elaboration, although little previous research has directly tested or explicitly provided evidence that matching can serve as an argument (for research consistent with this possibility see DeBono & Harnish, 1988; Lavine & Snyder, 1996), it has been proposed that, based on this evidence, matching effects can influence persuasion in such way (Teeny et al., 2021). As such, one could hypothesize that if a car, or any other product, is presented as intuitive or promoting one's intuition, such a feature should be more likely to be perceived as relevant for the merits of the car by intuitive participants, as these might be the ones reasoning that *"If this car is intuitive and if it enhances my intuition, then I like it!"* (i.e., serving as an argument). Finally, if elaboration is unconstrained or recipients are unsure about the amount of thought they should put into the ad, intuition appeals should lead to greater message scrutiny the more recipients perceive validity in intuition, by considering that these appeals make the ad seem more interesting. Such a matching would then make the recipient more willing to engage in a careful assessment of the quality of the car, meaning that for such a matching to work, its features should reflect quality.

Summary

In this thesis, we aimed to understand how intuition is perceived by the lay person, as the message recipient of a persuasion attempt, and how this recipient reacts to intuition appeals that match such perception. With this goal in mind, in Chapter I, we reviewed how the literature has addressed intuition, and highlighted important gaps concerning existing knowledge about how the lay person perceives and represents intuition. We stressed the understanding of such representation as essential to support the development and operationalization of persuasion appeals that match not only individuals' general conceptions of intuition, but also account for possible differences in intuitive and analytic styles. With that in mind, we focused on these differences not only for the perceptions of the central features of the lay conceptions of intuition, but also for the naïve theories regarding the validity of intuition.

In Chapter II, we reviewed the literature on persuasion stressing the relevance of individuals' processing styles and individuals' naïve theories for a better understanding of the outcomes promoted in a setting where persuasion appeals are used. We derived a matching hypothesis from this literature, expecting that intuition appeals should promote greater persuasion among recipients who perceive intuition as valid.

Section II

Empirical Section

Overview of Empirical Studies

In this thesis, we approached the use of intuition appeals in persuasion using the Elaboration Likelihood Model as a theoretical framework. Based on the above literature review, we proposed that the intuitive nature of a persuasion appeal is a variable of high relevance, which can exert different roles and influence persuasion in different ways. Our goal was to empirically address the questions of whether, when, and for whom these appeals influence persuasion, hypothesizing that such influence should be dependent upon both message features and recipients' characteristics, specifically, on how recipients perceive validity in intuition. As such, our main focus was on testing the hypothesis that the impact of intuition appeals in persuasion should be related to matching effects. However, the test of this hypothesis was not straightforward. Several empirical questions needed to be tackled before one could test such matching effects and document the role of intuition appeals as a persuasion variable. In this thesis, we approached each of these empirical questions and integrate them here in four different sections, henceforth designated as *Empirical Chapters*.

The first set of questions of this thesis related to the understanding of how intuition is perceived by the lay person (i.e., the message recipient). The importance of such understanding is associated with two aspects of this work. The first one concerns the fact that, when presenting recipients with intuition appeals in a persuasive message, we needed to ensure that they would perceive these appeals as representative of what intuition is. Hence, we needed to understand how message recipients perceive intuition and its features to be able to successfully operationalize intuition appeals in persuasive messages. The second aspect concerned the assessment of recipients' naïve theories about intuition. The knowledge of these lay concepts allowed us to measure participants' explicit preferences for the use of intuition and analysis and to assess how valid they perceive both decision-making processes. In the first empirical chapter, we address this question, by focusing on assessing the content of individuals' lay conceptions of intuition and analysis through a prototype approach, which allowed us to identify the most central features of these concepts (i.e., seen by the lay person as the most representative of intuition and analysis). Importantly, we also addressed how individuals' cognitive styles (operationalized by the Faith in Intuition and Need for Cognition scales) influence these lay conceptions.

The second set of questions approached in this thesis related to the understanding of which, when, and why individuals rely on their intuition. The answer to these points allowed us to further determine possible aspects related to message recipients that might influence how

they respond to intuition appeals in a persuasion context. We address these questions in the second empirical chapter of this thesis by assessing intuitive and analytical people's preferences for deciding intuitively and analytically across different products differing in complexity. We then focus on assessing people's naïve theories of validity of decisions made intuitively and analytically and the role that perceived validity plays in explaining such preferences. Because naïve theories of validity of intuition are likely to influence the efficacy of intuition appeals in persuasion, we focus, in the third empirical chapter, on developing two measures aimed at capturing individual differences in naïve theories of validity of intuition and analysis.

Finally, having an understanding of people's lay conceptions of intuition and being able to evaluate how message recipients perceive validity in intuition, our fourth empirical chapter aimed at directly testing how individuals react to intuition appeals in a persuasive situation. As such, in Empirical Chapter IV, we tested the main hypothesis of this thesis regarding the matching effects between intuition and analysis appeals (operationalized through central features obtained in the prototype analysis) and participants' individual differences in perceived validity of intuition and analysis (as measured through the developed measures), using an ad for a new car brand (a complex product) as a persuasion context.

In the next four empirical chapters, we present each set of studies detailing the knowledge and procedures sustaining how we approached each of these questions and goals.

Empirical Chapter I

More than meets the gut:

A prototype analysis of the lay conceptions of intuition and analysis

Introduction

In a psychological approach to intuition, it is important to understand the lay meanings attributed to intuition – that is, how people describe their own subjective experiences of intuition. Such an understanding should tell us about whether people's lay conceptions of intuition differ or not from conceptualizations employed by researchers. Additionally, it should clarify whether the lay person perceives intuition uniformly, as a single-dimension construct, or multidimensionally. If intuition is indeed perceived as a multidimensional concept, it is possible that perceivers' intuitive cognitive styles moderate such perceptions, and different individuals hold different conceptions or ways of describing their intuitions.

In this empirical chapter, we follow a prototype approach (Cantor & Mischel, 1977; Rosch, 1975, 1978) to intuition. This approach provides distinct benefits compared to the reviewed qualitative research on intuition, by foregoing a classical definition (Markman, 1989) at the outset and defining a construct as a set of features that are organized in terms of their degree of association with the concept, i.e., their centrality. Thus, a prototype approach does not aim to identify necessary features of a concept but rather to flag the most central features of the concept and differentiate them from more peripheral features. This is done by using participant-driven identification of critical aspects of their lay conceptions and validation of those features by different participants.

This approach should allow us to go beyond researcher definitions that have been rather inconsistent – especially with regards to intuition. One reason for the difficulty in reaching a consistent agreement on a formal definition of intuition might be that the concept does not have a classical definition. In fact, it has been argued that such a classical approach fails to adequately capture people's experiences and conceptions of emotions and other blended states (see Russell, 1991, for a review). Evidence has shown that a prototype approach better resembles the way people represent subjective constructs such as emotion (Fehr & Russell, 1984; Shaver et al., 1987), love (see Fehr, 2006, for a review), anger (Russell & Fehr, 1994), forgiveness (Kearns & Fincham, 2004), gratitude (N. M. Lambert et al., 2009), modesty (Gregg et al., 2008), respect (Frei & Shaver, 2002), disillusionment (Maher et al., 2020), prayer (Lambert et al., 2011), boredom (Harasymchuk & Fehr, 2012), virtue (Gulliford et al., 2020), and *saudade* (Neto & Mullet, 2014). Consistent with prototype theory, these studies have shown that people organize these concepts around central and peripheral features and that these are treated differently in information-processing. Specifically, central features are more accessible in memory (Cantor & Mischel, 1977) and hence more likely to be correctly recalled (e.g., Hepper et al., 2012;

Kinsella et al., 2015; May & Fincham, 2018), more quickly identified (e.g., Fehr et al., 1982; Kinsella et al., 2015; May & Fincham, 2018) and falsely recognized (e.g., Birnie-Porter & Lydon, 2013; Hepper et al., 2012; Kearns & Fincham, 2004; Kinsella et al., 2015) in comparison to peripheral features. With the goal of examining the lay conceptions of intuition, we also analyzed people's lay conception of analysis through a prototype approach. This allowed us to learn whether people perceive both concepts as independent or complementary.

Three studies sustained our approach. To develop a prototype structure of intuition and analysis, some conditions must be met: a set of features associated with the two concepts must be identified and capable of being rated on their centrality to the concept, and features' centrality should have implications for information processing (Gregg et al., 2008; Hassebrauck, 1997; Hepper et al., 2012; Rosch, 1975). To meet these conditions, our first study was directed at obtaining a pool of prototypical features of "intuition" and "analysis", by asking participants to describe in an open-ended format all the features that best represent what it means to act intuitively or to act analytically. Resulting descriptions were coded by independent judges into different features, and subsequently rated for centrality by an independent sample of participants in Study 1.2. Exploratory factor analyses of the centrality ratings allowed us to identify different facets of "intuition" and "analysis". As mentioned, our approach to understanding people's lay conceptions of intuition and analysis also considered individuals' own cognitive styles. It was an empirical question whether different individuals differ in their perceptions of what it means to act intuitively and analytically. As such, we subsequently examined how participants' intuitive and analytical cognitive styles predicted the observed centrality of identified underlying factors, aiming to understand whether intuition and analysis are represented differently by people who differ in their use of each. Finally, in Study 1.3, we examined the impact of centrality on information processing of these features, by analyzing response latencies when categorizing features as representative of "acting intuitively" or "acting analytically" and the consensus on classifying central and peripheral features as belonging to their respective category.

Across the three studies, sample sizes were determined based on sample sizes used in previous prototype research (e.g., Maher et al., 2020; Gregg et al., 2008; Hepper et al., 2012).

Study 1.1

Participants

This study's sample consisted of 209 North American participants recruited online on Prolific Academic (42.1% women, M_{age} = 31.60, SD_{age} = 10.71). Participants were randomly assigned to either describe intuition (n = 103) or analysis (n = 106).

Procedure

An online survey was created using the Qualtrics survey platform. Participants were invited to participate in a study with the goal of investigating people's understanding of daily actions. After providing informed consent, and within the study, participants were told either that the focus of the research was to understand what people mean by using their intuition or "acting intuitively", or that the research focused on what people mean by "acting analytically". Participants were asked to write down all the features and characteristics that, in their opinion, best describe what it means to "act intuitively" or to "act analytically" in an open-ended item designed for this purpose. Participants were further informed that there were no correct or incorrect answers and that the researchers were particularly interested in their personal views. After submitting their responses, participants were thanked and debriefed.

Results

We broke down participants' responses into distinct feature exemplars (N_{total} = 778, M = 3.72 per participant; $N_{intuition}$ = 350, $M_{intuition}$ = 3.40; $N_{analysis}$ = 428, $M_{analysis}$ = 4.04). There were no significant sex differences in the number of features reported (intuition: $t(101) = -1.18$, $p = .239$; analysis: $t(104) = -.26$, $p = .799$), and no significant associations between participants' age and the number of features generated for intuition (r = .14, p = .149), although this association did reach significance for the features generated for analysis (r = .20, p = .045).

Distinct feature exemplars were defined as one item from a list, or one "unit of meaning" (Joffe & Yardley, 2003) from responses with multiple descriptions. Following practices from previous prototype research (e.g., Hepper et al., 2012), the resulting features or units of meaning were coded by two independent coders into superordinate thematic categories by grouping (a) identical features, (b) semantically related features (e.g., "acting on feelings" and "taking action from your feelings"), and (c) meaning-related feature exemplars (e.g., "believing in yourself"

and “trusting yourself”). Discrepancies between coders were resolved through discussion. A final coding scheme contained 35 feature categories for intuition and 19 feature categories for analysis (see Tables 2 and 3). The validity of this coding scheme was evaluated by a third and fourth coder who independently applied the coding scheme to all original exemplars, assigning each exemplar to the categories identified for intuition and analysis. Inter-rater agreement was good (84% and 94.6% for the coding of intuition and analysis exemplars, respectively).

Table 2

Features of “acting intuitively” generated in Study 1.1 and average centrality ratings (Study 1.2)

		Centrality (Study 1.2)	
Rank	Feature	*M*	*SD*
1.	Following your gut	6.82	1.52
2.	Acting based on what feels right	6.81	1.33
3.	Following your instinct	6.69	1.69
4.	Acting based on what's natural	6.26	1.66
5.	Avoiding what feels wrong	6.26	1.67
6.	Trusting yourself	6.21	1.58
7.	Going with one’s first impression	6.18	1.43
8.	Acting automatically and effortlessly	6.10	1.67
9.	Using your senses	6.10	1.80
10.	Acting based on feelings and emotions	6.05	1.70
11.	Acting based on unexplained knowledge	6.01	2.00
12.	Thinking quickly	5.95	1.75
13.	Reading people	5.85	1.82
14.	Acting quickly	5.77	1.62
15.	Doing things easily and fluently	5.57	1.75
16.	Acting in uncertain situations	5.40	1.86
17.	Predicting something will happen	5.39	1.86
18.	Acting without thinking	5.33	2.19
19.	Fitting to the situation	5.33	1.53
20.	Acting impulsively	5.32	1.90
21.	Acting in a personal and unique manner	5.29	1.84
22.	Acting in an unplanned manner	5.21	1.92
23.	Solving problems	5.14	1.79
24.	Acting with integrity	5.14	2.00
25.	Acting based on prior experience	5.10	2.26
26.	Thinking abstractly	5.03	1.82
27.	Engaging in imagination	4.91	1.82
28.	Acting calmly	4.73	1.83
29.	Acting without reasoning or logic	4.71	2.25
30.	Acting upon superstition or a supernatural force	4.71	2.26
31.	Acting in a carefree manner	4.66	2.16
32.	Focusing on the big picture	4.43	1.71
33.	Acting thoughtfully	4.28	2.08
34.	Acting in a biased manner	4.10	1.89
35.	Disregarding objective and concrete facts	4.05	2.11

Table 3

Features of "acting analytically" generated in Study 1.1 and average centrality ratings (Study 1.2)

		Centrality (Study 1.2)	
Rank	Feature	*M*	*SD*
1.	Organizing and analyzing information	7.15	1.15
2.	Thinking objectively and logically	7.13	1.35
3.	Acting based on facts and data	7.11	1.27
4.	Acting objectively and logically	7.07	1.27
5.	Assessing and observing the situation	6.96	1.27
6.	Making rational and unbiased decisions	6.87	1.28
7.	Thinking about outcomes and consequences	6.84	1.46
8.	Weighting and considering all options and perspectives	6.84	1.42
9.	Gathering evidence	6.83	1.22
10.	Examining problems	6.80	1.33
11.	Paying attention to detail	6.75	1.49
12.	Thinking before acting	6.71	1.61
13.	Implementing method	6.60	1.53
14.	Reflecting and deliberating	6.37	1.62
15.	Analyzing people	6.28	1.63
16.	Acting carefully	6.11	1.50
17.	Resisting impulses	5.93	1.80
18.	Ignore feelings and emotions	5.81	1.71
19.	Acting slowly and calmly	5.67	1.75

Study 1.2

In Study 1.2, we took the features generated by participants in Study 1.1 and asked a new set of participants to rate the centrality of each feature for its respective category. In so doing, we were able to (a) identify the features generally viewed as most central to intuition and analysis, and (b) examine whether perceptions of centrality of some features were more associated with particular features than with others (i.e., identifying "centrality factors" within the categories of intuition and analysis, if they exist). We further examined whether perceptions of centrality of any obtained factors were influenced by individuals' cognitive styles, to understand whether these lay perceptions are uniformly shared or whether they diverge between different participants. To characterize individuals' cognitive styles we assessed their Faith in Intuition (Pacini & Epstein, 1999) and their Need for Cognition (Cacioppo et al., 1984).

Method

Participants

An independent sample of 199 North-American participants was recruited online through Prolific Academic (41.2% women, M_{age} = 31.59, SD_{age} = 11.36). Participants were randomly assigned to one of two versions of an online survey, consisting either of rating the centrality of the features of intuition (n = 97) or the features of analysis (n = 102).

Procedure and measures

We created an online survey using the Qualtrics survey platform. Participants were invited to participate in a study with the goal of investigating people's understanding of daily actions. Within the survey, and after providing informed consent, participants learned either that in this study they would be asked to rate how closely each of a set of features related with their personal views of "acting intuitively" or with their personal views of "acting analytically". Participants hence rated the centrality of each feature (identified in Study 1.1) according to their own views of intuition or analysis. Research has used this method to define the representativeness of exemplars (Gregg et al., 2008; Hassebrauck, 1997; Rosch, 1975). Specifically, participants rated how closely each of the 35 features of intuition or the 19 features of analysis related to their personal views of acting intuitively or analytically. Features were randomly and individually presented to participants at the center of the screen, each accompanied by up to three common exemplars (obtained in Study 11.) provided in brackets. As an example of when rating centrality of features of acting intuitively, participants saw, "Acting based on what feels right" followed by *"Doing something that feels right or like the right thing to do; Doing what feels right"*. Centrality ratings were made on a scale ranging from 1 (not at all related) to 8 (extremely related). Participants were further informed that there were no correct or incorrect answers and that the researchers were particularly interested in their personal views.

Afterwards, participants completed the Need for Cognition scale (Cacioppo et al., 1984). This 18-item empirically established measure was developed to assess individual differences in one's intrinsic enjoyment and motivation to engage in thoughtful thinking (see Cacioppo et al., 1996). For each item of this measure, participants are asked to indicate the extent to which each statement is characteristic of them, in a scale from 1 (not at all like me) to 5 (very much like me). Internal consistency for this measure was α = .93. Afterwards, participants completed the

20-item Faith in Intuition scale (Pacini & Epstein, 1999), which measures one's reliance and confidence in intuition. For each item, participants also indicated the degree with which each item is characteristic of them, using a scale form 1 (not at all like me) to 5 (very much like me). Internal consistency for this measure was also $\alpha = .93$. After completing both individual difference measures, participants were thanked and debriefed.

Results

Feature centrality and underlying factors

The mean centrality ratings for each feature are presented in Table 2 and Table 3. Suggesting a shared representation of both constructs, intraclass correlations (ICC) showed an overall good inter-rater reliability for the obtained centrality ratings of the features of *acting intuitively* (ICC for average measures = .83, 95% confidence interval = .78 to .88) and for the features of *acting analytically* (ICC = .93, 95% confidence interval = .91 to .95). Based on the ratings of feature centrality, we performed an exploratory factor analysis (EFA) to examine the extent to which variations in perceptions of feature centrality relate across the various features. For features that are viewed as similarly relating to the concept of intuition or analysis, respectively, variation across participants in perceptions of the centrality of a given feature should correspond with parallel variation in perceived centrality of other related features. These similarly viewed sets of features might then correspond with underlying factors that distinguish between different facets of people's lay conceptions of "intuition" and "analysis".

Results of a scree plot (see Appendix A, Figure 1) and parallel analysis (Fabrigar & Wegener, 2012) suggested a two-factor structure for the features describing *acting intuitively* (Rotated Factor Loading Matrix for a Maximum Likelihood EFA with 2 common factors and a Promax rotation (Fabrigar & Wegener, 2012): $\chi^2 = 788.807$, df = 526, $p < .001$, RMSEA = 0.072). The factor loadings for the two-factor structure of intuition are presented in Table 4 (loadings lower than .2 are omitted). The content of the features composing each factor suggests that people hold lay conceptions of intuition as involving different types of processes: Factor 1 – automatic, affective and non-logical processes (with features such as *acting based on what feels right, following your gut, acting automatically and effortlessly, acting without thinking*); and Factor 2 — a holistic processing that also relies on more deliberate aspects (*thinking abstractly, focusing on the big picture, acting based on prior experience*).

Table 4

Maximum likelihood Factor Loading Matrix of features of "acting intuitively"

	Factor loadings	
Features	1	2
Acting automatically and effortlessly	.787	
Following your instinct	.701	
Following your gut	.696	
Acting impulsively	.694	
Acting based on what's natural	.659	.315
Acting based on what feels right	.657	
Acting without thinking	.655	-.240
Acting quickly	.652	
Acting in an unplanned manner	.639	
Acting without reasoning or logic	.580	-.410
Going with one's first impression	.563	.218
Acting in a carefree manner	.534	
Trusting yourself	.524	.354
Acting based on unexplained knowledge	.520	
Acting based on feelings and emotions	.484	
Doing things easily and fluently	.456	
Thinking quickly	.454	
Acting upon superstition or a supernatural force	.451	
Acting in uncertain situations	.418	
Acting in a biased manner	.402	
Predicting something will happen	.379	
Reading people	.346	.223
Disregarding objective and concrete facts	.343	-.208
Acting with integrity		.696
Acting calmly		.655
Acting in a personal and unique manner	.270	.652
Acting thoughtfully	-.267	.645
Acting based on prior experience		.626
Thinking abstractly		.557
Solving problems		.539
Using your senses		.514
Focusing on the big picture	-.388	.451
Fitting to the situation		.368
Avoiding what feels wrong		.323
Engaging in imagination		.312

Extraction Method: Maximum Likelihood; Rotation Method: Promax with Kaiser Normalization.
Omitted loadings (.2)

The factor correlation matrix (Table 5) shows a weak negative correlation between the two factors. Results from reliability analyses (see Table 5) showed that both factors exhibited good levels of internal consistency.

Table 5

Factor Correlation Matrix between factors of "acting intuitively"

Factor	1 α =.91	2 α =.83
1. Automatic, affective and non-logical processes	-	
2. Holistic processes	-.12	-

Regarding the features describing what it means to *act analytically*, results of a scree plot (see Appendix A, Figure 2) and parallel analysis (Fabrigar & Wegener, 2012) suggested a single-factor structure for these features (maximum likelihood factor loadings of these features are presented in Table 6): $\chi^2 = 362.700$, df = 152, $p < .001$, RMSEA = 0.117).

Table 6

Maximum likelihood Factor Loadings of features of "acting analytically"

Features	Factor loadings α = .94
Thinking objectively and logically	.818
Examining problems	.805
Thinking about outcomes and consequences	.797
Assessing and observing the situation	.794
Gathering evidence	.770
Paying attention to detail	.755
Thinking before acting	.733
Acting based on facts and data	.724
Implementing method	.721
Organizing and analyzing information	.718
Making rational and unbiased decisions	.704
Acting objectively and logically	.670
Reflecting and deliberating	.636
Resisting impulses	.621
Weighting and considering all options and perspectives	.606
Acting slowly and calmly	.588
Acting carefully	.547
Ignore feelings and emotions	.507
Analyzing people	.484

The means for the two underlying factors of intuition and the general factor of analysis are presented in Table 7. The factor describing intuition as the activation of automatic, affective and non-logical processes was perceived as more central overall in comparison to the factor describing intuition as a holistic process with some more deliberate aspects. This difference was statistically significant, $t(96) = 2.95$, $p = .004$, $d = 1.56$.

Table 7

Mean centrality ratings for the factors of intuition and general factor of analysis

Factor	Mean centrality (SD)
Intuiton – Factor 1: Automatic, affective and non-logical processes	5.61 (1.04)
Intuiton – Factor 2: Holist processes	5.15 (1.09)
Analysis – General factor	6.62 (1.02)

Do cognitive styles predict the obtained centrality ratings? We next examined whether participants' own intuitive and analytical cognitive styles predicted the observed centrality ratings for the two identified underlying factors of intuition and the general factor of analysis.

Importantly, the measures of Faith in Intuition (FI) and Need for Cognition (NC) did not significantly correlate in any of the two versions of this study, confirming their independence: $r(95) = .12$, $p = .231$, for participants who rated the centrality of intuition's features; $r(100) = .07$, $p = .474$, for participants who rated the centrality of analysis' features.

As such, we aimed to understand whether intuition and analysis are, respectively, differently represented by relatively intuitive versus non-intuitive and relatively analytical versus non-analytical participants. This analysis was conducted within a multiple regression approach. A two-step hierarchical regression model was built for each of the two factors of intuition and the general factor of analysis. These factors were entered as dependent variables, with FI and NC as continuous predictors. Scores on FI and NC were mean-centered by subtracting their means from observed scores (Aiken & West, 1991). Main effects of the predictors were interpreted in the first step of the model, and, for each model, the two-way interactions were individually interpreted in the second step (Cohen et al., 2003). Bellow, we detail how these individual differences moderate the centrality of intuition's features followed by those of analysis.

Centrality of features of intuition. With regards to intuition's features, participants' own intuitive styles significantly predicted the obtained centrality ratings for the factor describing intuition as a holistic process, $B = .78$, $t(94) = 5.78$, $p < .001$, but not for the factor describing intuition as automatic, affective and non-logical processes, $B = -.09$, $t(94) < 1$. These results suggest that, regarding the former, participants who have more faith in their intuition considered the features that describe intuition as a holistic process as more central to what it

means to act intuitively in comparison to those who have less faith in their intuition. Regarding the latter, these results suggest that, overall, participants considered the features describing intuition as an automatic, affective and non-logical process, just as central to what it means to act intuitively, independently of how much they rely on their intuition.

Results were less relevant, and somewhat inverse, when considering participants' NC. Specifically, NC did not significantly predict the centrality ratings for the factor of intuition as a holistic process, $B = -.04$, $t(94) < 1$, and only marginally predicted the centrality ratings of the factor describing intuition as an automatic, affective and non-logical process, $B = .24$, $t(94) = 1.72$, $p = .088$.

The interaction between participants' FI and NC did not predict the centrality ratings of the factor describing intuition as an automatic and affective process, $B = .27$, $t(93) = 1.73$, $p = .086$, nor the centrality of factor of intuition as a holistic process, $B = -.10$, $t(93) < 1$.

Centrality of features of analysis. With regards to the general factor of "acting analytically", participants' NC marginally predicted how central participants considered the features composing this factor to what it means to act analytically, $B = .24$, $t(99) = 1.91$, $p = .059$. Regarding participants' FI, this variable did not significantly predict the perceived centrality of this factor, $B = -.23$, $t(99) = -1.55$, $p = .124$, nor did it interact with NC to predict the centrality of this factor, $B = .21$, $t(98) = 1.52$, $p = .131$.

Study 1.3

Study 1.3 was designed to further validate the relative centrality of the features identified in Studies 1.1 and 1.2, by examining the impact of centrality on the processing of these features. To this end, participants classified the features as representative of intuition or analysis as quickly but accurately as they could. We expected that participants would classify relatively central features as belonging to the prototype faster than they would classify relatively peripheral features (Fehr et al., 1982; Hassebrauck, 1997; Kintsch, 1980). Additionally, we also expected that participants would show higher consensus that central features actually belong to the category (i.e., more classifications that the central feature is a feature of the category), and evidence greater disagreement on peripheral features (i.e., some participants classifying the features as part of the prototype and others classifying the features as not part of the prototype; cf. Fehr & Russell, 1984, 1991; Mervis & Rosch, 1981). Because of the focus on reaction times

in this study, the experimental session was conducted in a laboratory setting, thereby also extending to a new type of sample.

Additionally, we further examined whether individual differences in intuitive and analytical cognitive styles significantly predicted participants' centrality ratings of these features. Our expectations were clear for participants differing in Faith in Intuition – expecting to find differences associated with the factor describing intuition as a holistic process – but less clear with regards to participants differing in Need for Cognition. Individual differences in the latter measure provided inconclusive results regards its relevance in predicting how participants perceive intuition and analysis. As such, we hoped Study 1.3 would help to clarify these results.

Method

Participants

A sample of 126 Ohio State University undergraduates participated in this laboratory study for partial course credit (61.1% women, M_{age} = 18.9, SD_{age} = 1.41).

Procedure and measures

Participants were welcomed into the laboratory and seated in front of a computer station running the DirectRT 2008 software (Jarvis, 2008), which was used to perform the experiment. After providing informed consent, participants learned that in this study their first task would consist of classifying a series of features (i.e., actions described in 2-7 words) into one of two categories: as features that represent "acting intuitively" or "acting analytically".

The 54 features describing both intuition (N = 35) and analysis (N = 19) were randomly and individually presented at the center of the screen. On the lower half of the screen, the categories "acting intuitively" and "acting analytically" were presented side by side. Participants classified each feature presented using the keys [S] and [L] of the keyboard to indicate whether the feature represented the category presented on the left or on the right of the screen, respectively (the side of the categories was counterbalanced between participants and promoted no differences in reaction times between classifications to the left or right side).

Participants first completed a set of 10 practice trials, in which they were presented with 8 neutral actions (*reading a book; typing an email; jogging; crossing a street; playing video games; talking to a stranger; riding a bike; driving a car*) and 2 target actions (*acting*

intuitively; acting analytically) and instructed to ascribe the presented features to the category that best represents each action. Participants completed these practice trials in order to become familiar with the task at hand and so that we could make sure that they ascribed "acting intuitively" and "acting analytically" to their correspondent categories (which was the case). Participants were told the goal of this task was for them "to get used to the button placements and responses".

Before starting the practice trials and the main task, participants were asked to put their index fingers on the [S] and [L] keys of the keyboard, and to use these keys to assign each feature to "acting intuitively" or "acting analytically" as quickly and accurately as possible. The main task was divided into two sets of a series of 27 features, to avoid task fatigue. Each response and its speed (in ms) were recorded.

Participants' second task consisted of rating the centrality of each feature according to their own views of intuition and analysis (replicating the procedures of Study 1.2). After this, participants completed the Need for Cognition scale (Cacioppo et al., 1984), followed by the Faith in Intuition scale (Pacini & Epstein, 1999) (internal consistency for both measures was $\alpha = .86$ and $\alpha = .82$, respectively), before they were thanked and debriefed.

Results

We first compared the frequency with which more versus less central features of intuition and analysis were classified as features of their respective dimensions to test the hypothesis that more central (vs. peripheral) features are more often classified to their respective categories. Following prior prototype research (Gregg et al., 2008; Hassebrauck, 1997; Hepper et al., 2012; Kearns & Fincham, 2004), we conducted a median split based on the centrality ratings for features of intuition and labeled the highest 18 features as relatively central and the lowest 17 features as relatively peripheral to intuition. The same approach was followed for the features of analysis, resulting in 10 features labeled as relatively central and 9 features labeled as relatively peripheral to analysis. This convention was applied merely to aid design and analysis of the experimental studies, but we note that centrality of the features to the prototype more likely functions as a continuum.

Paired samples t-tests revealed that central features were classified to their respective categories more often than peripheral features, for both "acting intuitively", $t(125) = 18.72$, $p < .001$, $d = 1.67$, and "acting analytically", $t(125) = 11.15$, $p < .001$, $d = 0.99$ (see Table 8).

Table 8

Classification of prototype features

	Intuition Feature type		Analysis Feature type	
Dependent measure	Central Mean (SD)	Peripheral Mean (SD)	Central Mean (SD)	Peripheral Mean (SD)
Percent verified	80.11 (12.04)	58.22 (12.82)	92.30 (11.88)	75.40 (15.37)
Response speed (ms)*	1502.11 (268.56)	1585.10 (307.11)	1444.35 (288.83)	1434.41 (317.26)
Response speed (log)*	7.30 (0.19)	7.35 (0.20)	7.25 (0.20)	7.25 (0.22)

* for verifications (i.e., "correct responses")

Next, we compared classification speed for central and peripheral features. Following conventions (Greenwald et al., 2003), we recoded extremely fast (< 300ms) and slow (> 3000ms) responses to 300ms and 3000ms respectively. Response times were then averaged across central features and across peripheral features for intuition and analysis and we applied a logarithmic transformation to further normalize their distributions and homogenize their variances. Finally, we compared average speed for verifications (i.e., "correct" responses) of each feature type. Results showed that participants were quicker to verify central than peripheral intuition features, $t(125) = -3.48$, $p < .001$, $d = 0.31$. The differences between central and peripheral features of analysis, however, failed to reach significance, $t(125) = 0.60$, $p = .552$, $d = 0.05$ (see Table 8).

Further analysis

Given that the same features were assessed across the samples of Studies 1.2 and 1.3, we performed further integrative analyses in order to support our claims.

Feature centrality as a continuum. To complement the above analyses, we reanalyzed feature centrality as a continuum taking into account the means of the features' centrality ratings. We did so at different levels of analysis. At the feature level of analysis we analyzed: a) the consistency of centrality ratings between Studies 1.2 and 1.3; and b) the relation that the centrality ratings in Study 1.2 established with the features' accurate classification and its response time in Study 1.3. We then ran a linear mixed-model analysis focused on these

relations both at a feature and individual level of analysis adding different predictors of centrality (dispositional features).

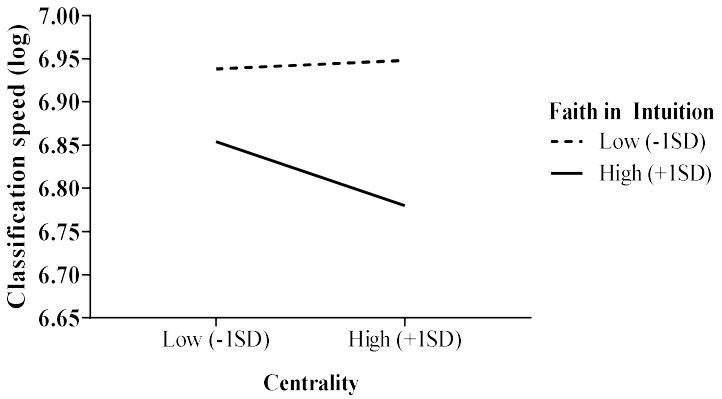
We analyzed the consistency of centrality ratings of Studies 1.2 and 1.3, having feature as unit of analysis. Results showed that centrality ratings across features of "acting intuitively" ($r(33) = .56$, $p < .001$, one tailed) and "acting analytically" ($r(17) = .85$, $p < .001$, one tailed) correlated significantly between studies. The centrality ratings obtained in Study 1.2 and the probability of the feature being classified "correctly" in Study 1.3, that is, as reflecting the intended category, correlated significantly both for the features of "acting intuitively" ($r(33) = .45$, $p = .004$, one tailed) and "acting analytically" ($r(17) = .87$, $p < .001$, one tailed). Also, classification speed in Study 1.3 correlated significantly with feature centrality in Study 1.2, when controlling for number of syllables of each feature (typically used as a measure of word length; e.g., Friedman & Kohn, 1990; Kay & Ellis, 1987). This occurred for the features of "acting analytically" ($r(16) = -.75$, $p < .001$, one tailed), but failed to reach significance for the features of "acting intuitively" ($r(32) = -.13$, $p = .235$, one tailed).

We then approached the prediction of classification speed at an individual and feature level of analysis with the data from Study 1.3. In this study, besides assessing classification speed we also obtained individuals' feature centrality ratings and individual differences in intuitive and analytical styles. This allowed us to relate the indicators across participants within features. Two linear mixed models were built (one for the features of intuition and another for the features of analysis) aimed at predicting features' classification speed, taking into account each feature's centrality ratings, number of syllables, as well as participants' individual differences in FI and NC. The models further substantiated the results obtained in the previous analyses.

For the intuition model, FI and feature centrality ratings were centered and treated as fixed effects along with their interaction. Number of feature syllables was entered as a covariate. A main effect of feature centrality (*estimate* = -0.02, $t = -3.71$, $p < .001$) confirmed that centrality ratings significantly predicted the speed with which the features of *intuition* were classified. Feature syllables (*estimate* = 0.05, $t = 21.19$, $p < .001$) and participants' level of FI (*estimate* = -0.06, $t = -4.30$, $p < .001$) also significantly predicted how quickly participants classified the features. In addition, individuals' level of FI and feature centrality significantly interacted to predict classification speed (*estimate* = -0.02, $t = -2.32$, $p = .02$). As the graphic in Figure 1 suggests, the effect of feature centrality on classification speed only occurred for relatively high-FI (+1 SD) participants.

Figure 1

Classification speed (log) as a function of centrality and Faith in Intuition



For the model of *analysis*, we repeated the same procedures, but using NC in the place of FI. Results from this model allowed us again to confirm that feature centrality significantly predicted the classification speed (*estimate* = -0.03, t = -3.36, $p < .001$) of the features. Again, feature syllables (*estimate* = 0.03, t = 9.96, $p < .001$) significantly predicted how quickly participants classified the features. However, neither individual differences in NC (*estimate* = 0.00, $t < 1$, $p = .99$) nor interaction between NC and feature centrality significantly predicted classification speed (*estimate* = 0.00, $t < 1$, $p = .90$).

Underlying factors of intuition and analysis

A second set of analyses was performed in order to study the factorial structure of the centrality ratings in Study 1.3, with the aim of providing a validation of the underlying factors of *intuition* and *analysis* found in Study 1.2. With regards to the features of *analysis*, results of a scree plot (see Appendix A, Figure 3) and parallel analysis (Fabrigar & Wegener, 2012) replicated evidence from Study 1.2, suggesting that a single-factor structure (χ^2 = 546.868, df = 152, $p < .001$, RMSEA = 0.144; internal consistency, $\alpha = .95$) explains the variability in perceptions of these features as central to "acting analytically".

For the features of *intuition,* the scree plot (see Appendix A, Figure 4) and a parallel analysis provided evidence for the previously found two-factor structure (Rotated Factor Loading Matrix for a Maximum Likelihood EFA with 2 common factors and a Promax rotation: $\chi^2 = 788.619$, df = 526, $p < .001$, RMSEA = 0.062). In order to objectively validate the similarity of the features composing these two factors across both samples, we performed a Procrustes

Factor Rotation, followed by the evaluation of Tucker's congruence (proportionality) index (e.g., Guadagnoli & Velicer, 1991; Lorenzo-Seva & ten Berge, 2006; Tucker, 1951; Wrigley, 1958). These analyses revealed a Tucker's congruence coefficient of $\Phi = .94$ for the first factor (intuition as an automatic, affective and non-logical process), and of $\Phi = .82$ for the second factor (intuition as a holistic process). These congruence coefficients suggest a fair amount of similarity (e.g., Chan et al., 1999; Lorenzo-Seva & ten Berge, 2006; Vijver & Leung, 1997) in the factor loadings across both studies.

As in to Study 1.2, the two latent factors correlated weakly in Study 1.3 (-.03), and a centrality index was created for each factor by averaging the centrality ratings of the features of each factor.[2] Both factors exhibited comparable levels of internal consistency in comparison to Study 1.2 (Factor 1: $\alpha = .92$; Factor 2: $\alpha = .81$). As in Study 1.2, the factor describing intuition as automatic, affective and non-logical processes was perceived as more central ($M = 6.63$, $SD = 1.10$) in comparison to the factor describing intuition as a holistic process with a more deliberate component ($M = 4.80$, $SD = 1.43$), $t(125) = 11.17$, $p < .001$, $d = 0.99$.

Do cognitive styles predict the obtained centrality ratings? We replicated the analyses of Study 1.2 to examine whether participants' own intuitive and analytical cognitive styles predicted the centrality ratings for the two factors of intuition and the general factor of analysis (FI and NC did not significantly correlate in this study, $r(124) = -.03$, $p = .758$).

Centrality of features of intuition. Replicating Study 1.2, the centrality of intuition's holistic, deliberate, factor was marginally predicted by participants' own intuitive styles, $B = .47$, $t(121) = 1.83$, $p = .069$, suggesting that participants with higher FI considered this factor's features more central to intuition in comparison to participants with lower FI. Differently from what was observed in Study 1.2, FI was now a significant predictor of the centrality of the facet of intuition as an automatic and affective process, $B = .71$, $t(121) = 3.84$, $p < .001$.

Clarifying the results of Study 1.2, participants' NC significantly predicted the centrality of the facet of intuition as an automatic and affective process, $B = .41$, $t(121) = 2.87$, $p = .005$,

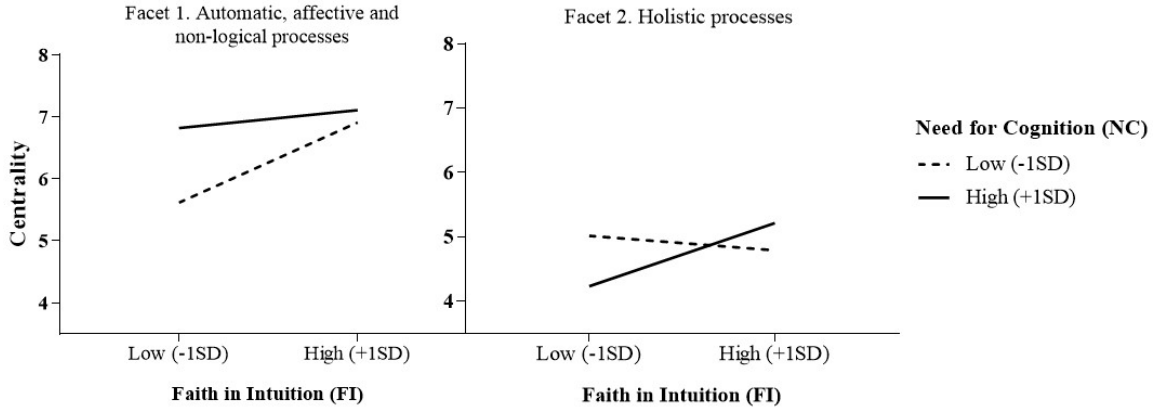
[2] For Factor 1, the features "Acting in a personal and unique manner" and "Engaging in imagination" were not included because these displayed similar loadings on both factors in this study whereas, in Study 2, they had loaded higher on Factor 2. For Factor 2, the features "Predicting something will happen" and "Reading people" were also not included due to their inconsistency across studies (loading higher on Factor 1 in Study 1.2). Additionally, "Avoiding what feels wrong" was also not included due to this feature's low loading on Factor 2 in this study.

and was not a significant predictor of the centrality of the facet of intuition as a holistic process, $B = .02$, $t(121) < 1$.

With regards to the interaction between FI an NC, results in this study differ from those of Study 1.2 in that this interaction significantly predicted the centrality of both factors of intuition (see Figure 2). Regarding the facet of intuition as an automatic and affective process, the previous marginal interaction was now significant, $B = -.78$, $t(120) = -2.90$, $p = .004$. This interaction suggests that only participants low in both NC and FI did not perceive this factor as representative of intuition. To understand this interaction, simple slope analyses were performed, suggesting that the previously observed positive association between FI and the centrality of this facet occurred only for low NC participants, $b = 1.29$, $p < .001$, but not high NC participants, $b = 0.29$, $p = .216$. Regarding intuition as a holistic process, contrary to Study 1.2, we found a significant interaction, $B = .93$, $t(120) = 2.47$, $p = .015$. Simple slope analyses suggest that the positive association between FI and the centrality of this facet was observed for high NC participants, $b = 0.97$, $p = .003$, but not low NC participants, $b = -0.22$, $p = .553$.

Figure 2

Intuitions' facets centrality as a function of FI and NC



Centrality of features of analysis. With regards to the general factor of analysis, contrary to Study 1.2, results suggest that the centrality of this factor was not significantly predicted by participants' NC, $B = .15$, $t(121) < 1$, but was now positively predicted by participants' FI, $B = .42$, $t(121) = 2.03$, $p = .045$. Once more, the two factors did not interact to predict this general factor, $B = .03$, $t(120) < 1$.

Discussion

The set of studies in this empirical chapter aimed to examine and contrast people's lay conceptions of intuition and analysis through a prototype approach. Results regarding centrality ratings for features of intuition and analysis suggested a single-factor structure for analysis and a two-factor structure for intuition. Specifically, intuition is perceived as 1) an automatic, affective and non-logical processing, and 2) as a holistic processing with more deliberate aspects. This implies that, when referring to *intuition*, different interpretations might be employed by different participants.

Complementing previous lay-perspective approaches to intuition (e.g., Burke & Miller, 1999; Morris, 1990; Petitmengin-Peugeot, 1999; Rogers & Wiseman, 2005; Sadler-Smith, 2016) the data of this prototype analysis allow us to distinguish between different features according to their centrality. Features' centrality was corroborated across Studies 1.2 and 1.3 (using different experimental settings and samples). Specifically, features of intuition and analysis classified as more central in Study 1.2 were more consistently identified as reflecting the intended category in Study 1.3, in comparison to more peripheral features. Additionally, these categorizations were done more quickly for central features in comparison to more peripheral features. Providing further evidence for the relative centrality of these features, participants' centrality ratings for all features of intuition and analysis were significantly consistent across studies, for different samples. In addition, these data inform the literature on several new aspects: first, regarding how lay conceptions of intuition and analysis match theoretical definitions of both constructs; second, on how individuals varying in intuitive and analytical cognitive styles differ in their perceptions of intuition and analysis; and, finally, regarding which features to rely on when aiming to operationalize settings, or contextual features (such as persuasion appeals), as intuitive or analytic.

Regarding the first point, results showed that several aspects of the obtained features for intuition resembled not only existing conceptualizations and definitions of intuition in the literature (see Table 1), but also other lay conceptions from previous research on people's lay conceptions of intuition. Specifically, relatively central features included features characterizing intuition as an affectively charged process (e.g., *acting based on what feels right; avoiding what feels wrong; acting based on feelings and emotions*), as a process that arises from operations that occur on an automatic and nonconscious level (e.g., *acting automatically and effortlessly;*), as a process that draws from holistic associations (e.g., *acting based on prior experience; focusing on the big picture; fitting to the situation*), and as a process that arises

rapidly through immediate apprehension (e.g., *going with one's first impression, thinking quickly*). Additionally, observed lay conceptions of intuition also reflected features typically associated with intuitive processing, such as *following your gut* and *following your instinct* – terms that, too, reflect the affective meaning of intuitive judgments (Dane & Pratt, 2009).

Interestingly, the fact that people distinguish between these factors suggests that intuition is not only perceived as a process that is opposed to analysis (although this could be here represented by the automatic and affective factor of intuition, with features such as "acting without thinking"), but also as an independent way of thinking, here characterized by a more deliberate facet of intuition. The observed lay conceptions of analysis also resembled features associated with how dual-process theories (e.g., Chaiken & Trope, 1999; Evans, 2007, 2009; Gawronski & Creighton, 2013) typically describe analytic thinking. Specifically, analysis was characterized through features associated with deliberation and slower mechanisms (e.g., *reflecting and deliberating; thinking before acting; acting slowly and calmly*), the treatment and examination of information and facts (e.g., *organizing and analyzing information; acting based on facts and data; gathering evidence*), a logical and rational approach towards problems (e.g., *thinking objectively and logically; implementing method*), and a deliberate opposition to processes typically associated with intuitive thinking (e.g., *ignore feelings and emotions; resisting impulses*).

Regarding the second point, our data provided evidence suggesting the importance of taking people's cognitive styles into account when aiming to understand lay conceptions of intuition, because different interpretations might be employed by different participants with regards to this construct. However, results across Studies 1.2 and 1.3 were not fully consistent. Although both studies suggested that participants with more in Faith in Intuition are more likely to perceive intuition as a holistic process, results were less consistent regarding how FI predicts the centrality of intuition, as an automatic and affective process. One reason may be that the studies vary in how extreme participants are in both dispositional features, since both dispositions interact. Namely, the relation between FI and centrality of intuition as an automatic and affective process was more clearly noticed in Study 1.3, for those with low NC but not high NC. Congruent with this possibility, participants in Study 1.2 showed higher levels of NC ($M_{Study\ 1.2}$ = 3.47 vs. $M_{Study\ 1.3}$ = 3.23) and lower levels of FI ($M_{Study\ 1.2}$ = 3.09 vs. $M_{Study\ 1.3}$ = 3.43), making this a pathway for future studies. An additional potential explanation for these results may have derived from methodological divergences across both studies. Specifically, whereas in Study 1.2 only the features describing *acting intuitively* or *acting analytically* were

presented to participants (i.e., this centrality was assessed between participants) and their only task consisted of ratings these features' centrality, contrastingly, in Study 1.3, participants rated the centrality of the features describing both *acting intuitively* and *acting analytically* and, in addition, also first classified all the features as intuitive or analytical in the dichotomous classification task. Both methodological features may have primed (or reinforced) a context within which intuition and analysis were perceived as opposing processes, promoting a contrast effect which led intuitive participants to perceive the features typically associated with intuitive processing (i.e., as an automatic and affective process) as more central, in comparison to less intuitive participants. This is a hypothesis to be explored in future research, and which is further discussed in the General Discussion of this thesis.

There seemed to be a more consensual view across the two studies regarding people's lay perceptions of analysis, which seems not to be dependent on cognitive styles (but see Study 1.3, on the effect of FI which seems to make a difference).

In sum, our data suggest that cognitive styles may be related with different conceptions of intuition. Any effect of cognitive styles that does not depend on the conception of intuition would have to rely on the only condition where they share the same view of intuition, which these studies indicate to be related with the perception of intuition as an automatic and affective process. Differences regarding intuition as a holist process may be more likely dependent on people's individual differences in FI and NC. This is relevant for the goals of this dissertation because matching effects with regards to intuition and analysis should be clearer for the common view of intuition as an automatic and affective process.

Finally, the data provided by this first set of studies provided us with the most central features regarding what people perceive as defining intuitive and analytic processing. These features should support future research that aims to operationalize intuitive and/or analytic settings (as we will do in this dissertation). Most specific, and relevant to the goals of this dissertation, central features of intuition and analysis should aid us in operationalizing persuasive contexts and messages perceived to appeal either to intuition or analysis.

Empirical Chapter II

Explicit preferences for intuition and analysis:

Who, when and why?

Introduction

People differ in their intuitive and analytic "cognitive styles" (see Chapter I). These individual differences have been operationalized as one's dispositional characteristics related to the reliance and tendencies to make decisions in a more intuitive or analytic manner (e.g., Allinson & Hayes, 1996; Betsch, 2004; Cacioppo et al., 1984; Epstein et al., 1996; Scott & Bruce, 1995; for an overview, see Betsch & Iannello, 2009). Intuitive cognitive styles have been shown to predict greater intuitive decision-making (e.g., Alós-Ferrer & Hügelschäfer, 2012; Epstein et al., 1996; Mahoney et al., 2011; Pacini & Epstein, 1999; Shiloh et al., 2002; Toyosawa & Karasawa, 2004). In contrast, analytic styles predict greater thinking before decision-making (e.g., Levin et al., 2000), processing and evaluation of advertisements (Batra & Stayman, 1999) and less reliance on intuitive thinking (e.g., Epstein et al., 1996; Pacini & Epstein, 1999; Shiloh et al., 2002; Toyosawa & Karasawa, 2004).

Despite evidence of reliable individual differences in intuitive and analytic styles, research has provided evidence that people exhibit explicit and specific preferences for intuition and analysis, as a function of context (see Phillips et al., 2016). The explicit preferences for intuition and analysis may vary as a function of choice objectivity, complexity and precision (Inbar et al., 2010), choice sequentiality (Dane et al., 2012; Hammond et al., 1987; Inbar et al., 2010), expertise (Dane et al., 2012; Kahneman & Klein, 2009; Pachur & Spaar, 2015; Salas et al., 2010), how much the decision is based on past experiences (Glöckner & Betsch, 2008; Reyna, 2004) and material/experiential nature of choice options (Gallo et al., 2017). Focusing specifically on the level of complexity involved in a choice, Inbar and colleagues (2010) showed that choices of products perceived as complex (i.e., as involving many aspects to take into account when making a purchase decision) elicit a greater preference for choosing analytically as opposed to intuitively. Conversely, choices of products perceived as simple elicit a greater preference for choosing intuitively as opposed to analytically.

In this empirical chapter, we address Inbar et al.'s (2010) findings further approaching recipients' cognitive styles as a moderator of the reported effects. Specifically, our first goal was to provide further evidence for these findings and to examine whether context characteristics cue one or another type of processing. We also sought to add to those results the fact that people's preferences for intuition and analysis across consumer products differing in complexity might be further predicted by individual differences in cognitive style. The second goal of this empirical chapter was to understand whether the mechanisms underlying such preferences relate to naïve theories of validity that individuals assess in these contexts.

Naïve theories of validity of intuition and analysis

The level of confidence in the validity of a process is an important factor for its effectiveness (e.g., Briñol et al., 2004). It is a consensual view that perceived validity is a relevant determinant of the outcome of a persuasive attempt as many theories start by assuming that people are motivated to be correct. People want to hold correct attitudes (Festinger, 1950, 1954), are motivated be accurate (Hart et al., 2009), and strive for mastery as an attempt to form accurate opinions and beliefs about the world (Smith et al., 2015). This assumption was, in fact, the basis of the first postulate and guiding principle of the ELM (Petty & Cacioppo, 1986). However, though people want to be correct, they do not always have the available resources and/or motivation to engage in effortful information-processing in pursuit of that correctness. In fact, and as also postulated by the ELM, the amount of elaboration people are willing or able to engage in varies as a function of individual and situational factors. This implies that people will elaborate more on available information when individual or situational factors increase the need to be accurate, but also that information scrutiny will be reduced when people feel they can be accurate in the absence of effortful information-processing (Priester & Petty, 1995). A similar prediction is provided by the HSM (Chaiken et al., 1989), positing that people will exert the cognitive efforts necessary to attain their processing goals. Hence, if people have the goal of reaching an accurate decision, they will most likely engage in effortful processing if they perceive that accuracy cannot be reached through the use of heuristics (see Allport, 1954 [on the principle of least effort], and Simon, 1955, 1957, 1972 [on the principles of efficiency and satisficing]).

Despite the relevance conferred by these models to how individuals perceive the validity of these processes, research has not empirically addressed perceptions of process validity as a relevant variable. Perceived validity is akin to a naïve theory that is capable of influencing how processing occurs (see Wegener & Petty, 1998). For instance, naïve theories that one can more successfully resist influence by consciously perceived persuasive attempts than by subliminal messages can lead people to expose themselves to situations in which unwanted social influence takes place (Wilson et al., 1998). Additionally, when the influence has already occurred, people can correct for those influences, with those corrections being guided by their naïve theories (e.g., DeSteno et al., 2000; Isbell & Wyer, 1999; Petty et al., 2008; Sczesny & Kühnen, 2004; Wegener & Petty, 1995).

Decision fit

As reviewed above, evidence shows that context and task features impact preferences for intuition and analysis. Research suggests that performance of tasks that can be decomposed and approached sequentially do not rely on intuitive processing, whereas tasks that are relatively non-decomposable do encourage reliance on intuitive processing (Hammond et al., 1987). Research also suggests that individuals prefer intuition when the tasks is simple rather than complex (Inbar et al., 2010). However, Dane, Rockmann, and Pratt (2012) showed that the circumstances under which intuitive decision-making is effective relative to analytical decision-making are determined by more than just the nature of the task. Using non-decomposable tasks, the authors addressed the efficiency of the intuitive versus analytic strategies across divergent expertise domains. Results showed that the effectiveness of intuition relative to analysis is amplified when individuals have a high level of expertise in the domain. These studies suggest that, with regards to efficiency, a fit between individual tendencies and context demands are desirable. This assumption underlies Betsch and Kunze's (2008) decisional fit theory, stressing the relevance of the "fit between the individually preferred decision strategy (intuition vs. deliberation) and the actually used decision strategy (intuition vs. deliberation)" (p. 534). Decisional fit is defined as a fit between an ad hoc applied strategy and the generalized strategy preference. This ad hoc strategy is determined by the situational constraints. The primary point of decisional fit theory is that the tendency to process intuitively or analytically does not imply that the preferred strategy will be used in every decision; situational constraints should also be taken into account.

Thus, individuals' explicit preferences for a decision strategy are expected to be incorporated in the decision-making strategy selection process. This selection is dependent on both contextual factors and the characteristics of the decision maker (Beach & Mitchell, 1978). As such, in a context in which a preference for using intuition and analysis is addressed explicitly, asking individuals for a conscious selection, we should expect context and recipient factors to interact; preference should increase when a decisional fit is observed. We hence hypothesize that decision makers' cognitive styles should elicit different preferences for the use of intuition and analysis as a function of the decision complexity and that these preferences for intuition and analysis in simple and complex contexts will be explained by how individuals perceive these processes as means to reach correct and accurate decisions (i.e., as valid processes).

Current studies

We designed two studies to test the direct and interactive effects of individuals' cognitive styles and decision context on preferences for intuition and analysis (Study 2.1) – the *who* and *when* associated with these preferences – and the mechanisms underlying such preferences – the *why* (Study 2.2) – examining the role of perceived validity of intuition and analysis. To empirically address these questions, we first conducted a pilot study with the goal of identifying products differing in complexity while holding constant other relevant dimensions (e.g., familiarity, material/experiential nature). After determining these norms, we selected the specific products upon which we tested our hypothesis in the two empirical studies of this chapter.

Pilot Study

Norms for 150 consumer products: perceived complexity, quality objectivity, material/experiential nature, perceived price, familiarity and attitude[3]

Consumer products are widely used as stimuli across several research fields. The use of consumer products as experimental stimuli lacks, however, the support of normative data regarding the range of product features associated with those products. In this work, we developed a set of norms for people's perceptions of 150 consumer products regarding six relevant dimensions: product perceived complexity, quality objectivity, material/experiential nature, perceived price, familiarity and attitude (see below for the operationalization of these features and consult Appendix B1 for a review of these consumer product dimensions regarding their relevance and operationalization across the existing literature). By developing these norms, we provided a valuable resource that should not only support our empirical work but also others' research. Specifically, these norms should help researchers to select consumer products according to specific attributes, facilitating choices aimed at achieving appropriate experimental control. These norms might also aid consumer behavior practitioners in the sense that they provide insightful information as to how consumers perceive products on a variety of relevant dimensions.

Method

Participants

A sample of 389 North-American participants (48.3 % women; M_{age} = 37.24, SD_{age} = 13.39) was obtained through online recruitment on Prolific Academic. Sample size was defined based on a minimum of 20 evaluations per product for each dimension (n = 150 products, for 6 dimensions). Each participants evaluated a total of 54 products for one dimension (as detailed in the section below), so the minimum sample size was set to 333 participants, which was increased based on available resources and to account for randomization variance across conditions. All participants' native language was English, and they were living in the United States at the time of their participation.

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Stimuli and dimensions

A list of 150 consumer products (word stimuli) was assembled based on 1) products that had previously been classified along some subset of the dimensions in previous research (e.g., complexity (Dijksterhuis et al., 2006; Gallo et al., 2017) and 2) products found on catalogs from several major store chains. For each dimension, from the total 150 products, six were calibration products (see below) and 144 were non-calibration products. Three lists of 48 products (144/3) were randomly created for each dimension.

The set of six calibration products spanned the range of each of the six dimensions to be evaluated and were selected to be presented first with the aim of providing participants a sense of the range of the stimuli to be evaluated (e.g., Brysbaert et al., 2014; Engelthaler & Hills, 2017; Warriner et al., 2013). The calibration products for each dimension (see Table 9) were selected based on previous research (e.g., perceived complexity: e.g., Dijksterhuis et al., 2006; Inbar et al., 2010); objectivity of the evaluation of their quality: e.g., Inbar et al., 2010); material/experiential purchase: Gallo et al., 2017; Guevarra & Howell, 2015).

The six dimensions to be evaluated were: product perceived complexity, objectivity of quality evaluation, material/experiential nature, perceived price, familiarity and attitude. These were selected based on previous studies (see Appendix B1). We used three items to measure each dimension for reliability purposes and to control for the possibility of these dimensions being multidimensional. The descriptions of these dimensions were made homogeneous for all participants. They are presented in association with the correspondent measures in Table 9.

Procedure and measures

We created an online survey using the Qualtrics survey platform. After providing informed consent, participants learned that the purpose of this research was to investigate people's perceptions of consumer products and experiences. Initial instructions indicated that their participation would involve rating a set of 54 consumer products and experiences with regard to a specific dimension. To prevent task fatigue and demotivation, each participant evaluated only one set of 54 products on only one of the six dimensions. This allowed for each of the 150 products to be evaluated by at least 20 participants.

After instructions, participants first evaluated the set of six calibration products, followed by ratings of the 48 additional products on the same dimension. Before evaluating the products, participants were given a brief description of what the dimension being evaluated

entailed (see Table 9), in order to ensure that all participants interpreted the assessed dimensions the same way. Products were individually displayed in a random order at the center of the screen with the dimension response scale presented below the product. Participants rated each product on all three items for the dimension before advancing to the next product. No time limits were imposed on responses and participants were told that there were no correct or incorrect answers and that their personal opinion was of particular interest to the researchers. Participants rated each product by choosing the number that best corresponded to their evaluation of the product for the given dimension. At the end participants were thanked and paid for their participation.

Table 9

Initial descriptions, calibration products and items used for each dimension

Dimension	Initial instruction/ calibration products	Items:
Perceived complexity	*Some products/goods are relatively simple and have very few important aspects affecting their quality. These tend to be rather unidimensional. Other products/goods are more complex and have many core aspects affecting their quality. These tend to be relatively multidimensional.* *With this in mind, in this study, you will rate 54 consumer products regarding your own perceptions of complexity of these products.* High calibrators: *Car, Desktop computer, Room (renting)*; Low calibrators: *Umbrella, Dishwashing brush, Oven mitts*	1. How complex is this product? (1-Very simple; 6-Very complex) 2. How many aspects of this product could you take into account when making a purchase decision? (1- 1 aspect; 2- 2-3 aspects; 3- 3-5 aspects; 4- 5-7 aspects; 5- 7-9 aspects; 6- 10 or more aspects; based on Dijksterhuis et al., 2006) 3. To what extent is this product relatively unidimensional or relatively multidimensional? (1-Relatively unidimensional; 6-Relatively multidimensional; based on Gallo et al., 2017)
Quality objectivity	*For some products/goods, one can objectively quantify whether their quality is good or bad. In these cases, the product's quality is based on facts. For other products/goods, whether a product's quality is good or bad is a subjective matter, depending on personal taste. In these cases, the quality of the product is merely a matter of opinion.* *With this in mind, in this study, you will rate 54 products regarding your own perceptions of how objective these products' qualities are.* High calibrators: *Paper clips, Hangers, Medical treatment* Low calibrators: *Vacation package, Dessert at a restaurant, Entrée at a restaurant*	1. To what extent is the evaluation of this product's qualities a subjective or an objective matter? (1-Mainly a subjective matter; 6-Mainly an objective matter; based on Inbar et al., 2010) 2. To what extent does the quality of this product depend on a personal taste or is objectively the same for everyone? (1-Quality depends on personal taste; 6-Quality is objective and the same for everyone) 3. To what extent is the quality of this product a matter of opinion or a function of facts? (1-Quality is a matter of opinion; 6-Quality is a function of facts)
Material/ experiential purchase	*Some purchases are material, tangible and purchased with the intention of acquiring and having a physical good. Other purchases are experiential, reflecting events that are lived*	1. To what extent is the purchase of this product a material purchase or an experiential purchase? (1-Definitely

	through and purchased with the intention of acquiring experiences (i.e., with doing something). *With this in mind, in this study, you will rate 54 products regarding your own perceptions of these products' experiential or materialistic characteristics.* High calibrators: *Vacation package, Museum ticket, Dinner at a restaurant* Low calibrators: *Suit, Necklace, Vase*	material; 6-Definitely experiential; based on Caprariello & Reis, 2013) 2. To what extent does the purchase of this product emphasize possession of an object or experiencing an activity? (1-Definitely emphasis on possession; 6-Definitely emphasis on experiencing) 3. To what extent is the purchase of this product focused on having or focused on doing? (1-Definitely focused on having; 6-Definitely focused on doing)
Perceived Price	*A product's price is the amount of expenses incurred in purchase transactions. While a product's objective price represents the actual price of the product, perceived price is the subjective perception people have of the objective price of a product. While people do not always remember the exact price of a specific product or service, they may remember the price as relatively "cheap" or "expensive".* *With this in mind, in this study, you will rate 54 products regarding your own subjective perceptions of these products' prices.* High calibrators: *House, Car, Cruise trip* Low calibrators: *Dishwashing brush, Pen, Paper clips*	1. How expensive is this product? (1-Very inexpensive; 6-Very expensive; (based on Chua et al., 2015; Dodds et al., 1991; Jeng et al., 2014; Oh, 2000) 2. How pricey is this product? (1-Not pricey at all; 6-Very pricey; based on Chua et al., 2015; Oh, 2000) 3. How high is this product's price? (1-Very low; 6-Very high; based on Chua et al., 2015; Oh, 2000)
Familiarity	*People may have different levels of familiarity with different products/goods. For instance, a person may have a lot of prior experience with a type of product or purchase it very frequently. Conversely, a person may be less familiar with a given product or its features, or buy it less frequently.* *With this in mind, in this study, you will rate 54 consumer products regarding your own levels of familiarity with these products.* High calibrators: *Shampoo, Breakfast cereal, Chewing gum* Low calibrators: *Life insurance, Cruise trip, 3D printer*	1. How familiar are you with this product? (1-Not at all familiar; 6-Extremely familiar; based on Coupey et al., 1998; Darley & Smith, 1993; Freling & Forbes, 2005) 2. How familiar are you with the features of this product? (1-Not at all familiar; 6-Extremely familiar; based on Coupey et al., 1998; Zhou & Nakamoto, 2007) 3. How frequently do you buy this product? (1-Never; 6-Very frequently; based on Darley & Smith, 1993; Freling & Forbes, 2005)
Attitude	*People have different attitudes and feelings towards different products and services.* *On this basis, in this study, you will rate 54 products regarding your own evaluations of how much you like these products.* High calibrators: *Ice cream, Vacation package, Massage* Low calibrators: *Toilet brush, Insecticide, Cigarettes*	1. How positive do you feel about this product? (1-Not positive at all; 6-Very positive) 2. How negative do you feel about this product? (reverse-coded) (1-Not negative at all; 6-Very negative) 3. How much do you like this product? (1-I don´t like this product at all; 6-I like this product very much) (All three based on Cui et al., 2014; Leclerc et al., 1994)

Results

Dimension evaluations

We started by analyzing participants evaluations regarding each of the six dimensions across all products. The mean number of evaluations per product was 23.34 (SD = 8.54). Table 10 presents the mean ratings across products for each dimension and the respective standard deviations. The table also presents the average internal consistency of the three items used for each dimension across products, and the average means for the low and high calibration products used for each dimension. Average Cronbach alphas suggested good internal consistency of the three items used to evaluate each dimension. The internal consistency of items used to evaluate product familiarity was lower in comparison to the other dimensions, however, suggesting that product familiarity and purchase frequency might reflect different dimensions. Mean values for each item, across all products for each dimension, can be consulted as Supplementary Materials of the published paper, allowing future research not only to make use of the dimensions average but also the mean values for each item.

Table 10

Descriptive statistics of mean dimension ratings

Dimension	*M*	*SD*	Average Alpha	Low calibrators' *M*	High calibrators' *M*
Perceived complexity	2.80	1.00	.84	1.91	4.79
Quality objectivity	3.55	1.14	.85	2.65	4.52
Material/experiential nature	2.97	1.36	.88	1.90	5.15
Perceived price	2.58	0.97	.94	1.76	5.12
Familiarity	4.45	1.02	.60	3.01	5.13
Attitude	4.67	1.08	.79	3.03	4.94

By observing the average means in Table 10 for the low and high calibration products used for each dimension, we see that the calibration items fulfilled their goal of providing participants a sense of the range of the dimension evaluated, by being rated as considerably lower and higher, respectively, in comparison to the average means across all products. In Table 11, we present a list of the five products with the most extreme mean ratings on each dimension.

Table 11

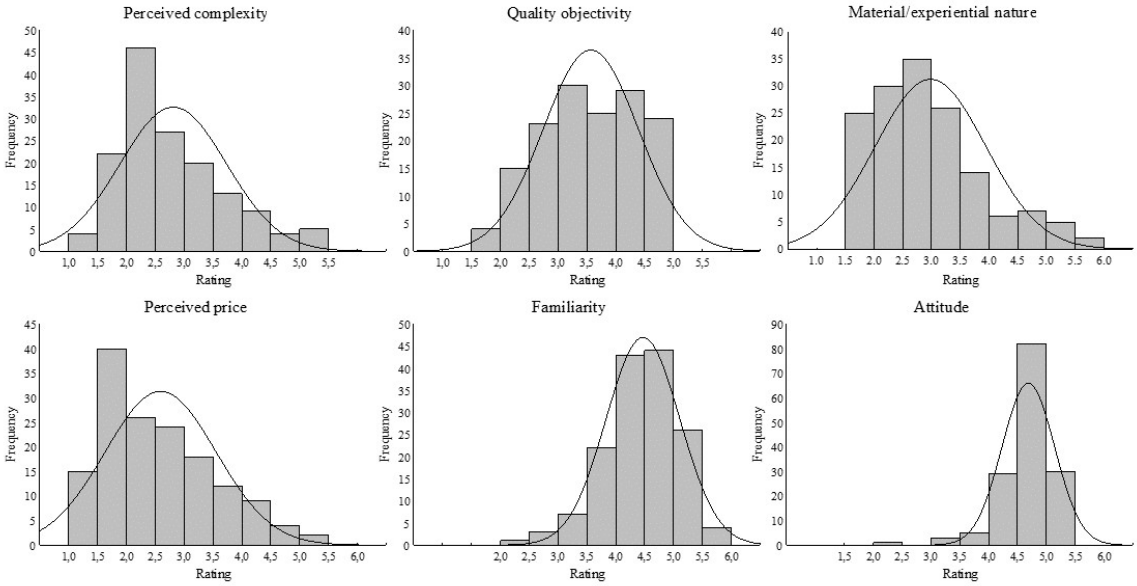
Products with the most extreme mean ratings per dimension (mean ratings in brackets)

Perceived Complexity	Quality Objectivity	Mat/exp. Nature	Perceived price	Familiarity	Attitude
Car (5.12)	Trash bin (4.98)	Massage (5.64)	House (5.48)	Toilet paper (5.62)	Television (5.36)
House (5.12)	Aspirin (4.97)	Cruise trip (5.56)	Car (5.11)	Bread (5.61)	Pillow (5.30)
Convertible laptop (5.10)	Trash bag (4.92)	Vacation package (5.40)	Medical treatment (4.90)	Pizza (5.58)	Soap (5.25)
Laptop (5.08)	Scissors (4.92)	Museum ticket (5.27)	Cruise trip (4.76)	Soap (5.54)	Desktop (5.25)
Smartphone (4.98)	DVD player (4.82)	Concert ticket (5.22)	Vacation package (4.73)	Toothpaste (5.43)	Air conditioner (5.24)
Trash bags (1.52)	Breakfast cereal (2.02)	Laptop bag (1.70)	Postcard (1.40)	Motorcycle (3.06)	Motorcycle (3.57)
Cleaning cloth (1.45)	Ice cream (1.97)	Table (1.70)	Yogurt (1.33)	Cruise trip (2.81)	Soft drink (3.49)
Coasters (1.45)	Whiskey (1.97)	Underwear (1.59)	Soap (1.32)	Nature park ticket (2.80)	Disposable plastic cups (3.35)
Hangers (1.43)	Tea (1.97)	Wall clock (1.53)	Air freshener (1.32)	3D printer (2.56)	Insecticide (3.22)
Toilet brush (1.38)	Chocolate bar (1.80)	Trash bin (1.52)	Chewing gum (1.25)	Power bank (2.41)	Cigarettes (2.07)

These average ratings show a good distribution across the range in their different dimensions. Figure 3 presents the frequency distributions of ratings for all products for each of the six dimensions. These further confirm that the products show an overall variation across the whole range of the dimensions evaluated, with the exception of the attitude dimension, for which most products were rated positively (an issue with potentially negative products is that they do not remain available for long – or never make it to market – so using existing products might always skew toward mostly positive attitudes). The distributions in Figure 3 allow us to conclude that, for each dimension, we largely fulfilled our aim of obtaining products that were perceived across the whole range of the dimensions evaluated.

Figure 3

Distribution of ratings across products for each of the 6 dimensions



Correlations between dimensions

Next, we computed correlations among the six dimensions across the evaluations of all 150 products using products as the unit of analysis. Overall, the results showed significant correlations between the dimensions (see Table 12). The stronger correlations show that: 1) perceived complexity correlated positively with perceived higher price; 2) the more products were perceived as experiential the less their quality was perceived as an objective matter; and 3) product familiarity correlated negatively with product perceived complexity and price and positively with product attitude favorability.

Table 12

Correlations between dimensions across all products

Dimensions	1	2	3	4	5	6
1) Perceived complexity	-					
2) Quality objectivity	.05	-				
3) Material/Experiential purchase	.18*	-.39**	-			
4) Perceived price	.86**	.03	.13	-		
5) Familiarity	-.44**	-.10	-.16*	-.55**	-	
6) Attitude	.17*	-.10	-.02	.10	.31**	-

* $p < .05$; ** $p < .01$ (2-tailed)

Discussion

In this study, we developed norms for people's perceptions of 150 consumer products on six relevant dimensions: perceived complexity, quality objectivity, material/experiential nature, perceived price, familiarity and attitude. The products in this normative database showed a good overall distribution across the rating range of the dimensions evaluated, allowing us to obtain products perceived as relatively high and low on these dimensions. Correlations between dimensions across all products replicated evidence from the previous literature where relevant pairs of dimensions have been examined (e.g., Inbar et al., 2010, for the perceived complexity-price association; Mudambi & Schuff, 2010, for the experientiality-quality objectivity association). The observed correlations provided further evidence of how these can be confounded across products, further justifying the need to control for these dimensions.

For the goals of the current empirical chapter, we selected three complex and three simple products to test our hypotheses. The selected complex products were a car, a house, and a smartphone; the simple products were a pillow, a shower gel, and a postcard. As previously mentioned, these products were selected to operationalize the complexity dimension while attempting to keep constant other relevant dimensions known to elicit different preferences for intuition and analysis (e.g., quality objectivity, material/experiential purchase nature).

Study 2.1

In this study, we approached the first goal of this empirical chapter: to replicate the findings of Inbar and colleagues (2010) and to test the decisional fit hypothesis combining cognitive styles with product types. Specifically, we expected that participants will report an explicit preference to choose intuitively for simple products and analytically for complex products. We also expected that intuitive and analytic styles positively influence explicit preferences for choosing products intuitively and analytically, respectively, and that such influence will be clearer when the context is one in which the strategy is perceived as better. We replicated the research conducted by Inbar and colleagues (2010) and assessed individual differences in intuitive and analytic cognitive styles. In the present study, cognitive styles were assessed by having participants complete the Need for Cognition (Cacioppo et al., 1984) and Faith in Intuition (Pacini, & Epstein, 1999) scales.

Contrary to the operationalization by Inbar and colleagues (2010), preferences for intuition and analysis were not treated as lying on an opposing continuum but instead by

conceptualizing intuitive and analytic decision-making as two separable dimensions (e.g., Akinci & Sadler-Smith, 2013; Epstein, 1994; Hodgkinson et al., 2009; Pacini & Epstein, 1999; Wang et al., 2017). Thus, we assessed preferences for intuition and analysis independently (see Pachur & Spaar, 2015). Finally, the decision contexts used in this study operationalized a specific dimension (complexity) while attempting to control for other associated dimensions.

Method

Participants and design

A sample of 52 North-American participants (38.5% women; M_{age} = 31.0, SD_{age} = 8.9), recruited online through Prolific Academic, rated six different product choice contexts (simple vs. complex) regarding the extent to which they would make a purchase decision based on intuition and on reason/analysis (all within-participants). Sample size was determined based on the within-participant nature of the experimental design and a priori power analyses conducted in G*Power (Faul et al., 2007). The obtained sample largely surpassed the estimated minimum sample size of 10 participants based on an effect size of f = 0.45 (converted from r = .41) reported by Inbar et al. (2010), to achieve .80 power at a significance level of .05 – also exceeding sample sizes used in similar research (e.g., 25 participants in Gallo et al., 2017; 31 participants in Inbar et al., 2010). To determine the minimum sample size needed to test for the moderating role of cognitive styles in the effect reported by Inbar et al., a moderate effect size was taken into account (f = 0.25) suggesting a minimum sample size of 36 participants.

Materials

Based on the norms reported in the Pilot Study, we used three exemplars of complex products (a car, a house and a smartphone) and three exemplars of simple products (a pillow, a shower gel and a postcard). These products operationalized the complexity dimension while attempting to keep constant other relevant dimensions that elicit different preferences for intuition and analysis, such as quality objectivity, and material/experiential purchase nature.

Procedure and measures

The study was conducted through an online survey in the Qualtrics platform. Participants were invited to participate in a study aimed at “investigating how people make

decisions". After providing informed consent, participants were told that, in this study, they would be asked to think about purchase decisions for different products and, for each, evaluate different aspects related to how they make such decisions. Participants' first task consisted of a decision-making strategy preference task. In this task, participants indicated for six different products, differing in complexity, the extent to which they would make a purchase decision based on their intuition ("I would make a purchase decision based on my intuition.") and based on reason/analysis ("I would make a purchase decision based on reason/analysis."). Each product was randomly presented and appeared individually and sequentially in the center of different survey pages. Participants were asked to make these preference decisions for each product using a rating a scale from 1 (Totally disagree) to 7 (Totally agree). These decisions were self-paced and no time restrictions were imposed to participants.

After the preference task, participants completed the Need for Cognition scale (NC; Cacioppo et al., 1984) followed by the Faith in Intuition (FI; Pacini, & Epstein, 1999) scale, in order to assess analytic and intuitive cognitive styles, respectively (internal consistency for both measures in this study was, respectively, α = .87, α = .87). Finally, participants were thanked and debriefed.

Results

Preference for intuition and analysis

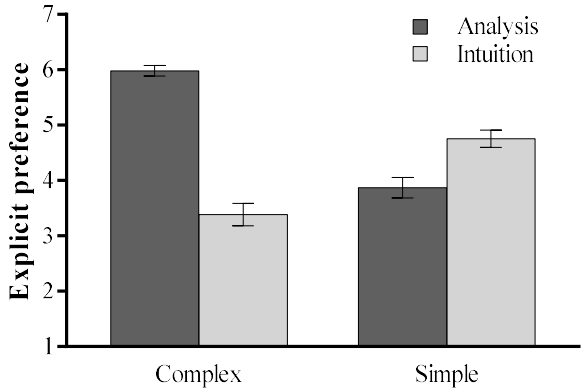
We first tested participants' different preferences for intuitive and analytic decision-making strategies for simple and complex products. Four index scores of decision-making strategy preferences for intuition and analysis for complex and simple products were computed by averaging participants' responses on these preferences across the three complex and three simple products. We first sought to replicate Inbar et al.'s (2010) findings. Participants' preference indexes were analyzed in a 2 (Decision-making strategy: Preference to use intuition vs. Preference to use analysis) x 2 (Context: Simple vs. Complex) repeated measures ANOVA.

Main effects of decision-making strategy, $F(1, 51) = 15.00$, $p < .001$, $\eta_p^2 = 0.23$, and decision context, $F(1, 51) = 14.12$, $p < .001$, $\eta_p^2 = 0.22$, suggested higher reported preferences to use analysis (in comparison to intuition) and to use strategies overall for complex contexts (in comparison to simple contexts). More important to our hypotheses, a significant interaction between decision-making strategy and decision context was also observed, $F(1, 51) = 121.56$, $p < .001$, $\eta_p^2 = 0.70$, suggesting that the explicit preference for intuition and analysis are

moderated by the complexity of the product (see Figure 4). Mean comparisons analyses showed a greater preference for intuition (vs. analysis) for simple contexts, $t(51) = 2.99$, $p = .004$, and a greater preference for analysis (vs. intuition) for complex contexts, $t(51) = -10.60$, $p < .001$. Results replicated the findings of Inbar et al. (2010) by showing a preference for intuition for decisions about simple products and analysis in choices about complex products.

Figure 4

Explicit preferences for analysis and intuition in complex and simple contexts



Effects of Cognitive styles. To test if the above effects were influenced by individuals' cognitive styles, we first tested the associations between FI and NC with explicit preferences and subsequently added these two measures as moderators of the detected effects.

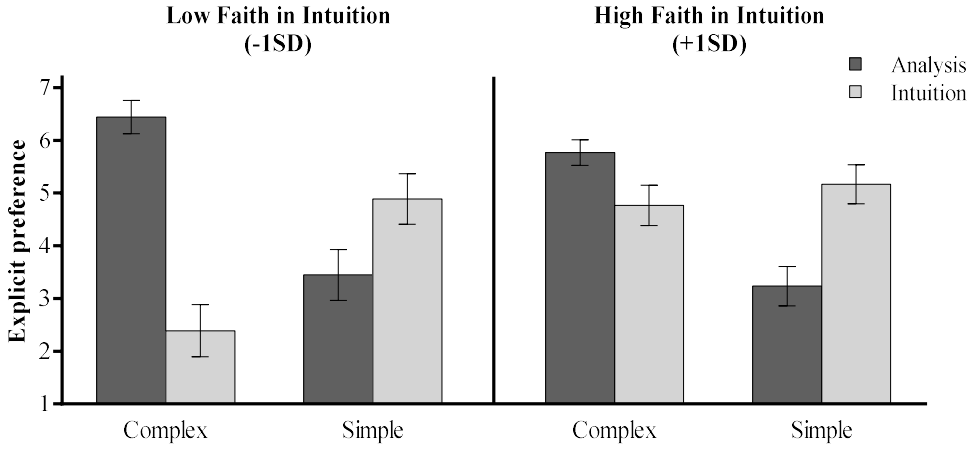
Correlational analyses focused the association of each cognitive style with the ratings of explicit preferences for intuition and analysis within the choice of simple and complex products. This analysis suggested that FI correlated positively with preference for intuition ($r(50) = .49$, $p = .001$) and negatively with preference for analysis ($r(50) = -.25$, $p = .070$), only in complex contexts. For simple contexts, no association was found either with preference of intuition ($r(50) = .09$, $p = .537$) nor preference for analysis ($r(50) = -.11$, $p = .451$). With regards to NC, this measure did not significantly correlate with preferences for analysis in either simple or complex contexts ($r(50) = .09$, $p = .546$; $r(50) = -.01$, $p = .947$, respectively), but was negatively correlated with preferences for intuition in both simple and complex contexts ($r(50) = -.28$, $p = .044$; $r(50) = -.42$, $p = .002$, respectively).

In the testing of the hypotheses related to cognitive styles' influences on preferences for intuition and analysis and their interaction with context complexity, we took into consideration participants' scores in the FI and NC scales as continuous variables (see Cohen, 1983; MacCallum et al., 2002). Participants' mean centered values of FI and NC (correlation between FI and NC, $r(50) = -.10$, $p = .462$) were introduced as continuous predictors in a 2 (Decision-making strategy) x 2 (Context) within-subjects general linear model (Judd et al., 1996). Results within this model replicated Inbar et al.'s (2010) findings showing the interaction between decision-making strategy and decision context, $F(1, 48) = 123.61$, $p < .001$, $\eta_p^2 = 0.72$.

As expected, FI impacted explicit preferences for one strategy over the other, specifically, FI significantly interacted with decision-making strategy, $F(1, 48) = 7.17$, $p = .010$, $\eta_p^2 = 0.13$, such that preferences for intuition over analysis were higher among participants with higher levels of FI. A three-way interaction showed that individuals' FI moderated the interactive effect of context complexity and decision-making strategy, $F(1, 48) = 4.10$, $p = .049$, $\eta_p^2 = 0.08$ This three-way interaction might be reflecting that the focused two-way interaction is less reliable for people high in FI who rate intuition highly for complex and simple products. This is likely occurring because FI is more determinant in the preferences for intuition for complex products, where intuition was not the default strategy (see Figure 5).

Figure 5

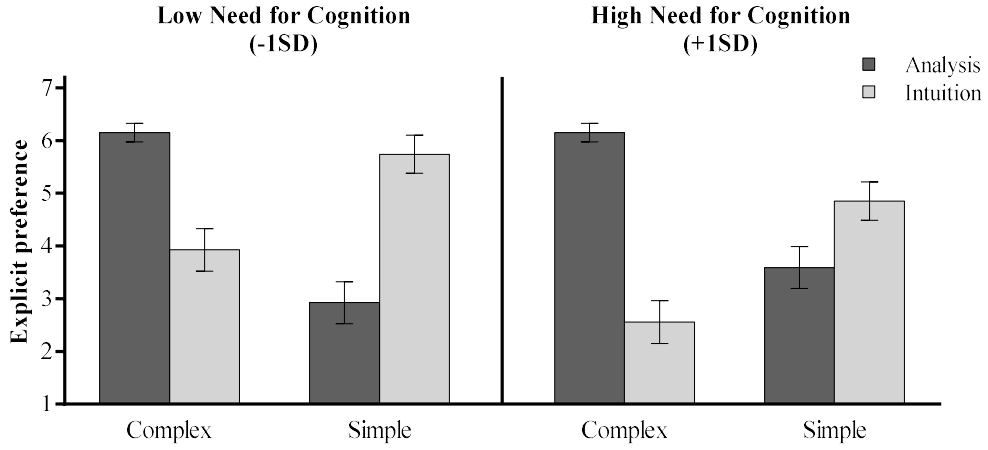
Explicit preferences for analysis and intuition as a function of decision complexity and FI



Need for Cognition was also a relevant determinant of the preferences of decision-making strategies. This is evidenced by a significant interaction between decision-making strategy and NC, $F(1, 48) = 4.63$, $p = .036$, $\eta_p^2 = 0.09$, suggesting that participants with higher levels of NC indicated higher preferences for analysis and lower preferences for intuition than participants lower in NC. However, no three-way interaction with context complexity emerged, $F(1, 48) < 1$ (see Figure 6), suggesting that the individual's NC and the context demands simply add to each other in influencing individuals preferences for use of intuition versus analysis. Also the four-way interaction with FI was not significant, $F < 1$.

Figure 6

Explicit preferences for analysis and intuition as a function of decision complexity and NC



In sum, in this study, we replicated Inbar et al.'s (2010) results, providing strength to their conclusions that context determines individuals' preference for one or the other decision-making strategy. We added to the literature evidence that the overall context fit occurs regardless of individuals' predispositional tendencies to approach intuitively or analytically the decisions. Yet, both cognitive styles were also relevant in helping individuals define their preferences. Importantly, we found that a simple context overcomes individuals' tendency not to rely on intuition. Even individuals high in Need for Cognition prefer intuition when the context is simple. Only people high in Faith in Intuition do not, but that is because they rate intuition relatively highly even for decisions about complex products.

Study 2.2

Study 2.1 provided evidence that intuitive and analytic cognitive styles influenced people's explicit preferences for intuition and analysis, and that sensitivity to context complexity was, in this study, clearer regarding preferences for intuition for participants differing in Faith in Intuition (with the predictive effect of FI being more determinant in the preferences for intuition for complex products).

In Study 2.2, we focus on the mechanisms by which these preferences occur, testing whether the impact of intuitive and analytic styles on preferences for intuition and analysis, respectively, can be explained by how individuals perceive validity in intuitive and analytic decision-making in simple and complex contexts. As such, in addition to the decision-making preference task of Study 2.1, participants in this study were asked to rate the perceived validity of intuition and analysis when making a purchase decision, through a set of different features of acting intuitively and analytically obtained in the prototype analysis conducted within the first empirical chapter.

Method

Participants and design

A sample of 50 North-American participants (34.0% women; M_{age} = 26.9, SD_{age} = 4.6), recruited on Prolific Academic, rated the same simple and complex products on two dimensions: a) the extent to which they would make a purchase decision based on intuition and on reason/analysis (i.e., decision-making preference) and b) the perceived validity of these decision-making strategies. Sample size was determined based on the same criteria described for Study 2.1.

Materials

The products selected for this study were the same six products (simple vs. complex) used in Study 2.1.

Measurement of perceived validity

To assess how valid participants perceive the use of intuition and analysis, we developed a measure anchored in the features obtained in the prototype analysis conducted within the first empirical chapter. A total of 18 features (see Table 13) were selected on the basis of their perceived centrality to the construct and their factor loadings on their respective factors. Each of these features was listed alongside a rating scale from 1 (Not at all valid) to 7 (Totally valid). Applying the items to the specific context of this study, instructions asked participants to rate each statement in how much the process defined by these features was a valid process through which they could achieve a good purchase decision.

Table 13

Features assessed on their perceived validity as decision-making processes

	Decision-making	Feature
Buying a [product]:	Intuition	1) based on my gut
		2) based on what feels right
		3) based on my instinct
		4) by avoiding thinking too much
		5) based on impulse
		6) deciding in a personal and unique manner
		7) considering my prior experience
		8) by actively engaging in imagination
		9) disregarding objective and concrete facts
	Analysis	1) by organizing and analyzing information
		2) by deciding in an objective and logical manner
		3) based on facts and data
		4) by making a rational and unbiased decision
		5) by thinking about the outcomes and consequences of my decision
		6) by weighting and considering all options
		7) by gathering evidence supporting my decision
		8) by paying attention to all details
		9) through reflection and deliberation

Procedure

We created an online survey using the Qualtrics survey platform. Participants were invited to participate in a study with the goal of investigating how people make decisions. As in Study 2.1, after providing informed consent, participants learned that, in this study, they would be asked to think about purchase decisions for different products and to evaluate different aspects related to these decisions.

Participants' first task consisted of indicating their perceived validity of intuition and analysis. In this task, they were asked to imagine a situation in which they would have to make a purchase decision for each of the six specific products. Each of these products was individually and sequentially presented in the center of the screen and, for each, participants were asked to indicate how valid they considered the 18 items operationalizing the decision-making process, in a scale from 1 (Not at all valid) to 7 (Totally valid). After this task, participants performed the same decision-making preference task performed in Study 2.1. They were, again, presented with each product and asked to indicate the extent to which they would make a purchase decision based on their intuition ("I would make a purchase decision based on my intuition.") and based on reason/analysis ("I would make a purchase decision based on reason/analysis."), on a scale from 1 (Totally disagree) to 7 (Totally agree) – replicating the procedures of Study 2.1. Afterwards, participants completed the Need for Cognition and the Faith in Intuition scales (α = .91, α = .89, respectively), before they were thanked and debriefed.

Results

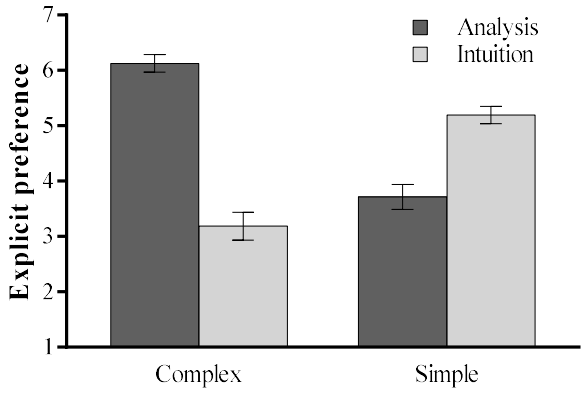
Preference for intuition and analysis

As in Study 2.1, four index scores of decision-making strategy preferences for intuition and analysis for complex and simple products were computed by averaging participants' responses on these preferences across the three complex and three simple products.

These preference scores for intuitive and analytic decision-making were analyzed within a 2 (Decision-making strategy: Intuition vs. Analysis) x 2 (Context: Simple vs. Complex) repeated measures ANOVA to parallel initial analyses from Study 2.1. The main effect of decision context was for this study only marginal, $F(1, 49) = 3.38$, $p = .072$, $\eta_p^2 = 0.06$. The significant main effect of decision-making strategy, $F(1, 49) = 14.82$, $p < .001$, $\eta_p^2 = 0.23$, suggests higher values of reported preferences for analysis, in comparison to intuition. More importantly, results replicated the expected interaction between decision-making strategy and decision context, $F(1, 49) = 108.25$, $p < .001$, $\eta_p^2 = 0.69$, supporting the previous finding that participants prefer intuition in simple choices and analysis in complex choices (see Figure 7). Mean comparisons analyses showed a greater preference for intuition (vs. analysis) for simple contexts, $t(49) = 5.50$, $p < .001$, and a greater preference for analysis (vs. intuition) for complex contexts, $t(49) = -9.81$, $p < .001$.

Figure 7

Explicit preferences for analysis and intuition in complex and simple contexts



Effects of Cognitive styles on decision-making preferences. Cognitive styles' associations with preferences and moderation of the focused interaction was further analyzed as in Study 2.1.

Replicating Study 2.1, levels of FI were significantly correlated with levels of explicit preference for intuition in complex contexts ($r(48) = .40$, $p = .004$) but not for simple contexts ($r(48) = .19$, p = .191). No significant correlations were observed between FI and preferences for analysis in simple or complex contexts ($r(48) = .10$, $p = .503$; $r(48) = -.03$, $p = .839$, respectively). With regards to NC, replicating Study 2.1, this variable did not significantly correlate with preferences for analysis in either simple or complex contexts ($r(48) = -.09$, $p = .556$; $r(48) = .03$, $p = .848$, respectively). A significant negative correlation with preferences for intuition was observed for complex contexts ($r(48) = -.29$, $p = .040$) but not simple contexts ($r(48) = .17$, $p = .238$).

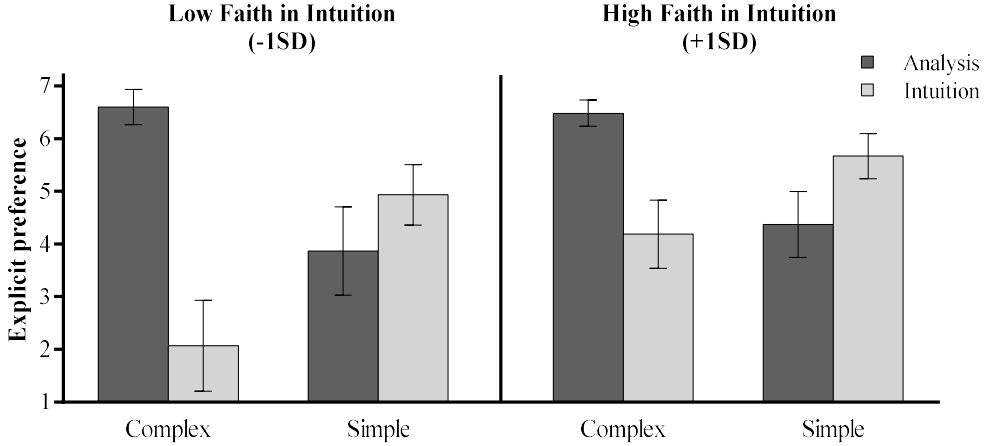
Replicating the analysis of Study 2.1, to the 2 (Decision-making strategy) x 2 (Context) within-participant design, we added as continuous predictors the mean-centered scores of the FI and NC scales (correlation between FI and NC, $r(48) = -.03$, $p = .837$), in order to examine the influence of intuitive and analytic cognitive styles on the above preferences.

Results replicated the findings of Study 2.1, by showing that FI significantly qualified the decision-making strategy, $F(1, 46) = 4.51$, $p = .039$, $\eta_p^2 = 0.09$, such that the relative differences between preferences for intuition over analysis (disregarding decision complexity) were higher among participants with higher levels of FI. However, the results of this analysis

also revealed the focused interaction between decision-making strategy and decision context, $F(1, 46) = 117.79$, $p < .001$, $\eta_p^2 = 0.72$, but, contrary to Study 2.1, this interaction was not significantly qualified by FI, $F(1, 46) = 2.64$, $p = .111$, $\eta_p^2 = 0.05$. Nevertheless, the pattern of results was very similar to the one previously observed in Study 2.1, which suggests that differences in FI are more relevant for the preference of intuition in complex choices (see Figure 8).

Figure 8

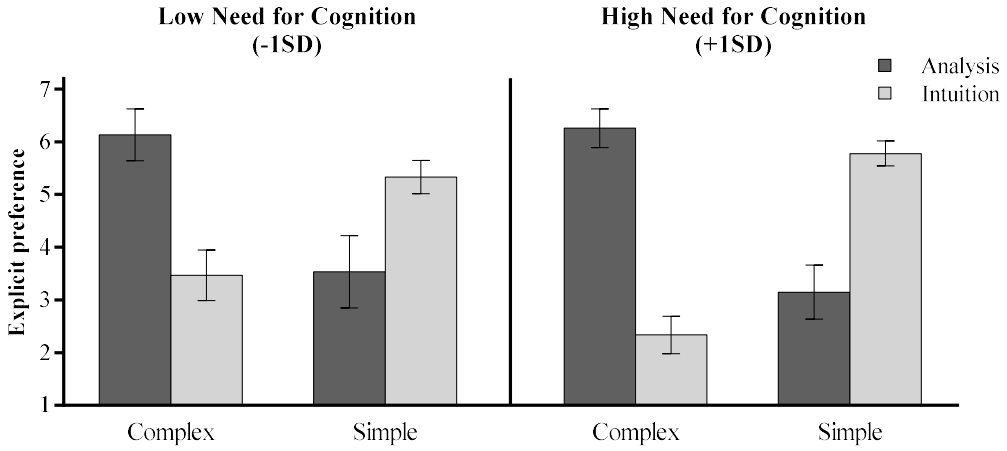
Explicit preferences for analysis and intuition as a function of decision complexity and FI



Regarding NC, results differed from those observed in Study 2.1. Instead of observing a direct effect of individuals' NC on their preferences (participants' NC did not qualify decision-making strategy preference, $F < 1$), we now observed a significant three-way interaction with context complexity $F(1, 46) = 4.29$, $p = .044$, $\eta_p^2 = 0.09$ (see Figure 9). This interaction appears driven by the relatively high levels of NC creating lower preferences for intuition relatively to analysis when the context is complex. The four-way interaction with FI was again non-significant, $F < 1$.

Figure 9

Explicit preferences for analysis and intuition as a function of decision complexity and NC



Perceived validity of intuition and analysis

We further addressed the role that individuals' naïve theories regarding the validity of intuition and analysis have in the preferences for one or the other decision-making strategy. For that, we first tested the psychometric properties of these measures across contexts and decision-making strategies, and then tested context and cognitive styles over these measures.

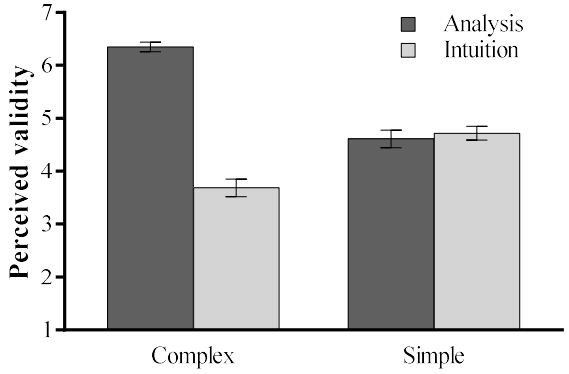
Psychometric study of the index measures. We first examined whether the factor structure of the perceived validity items was the same across all six products. Results of the factor analyses made for each measurement episode (see scree plots [Figure 1 and 2] and explained variances [Table 1] in the Appendix B2), suggested a single-factor structure for perceived validity of analysis (explained variances varied from 49.7% and 68.7%). The structure emerged independently of the complexity of the product. Results for perceived validity of intuition suggested a single-factor structure for all products (explained variances varied from 49.2% and 57.8%) – although this structure was less consistent for simple products (as suggested by the scree plots and explained variances; see Appendix B2). Internal consistency for these measures of perceived validity of intuition and analysis were high across all products (see Appendix B2, Table 1), with Cronbach alphas ranging from .87 and .94.

Perceived validity as a dependent measure. Four index scores of perceived validity of intuition and analysis for complex and simple products were computed by averaging participants' responses on these perceptions across the three complex and three simple products.

The influence of simple and complex contexts. To examine whether the perceived validity of intuition and analysis varied between simple and complex contexts, participants' ratings were examined in a 2 (Decision-making strategy: Intuition vs. Analysis) x 2 (Context: Simple vs. Complex) repeated measures ANOVA. The general indexes of perceived validity were used as dependent variables for the analysis. The main effect of decision-making strategy, $F(1, 49) = 52.08$, $p < .001$, $\eta_p^2 = 0.52$, showed that analysis was perceived as generally more valid than intuition, and the main effect of decision context, $F(1, 49) = 14.96$, $p < .001$, $\eta_p^2 = 0.23$, evidenced higher values of perceived validity for choices regarding complex rather than simple products. However, the two factors significantly interacted, $F(1, 49) = 113.64$, $p < .001$, $\eta_p^2 = 0.70$, and, as suggested by the graphic from Figure 10, whereas for choices of complex products analysis was perceived as a more valid decision-making process in comparison to intuition (mean comparisons, $t(49) = 11.43$, $p < .001$), for choices of simple products, both processes were perceived as similarly valid (mean comparisons, $t(49) < 1$).

Figure 10

Perceived validity of analysis and intuition in complex and simple contexts



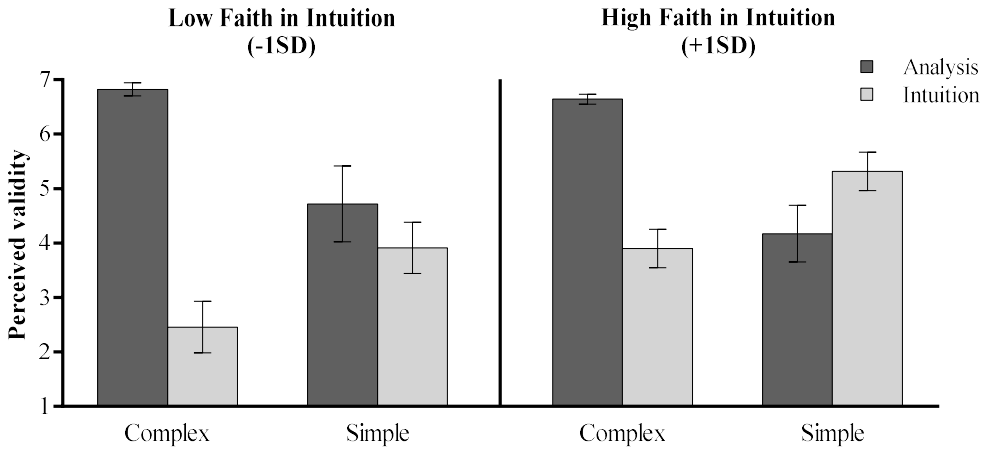
Effects of Cognitive styles on perceived validity. Cognitive styles' relation with perceived validity was further analyzed both at a cell level and the design level.

Correlation analysis show that cognitive styles were significantly correlated with perceived validity of intuition and analysis dependent upon the context. Levels of FI were significantly correlated with levels of perceived validity of intuition in simple contexts ($r(48) = .44$, $p = .001$) and complex context ($r(48) = .36$, $p = .011$), but no significant correlation with perceived validity of analysis was observed, both for simple and complex contexts ($r(48) = -.23$, $p = .114$; $r(48) = -.05$, $p = .756$, respectively). Results were not as clear with regards to NC. A marginal positive correlation with perceived validity of analysis was observed for complex products ($r(48) = .25$, $p = .085$) but no significant correlation was observed for simple products ($r(48) = .10$, $p = .500$). NC also did not significantly correlate with the perceived validity of intuition, both for simple and complex contexts ($r(48) = -.18$, $p = .210$; $r(48) = -.23$, $p = .116$, respectively).

We examined cognitive styles' influence on the context effects through a within-participants 2 (Decision-making strategy) x 2 (Context) general linear model analysis, with FI and NC as continuous mean-centered predictors. With regard to the effect of FI, results show that the already identified interaction between decision-making strategy and decision context, $F(1, 46) = 111.83$, $p < .001$, $\eta_p^2 = 0.71$, was not qualified by FI (three-way interaction, $F < 1$; see Figure 11). However, FI significantly moderated the perceived validity of the decision-making strategy, $F(1, 46) = 14.97$, $p < .001$, $\eta_p^2 = 0.25$, such that a higher perceived validity of intuition was observed among participants with higher levels of FI and no effect was exerted over perceived validity of analysis.

Figure 11

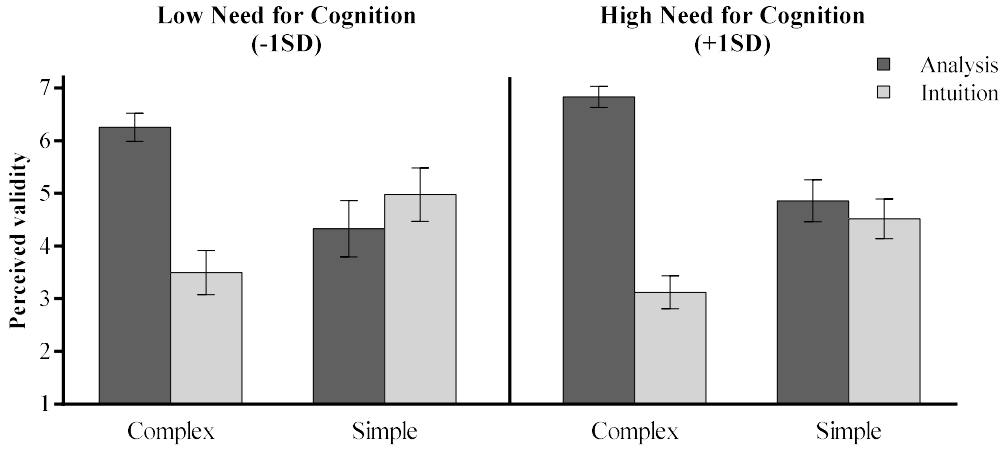
Perceived validity of analysis and intuition as a function of decision complexity and FI



With regard to the effect of NC, this variable significantly interacted with decision-making strategy, $F(1, 46) = 5.63$, $p = .022$, $\eta_p^2 = 0.11$, such that differences between perceived validity of analysis and perceived validity of intuition (collapsing across product type) were higher for participants with higher levels of NC. This effect was also not qualified by the complexity of the decision context, $F < 1$ (see Figure 12). Finally, the four-way interaction involving both FI and NC was non-significant, $F(1, 46) = 1.34$, $p = .228$, $\eta_p^2 = 0.03$.

Figure 12

Perceived validity of analysis and intuition as a function of decision complexity and NC



Effects over preference as mediated by perceived validity

Our mediation hypothesis was that perceived validity provides a route through which individuals' cognitive styles predict the explicit preferences for intuition and analysis. As a first step for this analysis, we corroborated the relation between the mediator (perceived validity) and the dependent variable (explicit preference). Then, we approached the mediation analysis involving different within-participant factors by directly contrasting the preference for intuition and analysis in one index (Preference for Intuition - Preference for analysis). With this regard, we created four indexes, reflecting the difference between preferences for *use* of intuition and analysis 1) for complex products and 2) for simple products, and the difference between perceived *validity* of intuition and analysis 3) for complex products and 4) for simple products. In the second step of this analysis, we tested whether the index of perceived validity is associated with the index of preference for use with complex and simple products.

Regarding the first step, results summarized in Table 14 show that preference for and perceived validity of intuition are significantly correlated for complex but not simple decision contexts. On the other hand, preference for analysis significantly correlated with its perceived validity both for complex and simple contexts. Regarding the second step, results from Table 14 show that the indexes of perceived validity and preference significantly correlated for both complex and simple contexts, suggesting that the greater the difference in perceived validity of intuition and analysis the more participants report a preference for one over the other.[4]

Table 14

Correlation analyses between preference for use and perceived validity of intuition and analysis, for complex and simple contexts

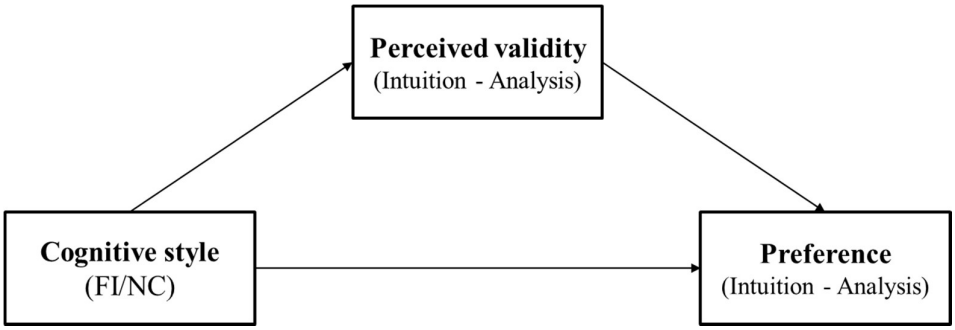
	Decision context	
	Complex	Simple
Intuition	$r = .40$, $p = .004$	$r = .15$, $p = .283$
Analysis	$r = .50$, $p < .001$	$r = .43$, $p = .002$
Intuition–Analysis index	$r = .51$, $p < .001$	$r = .44$, $p = .001$

We directly approached the mediating role of differences in perceived validity of intuition and analysis in the relation between individuals' intuitive and analytic styles and their explicit preferences for choosing intuitively relatively to analytically in simple and complex contexts (see Figure 13). We conducted a set of four mediation analyses specifying participants' individual differences in FI as the distal predictor (i.e., the X variable). Differences in perceived validity of intuition over analysis, in simple and complex contexts, were introduced as the mediating variable and differences in preferences for use of intuition over analysis, in simple and complex contexts, were approached as the dependent variable in all the analyses. For this, we used as mediators the created indexes of the differences between perceived validity of intuition and analysis, in simple and complex contexts, and as outcomes, the indexes of the differences between preferences for intuition and analysis, in simple and complex contexts. Although the role of NC in either promoting preference effects or impacting naïve theories of validity of analysis is likely irrelevant (as suggested by the non-significant relations), for sake of comparison we also ran this analysis using NC as the distal predictor.

[4] Preferences for intuition and preferences for analysis were not significantly associated in either simple or complex contexts ($r = .02$, $p = .899$; $r = -.01$, $p = .934$, respectively). However, perceived validity of intuition and perceived validity of analysis were negatively correlated in complex contexts ($r = -.35$, $p = .014$), but not in simple contexts ($r = -.15$, $p = .287$). The implications of these results for the ongoing debate on whether intuition and analysis are independent dimensions or opposite poles of a single dimension are discussed in the General Discussion.

Figure 13

Tested mediation model for simple and complex contexts



These analyses were conducted using SPSS's PROCESS extension Model 4 (Hayes, 2017) and we obtained the indirect effect (IE) of the predictor FI/NC on preferences via perceived validity, and the bias corrected 95% confidence interval (CI) from 5,000 bootstrap resamples – accepting the indirect effect as greater than zero when the bias corrected 95% CI excluded zero.[5] A summary of the results obtained for the tested mediation models is presented in Table 15 (a more detailed description of the mediation effects can be consulted as Appendix B3).

Table 15

Summary table of the conducted mediation analysis

Context	Predictor (X)	Mediator (M)	Path X to M	Outcome (Y)	Path M to Y	Total effect	Direct effect	Indirect effect & CI
Simple	FI	PV-IA	1.11**	Pref-IA	0.76**	0.15	-0.69†	**IE = 0.84** [0.34, 1.57]
	NC	PV-IA	-0.38	Pref-IA	0.65**	0.19	0.44	IE = -0.24 [-0.71, 0.14]
Complex	FI	PV-IA	0.84*	Pref-IA	0.67**	1.16*	0.60	**IE = 0.57** [0.17, 1.14]
	NC	PV-IA	-0.71*	Pref-IA	0.73**	-0.71†	-0.19	**IE = -0.52** [-1.03, -0.15]

FI: Faith in intuition; NC: Need for Cognition; PV-IA: Index of the difference between perceived validity of intuition and analysis; Pref-IA: Index of the difference between preference for intuition and analysis;
*$p < .05$, **$p < .01$, †$p < .10$; bolded significant indirect effects (95% CI's excluding zero)

[5] Products' perceived price was controlled for in the tested models by using a check measure as a covariate. Such control was done due to the fact that this feature varied positively along with perceived product complexity.

The results depicted in Table 15 suggest that, as expected, the differences in perceived validity of intuition and analysis (i.e., the index variables operationalizing the differences between perceived validity of intuition and analysis) mediated the effects that cognitive styles exert on preferences for use of intuition and analysis (i.e., the index variable operationalizing the differences between preferences for use of intuition and analysis). The effects are clear for differences with regards to FI, being however less clear with regards to NC's effects for simple contexts.

Discussion

The studies presented in this section were aimed at a) replicating the findings by Inbar and colleagues (2010) showing that context moderates individuals' explicit preferences for analysis and intuition; b) examining whether this effect might be moderated by people's intuitive and analytic styles, and c) testing the hypothesis that such preferences are explained by how people perceive validity in the use of intuition and analysis and whether the impact of intuitive and analytic styles on preferences for intuition and analysis can be explained by such perceived validity. As hypothesised, our results replicated previous findings (Inbar et al., 2010) suggesting that people show different preferences for intuition and analysis as a function of contextual factors associated with decision-making. Specifically, participants showed a preference for the use of intuition for simple decisions (i.e., purchase decisions of simple products) and for the use of analytic thinking for complex decisions (i.e., purchase decisions of complex products). An assumption underlying such research was that because people tend to think of complex decisions as more demanding and thought-oriented, these decisions should require greater rational analytic thinking. In contrast, decisions simpler in nature should be perceived as more susceptible to intuitive decision-making. The idea is that individuals' meta-decisional processes are cued by context characteristics as a means of adapting to the perceived environmental needs.

Results also corroborate that preferences for intuition and analysis fit individuals' cognitive styles and that these moderate the influence of context in such preferences. Levels of Faith in Intuition correlated positively with preferences for intuition, with no relation to preferences for analysis. This preference for intuition over analysis was, however, dependent on the context. Participants' sensitivity to the context was evidenced by the finding that, for simple contexts, high- and low-Faith in Intuition participants did not differ in their preferences

for intuition or analysis. Importantly, also those with low Faith in Intuition, despite not showing a tendency to rely more on analysis, adapted to the context evidencing no specific preferences for intuition or analysis in simple contexts. It was instead for complex products (where relevance of intuition might have been more ambiguous) that the level of Faith in Intuition related most to preference for using intuition in the decision.

Levels of Need for Cognition did not correlate with preferences for analysis but established a significant negative association with preferences for intuition. Preferences for analysis in relation to intuition were also context dependent, whereby participants with higher levels of NC reported higher preferences for analysis and lower preferences for intuition for complex contexts (this result being clearer in Study 2.2). Thus, results suggested that greater differences between cognitive styles occur with regards to the reliance of intuition within complex contexts. Taken together, these results supported our hypothesis that preferences for intuition and analysis are dependent on both contextual factors and characteristics of the decision-maker (Beach & Mitchell, 1978).

We also hypothesized that differences in cognitive styles might translate into different naïve theories of validity and that these could mediate the observed effects. Our results supported this view by showing that differences in cognitive styles are directly associated with differences in perceived validity. However, this effect was clearer for intuition, whereby participants with higher Faith in Intuition perceived intuition as more valid than participants with lower in Faith in Intuition, regardless of the context. Results also showed that, in comparison to intuition, analytic decision-making was perceived as more valid, but only for complex contexts. Such perceptions were related to preferences for use of intuition over analysis in the decision. Specifically, this relation established an indirect pathway through which Faith in Intuition impacted preference for use of intuition in decisions. Taken together, our mediational analyses suggested that both context effects and individuals' Faith in Intuition promote different preferences for decision-making strategies, which are potentially guided in part by the perceived validity of such strategies.

Results were not as clear for Need for Cognition. Specifically, this variable did not significantly correlate with preferences for analysis in either simple or complex contexts. Similarly, Need for Cognition also did not significantly correlate with perceived validity of analysis in simple or complex contexts (although a marginal correlation was observed for complex contexts). So, if we would rely on Need for Cognition as measure of analytic cognitive style, this would not allow us to conclude that the findings obtained by Inbar and colleagues

(2010) are moderated by this individual style. Results for Faith in Intuition would suggest otherwise. It is thus relevant to understand how these measures relate with cognitive styles. Specifically, whereas Faith in Intuition reflects participants' reliance on intuitive decision-making, Need for Cognition reflects one's motivation and enjoyment of thinking (rather than necessarily a preference to use analysis in decisions). The difference between results for Faith in Intuition versus Need for Cognition raises the need to replicate these results with other measures of cognitive styles to test whether this pattern is specific to Faith in Intuition's assessment of intuitive styles or if the relevance of cognitive styles generalizes to other styles as well.

Further considerations

In Study 2.2, we measured perceived validity with items based on features selected from the prototype analysis conducted in Empirical Chapter I. Contrary to the view in the prototype analysis, here we assessed perceived validity disregarding a two-factor view of intuitive decision-making. Although our decision to rely on a single-factor structure for perceived validity of intuition was supported by psychometric properties of the measure, further analyses of the factorial structure of this measure might have some implication for future studies. Specifically, whereas for complex contexts this measure constituted only one factor, for simple contexts, this structure was less consistent, suggesting a two-factor structure. Although these results (as well as the general findings of this empirical chapter) must be interpreted with caution given the lower sample size, they provide preliminary evidence that context might modulate the way we perceive intuition (as further discussed in the General Discussion of this thesis).

Another methodological issue to be considered is the fact that in this study we measured perceived validity before preference for use of intuition and analysis. This could lead preferences to follow the pattern shown on reports of validity because of some "demand" to be consistent. However, contrary to a hypothesis of overall consistency, the relation between the two variables was dependent on individual cognitive styles and also varied as a function of context complexity. Even so, future studies should at least counterbalance the measurement of both variables and test for the motivational demands participants feel for such a consistency.

One additional contribution of this research relates to our pilot study. Results from our pilot study are highly relevant for providing a normative database to the scientific community,

allowing researchers to select consumer products according to specific attributes and facilitate researchers' choices aimed at achieving appropriate experimental control. These results also provide evidence that using one dimension to choose stimuli can create a set of stimuli that confounds the dimension used to choose the stimuli with one or more other product dimensions, further justifying the need to control for these alternative dimensions. However, as it is the case with other normative databases, generalizations to other populations and cultures should be made with caution and cross-validation is recommended. Dimensions such as product familiarity or price, for example, may vary across populations. Therefore, future research should consider extending and replicating these norms to other countries/norms.

Finally, these results also inform future approaches to the study of intuition appeals in persuasion. They provide relevant guidance regarding the choice of contexts in which greater matching effects between intuitive and analytic styles and persuasion appeals could be observed. It seems to be for the choice of complex products (such as cars) that individual differences in intuitive styles promote greater influence on preferences for intuition. This is further supported by results from Study 2.2 suggesting that preferences for intuition were significantly predicted by their perceived validity, and that the effect of individual differences in Faith in Intuition on preferences for intuition and analysis in the choice of complex products was explained by such perceived validity. Furthermore, these findings suggest the importance of measuring perceived validity of intuitive and analytic decision-making as a means to assess and predict people’s preferences for intuition and analysis. This would imply developing a measure different from the one used in this empirical chapter – context dependent – which would be context independent and perhaps more closely related to individuals’ chronically-held naïve theories.

Empirical Chapter III

Measuring individual differences in perceived validity of intuition and analysis

Introduction

People make many judgments and decisions each day – some in a more analytic manner, others in a more intuitive fashion. The empirical interest in individual differences in how people make decisions in a more intuitive or analytic manner has led to the development of many instruments, with varying goals and differing operationalizations of intuition and analysis. Examples include instruments that focus on evaluating individuals' reliance on these two processes (Allinson & Hayes, 1996; Epstein et al., 1996; Hamilton et al., 2016; Hsee et al., 2015; Nygren & White, 2002; Pacini & Epstein, 1999; Scott & Bruce, 1995), reported preferences (Betsch, 2004; Sjöberg, 2003), behaviors (Sagiv et al., 2010), and motivations to engage in thoughtful cognitive activities (Cacioppo et al., 1983, 1984) and analytic thinking (Cools & Broeck, 2007).

These instruments assume that individuals' cognitive styles are mapped into dimensions such as "reliance or use", "preference", or "motivation" for intuition or analysis. These dimensions suggest, but do not measure, the notion that individuals perceive some degree of validity in these decision-making processes. For instance, when considering Faith in Intuition (e.g., Epstein et al., 1996; Pacini & Epstein, 1999), the concept of *faith in* resembles one's reliance that the outcome will be a good one. This suggests that individuals with high Faith in Intuition may hold naïve theories associating intuitive processing with valid outcomes. In addition, previous studies in this dissertation (see Empirical Chapter II) identified a strong relation between preference for intuition or analysis and the perception of such strategies as valid means to reach good decisions. Such findings suggest that individual differences in perceived validity of intuition and analysis might help to explain the relation between cognitive styles and contextual preferences for intuition or analysis.

Supporting the relevance of this dimension is the fact that judgment and decision approaches assume that people want to make correct judgments. It is an explicit assumption of the two most prominent models of persuasion, the ELM (Petty & Cacioppo, 1986) and the HSM (Chaiken et al., 1989) that individuals want to hold correct attitudes and are motivated to be accurate when forming opinions. In addition, it is also postulated by the ELM that although people elaborate more on available information when situational or individual factors increase the need to be accurate, if people perceive that they can be accurate in the absence of effortful thinking, then information scrutiny should be reduced (Priester & Petty, 1995). Similarly, the HSM posits that if people perceive that accuracy can be reached through heuristic processing, then they should rely on its use. It could be the case that reliance on intuition occurs even under

conditions of high elaboration if the person perceives that intuition can provide a reliable route to accuracy. Also, research in the judgment and decision-making field supports the view that people are more likely to rely on intuitive processing under conditions of high elaboration (and when conflict with normative information is made salient) when they perceive intuitive information as diagnostic to the decision at hand (e.g., Loureiro & Garcia-Marques, 2018).

Although of high importance, people's naïve theories of validity in intuitive and analytic decision-making are yet to be explored. Here, we propose the development of a measure of perceived validity of intuition and analysis supported by an operationalization based on the lay conceptions of intuition and analysis. Bellow we unpack the development of such measures.

Intuition and analysis: assessing their perceived validity

With most options researchers have to assess intuitive and analytic cognitive styles, a common feature is that they measure preferences or reliance on intuition and analysis based on participants' own conceptions of what intuition and analysis represent. In the case of intuition, participants indicate whether "intuition can be a very useful way to solve problems" (REI; Pacini & Epstein, 1999) or whether they are "a very intuitive person" (PID; Betsch, 2004) or when they "make decisions, they tend to rely on their intuition" (GDMS; Scott & Bruce, 1995). The understanding of the subjective experience of intuition to the respondent would seem important when interpreting what individuals' responses mean. If measures such as these were to be created anew, it would seem important that these reflect or incorporate people's lay conceptions of intuition and analysis.

In Empirical Chapter I, through a prototype analysis, we concluded that the lay construct of intuition is itself multidimensional, and different people represent the concept differently. Results showed that people have a clear sense of what acting intuitively and analytically represent. Furthermore, lay conceptions of intuition and analysis were defined by a set of features organized in terms of their degree of association with the constructs, i.e., their centrality. Importantly, the centrality of these features was consistent across different studies, experimental settings, and samples. These central features represent what for lay people more closely resembles what it means to act intuitively and analytically. As such, not only they aid a further understanding of the lay representations of intuition and analysis, but also provide a pool of descriptive features that directly tap into how people perceive intuition and analysis.

To that extent, in order to develop a measure to assess the perceived validity of intuition and analysis, we relied on the most central features of the lay conceptions of intuition and analysis and operationalized them as items reflecting means to reach correct/incorrect and accurate/inaccurate judgments and decisions. That is, respondents were asked to associate their use with good or bad outcomes (e.g., "leads me to good decisions", "allows to make the most progress", "leads to mistakes", "leads me to bad decisions"). This encompasses a view of a strategic use of intuition and analysis with the goal of achieving desirable judgments and decisions. Perceived validity is thus a utilitarian operationalization of the term "its use allows one to reach a desirable outcome".

Despite the abundance of instruments assessing individual differences in intuition and analysis, the controversy over the existence of two distinct cognitive systems or one continuous structure opposing intuition and analysis is not completely settled (cf., Keren & Schul, 2009; Kruglanski & Gigerenzer, 2011). Such debate has had its echoes in the assessment of such individual differences, and there is still a lack of consensus regarding the dimensionality or independence of both constructs. Some authors have developed independent measures of intuitive and analytic decision-making (e.g., Akinci & Sadler-Smith, 2013; Epstein, 1994; Hodgkinson et al., 2009; Pacini & Epstein, 1999). Others have developed instruments assessing intuition and analysis as opposites of a unidimensional construct and focus on individuals' position on an intuition-versus-analysis dimension of cognitive style (e.g., Allinson & Hayes, 1996; Hsee et al., 2015; Sjöberg, 2003). Recent results from a meta-analytic study provided evidence that intuition and analysis are independent constructs, rather than opposite ends of a continuum (Wang et al., 2017). This suggests an advantage to adopting such an approach in the measurement of perceived validity of intuition and analysis.

In two studies, we developed and tested the psychometric properties of a measure of perceived validity of intuition and a measure of perceived validity of analysis. In Study 3.1, we developed and tested the psychometric properties of the two measures and, in Study 3.2, we addressed how these measures relate to cognitive styles, as defined by the Faith in Intuition (applied through the Rational-Experiential Inventory; Pacini & Epstein, 1999) and the Need for Cognition scale (Cacioppo et al., 1984).

Study 3.1

Within this first study, we developed and tested the measures of perceived validity of intuition and perceived validity of analysis. All the developed items were supported by the features obtained in the prototype analysis conducted in Empirical Chapter I. The conducted psychometric tests included the study of item sensibility and descriptive statistics, construct validity through exploratory factorial analyses and tests of internal consistency.

Method

Participants

A total of 404 North-American participants were recruited online through Prolific Academic and completed either the 20-item measure of perceived validity of intuition (n = 204, 45.1 % women; M_{age} = 27.83, SD = 6.75) or the 20-item measure of perceived validity of analysis (n = 200, 39.0 % women; M_{age} = 28.19, SD = 6.72). Sample size recommendations for appropriate conditions to conduct a factor analysis has been rather varied and inconsistent in the literature, with recommendations ranging from a minimum sample size of 100 (e.g., Gorsuch, 1983; Kline, 1986) to minimum ratios of five (e.g., Gorsuch, 1983) or ten participants for each measured variable (e.g., Everitt, 1975; Nunnally, 1978). Subsequent research has not supported the use of these rules-of-thumb, suggesting that adequate sample size should be carefully considered as a function of structural variability, based on aspects such as the level of communality of the variables, number of factors, and number of variables per factor (see MacCallum et al., 1999; Mundfrom et al., 2005; Velicer & Fava, 1998). Drawing upon the findings of simulations performed by these investigations, it is suggested that a minimum sample size of 200 participants will offer adequate conditions for the testing of the factor structure of the measures proposed here – composed of a single factor with 20 items, accounting for wide to high levels of communality. All the participants of this study were living in the United States at the time of their participation, and their native language was English.

Item development

For each measure, we adapted the most central features of intuition (as an automatic and affective processing) and analysis obtained in the prototype analysis conducted in Empirical Chapter I and created a pool of 40 items to operationalize intuitive (20 items) and analytic (20

items) decision-making. In the items, the features were associated with either positive or negative consequences. As illustrative examples consider the prototype analysis' features presented in Table 16, and their association with choices that, for instance, lead to good decisions or decisions that work out best (positive outcomes), or choices that lead to mistakes or bad decisions (negative outcomes). For each measure, 10 items reflecting positive outcomes and 10 items reflecting negative outcomes (reverse-scored) were designed.

Table 16

Examples of prototype analysis' features and their operationalization into items of perceived validity of intuition and analysis

Prototype analysis' features		Items	
		Positive outcomes	Negative outcomes
Intuition	Acting based on what feels right	Choosing an option that I feel good about works out the best when choosing between alternatives.	Doing something because it feels right is generally a bad approach in making my decisions.
	Following your gut	Decisions I make with my gut tend to be good ones	When I make decisions based on my gut feelings alone, I often make mistakes.
	Acting quickly	In life, I generally make good decisions when acting quickly.	In my life, I make more mistakes when I make decisions on the fly.
Analysis	Organizing and analyzing information	My decisions turn out best when I organize and analyze all available information.	In some of my decisions "less is more", that is, less information can lead to better decisions.
	Making rational and unbiased decisions	I mostly make the right decisions when I base them on rational analysis.	In my life, I make more mistakes when I make purely rational decisions.
	Paying attention to detail	I make the most progress in a task when I examine all of its aspects in detail.	I don't need to take all details of a situation into account in order to make a good decision

Procedure

An online survey was created using the Qualtrics survey platform. Participants were invited to "complete a short measure assessing individual differences in decision-making". After providing informed consent, participants were randomly allocated to one of two versions of the survey, consisting of either completing the measure of perceived validity of intuition or the measure of perceived validity of analysis. Within the survey, participants were given the instruction that they would be presented with different statements describing how people can make decisions in general. For each statement, participants were instructed to indicate the extent

to which they perceived the statement to characterize themselves (in a scale from 1 = not at all like me, to 5 = very much like me). All items were presented to participants in the same page, and the order of the items presented to participants, for both measures, was randomly generated by Qualtrics. Participants took approximately three minutes to complete the survey ($M_{\text{seconds [intuition]}} = 176.94$, $SD_{\text{seconds [intuition]}} = 97.02$; $M_{\text{seconds [analysis]}} = 184.60$, $SD_{\text{seconds [analysis]}} = 158.82$).

Results

Independent psychometric tests were performed for each measure. As such, we first present a descriptive analysis of the items, followed by an exploratory factor analysis and, finally, tests of internal consistency through item reliability analysis.

Measure of perceived validity of intuition (PVI)

PVI items' descriptive statistics. Item analysis for the measure of perceived validity of intuition is summarized in Table 17 and describe participants' responses to each item of this measure. Overall, mean responses to these items surrounded the middle point of the scale, 3, and all items showed good sensitivity by ranging from the minimum to the maximum scale response options. Most values of skewness (Sk) and kurtosis (Kt) were slightly negative or close to zero, suggesting a close to normal distribution of the item responses.

PVI exploratory factor analysis. Before studying the factorial structure of this measure, KMO and Bartlett's sphericity tests were used to assess data adequacy for the factor analysis. KMO values of 0.93 and significant Bartlett's sphericity test ($\chi^2 = 2078.369$, $df = 190$, $p < .001$) suggest that the data meet the criteria for factor analysis (Hair et al., 1998). To study the factor structure of the items, we conducted an EFA, fitting maximum likelihood models with a Promax (oblique) rotation. Analysis of a scree plot (Appendix C, Figure 1) and parallel analysis (Fabrigar & Wegener, 2012) suggested a single-factor structure (Rotated Factor Loading Matrix for a Maximum Likelihood EFA: $X^2 = 509.102$, df = 170, $p < .001$, RMSEA = 0.099), with a first factor explaining 43.7% of the variance and a second factor explaining 7.3% (see factor loadings in Table 17). Responses to items were highly consistent (Cronbach's alpha = .93), evidencing good internal consistency and allowing us to create a general index of perceived validity of intuition.

Table 17

Descriptive statistics and factor loadings of the items of perceived validity of intuition

	Mean	SD	Mode	Sk	Kt	Min, Max	Factor loadings
1. Following my instincts will often lead me to good decisions.	3.39	0.94	4	-.40	-.04	[1. 5]	.720
2. My personal experience tells me it is best to follow a choice that feels right.	3.56	0.93	4	-.65	.45	[1. 5]	.710
3. I make the most progress when guided by my feelings.	2.93	1.03	3	.04	-.55	[1. 5]	.663
4. Decisions I make with my gut tend to be good ones.	3.42	0.89	3[a]	-.33	.08	[1. 5]	.818
5. I value my intuition when I make decisions.	3.72	0.99	4	-.82	.59	[1. 5]	.756
6. Choosing an option that I feel good about works out the best when choosing between alternatives.	3.53	0.94	4	-.64	.26	[1. 5]	.609
7. I am more effective when I generate spontaneous solutions to a problem.	2.86	1.13	2	.28	-.75	[1. 5]	.494
8. In life, I generally make good decisions when acting quickly.	3.01	1.05	3	-.10	-.62	[1. 5]	.569
9. Thoughts that come easily to mind when making a decision are thoughts worthy of my attention.	3.75	0.83	4	-.57	.48	[1. 5]	.517
10. The most effective way for me to make decisions is by going with my first intuition (by not second-guessing myself).	3.16	1.08	3	-.10	-.65	[1. 5]	.608
11. When I make decisions based on my gut feelings alone I often make mistakes.*	3.09	1.08	3	-.05	-.58	[1. 5]	.691
12. Making decisions based on my first impressions is not always the best course of action.*	2.52	1.09	2	.38	-.52	[1. 5]	.533
13. When making choices, my feelings/emotions often lead me to bad decisions.*	3.33	1.08	4	-.45	-.59	[1. 5]	.672
14. When my decision is guided by what comes naturally to me, I often make bad decisions.*	3.53	0.99	4	-.53	-.19	[1. 5]	.610
15. Doing something because it feels right is generally a bad approach in making my decisions.*	3.36	1.12	4	-.54	-.39	[1. 5]	.646
16. When I use my intuition to make decisions, these will usually turn out badly.*	3.64	0.90	4	-.80	.77	[1. 5]	.737
17. In my life, I make more mistakes when I make decisions on the fly.*	2.85	1.12	2	.20	-.75	[1. 5]	.575
18. Making my decisions based on instinct is often an ineffective approach.*	3.14	1.09	3	-.15	-.69	[1. 5]	.675
19. Choosing an option because I feel good about it is not always the best way of approaching a problem.*	2.65	1.05	2	.25	-.62	[1. 5]	.618
20. In many situations, the best approach is not to simply go with my initial response.*	2.97	1.06	3	-.02	-.73	[1. 5]	.414

a. Multiple modes exist. The smallest value is shown; * Reverse scored items.

Measure of perceived validity of analysis (PVA)

PVA items' descriptive statistics. Item analysis for the measure of perceived validity of analysis is summarized in Table 18. Overall, mean responses to these items were slightly above the middle point of the scale, and all items showed good sensitivity by ranging from the minimum to the maximum scale response options. Most values of skewness (Sk) and kurtosis (Kt) were slightly negative or close to zero, suggesting a close to normal distribution of the item responses.

Table 18

Descriptive statistics of the items of perceived validity of analysis

	Mean	SD	Mode	Sk	Kt	Min, Max
1. My decisions turn out best when I organize and analyze all available information.	4.11	0.84	4	-.88	.73	[1, 5]
2. In my experience, it is best to carefully plan a course of action before acting.	4.10	0.89	4	-.97	.82	[1, 5]
3. I mostly make the right decisions when I base them on rational analysis.	3.43	1.12	4	-.33	-.69	[1, 5]
4. I value attention to detail in most of my decisions.	4.13	0.85	4	-.94	.97	[1, 5]
5. When choosing between alternatives, contemplating all pros/cons works out the best for me.	4.06	0.95	4	-1.15	1.36	[1, 5]
6. I make the most progress in a task when I examine all of its aspects in detail.	3.91	0.98	4	-.73	.18	[1, 5]
7. I am most effective in a task when I weigh and consider all options and perspectives.	4.12	0.82	4	-.84	.70	[1, 5]
8. It works better for me to make decisions in an organized and analytical way.	4.04	0.92	4	-.97	.82	[1, 5]
9. In life, I find it useful to gather all needed evidence before making any conclusions.	4.07	0.83	4	-.91	.89	[1, 5]
10. The most effective way for me to solve a problem is by approaching it in a methodical manner.	3.97	0.90	4	-.61	-.17	[1, 5]
11. Reflecting and deliberating sometimes leads me in the wrong direction when I'm trying to solve a problem.*	3.33	1.10	4	-.15	-.82	[1, 5]
12. If I act only based on facts/data I often make bad decisions.*	3.70	1.08	4	-.53	-.62	[1, 5]
13. In some of my decisions "less is more", that is, less information can lead to better decisions.*	3.48	1.25	4	-.41	-.84	[1, 5]
14. A logical approach to my decisions isn't always the best course of action.*	3.35	1.15	4	-.17	-.94	[1, 5]
15. Relying on analytic thinking isn't always a good approach in making my decisions.*	3.43	1.12	4	-.13	-1.09	[1, 5]
16. When I make decisions, thinking about all outcomes and consequences can be an ineffective approach.*	3.55	1.25	4	-.41	-1.06	[1, 5]
17. Impulsive decisions are just as good as when I take my time deliberating.*	3.61	1.15	4	-.53	-.61	[1, 5]

18. In my life, I make more mistakes when I make purely rational decisions.*	3.61	1.10	4	-.63	-.23	[1, 5]
19. I don't need to take all details of a situation into account in order to make a good decision.*	3.57	1.08	4	-.59	-.29	[1, 5]
20. In many of my decisions, the best approach is not to think about data and evidence too carefully.*	3.78	1.05	4	-.61	-.49	[1, 5]

* Reverse scored items.

PVA exploratory factor analysis. Before studying the factorial structure of this measure, KMO and Bartlett's sphericity tests were used to assess data adequacy for the analysis. KMO values of 0.926 and significant Bartlett's sphericity test ($\chi 2 = 1780.690$, df = 190, $p < .001$) for the measure of perceived validity of analysis, suggest that the data meet the criteria for factor analysis (Hair et al., 1998). The analysis of the scree plot (Appendix C, Figure 2) and parallel analysis (Fabrigar & Wegener, 2012) suggested a two-factor structure, operationalized by one primary dimension and a slightly elevated second component (Rotated Factor Loading Matrix for a Maximum Likelihood EFA with 2 common factors and a Promax rotation (Fabrigar & Wegener, 2012): $X^2 = 228.52$, df = 169, $p < .001$, RMSEA = 0.042). The first factor accounted for 39.8% of explained variance and the second 10.7%. The factor loadings for the two-factor structure of perceived validity of analysis are presented in Table 19. When analyzing the content of the items composing each factor, we see that the distribution of the items across the two factors is entirely organized according to item valence (items 1-10 positively framed; items 11-20 negatively frame). Such effects have been common in rating scale responses, and empirical evidence has provided support that this tendency for "positive" and "negative" items to group into distinct factors may not necessarily reflect a distinction between different dimensions of the same construct, but rather a methodological effect or artifact associated with how differently people respond to positive and negative items (Carmines & Zeller, 1979; Corwyn, 2000; Dunbar et al., 2000; Greenberger et al., 2003; Marsh, 1996; Spector et al., 1997). Support for the latter view, within this data, is provided by the fact that both factors are highly correlated (correlation between latent factors = .62). It has been suggested that, for factor correlations of this magnitude – when both factors are mainly composed of positive and negative items – a single factor might be indicated (see Edwards, 2009a; Forsterlee & Ho, 1999; Hevey et al., 2012, for similar examples and examinations of the unidimensional Need for Cognition scale). Additionally, responses to these items were highly consistent (Cronbach's alpha of .92) independent of the factor, providing evidence for high internal consistency. This suggests as reliable the use of a general index of perceived validity of analysis.

Table 19

Maximum likelihood Factor Loading Matrix of the items of perceived validity of analysis

	Factor	
	1	2
7. I am most effective in a task when I weigh and consider all options and perspectives.	.788	
1. My decisions turn out best when I organize and analyze all available information.	.786	
5. When choosing between alternatives, contemplating all pros/cons works out the best for me.	.762	
4. I value attention to detail in most of my decisions.	.724	
6. I make the most progress in a task when I examine all of its aspects in detail.	.706	
8. It works better for me to make decisions in an organized and analytical way.	.696	
9. In life, I find it useful to gather all needed evidence before making any conclusions.	.657	
2. In my experience, it is best to carefully plan a course of action before acting.	.625	
10. The most effective way for me to solve a problem is by approaching it in a methodical manner.	.461	
3. I mostly make the right decisions when I base them on rational analysis.	.390	
15. Relying on analytic thinking isn't always a good approach in making my decisions.		.787
14. A logical approach to my decisions isn't always the best course of action.		.717
16. When I make decisions, thinking about all outcomes and consequences can be an ineffective approach.		.684
11. Reflecting and deliberating sometimes leads me in the wrong direction when I'm trying to solve a problem.		.679
12. If I act only based on facts/data I often make bad decisions.		.674
20. In many of my decisions, the best approach is not to think about data and evidence too carefully.		.637
13. In some of my decisions "less is more", that is, less information can lead to better decisions.		.620
18. In my life, I make more mistakes when I make purely rational decisions.		.600
17. Impulsive decisions are just as good as when I take my time deliberating.		.517
19. I don't need to take all details of a situation into account in order to make a good decision.		.458

Study 3.2

In Study 3.2, we further confirmed the psychometric properties of both measures and studied potential gender differences in their scores (to allow for comparations between studies; see, for example, Pacini & Epstein, 1999). In addition, we addressed how cognitive styles defined by the Rational-Experiential Inventory (REI; Pacini & Epstein, 1999) and the Need for Cognition scale (NC; Cacioppo et al., 1984) correlate with the measures of perceived validity of intuition and analysis.

Method

Participants

A sample of 243 North-American participants (48.1 % women; M_{age} = 29.30, SD_{age} = 7.58) was recruited online through Prolific Academic. Sample size was determined based on the criteria described in Study 3.1. All participants' native language was English, and they were living in the United States at the time of their participation.

Measures

The measures used were the two proposed measures of perceived validity of intuition and analysis, the Rational and Experiential Inventory (Pacini & Epstein, 1999) and the Need for Cognition scale (Cacioppo et al., 1984).

Rational and Experiential Inventory (Pacini & Epstein, 1999). We made use of an updated version of the REI that includes subscales of self-reported ability and engagement of rational and experiential (Faith in Intuition) thinking. Pacini and Epstein (1999, p. 974) described the subscales as follows: "Rational Ability refers to reports of a high level of ability to think logically and analytically (e.g., "I have no problem thinking things through carefully") and the subscale of Rational Engagement refers to reliance on and enjoyment of thinking in an analytical, logical manner (e.g., "I enjoy thinking in abstract terms"). Experiential Ability refers to reports of a high level of ability with respect to one's intuitive impressions and feelings (e.g., "When it comes to trusting people, I can usually rely on my gut feelings"). Experiential Engagement refers to reliance on and enjoyment of feelings and intuitions in making decisions (e.g., "I like to rely on my intuitive impressions")." In its validation study, the general factorial structure of the REI differentiated between the rational and experiential factors, with the first factor accounting for 19.4% and the second for 14.6% of variance (Cronbach alpha for the rationality scale = .90; Cronbach alpha for the experientiality scale = .87). Although the subscale of each factor was not confirmed through factor analysis, the structure was corroborated by the fact that regression analysis showed different independent contributions of each subscale in predicting other variables, such as personality and basic beliefs.

Need for Cognition scale (Cacioppo et al., 1984). This scale measures one's tendency to engage in and enjoy effortful cognitive activities – an individual characteristic more closely related with the Rational Engagement subscale of the REI.

Procedure

An online survey was created using the Qualtrics survey platform. Participants were invited to take part in a study that aimed to "understand how people made decisions". After providing informed consent, participants received instructions indicating that their participation would involve responding to different measures about how people make decisions in general. Then participants completed the measures of perceived validity of intuition, perceived validity of analysis, the REI and the NC, in a restricted counterbalanced order. We ensured that neither of the two measures of intuition (perceived validity of intuition and FI) or analysis (perceived validity of analysis and NC) were sequentially presented, and that the rationality scale of the REI (REI-R) was always presented in last place. Each measure was individually presented to participants, with all the items presented to participants in a table, with order of presentation of the items randomly generated by Qualtrics. For each measure, participants were asked to indicate the extent to which each item was characteristic of them, in a scale from 1 (not at all like me) to 5 (very much like me). Finally, participants were thanked for their participation.

Results

Independent psychometric tests were first performed for the perceived validity measures. Specifically, we tested construct validity through confirmatory factor analyses and internal consistency through item reliability analysis. Finally, we tested the association between cognitive styles as defined by the REI (Pacini & Epstein, 1999) and the Need for Cognition scale (NC; Cacioppo et al., 1984) and measures of perceived validity of intuition and analysis.

Measure of perceived validity of intuition (PVI)

PVI confirmatory factor analysis. In Study 3.1, exploratory factor analyses suggested a single-factor structure for the measure of perceived validity of intuition and a possible two-factor structure for the measure of perceived validity of analysis (distinguishing between positively and negatively framed items). Here, for sake of consistency and given that the measure of perceived validity of intuition is also composed of positively and negatively framed items, we tested the model fit for a single-factor and a two-factor structure for this measure.

The indices of model fit for the measure of perceived validity of intuition are presented in Table 20. Although there is "no silver bullet for gauging fit" (Edwards, 2009, p. 517), in the

sense that analyses should focus on presenting evidence that a model can sufficiently account for the data, most research relies on indices such as the comparative fit index (CFI), the goodness of fit index (GFI), the root mean square error of approximation (RMSEA) and – although less typically – the ratio of chi-square to degrees of freedom ($\chi 2/df$), considering model fit adequate when CFI and GFI > .90, RMSEA < 0.10 and $\chi 2/df \leq 5.0$ (Hu & Bentler, 1999). The obtained indices suggested that the two-factor structure provides a better fit to the data compared to the single-factor structure (see Table 20). This suggests that adjusting the model by creating two separate factors composed of positive and negative items slightly improves model fit, compared to a single-factor structure. However, and importantly, as previously observed for the measure of PVA in Study 3.1., the association between the latent factors was .75, suggesting that a single factor might be employed.

Table 20

Indices of model fit for the measure of perceived validity of intuition

		χ^2/df	CFI	GFI	RMSEA	*p* (model comparison)
Perceived validity of intuition	One-factor model	3.75	.792	.740	.107	
	Two-factor model	2.38	.897	.855	.075	.000

Scores were calculated for the general and specific factors of perceived validity of intuition by averaging participants' responses to the items. The scores of the subscales defined by this averaging correlated significantly ($r(241) = .64$, $p < .001$) – corroborating the previously observed correlation between latent factors – and both were strongly correlated with the general score of the scale ($r(241) = .90$, $p < .001$ and $r(241) = .92$, $p < .001$, respectively) suggesting that either factor is capable of capturing the underlying construct. This is corroborated by a Cronbach's alpha of .92 for the general score of perceived validity of intuition.

Measurement of perceived validity of analysis (PVA)

PVA confirmatory factor analysis. Model fit for a single-factor structure and the previously identified (Study 3.1) two-factor structure of perceived validity of analysis were tested through confirmatory factor analyses. The indices of model fit for this measure are presented in Table 21. Also for this measure, the CFA suggested that creating two factors composed of positive and negative items improves model fit in comparison to a single-factor

structure (see Table 21). However, and as previously observed, there was a high association between the latent factors in the CFA (.70).

Table 21

Indices of model fit for the measure of perceived validity of analysis

		χ^2/df	CFI	GFI	RMSEA	*p* (model comparison)
Perceived validity of analysis	One-factor model	3.68	.792	.738	.105	
	Two-factor model	2.22	.906	.852	.071	.000

The scores of the subscales defined by the two factors composed by positive and negative items correlated significantly ($r(241) = .63$, $p < .001$) – also corroborating the observed correlation between latent factors – and both were strongly correlated with the general score of the measure ($r(241) = .90$, $p < .001$ and $r(241) = .91$, $p < .001$, respectively) suggesting that either factor captures the underlying construct. This is also further corroborated by a Cronbach's alpha of .92 for the general score of perceived validity of analysis.

Descriptive statistics and sex differences

Means and standard deviations of the scores of general and specific factors of all measures for the total sample, as well as for men and women, are presented in Table 22. The observed significant sex differences for the general score of Faith in Intuition (Experiential dimension of the REI) indicate that women scored higher than men in this dimension. With regards to its different factors, this difference was only significant for the Engagement factor. Contrastingly, men scored significantly higher than women on the Ability factor of the Rational dimension of the REI. Such sex differences have been previously reported (Pacini & Epstein, 1999). No sex differences were found for Need for Cognition nor for the measures of perceived validity of intuition and analysis. An exception was observed for the general factor of perceived validity of intuition, in that women marginally perceived intuition as more valid than men. Age did not significantly correlate with any of the scores (see Table 22).

Table 22

Means and standard deviations of measures' scores, sex differences, and correlation with age

		M (SD)	Women	Men	Sex differences	Correl. w/age
			M (SD)	*M (SD)*		
Perceived validity of intuition	General	3.23 (0.63)	3.30 (0.69)	3.17 (0.58)	$t(241) = 1.70$, $p = .091$	$r = .06$, $p = .383$
	Positive	3.24 (0.66)	3.31 (0.68)	3.17 (0.63)	$t(241) = 1.60$, $p = .111$	$r = .05$, $p = .401$
	Negative	3.23 (0.77)	3.30 (0.83)	3.16 (0.71)	$t(241) = 1.44$, $p = .151$	$r = .05$, $p = .470$
Perceived validity of analysis	General	3.67 (0.64)	3.62 (0.62)	3.71 (0.66)	$t(241) = -1.09$, $p = .277$	$r = .00$, $p = .955$
	Positive	3.84 (0.69)	3.77 (0.68)	3.91 (0.70)	$t(241) = -1.52$, $p = .130$	$r = -.01$, $p = .941$
	Negative	3.49 (0.73)	3.46 (0.66)	3.51 (0.79)	$t(241) = -0.48$, $p = .633$	$r = .01$, $p = .866$
Faith in Intuition (REI-Experiential)	General	3.30 (0.71)	3.41 (0.76)	3.20 (0.65)	$t(241) = 2.41$, $p = .017$	$r = .07$, $p = .309$
	Ability	3.30 (0.78)	3.38 (0.85)	3.22 (0.70)	$t(241) = 1.53$, $p = .127$	$r = .09$, $p = .159$
	Engagement	3.31 (0.74)	3.45 (0.75)	3.17 (0.71)	$t(241) = 3.00$, $p = .003$	$r = .03$, $p = .639$
REI-Rational	General	3.61 (0.73)	3.57 (0.75)	3.64 (0.71)	$t(241) = -0.74$, $p = .458$	$r = .01$, $p = .842$
	Ability	3.70 (0.77)	3.60 (0.80)	3.79 (0.73)	$t(241) = -1.92$, $p = .056$	$r = .03$, $p = .645$
	Engagement	3.52 (0.84)	3.54 (0.83)	3.50 (0.85)	$t(241) = 0.46$, $p = .647$	$r = -.01$, $p = .940$
Need for Cognition		3.35 (0.79)	3.34 (0.80)	3.36 (0.78)	$t(241) = -0.20$, $p = .841$	$r = .02$, $p = .776$

Relation with cognitive styles

Before addressing how perceived validity of intuition and analysis relate with cognitive styles, we analyzed how both measures correlate with each other. The calculated scores of both measures correlated negatively ($r(241) = -.42$, $p < .001$), and the same was observed for the positive factors of both measures ($r(241) = -.36$, $p < .001$) and the negative factors of both measures ($r(241) = -.23$, $p < .001$).

The results regarding the relations of these two measures and the REI and NC are presented in Table 23. Perceived validity of intuition significantly correlated with FI and its *ability* and *engagement* factors. This association was stronger for perceived intuitive ability, compared to intuitive engagement. Perceived validity of analysis was also significantly, but weakly, correlated with the rational factor of the REI. Similarly, these associations were

stronger for the factor reflecting the ability to think logically and analytically, in comparison to the factor reflecting an engagement to think. Perceived validity of analysis was not correlated with NC, which better resembles the engagement factor of the REI-R.

Table 23

Correlations between general and specific factors of assessed measures

	PVI	PVI(p)	PVI(n)	PVA	PVA(p)	PVA(n)	1	2	3	4	5	6	7
1. FI	.84[b]	.79[b]	.73[b]	-.44[b]	-.42[b]	-.37[b]	(.93)						
2. FI(A)	.82[b]	.74[b]	.75[b]	-.35[b]	-.32[b]	-.32[b]	.94[b]	(.90)					
3. FI(E)	.74[b]	.73[b]	.61[b]	-.47[b]	-.47[b]	-.39[b]	.93[b]	.74[b]	(.88)				
4. REIR	.08	.06	.09	.34[b]	.34[b]	.28[b]	.05	.11	-.01	(.93)			
5. REIR(A)	.06	.02	.09	.43[b]	.41[b]	.37[b]	.03	.12	-.07	.90[b]	(.88)		
6. REIR(E)	.08	.09	.06	.20[b]	.21[b]	.16[a]	.07	.08	.05	.92[b]	.66[b]	(.90)	
7. NC	.13	.14	.10	.07	.09	.04	.08	.09	.06	.82[b]	.59[b]	.88[b]	(.93)

PVI: perceived validity of intuition; PVI(p): perceived validity of intuition (positive items); PVI(n): perceived validity of intuition (negative items); PVA: perceived validity of analysis; PVA(p): perceived validity of analysis (positive items); PVA(n): perceived validity of analysis (negative items); FI: REI's Faith in intuition; FI(A): REI's Faith in intuition (ability); FI(E): REI's Faith in intuition (engagement); REIR: REI's Rationality factor; REIR(A): REI's Rationality factor (ability); REIR(E): REI's Rationality factor (engagement); NC: Need for Cognition

[a] $p < .05$ (two tailed); [b] $p < .01$ (two tailed)

Interactive effects of FI (REI-Experiential) and REI-R on perceived validity

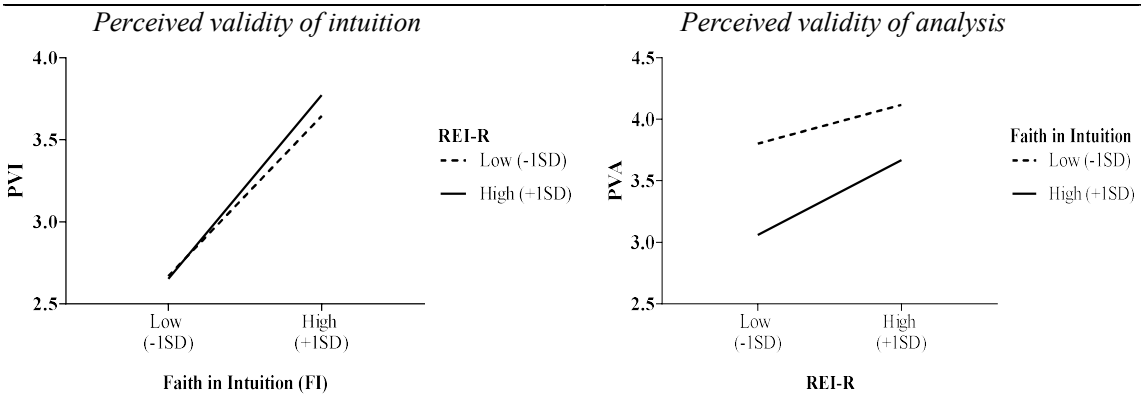
Assessing how perceived validity of intuition and perceived validity of analysis correlate with the two dimensions of cognitive styles does not fully inform about their relation, given that higher values of perceived validity of intuition or analysis may be observed mostly for individuals who tend to rely on a single way of processing information (being either high in FI and low in rationality, or high in rationality and low in FI). To test for this possibility, we focused our attention on testing how these two measures are interactively predicted by the experiential (FI) and the rational dimensions of the REI (correlation between measures, $r(241) = .05$, $p = .488$). We first addressed the interaction between these dimensions in predicting perceived validity of intuition, then perceived validity of analysis and, finally, an index defined by the perceived validity of intuition over analysis (Perceived validity of intuition - Perceived validity of analysis).

To estimate these models, we defined as predictors the main effects of FI and REI-R and their interaction (FI x REI-R), having the two measures of perceived validity and the index as criteria. Figure 14 shows that the rational dimension of the REI moderates FI's relation with perceived validity of intuition and FI moderates the REI-R relation with perceived validity of analysis. These analyses reveal that is not that the relation only exist when the other dimension

is not relevant, but instead, the relation exists across all conditions of the other dimension, and becomes stronger when the moderator achieves higher values (+1 SD).

Figure 14

Perceived validity as a function of FI and REI-R



FI x REI-R: $B = .07$, $p = .062$

REI-R x FI: $B = .14$, $p = .012$

But perhaps what is more informative about these relations is that both dimensions of cognitive styles are associated with differences in the index of perceived validity of intuition over analysis. Specifically, FI positively predicts values of this index, $B = 1.15$, $p < 001$, suggesting that those with higher levels of FI perceive intuition as more valid than analysis. The opposite occurs for REI-R, which negatively predicts this index, $B = -0.28$, $p < 001$, suggesting that those with higher levels of REI-R perceived analysis as more valid over intuition. Importantly, both dimensions did not interact to predict the index, $B = -.07$, $p = 324$.

Discussion

The goal of the research conducted within this empirical chapter was to develop and study the psychometric properties of two measures: a measure of perceived validity of intuition and a measure of perceived validity of analysis. In Study 3.1, these measures were tested for their psychometric properties, and items of both measures exhibited good levels of sensitivity and internal consistency.

Because the features based on which the items for these two measures were developed represented the same factors in the prototype analysis conducted in Empirical Chapter I, we

expected to observe a single-factor structure for both measures of perceived validity. However, a two-factor structure distinguishing between positive and negative items of perceived validity of analysis – i.e., between the items reflecting how analytic decision-making leads to positive and negative outcomes – was observed in Study 3.1. Confirmatory factor analyses performed in Study 3.2, further suggested that creating two factors composed of positive and negative items improved model fit in comparison to a single-factor structure. However, results also suggested that both factors complement each other in relating to a general factor of perceived validity by showing that both factors were strongly correlated with each other and with the general score of the measures of perceived validity of intuition and of perceived validity of analysis – suggesting that either factor is capable of capturing the underlying construct. Additionally, inter-item reliability analyses suggested high values of internal consistency for the general scores of perceived validity of intuition and perceived validity of analysis.

The study of the associations between the two developed measures and individual differences in the REI and NC was highly informative of the nature of both measures. Although the measures of perceived validity of intuition and analysis significantly correlated with the experiential (Faith in Intuition) and the rational scales of the REI, these associations were higher with regards to a specific sub-dimension of this inventory: the ability sub-dimension. The items in the intuitive ability and rational ability subscales relate to individuals' ability to make effective intuitive judgments (e.g., "When it comes to trusting people, I can usually rely on my gut feelings") and to think analytically and logically (e.g., "I have no problem thinking things through carefully"). On the other hand, the items in the intuitive engagement and rational engagement subscales relate to individuals' pleasure and satisfaction in making decisions in an intuitive (e.g., "I like to rely on my intuitive impressions") and analytical manner (e.g., "I enjoy thinking in abstract terms"). To the extent that the proposed measures of perceived validity assess how one perceives intuitive and analytic decision-making as valid processes, the findings that these measures correlated more highly with the ability subscales of the REI, can be explained by the fact that these more closely resemble a result-oriented dimension related with achieving positive (or negative) outcomes. In comparison, the engagement subscales of the REI relate more to one's enjoyment of relying on intuition or analysis. This assumption could also explain why we did not find a relation between perceived validity of analysis and the Need for Cognition scale, which more closely resembles the engagement subscale of the rational dimension of the REI. However, and interestingly, despite not correlating with the perceived validity of analysis, Need for Cognition did significantly correlate with the ability subscale of

the rational dimension of the REI. This further suggests the specificities associated with how one perceives validity in analytic decision-making, and how it is distinguished from these two variables.

With regards to sex differences, results of this empirical chapter provide evidence in support of previous findings obtained using the REI (Pacini & Epstein, 1999). Specifically, whereas women were more likely than men to perceive pleasure and satisfaction in making intuitive decisions (engagement dimension), men were more likely than women to perceive themselves as able to make analytical decisions (ability dimension). These sex differences were not found with regards to the measures of perceived validity (with the exception of a marginally significant difference between women's higher scores in perceived validity of intuition compared to men), suggesting that this variable is not sex dependent.

Although additional results provided evidence that both dimensions of cognitive styles (FI and the rational dimension of the REI) interact to predict perceived validity of intuition and perceived validity of analysis, data also showed that both dimensions did not interact to predict the index contrasting perceived validity of intuition and perceived validity of analysis.

In sum, data show that the relation between cognitive styles and perceived validity is very strong for the case of PVI and FI but not for PVA and NC or the rational dimension of the REI. Thus, adding PVA to the literature likely represents a potentially important contribution. The fact that FI captures PVI and NC does not capture PVA might help to explain some differences in effects of FI versus NC in predicting use of different decision-making strategies. Possibly, using PVA instead of NC might produce results for analysis that more directly parallel results for FI and use of intuition.

Further considerations

In our approach, we adopted a single-factor structure for both measures of perceived validity, disregarding the potential differences between positive and negative items. Empirical approaches have provided evidence that such tendency for positive and negative items to group into distinct factor may not necessarily reflect different dimensions of the construct, but rather a methodological effect or artifact associated with people's responses to positive and negative items (Carmines & Zeller, 1979; Corwyn, 2000; Dunbar et al., 2000; Greenberger et al., 2003; Spector et al., 1997; Marsh, 1996). Notably, and as already mentioned, similar patterns have been observed for the Need for Cognition Scale (e.g., Edwards, 2009; Forsterlee & Ho, 1999;

Hevey et al., 2012). Additional evidence for this effect comes from the development of the REI (Pacini & Epstein, 1999), which evidenced a two-factor structure for the experiential scale distinguishing between positive and negative items. The authors later discarded the meaningfulness of this distinction, focusing instead on the obtained correlations between the ability-engagement subscales with other variables as evidence for discriminant validity and therefore as evidence for retaining the ability and engagement factors. A potential reason for not disregarding the identified two-factor structure in our data regards the fact that model fit in confirmatory factor analysis – which researchers have suggested as means to identify the potential meaningfulness of the distinction between these factors (Marsh, 1996; Kaufman et al., 1991) – provided evidence that the two-factor structure improved model fit in comparison to a single-factor structure. However, it has been suggested that when both latent factors are highly correlated (both mainly reflecting positive and negative items), a single factor might be indicated, as it is the case with the Need for Cognition scale (e.g., Edwards, 2009; Forsterlee & Ho, 1999; Hevey et al., 2012). The data obtained within these two studies provide evidence in support of this view. Additionally, researchers have also proposed testing whether the factors are differently related to external constructs (Carmines & Zeller, 1979) as an indication that the distinction could be substantively meaningful. In our data, the correlations between the positive and negative factors of perceived validity of intuition and analysis and other measures within Study 3.2 were similar not only in direction but also in strength, failing to provide evidence for a meaningful distinction or existence of different dimensions of perceived validity.

Nevertheless, future studies might further confirm the factor structure of these two measures. Eventually, such work could analyze whether positive or negative items reflecting perceived validity (and lack of validity) of intuition and analysis are differently interpreted by individuals and whether contextual features influencing decision-making and how these processes are perceived in their validity (e.g., decision complexity) might influence the emergence of different factor structures. Additionally, future studies aimed at validating reduced versions of these two measures could consider the possibility of using only positive items in order to avoid potential methodological effects or, simply, to analyze a revised set of items aimed at avoiding this methodological artifact, without dropping the reverse-scored items altogether.

Also, future research should further extend and investigate the construct validity of these two measures by studying their associations with other measures of decision-making styles and personality traits in order to establish their unique characteristics and contributions beyond

other measures. For the goals of the current work, the resulting measures fulfill their goal of adequately measuring individual differences in perceived validity and analysis.

In sum, the findings provided in this empirical chapter not only provide evidence for good psychometric properties of the developed measures of perceived validity of intuition and perceived validity of analysis, operationalized through items reflecting people's lay views of intuitive and analytic decision-making, but also further corroborate the relevance of measuring individual differences in these two dimensions.

Empirical Chapter IV

Intuition for the intuitive:

Matching effects and multiple roles for intuition appeals in persuasion

Introduction

Within the last few years, Mini invited us to go with our gut and let our instincts take the wheel, Peugeot launched its "*208* Intuitive model", before they introduced the new 2018 Peugeot Instinct Concept Car, Mercedes welcomed us to the new era of "intuitive mobility", Audi launched their new "engineered intuition" and Lexus presented a new model "driven by intuition" (see Appendix D, Figures 1-6).

The use of intuition appeals in many persuasion contexts, including car advertisements, suggests that intuition is perceived as an effective persuasion variable. However, no research has examined *whether, when* or for *whom* intuition appeals influence attitudes. In this empirical chapter, we directly address these questions by testing how message recipients react to intuition appeals in a persuasive situation. We hypothesize that intuition appeals are more likely to positively influence the attitudes of recipients who hold a naïve theory of intuition as a valid process. As such, in two studies, we introduce the study of intuition appeals as a persuasion variable in an advertisement for a new car brand (a product perceived as complex), testing for matching effects between intuition appeals and individual's naïve theories, and examining the multiple processes through which this matching can influence attitudes.

Bellow we unpack this hypothesis and detail the reasons supporting our methodological decisions.

Matching intuition appeals and message recipients

Marketing strategies make use of different types of appeals to lead consumers to develop positive and perceived valid attitudes towards products (Meyers-Levy & Malaviya, 1999). Appeals are part of a persuasive message that may have multiple roles in the persuasion setting. They can work as arguments or cues, and they could bias processing or influence the degree of elaboration depending on the level of motivation and ability to think carefully about available information (i.e., determinants of baseline levels of elaboration; Petty & Cacioppo, 1986; Petty & Wegener, 1999). These roles can also be influenced by the presence of other features in the persuasion context, such as recipients' characteristics and existing beliefs.

A reaction to an appeal may thus, depend on recipients' naïve theories about how valid such an appeal is. As such, the reaction to an intuition appeal might be influenced by how valid the recipient perceives the use of intuition to be. Research has provided evidence that a matching between message content and recipient characteristics is likely to induce a more

positive response from the message recipient. For instance, Wheeler and colleagues (2002) showed that matching brand descriptions with participants' Need for Cognition (by describing the brand as intelligent, technical and corporate) induced more favourable attitudes in comparison to mismatching conditions (when the brand was described as glamorous, upper-class and good looking). Such matching effects can occur through different processes. Specifically, matching could occur through a direct influence of matching on attitudes (e.g., DeBono, 1987; Lammers & Baldwin, 2018; Wheeler et al., 2002), through matching leading to positively biased thoughts (e.g., Lavine & Snyder, 1996; Ziegler et al., 2005, 2007) or because matching leads to higher scrutiny of strong arguments when the elaboration likelihood is neither high nor low (e.g., DeBono & Harnish, 1988; DeBono & Telesca, 1990; Haddock et al., 2008; Petty & Wegener, 1998b; Wheeler et al., 2005).

In this empirical chapter, we address for the first time how naïve theories of validity of intuition and analysis, as recipient characteristics, interact with message content to create a matching effect in attitudes. As such, in Study 4.1 we addressed naïve theories matching effects using an advertisement for a new car brand (a complex product) designed to appeal to either intuition or analysis. Complex products (such as cars) provide an adequate context for testing these matching effects, because these are contexts in which participants differ in perceived validity of intuition and analysis and in which perceived validity mediates the effect of individual differences on explicit preferences for intuition and analysis (see Empirical Chapter II). In order to promote such matching, both the measures of perceived validity of intuition and analysis (as recipient characteristics; see Empirical Chapter III) and the appeals in the advertisement used in this study were based on the central features obtained in a prototype analysis (see Empirical Chapter I). In addition to measuring the impact of matching on attitudes, we assessed recipients' cognitive responses to understand whether the impact of matching on attitudes occurs directly or through a more elaborative pathway.

Because naïve theories of validity of intuition and analysis are closely related with individuals' cognitive styles, we also addressed whether these matching effects depend or not on those cognitive styles. The goal of Study 4.1 was to test these matching effects in conditions of unrestricted elaboration likelihood. However, in Study 4.2, we manipulated baseline elaboration likelihood conditions. As such, Study 4.2 allowed us to test the mechanism through which these matching effects can influence attitudes (i.e., whether a direct effect occurs under low elaboration conditions and biased processing under high elaboration conditions). To this

end, we introduced to the intuitive and analytic ads presented in Study 4.1 a set of arguments that were either related with central features of intuition or analysis.

Study 4.1

Participants and design

A sample of 93 North American participants (51.6% females; M_{age} = 28.2, SD_{age} = 7.16), was recruited on Prolific Academic. Sample size was determined based on a power analysis conducted using G*Power (Faul et al., 2007). Assuming an effect size of f = 0.40 (converted from r = .37 reported in a meta-analytic study of functional matching effects; Carpenter, 2012), 52 participants are needed for a 80% power to detect the predicted interaction between the fixed factor ad appeal and a continuous variable (i.e., perceived validity) at a significance level of .05. Additional participants were collected to account for randomization variance across conditions and in case of need to exclude participants due to lack of attention. Participants were randomly assigned to one of two versions of an online survey, created on Qualtrics platform, in which they evaluated: a) an advertisement for a new car brand with intuition appeals followed by two filler advertisements (n = 44); or b) an advertisement for a new car brand with analysis appeals followed by filler advertisements (n = 49).

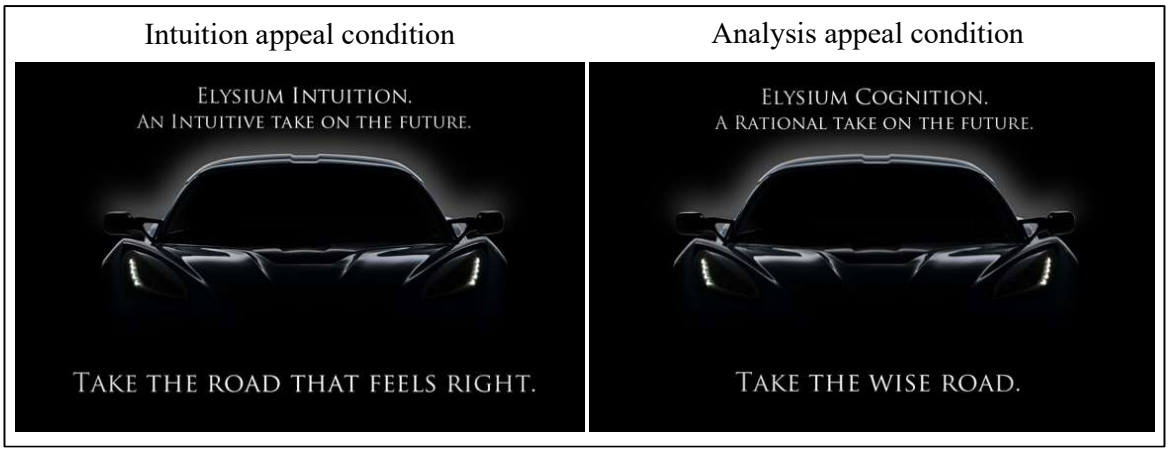
Materials

Target advertisement. Two versions of an advertisement for a new car brand, *Elysium* (fictitious name) were developed for the purposes of this study. These two ads were designed to contain appeals either related to intuition or analysis. The nature of the appeals presented in the ads was operationalized through the car model's name (Elysium Intuition vs. Elysium Cognition) and a slogan. The appeals presented in the slogan were developed based on central features of intuition and analysis obtained in a prototype analysis (see Empirical Chapter I). For instance, for the intuitive version of the ad, the central feature of intuition "Acting based on what feels right" was adapted to the promotional nature of the ad, resulting in the slogan "An intuitive take on the future. Take the road that feels right.". For the analytic version of the ad, a similar approach was taken by adapting the central feature of "Making rational and unbiased decisions" to the nature of the ad, resulting in the slogan "A rational take on the future. Take the wise road."

Figure 15 illustrates the two versions of the target ad. The brand and car model name were presented at the top of the ad, followed by a short statement referring to intuition and rationality and the silhouette of a car, ending with the slogan at the bottom. The ad did not reveal much visual detail about the car in order to keep participants' focus directed at the presented appeals.

Figure 15

Different appeal conditions (intuition vs. analysis) for the target car advertisement



Filler advertisements. Two filler advertisements were also developed for the purposes of this study, pertaining to new models of everyday use objects: one for a set of headphones and another for a water bottle. Similar to the target ad, these ads contained a brand model name, the image of the product and a slogan. No information in these filler ads was related to either intuition or analysis. Figure 16 illustrates the two developed filler ads.

Figure 16

Filler advertisements

Instruments

We assessed participants' perceived validity through the measures of perceived validity of intuition and perceived validity of analysis presented in Empirical Chapter III. For each of the 20 items of both measures, participants were asked to indicate the extent to which each item was characteristic of them in a scale from 1 (not at all like me) to 5 (very much like me). In the current study, both measures showed values of model fit to a single-factor structure comparable to that observed in the validation study (see Empirical Chapter III; $\chi^2/df = 2.24$, CFI = .822, GFI = .750, RMSEA = .106; $\chi^2/df = 2.28$, CFI = .770, GFI = .764, RMSEA = .086, for perceived validity of intuition and analysis, respectively) and displayed good levels of internal consistency (Cronbach's alphas = .95 and .93, for perceived validity of intuition and analysis, respectively). Participants also completed the Faith in Intuition (Pacini & Epstein, 1999) and Need for Cognition (Cacioppo et al., 1984) scales (Cronbach's alpha = .94 and .92, respectively). For these two scales, participants also indicated the extent to which each statement was characteristic of them also in a scale from 1 (not at all like me) to 5 (very much like me).

Procedure

Participants were invited to take part in a study of "evaluation of different advertisements". After providing informed consent, instructions provided to participants indicated that their participation would involve evaluating three different advertisements and that additionally they would be asked to rate different statements in how well each was characteristic of them. Participants were then randomly presented with one of the versions of the target advertisement for a new car brand, "Elysium" (see Figure 22). The ad was presented in the center of the screen, and its size was 613 px width and 379 px height. The presentation of the ad was self-paced and, following its presentation, on the same page, participants indicated their attitudes toward several aspects: the ad (bad-good, dislike-like, negative-positive), the brand (bad-good, dislike-like, negative-positive), the slogan (bad-good, dislike-like, negative-positive), the product (bad-good, low quality-high quality, not satisfying-satisfying, not attractive-attractive), and their feelings toward the product (unpleasant-pleasant, unfavorable-favorable, dislike-like), on a series of seven-point semantic differential scales. All items used to measure attitudes loaded on a single general attitude factor (accounting for 68% of the variance) with an internal consistency of $\alpha = .97$. To simplify the analyses and presentation of the results, these items were averaged to form a general attitude index.

Participants then reported their behavioral intentions regarding the product on two items associated with a seven-point scale ranging from on 1 (Not at all likely) and 7 (Extremely likely): “If you needed a [product], how likely would you be to purchase this [product]?”, and “How likely would you be to recommend this [product] to others?”. Both items assessing behavioral intentions were averaged to create a behavioral intention index ($r(91) = .80$, $p < .001$).

Then, in a following page, participants were asked to list the thoughts they had while looking at the advertisement. Participants listed each of their thoughts in a box provided for this effect (three boxes total). Each thought was subsequently presented to participants on the next page and classified by them as positive, neutral, or negative toward the car. After classifying their thoughts, participants were presented with the two filler ads (see Figure 23): the first for a set of headphones followed by another for a water bottle. The presentation of these filler ads aimed to prevent awareness in participants of our goals, i.e., from associating the nature of the appeals presented in the ad and the constructs assessed in the self-reported measures. Participants completed the same measures for each of these filler ads. After evaluating all ads, participants completed the measure of perceived validity of intuition followed by the measure of perceived validity of analysis. Finally, participants completed the Faith in Intuition (Pacini & Epstein, 1999) followed by the Need for Cognition (Cacioppo et al., 1984) scale, before they were thanked and debriefed.

Results

We first tested whether the nature of the appeals presented in the target advertisement biased participants’ reports of perceived validity of intuition and analysis (in order to be able to study the role of these measures as moderators of the effect of the appeals). We also tested whether these appeals biased participants’ reports of FI and NC. The results from four independent t-tests (see Table 24) revealed non-significant differences between conditions for each of these measures, indicating that the manipulated appeals did not bias participants’ responses.

Table 24

Means and standard deviations of measures' scores across appeal conditions

	Total Sample	Intuition appeals	Analysis appeals	Condition differences
	M (SD)	*M (SD)*	*M (SD)*	
Perceived validity of intuition	3.23 (0.75)	3.19 (0.82)	3.26 (0.69)	$t(91) = 0.47$, $p = .639$
Perceived validity of analysis	3.65 (0.69)	3.70 (0.67)	3.60 (0.72)	$t(91) = -0.70$, $p = .484$
Faith in Intuition (REI-E)	3.34 (0.81)	3.24 (0.85)	3.43 (0.76)	$t(91) = 1.20$, $p = .235$
Need for Cognition	3.33 (0.76)	3.29 (0.72)	3.37 (0.80)	$t(91) = 0.53$, $p = .598$

Matching effects

Matching ad appeals and perceived validity: effects on attitudes. We approached the hypothesized matching effects between ad appeals and perceived valdity within a multiple regression analysis (e.g., Haddock et al., 2008; Wheeler et al., 2002, 2008). Two two-step hierarchical regression models were built to test our matching hypotheses for intuition and analysis appeals. For both models, attitude scores were entered as the outcome variable, with ad appeal (dummy coded, 1 = intuition, 0 = analysis), perceived validity of intuition (PVI) and perceived validity of analysis (PVA) as continuous predictors. Scores on the measures of PVI and PVA were mean-centered by subtracting their means from observed scores (Aiken & West, 1991). Main effects of the predictors were interpreted in the first step of the model, and, for each model, the two-way interactions were individually interpreted in the second step (Cohen et al., 2003).

Suggesting that both ads promoted equally favorable attitudes overall, the main effect of ad appeal was non-significant, $B = 0.26$, $t(89) = 0.95$, $p = .343$. Perceived validity of intuition, $B = 0.49$, $t(89) = 2.40$, $p = .019$, and perceived validity of analysis, $B = 0.44$, $t(89) = 1.96$, $p = .053$, each exerted overall effects in predicting attitudes, in that higher values in these measures predicted more favorable attitudes. Relevant to our matching hypotheses, perceived validity of intuition and analysis, both independently, moderated the effects of ad appeal. The interactions were significant for the *intuition* matching (i.e., PVI x Appeal), $B = 1.23$, $t(88) = 3.56$, $p = .001$, and the *analysis* matching (i.e., PVA x Appeal), $B = -1.30$, $t(88) = -3.39$, $p = .001$. Importantly, the unstandardized coefficients (B's) had opposite signs supporting the matching hypothesis.

We followed two approaches in interpreting the obtained interactions for the *intuition* and *analysis* matching effects. We first focused on the simple effects centered on individual differences in perceived validity, in order to understand how much this individual feature

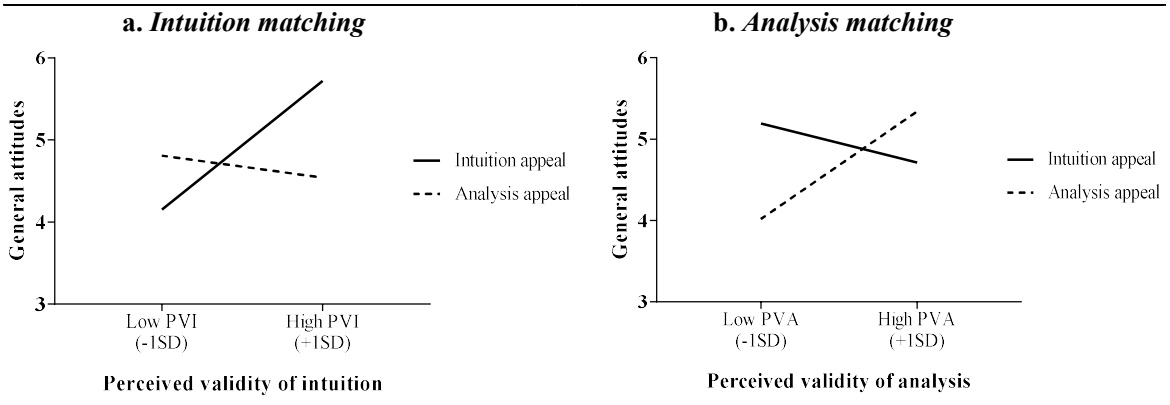
determines attitudes for each type of appeal. And then we focused on the simple effects centered on ad appeal, to understand whether attitudes towards different ad appeals were different for recipients differing in levels of perceived validity.

Perceived validity simple effects. As shown in Figure 17a, the relation between PVI and attitudes was significantly positive when recipients were presented with the intuition appeal ad, $b = 1.04$, $t(88) = 4.22$, $p < .001$, and no significant association between PVI and attitudes was observed when recipients received the ad with analysis appeals, $b = -0.18$, $t(88) = -0.68$, $p = .502$. In contrast, PVA was significantly associated with more favorable attitudes toward the analysis appeal ad, $b = 0.95$, $t(88) = 3.66$, $p < .001$, and no significant association between PVA and attitudes was observed when receiving the ad with intuition appeals, $b = -0.35$, $t(88) = -1.11$, $p = .271$ (Figure 17b).

Ad appeal simple effects. Figure 17 also informs about to whom ads with intuition versus analysis appeals promoted more favorable attitudes. Results show that intuition appeals significantly promoted more favorable attitudes compared to analysis appeals, among participants with higher levels of PVI (+1SD), $b = 1.18$, $t(88) = 3.24$, $p = .002$, reverting the effect among participants with lower levels of PVI (-1SD), $b = -0.67$, $t(88) = -1.83$, $p = .071$ (Figure 17a). The interaction pattern was nearly inverted for the *analysis* matching. Specifically, analysis (vs. intuition) appeals promoted marginally more favorable attitudes compared to intuition appeals, among recipients with higher levels of PVA (+1SD), $b = -0.63$, $t(88) = 1.71$, $p = .091$, and significantly less favorable attitudes among recipients with lower levels of PVA (-1SD), $b = 1.17$, $t(88) = 3.14$, $p = .002$ (Figure 17b).

Figure 17

General attitudes as a function of ad appeal and perceived validity



Isolating the matching effects with perceived validity. As expected (see Empirical Chapter III), PVI was significantly correlated with FI ($r(91) = .82$, $p < .001$) and PVA was not significantly correlated with NC ($r(91) = .03$, $p = .752$). To confirm that PVI promoted the observed matching effects independently of participants reliance on intuition, we tested whether these matching effects still occurred when controling for FI. As such, the mean centered score of FI was added as a predictor, and its interaction with ad appeal was interpreted in the second step of the model along with the interaction of ad appeal and PVI. Despite the strong relation between FI and PVI, the obtained results showed a significant interaction between ad appeal and PVI, $B = 1.68$, $t(86) = 2.76$, $p = .007$. However, and importantly, the interaction between ad appeal and FI was non-significant, $B = -0.51$, $t(86) = -0.89$, $p = .374$. The same analysis was replicated controlling for NC in analyses of PVA matching. Results showed a significant interaction between ad appeal and PVA, $B = -1.34$, $t(86) = -3.22$, $p = .002$, whereas the interaction between ad appeal and NC was non-significant, $B = 0.33$, $t(86) = 0.89$, $p = .375$. These results suggest that individual differences in naïve theories that link intuition and analysis with perceived validity significantly promoted matching effects with ad appeal, above and beyond matching effects with individual differences in reliance in intuition and need for cognition, as measured by the FI and NC scales.

Matching effects on behavioral intentions. Given the strong correlation between attitudes and behavioral intentions ($r(91) = .76$. $p < .001$) we assumed that the same matching effects would be observed for this outcome variable. Hence, a hierarchical regression was also performed predicting behavioral intentions with ad appeal, PVI, and PVA as predictors.

All main effects in this model were marginal or non-significant. The effect of ad appeal, $B = 0.61$, $t(89) = 1.81$, $p = .074$, suggested that the ad with intuition appeals promoted marginally higher behavioral intentions toward the car ($M = 3.74$, $SD = 0.25$) in comparison to the ad with analysis appeals ($M = 3.14$, $SD = 0.23$). The main effect of PVI, $B = 0.45$, $t(89) = 1.77$, $p = .080$, suggested that those who perceive it more valid also show a higher intention to buy a car. No significant main effect was found for PVA, $B = 0.15$, $t(89) = 0.53$, $p = .599$. Evidence of a matching effects (i.e., perceived validity x appeal interactions) were found for intuition, $B = 1.42$, $t(88) = 3.28$, $p = .002$, and analysis, $B = -1.40$, $t(88) = -2.89$, $p = .005$.

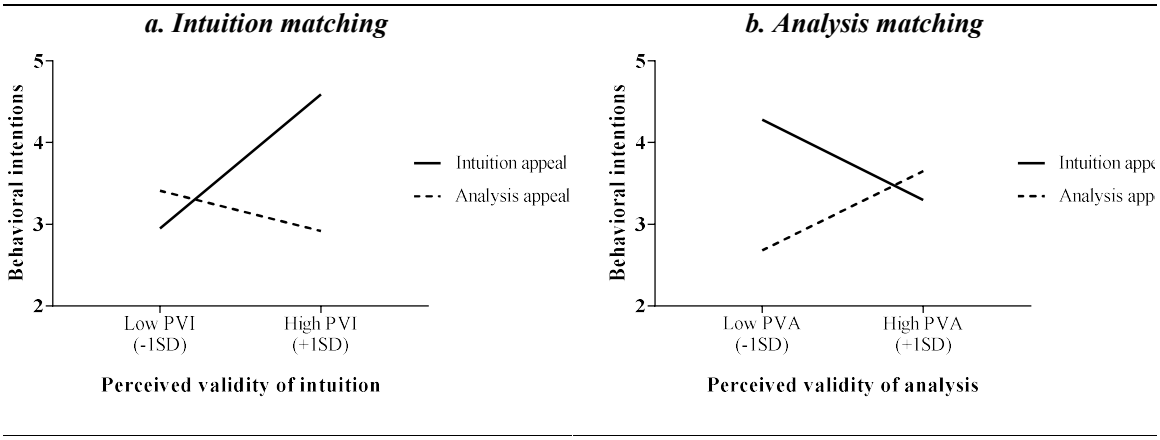
We followed the same two approaches in interpreting the obtained interactions for behavioral intentions.

Perceived validity simple effects. As illustrated in Figure 18a, the relation between PVI and behavioral intentions was significantly positive when recipients were presented with intuition appeals, $b = 1.09$, $t(88) = 3.50$, $p = .001$, and no significant association between PVI and behavioral intentions was obtained toward analysis appeals, $b = -0.33$, $t(88) = -0.96$, $p = .338$. Contrastingly, PVA was significantly associated with greater behavioral attitudes toward the analysis appeals, $b = 0.70$, $t(88) = 2.12$, $p = .037$, and a marginal negative association was obtained for intuition appeals, $b = -0.70$, $t(88) = -1.76$, $p = .081$ (Figure 18b).

Ad appeal simple effects. Intuition appeals significantly promoted greater behavioral intentions compared to analysis appeals, among recipients at higher levels of PVI (+1SD), $b = 1.68$, $t(88) = 3.67$, $p < .001$, but no differences were observed among recipients at lower levels of PVI (-1SD), $b = -0.46$, $t(88) = -1.00$, $p = .322$ (Figure 18a). Contrastingly, recipients at higher levels of PVA (+1SD) reported similar behavioral intentions when presented with intuition or analysis appeals, $b = -0.34$, $t(88) < 1$, but participants at lower levels of PVA (-1SD) reported greater behavioral intentions when presented with the intuition (vs. analysis) appeals, $b = 1.59$, $t(88) = 3.39$, $p = .001$ (Figure 18b).

Figure 18

Behavioral intentions as a function of ad appeal and perceived validity



Direct or thought mediated matching effects?

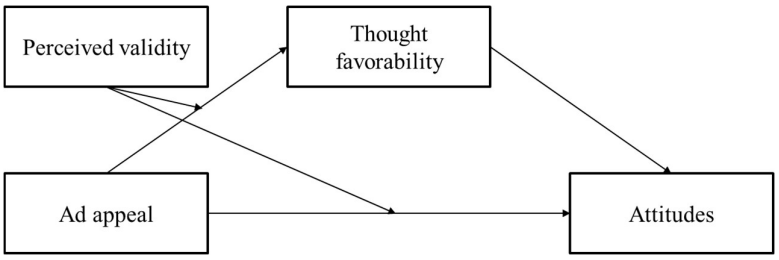
The previously observed moderated effects of ads on attitudes can occur either as direct effects of matching or through a process mediated by cogntition. That is, it is possible that perceived validity could make thoughts more favorable either because the matching argument

is viewed as compelling (i.e., as a strong argument) or because matching biases individuals thoughts to be favorable when the ad is somewhat ambiguous. In order to test whether the current matching effects were or were not thought-mediated, we tested whether the observed matching effects were mediated by participants positive thoughts about the ad (i.e., a moderated mediation). For this analysis, a thought favorability index was calculated based on the difference in the number of positive thoughts and the number of negative thoughts, dividing by the total number of thoughts (four participants did not report any thoughts).

To test the moderated mediation model, we used SPSS's PROCESS extension Model 8 (Hayes, 2017). By using this model (see Figure 19), the effects of the moderator (perceived validity) on the direct and indirect effect of the independent variable (ad appeal) on the outcome (attitudes) and the direct effect between the independent variable (ad appeal) and the mediator (thought favorability) can be simultaneously tested. By introducing ad appeal as the predictor in this model, the interpretation of the interaction (i.e., the matching effect) will be focused on the simple effects of ad appeal at different levels of the moderator (PV). The indirect effect (IE) of ad appeal on attitudes via thought favorability was estimated based on a bias corrected 95% confidence interval (CI) from 5,000 bootstrap samples.

Figure 19

Moderated mediation model



Intuition matching. Results of this analysis (see Table 25) provided evidence consistent with thought-mediated matching effects. First, there was a significant PVI x Appeal interaction on thought favorability, $B = 0.53$, $p = .005$. Simple slope analyses showed that the effect of ad appeal on thought favorability was significant for participants with higher levels of PVI (+1SD), $b = 0.73$, $p < .001$, but not for participants with lower levels of PVI (-1SD), $b = -0.07$, $p = .720$. Results also suggested that PVI moderated the indirect effect of ad appeal on attitudes via thought favorability (bootstrap estimate of moderated mediation = 0.72, 95% CI [0.25, 1.14]).

Specifically, only at higher levels of PVI, was the positive indirect effect of intuition appeals on attitudes significant, b = 1.00, 95% CI [.51, 1.52]. At lower levels of PVI, the indirect effect of intuition appeals was not significant, b = -.1, 95% CI [-0.60, 0.47]. This pattern suggests that the matching effect between the intuitive nature of the ad appeal and participants' PVI positively influenced attitudes via a favorable generation of thoughts elicited by the ad. It should also be noted that there was a significant PVI x Appeal interaction on attitudes (controlling for thoughts), B = 0.52, p = .042, which might suggest that some portion of the overall pattern on attitudes might also have been driven by cue effects (that would not be mediated by thoughts).

Table 25

Moderated mediation analysis – perceived validity of intuition as moderator of the direct and indirect relation between appeal and attitudes

	Bootstrapped CI 95%					
	B	*SE*	*t*	*p*	*CI*	R^2
Model 1: mediator variable model	Outcome: Thought favorability					
Ad appeal	0.33	0.14	2.38	.020	[0.05, 0.61]	0.18
Perceived validity of intuition (PVI)	-0.07	0.15	-0.51	.611	[-0.36, 0.21]	
Perceived validity of analysis (PVA)	0.15	0.11	1.28	.204	[-0.08, 0.37]	
Ad appeal x PVI	0.53	0.18	2.86	.005	[0.16, 0.89]	
Conditional effects of ad appeal on thought favorability						
Low perceived validity of intuition (-1SD)	-0.07	0.20	-0.36	.720	[-0.47, 0.32]	
High perceived validity of intuition (+1SD)	0.73	0.20	3.71	.000	[0.34, 1.13]	
Model 2: outcome variable model	Outcome: Attitudes					
Ad appeal	-0.12	0.19	-0.62	.538	[-0.49, 0.26]	0.63
Thought favorability	1.37	0.14	9.66	.000	[1.09, 1.65]	
Perceived validity of intuition (PVI)	-0.09	0.19	-0.45	.654	[-0.46, 0.29]	
Perceived validity of analysis (PVA)	0.28	0.15	1.84	.069	[-0.02, 0.57]	
Ad appeal x PVI	0.52	0.25	2.06	.042	[0.02, 1.01]	
Conditional direct effects of ad appeal on attitudes						
Low perceived validity of intuition (-1SD)	-0.51	0.26	-1.98	.051	[-1.03, 0.00]	
High perceived validity of intuition (+1SD)	0.28	0.28	1.01	.314	[-0.27, 0.83]	
Bootstrapping results for the indirect effect (via thought favorability)						
Index of moderated mediation	0.72	0.22			[0.25, 1.14]	
Conditional indirect effect of ad appeal on attitudes (via thought favorability)						
Low perceived validity of intuition (-1SD)	-0.10	0.27			[-0.60, 0.47]	
High perceived validity of intuition (+1SD)	1.00	0.26			[0.51, 1.52]	

Ad appeal: 0 = analysis, 1 = intuition; B = Unstandardized regression coefficients. Bootstrap sample size = 5.000

Analysis matching. Results of this analysis (see Table 26) provided evidence consistent with thought-mediated matching effects. Importantly, there was a significant PVA x Appeal interaction on thought favoraiblity, B = -0.49, p = .022. Simple slope analyses show that the

effect of ad appeal on thought favorability is significant for participants with lower levels of PVA, $b = 0.68$, $p = .001$, but non-significant for participants with higher levels on this variable, $b = -0.00$, $p = .983$. As observed for the previous model, results suggest that PVA moderated the indirect effect of appeal on attitudes via thought favorability (bootstrap estimate of moderated mediation = -0.66, 95% CI [-1.17, -0.10]). However, in this case, the indirect effect of the intuition appeal on attitudes was significant for participants with lower levels of PVA, $b = .92$, 95% CI [0.35, 1.47]. This suggests that, in this model, matching intuition appeals with participants' lower levels of PVA positively influenced attitudes via a biased generation of thoughts. When PVI was high (+1SD), however, the indirect effect of intuition appeals was not significant, $b = -.01$, 95% CI [-.51, .55]. Also in this model, there was a significant PVA x Appeal interaction on attitudes, when controlling for thoughts, $B = -0.77$, $p = .006$. This might be consistent with cue effects that were not mediated by thoughts for some portion of the participants (see also conditional direct effects of ad appeal on attitudes presented in Table 26).

Table 26

Moderated mediation analysis – perceived validity of analysis as moderator of the direct and indirect relation between appeal and attitudes

					Bootstrapped CI 95%	
	B	*SE*	*t*	*p*	*CI*	R^2
Model 1: mediator variable model	Outcome: Thought favorability					
Ad appeal	0.35	0.14	2.44	.017	[0.07, 0.63]	0.15
Perceived validity of intuition (PVI)	0.17	0.11	1.62	.109	[-0.39, 0.39]	
Perceived validity of analysis (PVA)	0.33	0.14	2.30	.024	[0.04, 0.61]	
Ad appeal x PVA	-0.49	0.21	-2.34	.022	[-0.90, -0.07]	
Conditional effects of ad appeal on thought favorability						
Low perceived validity of analysis (-1SD)	0.68	0.20	3.32	.001	[0.27, 1.08]	
High perceived validity of analysis (+1SD)	-0.00	0.20	-0.02	.983	[-0.41, 0.40]	
Model 2: outcome variable model	Outcome: Attitudes					
Ad appeal	-0.09	0.18	-0.49	.624	[-0.46, 0.27]	0.64
Thought favorability	1.36	0.14	9.95	.000	[1.09, 1.63]	
Perceived validity of intuition (PVI)	0.13	0.14	0.99	.324	[-0.14, 0.40]	
Perceived validity of analysis (PVA)	0.57	0.18	3.10	.003	[0.20, 0.93]	
Ad appeal x PVA	-0.77	0.27	-2.85	.005	[-1.31, -0.23]	
Conditional direct effects of ad appeal on attitudes						
Low perceived validity of analysis (-1SD)	0.43	0.27	1.59	.117	[-0.11, 0.97]	
High perceived validity of analysis (+1SD)	-0.64	0.25	-2.54	.013	[-1.14, -0.14]	
Bootstrapping results for the indirect effect (via thought favorability)						
Index of moderated mediation	-0.66	0.27			[-1.17, -0.10]	
Conditional indirect effect of ad appeal on attitudes (via thought favorability)						
Low perceived validity of analysis (-1SD)	0.92	0.28			[0.35, 1.47]	
High perceived validity of analysis (+1SD)	-0.01	0.27			[-0.51, 0.55]	

Ad appeal: 0 = analysis, 1 = intuition; B = Unstandardized regression coefficients. Bootstrap sample size = 5.000

Study 4.2

In Study 4.2, we aimed to replicate the matching effects observed in Study 4.1 and examine the multiple processes by which matching might influence attitudes. More specifically, those occurring in high and low elaboration. For that, we added to the advertisements presented in Study 4.1 a set of persuasive arguments consisting of car features framed as intuitive or analytic. We also manipulated baseline involvement (motivation to elaborate).

Method

Participants and design

A sample of 107 North American participants (41.1% females; M_{age} = 27.87, SD_{age} = 6.88), was recruited on Prolific Academic. To replicate the matching effects obtained in Study 4.1, a power analysis conducted on G*Power (Faul et al., 2007) estimated a minimum sample size of 35 participants for a 80% power, at a significance level of .05, to detect the predicted two-way interaction, assuming an effect size of f = 0.49 (converted from R-squared = 0.195 observed in Study 4.1). A sensitivity power analysis (Faul et al., 2007), for a significance level of .05, was performed with a sample of 107 participants, revealing 80% power to detect the expected matching effects in this study, for a minimum effect size of f = 0.27. Participants were randomly assigned to a version of an online survey, defined by the 2 (Ad/message appeal: Intuition vs. Analysis) x 2 (Involvement: High vs. Low) between-participants design.

Materials

Target advertisement. We used the same target advertisement developed for Study 4.1 followed by an additional extended ad describing the car features as either intuitive or analytic. For this purpose, several car features were manipulated to be presented as either intuitive or analytic based on the application of central features of intuition and analysis obtained in the prototype analysis in Empirical Chapter I. The car features presented in the ads and their operationalization into intuitive and analytic attributes are presented in Table 27. Central features of intuition such as “Using your senses”, “Acting automatically and effortlessly”, “Predicting something will happen” and “Thinking quickly” were used to operationalize the car features as intuitive. To operationalize the car features as analytic, features such as “Organizing and analyzing information”, “Acting based on facts and data”, “Assessing and observing the

situation" and "Paying attention to detail" were employed. The descriptions of the car features were thus similar across both ads, with the exception of the nature of the intuitive and analytic appeals differentiating them (underlined in Table 27).

Table 27

Car features described intuitively and analytically in the target advertisement

Car features	Intuitive description	Analytic description
Forward Collision Warning	[…] senses when your vehicle is approaching another vehicle […]	[…] calculates when your vehicle is approaching another vehicle […]
Automatic Emergency Braking	[…] will also quickly sense danger and automatically brake for you […]	[…] will also quickly analyze danger and automatically brake for you […]
Blind-spot Assist	[…] helps you to predict potential danger of surrounding vehicles […]	[…] examines all aspects of potential danger of surrounding vehicles […]
Night Vision Assistant	[…] to extend your senses and detect unseen objects […]	[…] to gather data and detect unseen objects […]
LCD panoramic screen	[…] provides fast, intuitive menus (…) allowing for effortless control over entertainment and comfort features […]	[…] provides thorough, detailed menus (…) allowing for an in-depth control over entertainment and comfort features […]

In addition to the description of the car features, the intuitive and analytic nature of the ad was also operationalized through short descriptions mentioning *intuition* and *analysis*, both preceding the description of the car features and at the end of the ad. For instance, for the intuitive version of the ad, it was described that "*Technology and intuition fuel each other on the road to the future of mobility. […] Elysium brings intuition into its technologies and systems."*, and the ad ended with *"Future meets present with these intuitive features. All working together to support your decisions and providing an incredibly natural and comfortable driving experience."* For the analytic version of the ad, it was described that *"Technology and rationality fuel each other on the road to the future of mobility. […] Elysium brings a data-analytic approach into its technologies and systems."*, and the ad ended with *"Future meets present with these analytical features. All working together to support your decisions and providing an incredibly thorough and comfortable driving experience."*

Figure 20 illustrates the two versions of the ad. The ad started by introducing the new Elysium model, followed by the presentation of general car features without any reference to intuition or analysis. After this short introduction, the intuitive or analytic nature of the car was introduced and the features were described. After the description of the features, the ad ended with the sentences described in the previous paragraph. Both versions of the ad were similar in

length. The ad also did not reveal much visual detail about the car in order to keep participants' focus directed at the description of the features.

Figure 20

Different appeal conditions (intuition vs. analysis) for the target car ad used in Study 4.2

Filler advertisements. The same two filler advertisements developed for Study 4.1 (see Figure 16) were used in this study.

Instruments

Participants' PVI and PVA were assessed through the application of the measures of perceived validity used in Study 4.1 of Empirical Chapter III. Both measures showed values of model fit to a single-factor structure comparable to those observed in Study 4.1 and Empirical Chapter III ($\chi^2/df = 2.30$, CFI = .727, GFI = .730, RMSEA = .111; $\chi^2/df = 1.80$, CFI = .795, GFI = .767, RMSEA = .087, for PVI and PVA, respectively) and displayed good levels of internal consistency (Cronbach's alphas = .86 and .89, for PVI and PVA, respectively).

Procedure

Participants were invited to take part in a study of "evaluation of different advertisements". After providing informed consent, participants were told that their participation would involve evaluating three different advertisements and rating different statements in how well each was characteristic of them (replicating the instructions in Study 4.1). Participants then received the instructions that operationalized the involvement manipulation. Based on procedures used by Petty and colleagues (Petty et al., 1980, 1983; Petty & Cacioppo, 1984), in the high-involvement condition, participants were told that they would *"take part in a marketing study in which they would be presented with an advertisement for a new car brand to be introduced in the United States within the next year".* To further enhance involvement, instructions provided to participants emphasized that *"only a small sample of people would be surveyed to provide their opinions and that the collected data would be used to make important decisions pertaining the launch of the new car"*, and that *"their opinions towards the ad were extremely important".* In the low-involvement condition, participants were told that they would *"be presented with an advertisement for a new car brand to be introduced in the European market within the next two years"*, and that *"a large sample of people would be surveyed to provide their opinions"*, finalizing with the instruction that *"their opinions towards the ad would be averaged with those of all other people."*

Participants were then randomly presented with the intuitive or analytic version of the target advertisement presented in Study 4.1 (see Figure 15). After this self-paced presentation, participants saw in the next page the ad containing the description of the car features. The

intuitive and analytic nature of the appeals was kept consistent across the first ad and the second ad describing the car features. This ad was, too, presented in the center of the screen, and its size was 735 px width and 512 px height. Participants read these car features at their own pace and, on the following page, listed the thoughts they had while seeing the advertisement and reading the description of the car features. Participants listed one thought per box in up to five boxes provided for thought listing. Each thought was subsequently presented to participants on the next page, and classified by them as positive, neutral, or negative toward the car. After classifying their thoughts, participants indicated their attitudes and behavioral intentions using the same measures employed in Study 4.1. All items used to measure attitudes loaded on a single general attitude factor (accounting for 65.9% variance) with an internal consistency of $\alpha = .97$. To simplify the analyses and presentation of the results, these items were averaged to form a general attitude index. Additionally, both items assessing behavioral intentions were averaged to create a behavioral intention index ($r(105) = .76$, $p < .001$). After providing their attitudes and behavioral intentions, participants completed a manipulation check for involvement for which they rated how personally involved they felt while evaluating the ad, on a scale from 1 (Not at all involved) to 7 (Very involved).

After this task, participants were presented with the two filler ads used in Study 4.1 (see Figure 16) and completed the same measures for each of them. Finally, after evaluating all ads, participants completed the measure of perceived validity of intuition followed by the measure of perceived validity of analysis, before they were thanked and debriefed.

Results

As in Study 4.1, we first tested whether the nature of the appeals presented in the ad and the description of the car features biased participants' reports of PVI and PVA. The results showed non-significant differences between both conditions for the measure of PVI, $t(105) = -1.48$, $p = .143$ ($M_{intuition} = 3.17$, $SD = 0.42$ vs. $M_{analysis} = 3.02$, SD = 0.62), and PVA, $t < 1$ ($M_{intuition} = 3.81$, $SD = 0.54$ vs. $M_{analysis} = 3.84$, SD = 0.62), indicating that the manipulation did not bias participants' responses. We also tested whether our manipulation check for involvement, only assessed at the end of the task, was still sensitive to the involvement manipulation. This seemed not to be the case. Participants in conditions of high ($M = 4.77$, $SD = 1.69$) and low involvement ($M = 4.81$, $SD = 1.83$) did not significantly differ on how involved

they perceived themselves in the evaluation of the ad, $F < 1$, and this was true for both experimental conditions manipulating ad appeal, $F's < 1$.

Matching effects

Matching ad appeals and perceived validity: effects on attitudes. We followed the procedures of Study 4.1 and replicated the two three-step hierarchical regression models reported in the analyses above to approach the hypothesized matching effects for intuition and analysis appeals. Suggesting that both ads promoted equally favorable attitudes, the main effect of appeal was non-significant, $B = 0.20$, $t(102) = 0.87$, $p = .385$. Also the main effects of PVI, $B = 0.04$, $t(102) = 0.15$, $p = .880$, PVA, $B = 0.33$, $t(102) = 1.54$, $p = .127$, and involvement, $\beta = -0.32$, $t(102) = -1.39$, $p = .169$, were all non-significant.

In examining *intuition* matching effects, appeal did not significantly interact with perceived validity of intuition, $B = 0.34$, $t(99) = 0.73$, $p = .470$, failing to produce the relevant interaction found in Study 4.1.

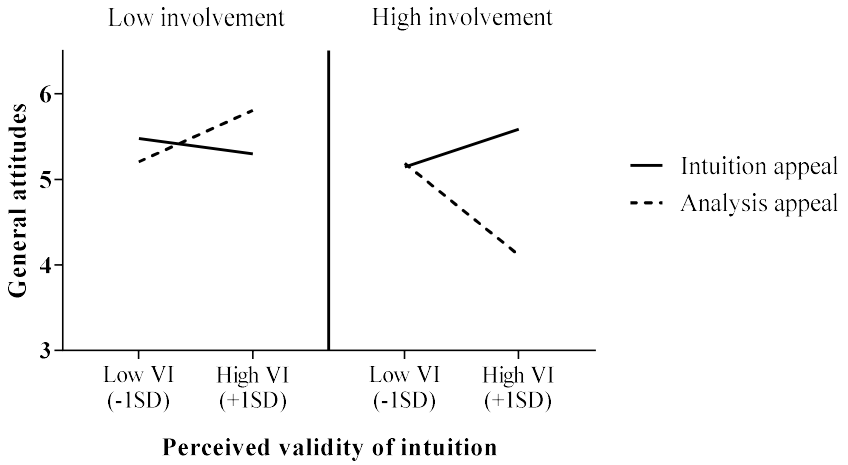
The non-significant interaction seemed to occur because of the effects of involvement. Specifically, although involvement produced no main effect, it both marginally interacted with appeal, $B = 0.78$, $t(99) = 1.69$, $p = .094$, and PVI, $B = -0.78$, $t(99) = -1.79$, $p = .077$, but also promoted a significant three-way interaction with appeal and PVI, $B = 2.09$, $t(98) = 2.32$, $p = .022$. As illustrated in Figure 21, evidence of matching effects between appeal and PVI was only observed for conditions of high involvement. A test of conditional interactions at values of the moderator involvement, showed that this interaction was significant for conditions of high involvement (when elaboration should be high), $F(1, 98) = 4.56$, $p = .035$, but not for conditions of low involvement (when elaboration should be low), $F(1, 98) = 1.37$, $p = .244$. We follow up on the significant interaction detected in the high involvement condition with simple slope analyses, to test if the interaction follows the patterns found in Study 4.1.

Perceived validity simple effects. Results do not replicate the pattern observed in Study 4.1. Specifically, although there was a tendential positive association between PVI and attitudes toward the ad with intuition appeals, this effect was non-significant for this study, $b = 0.37$, $t(98) = 0.74$, $p = .463$. Additionally, instead of a null effect for analysis appeals (evidenced in Study 4.1), individual differences in PVI were here negatively associated with attitudes when participants received the ad with analysis appeals, $b = -0.96$, $t(98) = -2.39$, $p = .019$ (Figure 21).

Ad appeal simple effects. Replicating the results of Study 4.1., participants at higher levels of PVI (+1SD) reported more favorable attitudes when presented with the intuition (vs. analysis) appeals, b = 1.37, $t(88) = 2.94$, $p = .004$, and no differences were observed among participants at lower levels of PVI (-1SD), b = -0.03, $t(88) < 1$ (Figure 21).

Figure 21

General attitudes as a function of ad appeal, perceived validity of intuition and involvement



Regarding the *analysis* matching effects, the model revealed a set of non-significant relations. The two-way interactions of Involvement x Appeal, $B = 0.65$, $t(99) = 1.37$, $p = .173$, Involvement x PVA, $B = -.01$, $t(99) = -0.01$, $p = .989$, and Appeal x PVA, $B = -.03$, $t(99) = -0.06$, $p = .951$ were all non-significant. Also the three-way interaction between appeal, PVA, and involvement was non-significant, $B = 0.69$, $t(98) = 0.84$, $p = .404$. The relevance of this set of null results is that they suggest that no matching effects were observed between analysis appeals and PVA for either involvement conditions.

Matching effects on behavioral intentions. Also for this study, a strong correlation between attitudes and behavior intention ($r(105) = .75$. $p < .001$) was found. Hence, we assumed that the same matching effects would be observed for this variable. We performed the two previous hierarchical regression models conducted in Study 4.1 predicting behavioral intentions, using ad appeal and PVI and PVA as predictors, and now adding involvement to the models. In this analysis, all main effects in the model were non-signficant (appeal, B = -0.04,

$t(102) < 1$; PVI, $B = -0.29$, $t(102) < 1$; PVA, $B = 0.08$, $t(102) < 1$; involvement, $B = -.26$, $t(102) < 1$). Also, the matching effect for intuition was weaker in this study, as the interaction between appeal and PVI was non-significant, $B = 0.79$, $t(99) = 1.14$, $p = .256$. Contrary to what occurred for attitudes, we found no significant evidence that involvement qualified this interaction, as the three-way interaction between three predictors was non-significant, $B = 2.25$, $t(98) = 1.65$, $p = .102$ (although the same pattern was observed). In addition, the other two-way interactions were also non-significant: Involvement x Appeal, $B = 0.80$, $t(99) = 1.02$, $p = .246$, and Involvement x PVI, $B = -0.85$, $t(99) = -1.30$, $p = .198$.

The same results were observed for the model testing the analysis matching effects, as all two-way interactions were non-significant: Involvement x Appeal, $B = 0.45$, $t(99) = 1.28$, $p = .204$, Involvement x PVA, $B = -0.09$, $t(99) = -0.14$, $p = .887$, and Appeal x PVA, $B = -0.43$, $t(99) = -0.71$, $p = .479$. The three-way interaction between all three predictors was non-significant, $B = .02$, $t(98) = 0.01$, $p = .990$.

Direct or thought mediated matching effects for attitudes?

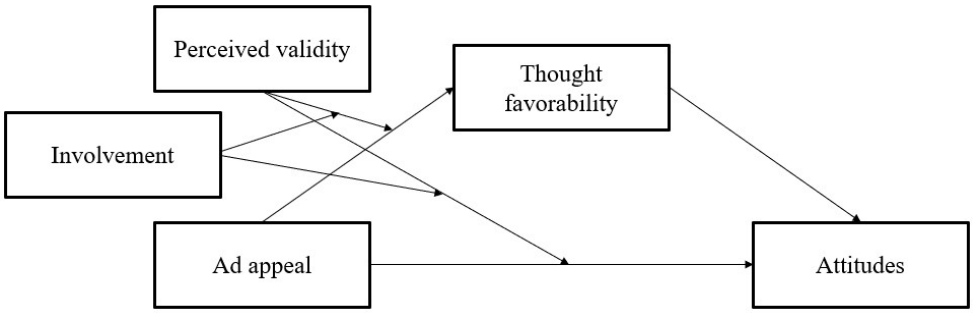
We further tested whether the observed matching effect of intuition appeals in conditions of high involvement occurred as direct effects of matching or through a process mediated by cogntition. We hypothesized that, in conditions of high involvement, high PVI can promote favorable thoughts in reactions to intuition appeals either because the intuition appeals seem more compelling or because of a bias in thoughts elicited by the intuition appeals. To test this hypothesis, we analyzed whether the observed matching effects were mediated by participants' positive thoughts about the ad, but only in conditions of high involvement (i.e., a moderated moderated mediation). For this analysis, a thought favorability index was calculated based on the difference in the number of positive thoughts and the number of negative thoughts, divided by the total number of thoughts (one participant did not report any thoughts).

To test this hypothesis, we used SPSS's PROCESS extension Model 12 (Hayes, 2017). By using this model (see Figure 22), the effects of the moderator (perceived validity) on the direct and indirect effect of the predictor (ad appeal) on the outcome (attitudes) and the direct effect between the predictor and the mediator (thought favorability) can be simultaneously tested, for conditions of high and low involvement. As in Study 4.1, by using ad appeal as the predictor in this model, the interpretation of the interaction (i.e., the matching effect) will be focused on the simple effects of ad appeal at different levels of the moderator (PV). The indirect

effect (IE) of ad appeal on attitudes via thought favorability for both involvement conditions was estimated based on a bias corrected 95% CI from 5,000 bootstrap samples.

Figure 22

Moderated moderated mediation model



Results of this analysis (see Table 28) suggested that the previously identified three-way interaction for attitudes between ad appeal, perceived validity of intuition and involvement were potentially due, in part, to influences on thought favorability. The same three-way interaction was marginally significant for thought favorability, $B = 0.76$, $p = .071$. A test of conditional interactions between appeal and PVI at high and low values of Involvement showed that the Appeal x PVI interaction was significant for conditions of high involvement, $F(1, 97) = 8.97$, $p = .003$, but not for conditions of low involvement, $F < 1$. Simple slope analyses showed that intuition appeals promoted significantly more favorable attitudes compared to the analysis appeals for participants with higher levels of PVI, but only for conditions of high involvement, $b = .76$, $p = .001$.

Results also suggested that, as observed in Study 4.1, only for participants high in PVI, there was a significant indirect effect of ad appeal on attitudes via thought favorability ($b = .95$, 95% CI [0.25, 1.14]). Furthermore (although the index of moderated moderated mediation was non-significant (estimate = 0.95, 95% CI [-0.37, 2.08]), the indices of conditional moderated mediation, showed that the PVI-moderated mediation was significant for conditions of high involvement (estimate = 1.08, 95% CI [0.32, 1.95]) but not low involvement (estimate = 0.12, 95% CI [-0.56, 1.22]). These results supported the notion that, in conditions of high involvement, the matching between the intuition appeal and participants' PVI positively influenced attitudes via thought favorability elicited by the matching ad.

Table 28

Moderated moderated mediation analysis – perceived validity of intuition and involvement as moderators of the direct and indirect relation between appeal and attitudes

	Bootstrapped CI 95%					
	B	*SE*	*t*	*p*	*CI*	R^2
Model 1: mediator variable model	Outcome: Thought favorability					
Ad appeal	-0.28	0.15	-1.81	.073	[0.29, 0.71]	0.15
Perceived validity of intuition (PVI)	-0.03	0.17	-0.15	.880	[-0.36, 0.31]	
Ad appeal x PVI	0.10	0.30	0.33	.746	[-0.50, 0.70]	
Involvement	-0.38	0.15	-2.49	.015	[-0.68, -0.77]	
Ad appeal x Involvement	0.58	0.21	2.77	.007	[0.16, 1.00]	
PVI x Involvement	-0.49	0.25	-1.99	.049	[-0.98, -0.00]	
Appeal x PVI x Involvement	0.76	0.42	1.83	.071	[-0.07, 1.58]	
Perceived validity of analysis (PVA)	-0.08	0.10	-0.86	.393	[-0.27, 0.11]	
Test of conditional Appeal*PVI interaction at values of Involvement						
Low involvement	0.10		$F < 1$	.746		
High involvement	0.86		$F = 8.97$	.003		
Conditional effects of ad appeal on thought favorability						
Low PVI (-1SD), Low involvement	-0.33	0.23	-1.43	.157	[-0.79, 0.13]	
Low PVI (-1SD), High involvement	-0.15	0.20	-0.74	.463	[-0.54, 0.25]	
High PVI (+1SD), Low involvement	-0.23	0.21	-1.07	.286	[-0.64, 0.19]	
High PVI (+1SD), High involvement	0.76	0.22	3.52	.001	[0.33, 1.18]	
Model 2: outcome variable model	Outcome: Attitudes					
Ad appeal	0.18	0.29	0.63	.528	[-0.39, 0.75]	0.42
Thought favorability	1.26	0.19	6.77	.000	[0.89, 1.63]	
PVI	0.54	0.31	1.76	.082	[-0.70, 1.16]	
Ad appeal x PVI	-0.82	0.55	-1.48	.143	[-1.92, 0.28]	
Involvement	-0.43	0.29	-1.50	.138	[-1.00, 0.14]	
Appeal x Involvement	0.16	0.40	0.40	.691	[-0.63, 0.95]	
PVI x Involvement	-0.92	0.46	-2.00	.048	[-1.83, -0.01]	
Appeal x PVI x Involvement	1.17	0.77	1.52	.133	[-0.36, 2.71]	
PVA	0.34	0.18	1.93	.057	[-0.10, 0.69]	
Conditional direct effects of ad appeal on attitudes						
Low PVI (-1SD), Low involvement	0.61	0.43	1.43	.156	[-0.24, 1.46]	
Low PVI (-1SD), High involvement	0.15	0.37	0.42	.676	[-0.57, 0.88]	
High PVI (+1SD), Low involvement	-0.25	0.39	-0.65	.521	[-1.02, 0.52]	
High PVI (+1SD), High involvement	0.53	0.42	1.26	.210	[-0.30, 1.35]	
Conditional indirect effect of ad appeal on attitudes (via thought favorability)						
Low PVI (-1SD), Low involvement	-0.41	0.29			[-1.06, 0.10]	
Low PVI (-1SD), High involvement	-0.19	0.29			[-0.79, 0.39]	
High PVI (+1SD), Low involvement	-0.28	0.33			[-0.82, 0.45]	
High PVI (+1SD), High involvement	0.95	0.28			[0.44, 1.53]	
Bootstrapping results for the indirect effect (via thought favorability)						
Index of moderated moderated mediation	0.95	0.61			[-0.37, 2.08]	
Indices of conditional moderated mediation by Involvement						
Low involvement	0.12	0.47			[-0.56, 1.22]	
High involvement	1.08	0.41			[0.32, 1.95]	

Ad appeal: 0 = analysis, 1 = intuition; B = Unstandardized regression coefficients. Bootstrap sample size = 5.000

Discussion

The two studies presented in this empirical chapter aimed to test how message features regarding intuition and analysis appeals interact with recipients' naïve theories of validity related to intuition and analysis. For this end, in two studies, we made use of an advertisement for a fictitious new car brand designed to appeal to either intuition or analysis. In Study 4.1, we tested for these matching effects in unrestricted elaboration likelihood conditions and, in Study 4.2, we manipulated baseline elaboration likelihood conditions allowing us to test the mechanisms through which these matching effects influence attitudes.

Consistent with our hypotheses, the results obtained in Study 4.1 evidenced matching effects between intuition-based appeals and participants' PVI and between analysis-based appeals and participants' PVA, respectively. Specifically, more favorable attitudes toward the ad with intuition appeals were observed among participants with higher (vs. lower) levels of PVI, and more favorable attitudes toward the ad with analysis appeals were observed for participants with higher (vs. lower) levels of PVA. Additionally, through analyses focused on simple effects of ad appeals, results also revealed that participants with higher levels of PVI and lower levels of PVA reported more favorable attitudes toward the ad with intuition appeals in comparison to the ad with analysis appeals. Importantly, these matching effects for intuition appeals were obtained even when controlling for matching with individual differences in reliance in intuition, as measured by the Faith in Intuition scale. This suggests that this effect is not qualified by individual differences in mere reliance in intuition.

The matching effects observed for intuition and analysis appeals in Study 4.1, in conditions of unrestricted elaboration likelihood, were at least partly mediated by thought favorability. Specifically, regarding intuition, the observed matching effects occurred at least partly because the positive indirect effect of intuition appeals on attitudes via thought favorability was different for participants with high and low PVI (a moderated mediation), suggesting that the matching positively influenced attitudes via a generation of more favorable thoughts elicited by the ad. PVA also moderated the impact of the ads on attitudes via thought favorability. Specifically, intuition appeals positively influenced attitudes of participants with low PVA through generation of more favorable thoughts towards the ad, but intuition appeals had no such effects for people high in PVA. Furthermore, direct effects of the matching on attitudes, when controlling for thought favorability, were still observed for both intuition and

analysis appeals. This might suggest that, for some message recipients, these matching effects might also be partially driven by cue effects.

Taken together, these results suggest that, in conditions in which thinking is not constrained by other variables to be high or low and in which messages make broad but not detailed allusions to intuition or analysis, matching effects of intuition and analysis appeals influenced attitudes at least partly by influencing the direction of thoughts elicited by the message. These findings replicate previous matching effects showing that matching a message to recipients' characteristics in such conditions is likely to influence persuasion by affecting the favorability of thoughts (e.g., Lavine & Snyder, 1996; Ziegler et al., 2005, 2007). Our results add to this research by showing that matching effects occurred especially when participants perceived intuition as valid or analysis as not valid.

In Study 4.2, by manipulating baseline involvement, we attempted to address whether the mechanisms through which these matching effects influence attitudes are dependent upon elaboration. Specifically, we tested whether a direct effect of matching on attitudes occurs in conditions of low involvement and whether, in conditions of high involvement, this matching influences attitudes through a thought-mediated process. Results were not clear with this regard, suggesting as possible that our manipulations interfered with the effects found in Study 4.1. In Study 4.2, no matching effects were obtained in conditions of low involvement. And the effects that were obtained in conditions of high involvement only partially replicated the pattern of matching effects observed for intuition appeals in Study 4.1. Specifically, at an individual differences level (focusing on perceived validity simple effects), for highly involved participants, higher levels of PVI did not predict more favorable attitudes toward the ad with intuition appeals, thus failing to replicate the effect of Study 4.1. Moreover, higher levels of PVI significantly predicted less favorable attitudes toward the ad with analysis appeals – contrasting with the null effect found on Study 4.1. Suggesting that perhaps the interpretation of the matching effects should be more centered on an ad appeal level (focusing on ad appeal simple effects) rather than on an individual differences level, participants at higher levels of PVI reported more favorable attitudes when presented with intuition compared to analysis appeals, replicating the results of Study 4.1. Regarding the matching effects of analysis appeals, these were not observed in conditions of either low or high involvement.

The effects of intuition appeals in conditions of high involvement were shown to occur via a generation of favorable thoughts elicited by the ad. Corroborating the results of Study 4.1, there was a positive indirect effect of intuition appeals on attitudes via thought favorability

dependent upon participants PVI. The interference of involvement, although replicating previous research (e.g., Lavine & Snyder, 1996; Ziegler et al., 2005, 2007), is not as clear as one would expect. One hypothesis that could be further explored is that matching effects might be more clearly observed when elaboration is moderated, clarifying why they are less evident when conditions are extreme. In condition of moderated elaboration, matching can impact the degree of elaboration itself offering an avenue for an effect occur (as further discussed in the General Discussion).

Although future research should provide more data to clarify the null effects obtained in Study 4.2 – also replicating it with a larger sample size (due to low power) –, our findings across studies provided the first evidence of matching effects for intuition appeals in persuasion and suggest that these can occur via a relatively elaborative process. More favorable attitudes were observed when ads containing intuition appeals, and when the car's features were described as intuitive, were presented to participants with higher (vs. lower) levels of PVI. Furthermore, these findings provide further evidence of the contribution of assessing individuals' naïve theories of validity – here, by promoting a significant matching effect with the intuitive nature of the appeals of the advertisement, through a thought-mediated process.

Section III

General Discussion

General Discussion

The main goal of this thesis was to introduce the study of intuition in persuasion by focusing on the interplay between people's lay conceptions of intuition and the use of intuition appeals as a persuasion variable. Specifically, we developed a set of studies with the main goal of empirically addressing the questions of *whether, when*, and *for whom* intuition appeals influence persuasion. Based on our literature review and preliminary studies conducted within this thesis, we hypothesized that such influence should occur as a function of the match between intuition (or analysis) appeals presented in the persuasive message and recipients' characteristics, specifically, how recipients perceive validity in the use of intuition (or analysis). Several empirical questions had to be tackled before the test of such hypotheses. These questions guided our preliminary studies.

The first question pertained to the understanding of how intuition is perceived by the lay person, i.e., the message recipient (Empirical Chapter I). The studies conducted regarding this first question allowed us to flag the most central features of people's lay conceptions of intuition and analysis and provided us with the means to successfully operationalize intuition and analysis in following studies in a way that reflects how the lay person perceives the two concepts. The second question pertained to the understanding of two important aspects regarding the use of intuition and analysis. First, we wanted to understand people's explicit preferences for intuition and analysis across different contexts and as a function of individual differences in intuitive and analytic styles. Second, we wanted to understand people's naïve theories of validity of intuition and analysis as well as the role of such theories in explaining preferences for use of intuition or analysis (Empirical Chapter II). Our studies provided evidence in support of the view that although individuals may display a priori intuitive or analytic styles, their explicit preferences for intuition and analysis are likely context-dependent. Additionally, our results suggested that people's naïve theories of validity of intuition and analysis mediate the effects that cognitive styles exert on preferences for use of intuition and analysis – although not as clearly for analysis.

Recognizing the importance of naïve theories of validity, namely in explaining decision-makers' preferences for intuition and analysis, the third question of this thesis pertained to the possibility of developing measures assessing individual differences in perceived validity of intuitive and analytic decision-making (Empirical Chapter III). Borrowing the most central features of intuition and analysis obtained in the prototype analysis conducted in Empirical Chapter I, we developed and validated the two proposed measures. These evidenced good

psychometric properties and the study of their associations with individual differences in intuitive and analytic cognitive styles (as assessed by the Rational-Experiential Inventory and the Need for Cognition scales) was highly informative of the nature of both measures and further confirmed the specificities associated with how one perceives validity in intuition and analysis and how these are distinguished from the other measured individual differences.

Finally, the goal of Empirical Chapter IV pertained to the testing of the matching effects between intuitive and analytic features of a persuasive message and participants' naïve theories of validity of intuition and analysis. In two studies, we provided evidence for matching effects whereby more favorable attitudes towards an advertisement with intuition appeals were observed among participants with higher (vs. lower) levels of perceived validity of intuition. Additionally, results also revealed that participants with higher levels of perceived validity of intuition reported more favorable attitudes toward an advertisement with intuition appeals in comparison to an advertisement with analysis appeals. Importantly, this effect occurred through a relatively elaborative process, in which the matching positively influenced attitudes via generation of more favorable thoughts when the message matched the person's theory of validity of intuition. These matching effects and the mediating role of thought favorability of matching of analysis appeals and recipients' perceived validity of analysis were not as clear or consistent as those observed for *intuition* matching. In general, though, the matching effects seemed stronger and more consistent across intuition and analysis when the persuasive message was brief and referred broadly to intuition or analysis rather than unpacking specific features of the product that were related to intuition or analysis.

In sum, this thesis provides a systematic approach to the role of intuition in persuasion, and its main findings provide the first evidence for matching effects for intuition appeals and individuals' naïve theories of intuition. For that, it provided an empirical support for how people perceive intuition and how they assess the validity of using intuition and analysis in decision-making. All of these data were important not only for the scope of the general goal of this work, but they also raise, themselves, relevant questions and a call for additional discussion. In the following sections, we discuss the main findings concerning each of the questions for which we provide data and address their implications for current knowledge on the topic and in the persuasion literature. We also address the limitations associated with this work, providing recommendations for future studies to directly address them, as well as suggestions for future research to build upon the work conducted in this thesis.

Intuition and analysis: how are they conceived?

In the first Empirical Chapter of this thesis, we empirically addressed the lay conceptions of *intuition* and *analysis.* Our review of the literature allowed us to identify several definitions and theories of intuitive and analytic decision-making as well as evidence for how the concepts are perceived by the lay person. It was our view that, in order to study the role of intuition and analysis appeals in persuasion, it is relevant first to understand how the concepts are generally perceived by the lay person. Greater understanding of such conceptions allowed us to operationalize intuition and analysis in persuasion settings. In addition, such conceptions are relevant to understanding individual differences in both reported cognitive styles and in perceptions of validity of intuition and analysis, as many of such measures require people to use their own lay conceptions of intuition and analysis to answer the relevant questions.

On the lay conceptions of intuition and analysis

Through the findings of the prototype analysis conducted in Empirical Chapter I, we were able to a) flag the most central features of people's lay conceptions of intuition and analysis (whose centrality was corroborated across different settings and samples), and b) to realize that the lay concepts differ in their dimensionality. A single dimension characterized the lay conceptions of analysis, suggesting a unitary construct. This suggests that people have a relatively homogeneous way of perceiving a process as relatively analytic or non-analytic. On the other hand, two dimensions characterized the lay conceptions of intuition, suggesting that people might qualitatively differ in how they perceive intuition, distinguishing between a facet of intuition as 1) an automatic, affective and non-logical processing, and 2) as a holistic processing with more deliberate aspects. Importantly, the two-dimension structure of the lay conceptions of intuition was corroborated across different samples.

The first facet of intuition (i.e., as automatic, affective and non-logical processing) is characterized by features that most closely resemble existing conceptualizations and definitions of intuition: intuition as an affectively charged process that arises from operations that quickly occur on an automatic and nonconscious level (see Dane & Pratt, 2007). Additionally, this dimension can be paralleled by existing aspects of current multidimensional perspectives on intuition. Specifically, this facet can be compared to Pretz and Totz's (2007) affective (judgments based on emotional reaction) and inferential (judgments based on automated inferences) aspects of intuition, Dane and Pratt's (2009) problem solving (automatic pattern

matching and recognition) type of intuition, and Glöckner and Whitteman's (2010) associative (learning-retrieval processes related to stimulus-response processes) and matching (learning-retrieval processes related to stimuli-prototype matching) processes of intuition. As mentioned, this facet refers to the most common conceptualization of intuition in the literature. It was thus without surprise that this facet was perceived as the most central to intuition by participants across studies in Empirical Chapter I.

Regarding the second facet of lay conceptions of intuition (i.e., a holistic and more deliberate type of reasoning), this, too, can be paralleled with existing aspects of multidimensional perspectives of intuition. Specifically, this facet can be compared to Pretz and Totz's (2007) holistic intuition (a qualitative process and decisions made by integrating multiple cues into a whole that can or not be explicit in nature), Dane and Pratt's (2009) creative (process through which knowledge is combined in novel ways) and moral (affective and automatic reactions to issues with moral content) types of intuition, and Glöckner and Whitteman's (2010) accumulative (based on automatic integration of associative learning) and constructive (based on the activation of related information and the construction of mental representations) processes of intuition. All these "holistic" conceptions can be considered in relation to the extent that they are theoretically based on primarily bottom-up processes, depending on data-driven, holistic integration of several cues. The notion of holistic processing has been traditionally based on the Jungian concept of 'big picture' (see Andersen, 2000) and, more recently, on the ability to synthesize unconnected memory fragments into new information (Mintzberg et al., 1998).

The identified facets of lay conceptions of intuition provide a fruitful contribution to the discussion in support of intuition as a label for different cognitive mechanisms and phenomena, and not as a homogeneous concept. Even though recent approaches tried to disentangle different dimensions of intuition, the multidimensional perspective is not yet well established (Amit et al., 2016). In addition to the fact that not all researchers adopt a multidimensional perspective to conceptualize intuition, there is also a lack of agreement on the relevant dimensions in which to conceptualize intuition. Additionally, when researchers do adopt a multidimensional perspective, chances are they propose different (although relatable) dimensions, as reviewed above. More crucially, there is yet a lack of empirical evidence that allows for a systematic comparison between the unidimensional and the multidimensional perspectives. The current work might not represent the ideal data to allow for such a comparison. The present prototype analysis nevertheless provided evidence that people's lay conceptions distinguish between

affective/automatic and holistic/deliberative processes involved in intuition. This alone, should be a strong point in favor of differentiating between distinct aspects of intuition before conclusions about it or its performance are made.

Intuition for the intuitive: influence of cognitive styles on lay conceptions of intuition

Another contribution of our results to the discussion surrounding the concept of intuition concerns the finding that people's own cognitive styles influenced their lay conceptions of intuition. Although previous research had already suggested the possibility that there might be individual differences in the subjective experience of intuition, until now, no empirical work had systematically addressed this hypothesis. The obtained data provided evidence in support of such a hypothesis by showing that the centrality of intuition's features was predicted by participants' self-reported intuitive style (as measured by the Faith in Intuition scale; Pacini & Epstein, 1999). Specifically, the centrality of the facet of intuition as a holistic process was significantly predicted by levels of Faith in Intuition (Empirical Chapter I, Studies 1.2 and 1.3) – and this relation was moderated by Need for Cognition (Study 1.3). This finding suggested that individuals with higher levels of Faith in Intuition were more likely to perceive intuition as a holistic and more deliberate type of reasoning in comparison to participants with lower levels of Faith in Intuition. The fact that Need for Cognition moderated this effect suggested that the influence of Faith in Intuition on perceptions of the centrality of holistic intuition was the case only for individuals who are also relatively more motivated to engage in and enjoy effortful thinking. Individuals who are both intuitive and have a high need for cognition also perceive intuition more as a deliberate decision-making process in comparison to individuals who have faith in intuition but are not as motivated to engage in or enjoy effortful thinking.

However, our results also suggested that the interaction pattern between Faith in Intuition and Need for Cognition might not generalize to all conceptions of intuition. Individuals' styles might not impact perceptions of the facet of intuition as an automatic, affective and non-logical process. However, this is still an empirical question, because the current evidence was somewhat conflicting. Study 1.2 produced no significant effects, but in Study 1.3 the automatic, affective and non-logical facet was perceived as more central to intuition by participants with higher FI, especially by those who are relatively low in Need for Cognition. Future studies should address whether individuals who have faith in intuition but

are relatively unmotivated to engage in and enjoy effortful thinking perceive intuition more as a more automatic, affective, and less logical process.

Also important is the evidence suggesting that there is a more consensual view of analysis whose features' centrality was less likely to be influenced by individual differences in participants' cognitive styles.

Open questions and future research

Several questions are left open in this thesis with regards to the lay conceptions of intuition and analysis. One such question to be approached in future studies regards whether and why the centrality of what seems to be the more common view of intuition, as an automatic and affective process, is less likely to be influenced by individual differences and more consensually perceived. One reason for this might be that what is socially shared is more consistent; a hypothesis to be approached by future studies. However, we should also consider the possibility that these effects might have derived from methodological aspects of our research.

As already discussed in Empirical Chapter I, the conflicting evidence from Studies 1.2 and 1.3 regarding the predictive effect of Faith in Intuition on the centrality of intuition as an automatic and affective process, may have derived both from differences in how extreme participants were in both Faith in Intuition and Need for Cognition (as participants in Study 1.2, compared to Study 1.3, displayed higher levels of NC and lower levels of FI) but also from methodological divergences across both studies. Specifically, whereas in Study 1.2 the centrality of the features of intuition and analysis were assessed between participants, contrastingly, in Study 1.3, participants rated the centrality of features of intuition and analysis and, additionally, also first classified all the features as intuitive or analytical in a dichotomous classification task. As proposed, rating both as well as classifying all the features may have primed (or reinforced) a context within which both processes were perceived as opposed, promoting a contrast effect that led more intuitive participants (i.e., with higher levels of Faith in Intuition) to perceive the features typically associated with intuitive processing (i.e., as an automatic and affective process) as more central. If null effects were obtained when the experimental context did not provide such a contrast, however, this suggests that the contrast was not made spontaneously by individuals. If so, one might regard the observed effects in Study 1.3 as somewhat artifactual. Although future studies can examine both whether the

centrality of the features is modulated by the cognitive context and whether this cognitive context promotes a spontaneous comparison or not, it is worth noting that this methodological context did not impact how participants perceived the facet of intuition as a holistic process. As such, the comparison across studies did not modulate how individuals perceived intuition as a general concept.

Another open question regards the null effects of cognitive styles on ratings of centrality of the features characterizing people's lay conceptions of analysis. In general, our data suggest that analysis is more consensually perceived by individuals. However, participants' Need for Cognition did seem to affect the centrality of the features of acting analytically in Study 1.2. Given that Study 1.2 relied on a between-participants comparison, future research should also approach the effects of such methodological differences between studies in the results concerning the impact of individual differences on ratings of centrality of the features characterizing *acting analytically*.

A third question opened by our research concerns the assessment of cognitive styles. The general null effects obtained with regards to the influence of individual differences on the lay conception of analysis might have been due to the use of the measure of Need for Cognition to assess individuals' analytic style. This measure was originally developed to assess the extent to which people engage in and enjoy effortful thinking (Cacioppo et al., 1984; Cacioppo & Petty, 1982). It is likely that such a trait is associated with a more analytical cognitive style, such that higher values in this measure have been positively associated with more thinking prior to decision-making (e.g., Levin et al., 2000), reasoning (Fleischhauer et al., 2010; Hill et al., 2013), complex problem solving (Rudolph et al., 2018), and greater processing and evaluation of advertisements (Batra & Stayman, 1990; Mantel & Kardes, 1999) and of the quality of information presented in persuasive communications (see Cacioppo et al., 1996; Petty et al., 2009). However, it is also likely that the motivational component of this measure distinguishes it from other decision-making style inventories. With that regard, some authors (see Appelt et al., 2011) propose that the Need for Cognition is better described as a measure of epistemic motivation, which assesses motivated cognition related to information processing and thinking (such as the measure of Need for Cognitive Closure; Webster & Kruglanski, 1994), and distinguish it from other measures of cognitive style (such as the REI; Epstein et al., 1996; Pacini & Epstein, 1999) and decision style (such as the General Decision-Making Style;

GDMS; Scott & Bruce, 1995).[6] Additional challenges to the idea of measuring an analytic style with the Need for Cognition, originate from recent attempts to distinguish between "deliberate" and "systematic" thinking. Amit and colleagues (2021) provided evidence that this measure better captures deliberate thinking (i.e., "deep and effortful thinking"; Amit et al., 2021, p. 766) and not analytic/systematic thinking (i.e., "planned and structured"; Amit et al., 2021, p. 766). The lack of association between Need for Cognition and the analytic factor in our data might provide partial support for this contention.

Our data challenged the idea of a unitary view of intuition but not of analysis. How this relates to a unitary intuitive and analytic processing style is also an open question to be addressed by future research. Amit et al. (2021) argued in support of the existence two specific dimensions of analysis (deliberate thinking and systematic thinking). Their claim was based on different patterns of association with measures of individual differences and differential influences on problem choice. The authors argue that there seems to be a "need to clarify what we mean when we describe a person as a rational, analytic, or systematic (i.e., non-intuitive) thinker, and what qualities should be expected to generalize from one dimension to another" (Amit et al., 2021, p. 766). Although the data obtained within our prototype analysis suggest that, at least regarding *lay conceptions* of analysis, such a non-intuitive mode of thinking seems to be unidimensional, future studies should clarify whether the dimensionality of such lay conceptions is replicated when individuals are prompted to describe non-intuitive thinking on the basis of these different deliberate/systematic processes.

A possible limitation of our approach is that it depended on language labels. The choice of the labels "intuitive" and "analytic" to refer to the different types of processes adopted by people in decision-making relied on the scientific consensual approach distinguishing between the intuitive/analytical dimensions (e.g., Allinson & Hayes, 1996; Hammond, 1996; Nygren & White, 2002; see Armstrong et al., 2012; Kozhevnikov et al., 2014; Newton et al., 2021). At a lay level, these are also fairly familiar terms and, hence, people are capable of thinking about them when considering how they make decisions. However, we cannot exclude the possibility that the choice of these labels might have influenced the obtained results. Such a concern might be more patent regarding the different labels we could ascribe to analytic thinking (e.g., rational, deliberate, systematic, reflective). Nevertheless, future research should look to replicate and

[6] There is not a consensual view on whether cognitive style and decision style represent the same construct (e.g., Mohammed & Schwall, 2009; Thunholm, 2004). For a further analysis of the proposed categorization see the guidelines proposed by Appelt and colleagues (2011).

extend the current findings by taking into consideration other terms that might be employed to refer to these two dimensions of decision-making. Also, future research should assess the perceived valence associated with the two decision-making dimensions and their specific facets to control for the possibility that the effects of individual differences on centrality ratings might be due to the perceived desirability of the features of each decision-making dimension.

Finally, there is a general caveat that should be taken into account when considering these findings. It regards the fact that our approach relied on conscious retrieval processes. This is important because it conflicts with the notion that intuitions are based on information activated in memory that is not accessible to consciousness or verbal report (Bolte & Goschke, 2005). It has been argued that there is a barrier of metacognitive awareness in the ability to report or describe intuitive processes (Klaczynski et al., 1997), and individuals might not have introspective access to specific cognitions or forms of thinking that are suitable to introspection (Nisbett & Wilson, 1977). However, despite the fact that intuitive processes themselves might remain unconscious, their products, such as intuitions or gut feelings, can be attended to consciously (Dane, 2010). The lay conceptions reported in this research refer, hence, to products of such processing. Linked with this limitation, the current results allow us only to draw conclusions about the way individuals think about and perceive intuitive processing, not about the way individuals actually intuit. Future studies should focus on understanding whether, in fact, different types of people (e.g., low- vs. high-Faith in Intuition) intuit in different ways, and whether their performance on "intuitive" tasks differs as a function of the ways they intuit.

In sum, the results of this thesis provide evidence for the multidimensionality of the lay concept of intuition and provide the first systematic evidence that that different people might indeed perceive intuition differently, as a function of the extent to which they usually rely on intuitive processing. In addition, the studies open new questions to be addressed in future research. To this extent, the current results provide the first step in attempts to understand whether intuitive and non-intuitive individuals intuit in different ways along with calls for future clarifications of processes.

Preferences for intuition and analysis as context dependent

Our data provide further evidence supporting previous findings that explicit preferences for intuition and analysis are influenced by contextual factors (e.g., Dane et al., 2012; Inbar et al., 2010; Pachur & Spaar, 2015; see Phillips et al., 2016) and extend these effects to individual

characteristics of the decision-maker (see Empirical Chapter II). Within the several contextual factors that have been shown to influence people's preferences for intuition and analysis, one concerns the level of complexity involved in a decision (i.e., the amount of information to be taken into account when making a decision). We extended research by Inbar and colleagues (2010) showing that complex products elicit greater preference for choosing analytically and simple products elicit a greater preference for choosing intuitively. We replicated such findings and additionally showed that preferences for intuition were higher among individuals with higher levels of Faith in Intuition and lower among individuals with higher levels of Need for Cognition. These results also aligned with previous research suggesting that intuitive cognitive styles predict greater use of intuitive decision-making strategies (e.g., Alós-Ferrer & Hügelschäfer, 2012; Epstein et al., 1996; Mahoney et al., 2011; Pacini & Epstein, 1999; Shiloh et al., 2002; Toyosawa & Karasawa, 2004) and analytic styles predict lower reliance on intuitive strategies (e.g., Epstein et al., 1996; Pacini & Epstein, 1999; Shiloh et al., 2002; Toyosawa & Karasawa, 2004). However, despite predicting lower preferences for intuition, Need for Cognition did not predict higher preferences for analysis. These data relate with the question previously raised regarding the use of Need for Cognition as a measure of analytic cognitive style per se (Amit et al., 2021).

What seems to be of greater importance in the pattern of our data is that, besides predicting explicit preferences for intuition and analysis, individual differences also interacted with context complexity in predicting such preferences. Specifically, the effects of individual differences on preferences for intuition were most evident for complex decisions. There seems to be a consensual perception that simpler decisions can be addressed intuitively, and our data suggest that individuals who are higher in Faith in Intuition will display an explicit preference for intuition also for complex decisions. This suggests that, contrary to our previous assumption, the decision fit between environment and individuals' cognitive style is not symmetric. Individuals' decisions may be qualified by criterions of efficiency and these will accept less reliable processes when these are perceived to provide adequate responses. We discuss how to approach this assumption bellow.

Taken together, these results support our hypothesis that preferences for intuition and analysis are dependent on both contextual factors and characteristics of the decision-maker and that these factors interact to predict preferences for intuition.

Open questions and future research

The replication of the finding that individuals prefer intuition for simple choices and analysis for complex choices (Inbar et al., 2010) is of particular importance for two reasons that may both close and open new questions. First, the experimental setting within which this hypothesis was tested sought to operationalize the complexity dimension associated with different purchase decisions, while keeping constant other relevant dimensions known to elicit different preferences for intuition and analysis (e.g., quality objectivity, material/experiential purchase nature). And second, these preferences seem to contrast with findings evidencing that complex decisions can be better approached by intuitive thought and simple decisions can be better approached by analytic thinking (Dijksterhuis et al., 2006; Reber, 1989; Usher et al., 2011; see Dijksterhuis & Nordgren, 2006), suggesting that people's explicit preferences for intuition and analysis in simple and complex contexts do not necessarily match the type of processing that leads to better outcomes in those specific contexts.

The dissociation between the effects concerning preferences and efficacy of such preferences is of high relevance for future research. Future studies should assess within the same experimental design the two dependent measures: explicit preferences for intuitive and analytic decision-making, and the objective quality of the decision in simple and complex contexts. Results could then clarify a dissociation between the effects obtained for the two dependent variables. It should be equally relevant to take into consideration individual differences in intuitive and analytic cognitive styles. Specifically, in light of our evidence suggesting that intuitive individuals display a greater explicit preference for intuition for complex decisions in comparison to non-intuitive and analytic individuals, such preferences might lead to better decisions if intuitive process can, in fact, increase decision quality. It should also be taken into account that, within the described framework of Dijksterhuis and Nordgren's (2006) Unconscious-Thought Theory (UTT), intuition is defined as a gut feeling that is based on unconscious past experience, operationalized by a feeling that a certain option is better or worse, the origin of which is largely unknown. However, it should be interesting to test whether specific dimensions of intuitive decision-making could promote such a better performance for complex contexts.

Naïve theories of validity of intuition and analysis

Here we also contribute to the understanding of people's naïve theories of intuition and analysis as means to reach correct and accurate decisions (i.e., as valid processes). We clarify their role as mechanisms underlying the explicit preferences for intuition and analysis in simple and complex decisions, and in explaining the impact of individual differences on these preferences. Empirical Chapter II provided an important contribution by showing that individuals with higher Faith in Intuition perceived intuition as more valid than individuals with lower Faith in Intuition, regardless of the complexity involved in the decision. However, the same was not observed for participants' Need for Cognition, which was not associated with perceived validity of analysis for either simple or complex decision contexts. Hence, whereas previous effects of Faith in Intuition might reflect effects of beliefs that intuition is a valid process that leads to favorable outcomes, contrastingly, previous effects of Need for Cognition are unlikely a reflex of the belief that analysis is a valid process.

Open questions and future research

Although our findings suggest that people's naïve theories about validity of intuition and analysis play a key role in predicting explicit preferences for intuition and analysis and that these can explain the impact of individual differences in Faith in Intuition, we cannot claim that the effect generalizes to individual differences in Need for Cognition. This leaves open the question of why no such effect was observed. One possible reason is because Need for Cognition reflects one's motivation to engage in effortful thinking and enjoyment of such thinking. Perhaps that measure simply does not provide a valid operationalization of analytic cognitive style per se (as previously discussed). As such, future studies could replicate these results addressing analytic cognitive styles through the application of other measures such as the Rational–Experiential Inventory (Pacini & Epstein, 1999), the Decision-making Style Inventory (DMI; Nygren & White, 2002), the Preference for Intuition and Deliberation scale (PID; Betsch, 2004), the Cognitive style index (CSI; Allinson & Hayes, 1996) or the General Decision-making Inventory (GDMI; Scott & Bruce, 1995).

Another question that calls for further research regards the clarity of the evidence for the role that perceived validity of intuition plays as the mechanism explaining preferences for intuition in complex and simple decisions. For complex decisions, results showed that the effect of Faith in Intuition on preferences for intuition relied on its perceived validity, however, the

same was not the case for simple decisions (see Appendix B3). One possible reason for this is that complex decisions are, in nature, more demanding and thought oriented. So if individuals are to display an explicit preference for intuition, the mechanisms underlying such preference should be associated with its perceived validity (i.e., its ability to lead to accurate and correct decisions). In addition to or as an alternative to this hypothesis, simple decisions, being less demanding, should be more prone to intuitive decision-making, independently of its perceived validity overall. Finally, it could also be the case that – to the extent that perceptions of validity are, themselves, also context-dependent – most individuals perceive intuition as valid for simple decisions, but only those with high Faith in Intuition perceive intuition as somewhat valid for complex decisions. Future studies should address these hypothesis in order to understand what drives these effects, also allowing for a better understanding of the role that perceived validity plays in predicting and explaining actual reliance on intuition, extending this effect beyond individuals' reported explicit preferences.

Another question for future research is whether the obtained effects extend to other contexts known to elicit different preferences for intuition and analysis, such as, for example, choice objectivity (Inbar et al., 2010) or material/experiential nature (Gallo et al., 2017). If perceived validity were, for these dimensions, to predict explicit preferences for intuition for choices whose quality can be objectively evaluable or for purchases of a material nature (i.e., contexts that tend to promote greater preferences for analysis), such findings could suggest that preferences for intuition explained by its perceived validity might not be due to the demanding and thought-oriented nature of a context, per se, but instead, it could be due to the mere counter-intuitive decision of going with one's intuition in decisions for which most people typically choose to go with analysis. Such a role for perceived validity of intuition across different contexts in which analysis is generally preferred, would suggest a broader role for perceived validity in decision-making.

An additional interesting question suggested by our data regards the factor structure that empirically emerged for the measure of perceived validity of intuition in Empirical Chapter II. The psychometric analysis provided evidence of a possible two-factor structure that only occurred for simple choices but not for choices of complex products. Such a distinct factorial structure suggests that context can modulate the way intuition is perceived with regards to its perceived validity. Specifically, whereas in complex contexts, individuals might perceive the validity of intuitive decision-making as a single dimension, contrastingly, for simple contexts, the features that constitute the validity of intuitive decision-making might distinguish between

the two facets of intuition previously identified within our prototype analysis (as suggested by the features present on both factors in the pattern matrixes in Appendix B2). Such an observation has two implications. First, whereas for contexts that do not typically promote a preference for intuition (i.e., complex, in this instance), individuals perceive intuition's validity as a single dimension (i.e., it is either valid or not valid), contrastingly, for contexts that typically promote a preference for intuition (i.e., simple), additional alternative ways of perceiving the validity of intuition might be put to work (reflecting the facets previously identified). Second, this finding suggests that participants in our prototype analysis might have been spontaneously thinking about the use of intuition in simple contexts – thus promoting the emergence of the same two identified facets. Future studies could test whether the effects detected in Empirical Chapter II are replicable for both of the two specific facets of intuition. For instance, we could hypothesize that a measure of perceived validity of intuition as a *holistic* process would not only be more strongly associated with Faith in Intuition, as evidenced by the results obtained in the prototype analysis, but also, due to its deliberative nature, more strongly predict and explain people's preferences for intuition in complex decisions.

Finally, two possible caveats should be discussed regarding our test of the role of naïve theories of validity in preference for intuition and analysis. The first regards the fact that naïve theories of validity were measured before preference, making it possible that preference ratings were directly influenced by making the perceived validity dimension salient. However, contrary to such hypothesis, the relation between the two variables was not only dependent upon individuals' cognitive styles but also varied as a function of context complexity. Nevertheless, one could argue that our preference measure was open to this alternative explanation, making it important that future studies counterbalance the measurement order to establish the role of perceptions of validity even when not made salient prior to expressing preferences for decision strategies. Secondly, in this work, we defined decisions regarding the purchases of simple and complex products as *simple* and *complex* decisions. Although such an operationalization has been used in previous research in the field (and despite our additional effort to control for different perceived product dimensions through the development of a normative database of consumer products), future research should extend these effects to other decisions that might be perceived as "simple" or "complex". For example, research could manipulate the number or the nature of the characteristics to take into account when making decisions in several contexts. Such methods would allow for greater control of the domain and meaningfulness of the decision if the object is the same across conditions but just varying in the amount of available

information. Regarding the nature of the characteristics to take into account, it could even be hypothesized that different individuals, as a function of their intuitive and analytic cognitive styles, could differ as to what is perceived by them as a complex or simple decision.

Measurement of naïve theories of validity of intuition and analysis

One outcome of this thesis is a structured and validated measurement of perceived validity of intuition and analysis. Importantly, the proposed measures were developed based on the most central features of the lay conceptions of intuition and analysis. Convergent and discriminant validity evidence was obtained by relating the measures to measures of Faith in Intuition (i.e., the experiential dimension of the Rational-Experiential Inventory; REI), the rational dimension of the REI, and the Need for Cognition.

Besides being informative about the quality of the measures, these relations are relevant to understanding how different individuals perceive the validity of their natural tendencies and, as such, related to results obtained in Empirical Chapter II. The first relevant piece of information gathered from these results is that the Need for Cognition did not relate to either perceived validity of intuition or perceived validity of analysis (once more, suggesting that Need for Cognition seems to be more of a measure of epistemic motivation to think and not a measure of cognitive style, Appelt et al., 2011). The second relevant piece of information is that, as expected, perceived validity of intuition was positively associated with individuals' Faith in Intuition – replicating the findings of Empirical Chapter II – and negatively associated with the rational dimension of the REI. Conversely, perceived validity of analysis was shown only to be positively associated with the rational dimension of the REI, not establishing any relation with individuals' Faith in Intuition.

The measures of perceived validity evidenced stronger relations with the dimensions of *"ability"* than the dimensions of *"engagement"* of the REI scale. Such a distinction suggests that perceived validity more closely resembles a result-oriented dimension related to the *ability* dimension (e.g., *"When it comes to trusting people, I can usually rely on my gut feelings"*; *"I have no problem thinking things through carefully"*) than an *engagement* dimension related to individuals' satisfaction in relying on intuition or analysis (e.g., *"I like to rely on my intuitive impressions"*; *"I enjoy thinking in abstract terms"*). This pattern of relations is congruent with the lack of association between perceived validity of analysis and Need for Cognition, which more closely resembles the *engagement* subscale of the rational dimension of the REI (as

evidenced by the correlations between Need for Cognition and the REI). However, and interestingly, despite not being associated with perceived validity of analysis, Need for Cognition was associated with the ability subscale of the rational dimension of the REI, suggesting that such interpretation is not entirely clear.

Higher values of perceived validity of intuition or analysis may be observed for individuals who tend to rely on a single way of processing information – being either high in Faith in Intuition and low in rationality, or high in rationality and low in Faith in Intuition. This would suggest that, for instance, the rational dimension of the REI would moderate the relation between Faith in Intuition and perceived validity of intuition and that the Faith in Intuition would moderate the relation between the validity of analysis and the REI. However, evidence within our data suggests the opposite. The association between Faith in Intuition and perceived validity of intuition was stronger for participants with higher values of rationality, and the association between the rational dimension of the REI and perceived validity of analysis was stronger at higher levels of Faith in Intuition.

Open questions and future research

This set of findings raises several questions and offers new hypotheses to be tested in future research. A first question relates to the need to attend to individuals' naïve theories about intuition and analysis by assessing differences in perceived validity of intuition and analysis in addition to the assessment of cognitive styles. Future studies could further extend and investigate the role of these naïve theories in helping to explain when and why individuals rely on one or another type of processing. Of special importance will be to address the (lack of) association between perceived validity of analysis and Need for Cognition. If the reason for the absence of such association is due to Need for Cognition not necessarily reflecting an evaluation of the accuracy and correctness of analytic decisions, then a similar result should be expected for the association between perceived validity of intuition and the measure of Need for Affect (Maio & Esses, 2001; reflecting a general motivation for people to pursue or avoid emotions). Future studies should seek to study the association between the two measures in order to test such a hypothesis. Additionally, to the extent that previous effects of Need for Cognition are unlikely a reflex of the belief that analysis is a valid process, adding this measure to the literature should constitute an important addition for future research.

Our findings also provide important implications to the ongoing debate on whether intuition and analysis are independent dimensions (e.g., Pacini & Epstein, 1999; Scott & Bruce, 1995) or opposite poles of a single dimension (e.g., Allinson & Hayes, 1996; Sagiv et al., 2010). Based on the reviewed literature (see Wang et al., 2017), we operationalized perceived validity of intuition and perceived validity of analysis as independent constructs rather than opposite ends of a continuum. Such a decision was based on evidence suggesting the independence between these two cognitive styles and on recent attempts to investigate the relation between intuition and analysis when mapped into dimensions of "reliance or use", "preference", or "motivation" for intuition or analysis. Wang and colleagues (2017) argued for independence based on their meta-analytic approach and suggested that measuring intuition as the opposite of analysis is "likely to lead to erroneous conclusions regarding the nature of cognitive style and its relation with general information processing" (p. 22). However, perceived validity of intuition and analysis were not perceived as entirely independent. Rather, they were significantly and negatively associated.

It is thus an open question as to what specific relation should be expected between reports of perceived validity of intuition and analysis. It could be hypothesized that intuition and analysis might be perceived in opposition rather than independently. Data from our Empirical Chapter II provided evidence for this distinction by showing that while explicit preferences for intuition and explicit preferences for analysis were indeed independent (corroborating the literature), perceived validity of intuition and perceived validity of analysis were negatively associated. Importantly, our data also showed that such a question should take into consideration the contexts under which intuition and analysis are perceived, as findings from the same empirical chapter suggested that intuition and analysis can be perceived as equally valid for simple contexts and may not be negatively associated in such contexts.

Intuition for the intuitive: matching perceived validity and intuition appeals in persuasion

All the empirical questions tackled until now in this discussion were developed to support the test of *whether*, *when*, and for *whom* intuition appeals influence persuasion. The identification of the central features obtained in the prototype analysis allowed us to manipulate intuition and analysis appeals. The development of the measures assessing perceived validity allowed us to assess participants' naïve theories regarding validity of intuition and analysis. Also, use of a relatively complex product in the persuasion studies was based on the fact that

our previous research suggested that complex products allowed for influences of both perceived validity of intuition and analysis. Thus, it seemed that a complex product might be more prone to promote the expected matching effects.

The answer to the three questions put above are inherently tied together, as the *whether* depends on *for whom* and, ultimately – as evidenced by the results of Study 2 – *when*. Specifically, the question regarding *whether* these appeals influence persuasion, our best answer would have to be: "it depends". Results suggested that the use of intuition or analysis appeals is indifferent overall as both promoted equally favorable attitudes overall. However, it depends *for whom* the appeals are made. Intuition appeals promoted consistently more favorable attitudes for individuals who perceived validity in intuition (the hypothesized matching effect). Furthermore, regarding the *when*, results suggested that such matching effect is likely to be observed when involvement is high and when involvement is left unconstrained (where some portion of the participants, at least, might engage in elaboration). These questions also lead to an equally important additional question concerning *how.* Both studies suggested that the effect is driven by the favorability of the thoughts generated in these matching conditions, providing evidence that this effect is more likely to occur through a relatively elaborative route.

These findings provided the first evidence for matching effects for intuition appeals in persuasion. Although they shed some initial light on the conditions that promote them and the processes through which they occur, they also give rise to new questions and call for future research to further establish this work and extend its implications to the persuasion field.

Intuition and analysis appeals in persuasion

The findings presented within Empirical Chapter IV provided somewhat consistent evidence for the hypothesized matching effects between intuition appeals and recipients' perceived validity of intuition. Across two studies, more favorable attitudes toward an advertisement with intuition appeals (Study 4.1) or framing a car's features as intuitive (Study 4.2) were observed among participants with higher levels of perceived validity of intuition, in comparison to participants with lower levels of such perceived validity. Additionally, participants with higher levels of perceived validity of intuition and lower levels of perceived validity of analysis reported more favorable attitudes toward the advertisement with intuition appeals in comparison to the advertisement with analysis appeals. This effect occurred in

conditions of unconstrained elaboration (Study 4.1) and in conditions of high involvement (Study 4.2). Importantly, the effect seemed to occur through elaboration as, in both studies, the effects on attitudes were mediated by matching effects on the favorability of recipients' thoughts about the product. Such results conceptually replicated previous findings evidencing that matching a persuasive message to various recipient characteristics can influence persuasion by changing the favorability of thoughts in response to the message (e.g., Lavine & Snyder, 1996; Ziegler et al., 2005, 2007). Additionally, in the conditions of unconstrained elaboration of Study 1, a direct effect of the matching, when controlling for thought favorability, was still observed for both intuition and analysis appeals, which suggests that some of these matching effects might also be partially driven by cue effects.

The results of this work suggested that matching the content of the message to individuals' naïve theories about intuition can positively influence persuasion. Specifically, these results provided further support to research suggesting the effectiveness of matching some characteristic of the recipients' individuality (here, perceived validity of intuition) to some aspect of the message (see as other examples Carpenter, 2012; Noar et al., 2007; Petty et al., 2000; Rothman et al., 2020). Although matching can promote a direct influence on attitudes by serving as a peripheral cue under conditions of low elaboration (e.g., DeBono, 1987; Lammers & Baldwin, 2018; Wheeler et al., 2002), this was not the case in the present data. Matching effects were not observed for conditions of low involvement (Study 4.2), and results suggested that a match with intuition appeals promoted more favorable thoughts by individuals with greater (vs. lower) perceived validity of intuition. Bellow, we discuss why these conditions might have favored the occurrence of matching effects in conditions of high elaboration and whether it would be possible to detect them under low elaboration, given that this bias was seemingly promoted by individuals' own naïve theories.

The matching effects for analysis appeals and recipients' perceived validity of analysis were not as clear as the matching effects for intuition appeals, being only observed for conditions of unconstrained elaboration (Study 4.1). One reason for the asymmetry of the matching effects for intuition and analysis appeals might be that participants are differently aware of such matching as potentially biasing their thinking. If participants perceive that analysis appeals are more likely to bias their judgments than intuition appeals, they might engage in different metacognitive correction processes (i.e., adjusting their evaluations to correct for any "unwanted" influence of the match; Wegener & Petty, 1995, 1997). Analysis appeals might be more consciously disregarded than intuition appeals if individuals do not

perceive the latter as biasing their thoughts (e.g., because intuition is perceived as less thought-related). Bellow we discuss this possibility and suggest how future studies might test it.

Matching effects of intuition appeals in conditions of high elaboration

The matching effects between intuition appeals and individuals' naïve theories about intuition were observed under conditions of high involvement (when elaboration should be high). Research suggests that matching effects in such conditions influence persuasion not only by biasing the favorability of thoughts that come to mind, but also by serving as an argument in support of the attitudinal object and through self-validation processes (Briñol & Petty, 2006, 2015; Teeny et al., 2021). The data of this work was clear in suggesting that, in conditions of high involvement, the promoted matching influenced persuasion by changing the favorability of individuals' thoughts. However, the obtained data might not provide a clear answer as to whether these matching effects influenced attitudes merely by biasing the favorability of thoughts or also by serving as an argument. For the latter to occur, the intuitive nature of the car (by being presented as intuitive or as promoting one's intuition) would have to be perceived as a relevant feature for the evaluation of the merits of the car by individuals who perceive validity in intuition., In fact, unless only happening with mixed messages, biased processing and impact of matching as an argument might look the same regarding thought mediation. This might make it harder to infer whether such effects occurred because of high elaboration of strong (matching) arguments or because of processing of arguments being positively biased when matched. One could argue that the detailed features presented in Study 4.2 were actually less likely to be affected by a biased processing mechanisms than the vague allusions to intuition and analysis in Study 4.1. Hence, it could be that the difficulty in detecting effects, or finding some only for high elaboration, might mean, in part, that the effects of Study 4.2 were argument effects, whereas the effects in Study 4.1 occurred through a biased processing (or self-generated arguments) in addition to cue effects.

Nevertheless, future studies could further examine, in controlled conditions, the possibility of argument effects driving matching to intuition. One possible approach to study the role of matching as an argument in persuasion would be by manipulating the context in which such matching occurs. For this purpose, studies could adapt previous experimental approaches (Kang & Herr, 2006) that manipulated source attractiveness and its relevance for the evaluation of an ad featuring a product relevant to attractiveness (e.g., a razor) or a product

irrelevant to attractiveness (e.g., a computer processor), in conditions of high and low elaboration. Such an approach has evidenced source attractiveness effects in conditions of high elaboration only for the ad featuring the razor (when attractiveness was relevant), but not for the ad featuring the computer processor (when attractiveness was irrelevant). Adapting this experimental approach to our goals, we could hypothesize that individuals who perceive validity in intuition would be more persuaded by the intuitive nature of the features of, for example, a car (a matching condition within an issue-relevant context) in comparison to the intuitive nature of the features of a razor blade (a matching condition within an issue-irrelevant context). The question of what constitutes a context within which such matching can be perceived as an argument is an interesting empirical question, whose answer might rely on our own data – specifically, on the findings of Empirical Chapter II. Results obtained within this empirical chapter suggested that, only for choices of complex products, perceived validity of intuition significantly predicted explicit preferences for intuition. We can hypothesize that contexts within which perceived validity of intuition predicts preferences for intuition could be the contexts in which matching to intuition could constitute an argument for persuasion.

As referred above, in conditions of high elaboration, it has also been proposed that matching can influence persuasion through metacognitive processes involving self-validation (Briñol & Petty, 2006, 2015; Teeny et al., 2021). Could this be characterizing our data? Evidence shows that individuals report more confidence in their thoughts in matching (vs. mismatching) conditions, relying more on these thoughts and thus increasing persuasion for positive thoughts but decreasing persuasion for negative thoughts (Evans & Clark, 2012). According to the self-validation hypothesis (Petty et al., 2002), this effect is more likely to occur when the match (regarding information related to the source of a message) is revealed after the message processing (Briñol & Petty, 2009). Unfortunately, we have no information in our studies that can help us understand whether these effects also occurred in our data. Because the nature of the appeal was revealed before, during, and after the key advertising information, it seems unlikely that participants would generate positive or negative thoughts and then afterward have new (mis)matching elements increase (or decrease) thought confidence. However, we see the possibility for future studies to extend these findings to other message-related matching effects, such as that of identifying information as related to intuition only after an advertising appeal.

In approaching matching as a metacognitive process, if studies were to manipulate the timing of the presentation of information that constitutes the matching, particular attention

might also be given to evidence suggesting that if recipients believe that their thoughts have been biased or (unwantedly) influenced by a feature of the persuasive context, they can correct their judgments in the opposite direction to the bias (Wegener & Petty, 1995, 1997). In this case, if the recipient perceives such matching as an attempt at manipulation, rather than a personalized source of information (Teeny et al., 2021), the reactance associated with such perception could have a number of consequences. Such reactance could lead to less willingness to engage with the ad (e.g., click-through intentions, Bleier & Eisenbeiss, 2015; lower evaluations of message effectiveness, David et al., 2012; and higher perceptions of manipulative intent – which lead to more negative message reactions, Reinhart et al., 2007). However, perceptions of bias per se could be mitigated to the extent that the matching effects are driven by recipients' naïve theories of validity in a context where corrections generally occur because people want to hold valid attitudes and opinions. Thus, it might require explicit instructions labeling matching effects as biasing or otherwise promoting correction for the influence of these matching appeals (cf. Martin, 1986; Martin et al., 1990; Petty & Wegener, 1993). Based on the ELM's (Petty & Cacioppo, 1986) assumption that when recipients have the motivation and capacity to do so, they scrutinize all available information for validity, we can hypothesize that, by perceiving validity in intuition at the heart of these matching effects, equally strong matching effects might be observed regardless of the presence of correction cues.

However, an equally important (yet, still underexplored) factor that could influence the occurrence of matching effects, especially in conditions such as the described above, is that of peoples' naïve theories about matching per se. Research suggests that the more individuals explicitly endorse the view that, to be effective, a message needs to be personalized to the recipient, the more effective these matching messages are (Webb et al., 2005). Additionally, and as evidenced by previous research (Briñol et al., 2015), naïve theories of persuasion can as well be malleable. Applying this approach and the methods of the reported research to our goals, future studies could manipulate naïve theories about matching in persuasion, by priming positive or negative meanings associated with matching (e.g., by asking participants to associate target words such as "matching", "personalizing", and "tailoring" with potential synonyms including "communication", "efficiency", "understanding", "flexibility", and "change" [i.e., a 'matching good' condition], or synonyms such as "manipulation", "deception", "suspicious", "lying" and "consume" [i.e., a 'matching bad' condition]). These aspects are particularly important in current times, as people became increasingly aware of marketing strategies applied by social media platforms such as Facebook or Instagram, where targeting or tailoring of

advertisements can be achieved based on information collected through big data, such as publications, interactions, or tracking of user browsing (e.g., Jennings, 2018; Kuchler, 2014; The Associated Press, 2018). The implications of these aspects and their implications for the study of persuasion and, more specifically, the impact of matching in persuasion are still to be examined in future research.

Asymmetry of matching for intuition and analysis appeals

We approached matching effects for intuition appeals but also for analysis appeals. Effects were clearer with regards to the matching between intuition appeals and participants' perceived validity of intuition. However, the employed procedures to test the matching effects for both types of appeals was equivalent: using central features of both constructs, we developed two advertisements and assessed individuals' perceived validity of intuition and analysis, as a way of assessing their naïve theories. Nevertheless, the detected effects diverged. Matching effects for intuition appeals occurred clearly for conditions of high involvement and unconstrained elaboration whereas matching effects for analysis appeals were only observed in the latter condition.

Future studies could address whether this occurs as a result of a different sensitivity to the degree of bias promoted by the experienced matching. As previously proposed, it could be that recipients perceive analysis appeals as more likely to bias their judgments in comparison to intuition appeals (possibly because intuition is less thought-oriented), thus differently engaging in correction processes. Future studies could seek to test whether analysis appeals are indeed perceived as more biasing than intuition appeals and whether such lay beliefs are associated with greater correction effects on attitudes for analysis appeals. As matching would be driven by people who both perceive validity in analysis and receive information about analytic features, it might be unlikely for such individuals to perceive information about analytic features as biasing per se.

There is also the possibility that asymmetry in the matching effects results from methodological aspects of our studies. Specifically, it could be that the operationalization of analysis appeals were simply less effective for this particular context because the description of technological features (such as that of a modern car) should more typically be expected as analytical, and hence less prone to promoting matching effects with recipients' perceived validity of analysis. Future studies should look to test the matching effects related to analysis

appeals in contexts in which the use of these appeals is seen as less typical. Finally, it should not be discarded the possibility that the non-significant results regarding matching effects for analysis appeals might have derived from the sample size with inadequate power for an expected three-way interaction. Hence, besides testing the above proposed alternative explanations, future studies should seek to test such matching effects with larger sample sizes.

Matching intuition appeals in conditions of unconstrained elaboration

The obtained matching effects in conditions of unconstrained elaboration, in Study 4.1, also provided important insights and implications for future research. Our results suggested that the matching effects within these conditions occurred at least in part through a generation of more favorable thoughts promoted by the matching. Additionally, direct effects of matching, when controlling for thought favorability, were still observed suggesting that, for some message recipients, this matching might have also been partially driven by cue effects. These results suggest that, for conditions in which thinking is not constrained by other variables to be high or low, and in which messages are relatively ambiguous in that they make broad but not detailed allusions to intuition, matching could occur through a biased processing, or through self-generated arguments (as already proposed), in addition to cue effects. These conditions, in comparison to conditions of high or low elaboration, might provide an opportunity for future research to further explore the biasing role of such matching effects.

Future research could extend these findings by testing the other roles matching can adopt when elaboration is unconstrained, specifically that of enhancing message processing (e.g., DeBono & Harnish, 1988; Haddock et al., 2008; Petty & Wegener, 1998b; Wheeler et al., 2005). Research shows that in conditions in which thinking is not constrained to be either high or low, matching can increase elaboration, thus leading to greater argument quality effects. The enhanced scrutiny hypothesis (Petty & Wegener, 1998b) hence posits that matching can either lead to greater or lower persuasion, depending on the quality of the matched information. Future research manipulating, for instance, intuitive car features should observe greater persuasion in matching compared to mismatching conditions but only when these are supported by strong information (i.e., the car features are perceived as of high quality) rather than by weak information. Contrastingly, if these features are supported by weak information, then matching should lead to lower persuasion compared to mismatching conditions. Additionally, an alternative hypothesis can be put forward based on the idea that matching could lead message

recipients to feel that they already know enough about the message topic and hence reduce message processing (Briñol & Petty, 2015).

Matching intuition appeals in conditions of low elaboration

Although no matching effects of intuition (or analysis) appeals were observed in conditions of low involvement in our data (Study 4.2), this does not mean that they cannot occur. Such results could have originated from methodological features of our studies. Specifically, the operationalization of the appeals through the detailed car features might have inhibited the detection of matching effects in these conditions – by being presented deep within the message (and past the initial introductory paragraph) – specially, when participants were not personally involved in the processing of the message. Such conditions might have meant that recipients would be less likely to attend to these appeals and thus less prone to be influenced by the matching information. One could propose that, to overcome this methodological caveat, futures studies could make use of relatively ambiguous ads that make broad but not detailed allusions to intuition (such as that of Study 4.1), however, it should be stressed that before being presented with the detailed car features, participants saw, in an initial screen, that same advertisement presented in Study 4.1 – which should have promoted the same matching effects observed in Study 4.1, even for participants who were less involved. Thus, it seemed that the materials were potentially capable of producing matching effects under low-elaboration conditions if those effects exist in this setting.

In addition, to understand these null results we should attend to the fact that some of previous research that has been presented as evidence of matching effects between message and recipient features as a peripheral cue in conditions of low elaboration (DeBono, 1987; see Briñol & Petty, 2006, 2015; Teeny et al., 2021) has not manipulated elaboration per se. Specifically, in these studies, persuasion appeals were presented without actual arguments in the message, concluding that matching effects observed in such conditions "may best be considered a peripheral process" (DeBono, 1987, p. 284). In fact, although the paradigm and findings from our Study 4.1 replicate that of DeBono (1987), these not only provided partial evidence for matching effects as a peripheral cue, but also, the effect of matching on attitudes through thought favorability suggested a biased processing of the ad, evidencing persuasion through a central route.

Future directions

Matching intuition appeals within other features of persuasion variables

In this thesis we focused on matching through the combination of the characteristics of recipients' individuality and the features of the message. However, there are several other ways through which the features of the persuasive context could be matched to the recipient in future studies. Matches might include matching source and recipient (e.g., Fleming & Petty, 2000) and changing or priming the recipient to match the message (e.g., Julka & Marsh, 2000; Loersch et al., 2013; Wheeler et al., 2008). Regarding the former, the message source could be manipulated to be perceived as more or less intuitive, for example, by presenting to participants a short description – or a vignette story – in which the source makes a set of decisions (in a more or less intuitive way), describing such decisions through the use of the central features of 'acting intuitively' obtained in our prototype analysis. We could hypothesize that message recipients with higher (vs. lower) levels of perceived validity of intuition should be more (vs. less) persuaded by sources described as intuitive (vs. non-intuitive). Future studies could test the multiple roles for such matching effects as well as the mechanisms mediating such effects in conditions of high elaboration, if these were to occur (e.g., perceived trustworthiness, credibility, expertise, likeability, as a result of the source matching beliefs about validity of intuition or analysis). Regarding the latter form of matching, a priming approach to change the recipient to match the intuitive nature of the message (i.e., priming an intuitive mindset) could be implemented. For example, this could be done by asking participants to write about a time in their lives when intuitive decision-making worked out well (vs. poorly) (e.g., Rand et al., 2012), by manipulating participants' naïve theories about the meaning of intuition (e.g., Briñol et al., 2015) or by priming subliminal emotional information to participants during the persuasive situation (Lufityanto et al., 2016).

Finally, as matching can be operationalized through the combination of any category of persuasion variables, we can also consider a form of matching in which the intuition appeal presented in the message is matched in some way to the source (e.g., Karmarkar & Tormala, 2010). In this instance, intuitive sources matched with some sort of an intuitive feature of the presented message (e.g., arguments given based on the source's intuition) should produce more persuasion compared to a mismatching situation in which such an intuitive source were to present, for example, an analytic message. Following previous research (Clark et al., 2013), different results could also be expected as a function of people's motivation to focus on the message or the source of the message. Specifically, if focused on the source of the message, it

could be hypothesized that motivated participants would be more confident in their thoughts (and their attitudes would be more reflective of their thoughts) when the intuitive nature of the message matched rather than mismatched the intuitive characteristics of the source (i.e., a content-dependent validation). Conversely, if focused on the message, self-validation should be content-independent.

Additionally, these effects could be further moderated by participants' individual differences in perceived validity of intuition. Such a three-way matching (source-message-recipient) should be of particular interest for the self-validation hypotheses described here.

Matching intuition appeals with indirect expressions of the recipient's individuality

The matching effects studied in this thesis relied on recipients' self-reported perceived validity of intuition. In addition to a general limitation associated with the use of self-reported measures, limits of self-reported validity of intuition should be taken into further consideration when considering the study of matching effects in persuasion. Specifically, most of the matching literature has focused on recipients' characteristics (be it motives, personality or cognitive styles) through the reliance on conscious reports about their self-concept (Briñol & Petty, 2006). In addition to preventing potential biases in the study of these effects, matching persuasion variables to other aspects of the self-concept that are less consciously accessible or are reflected in an automatic manner should be of great interest for future research. As such, within the scope of our findings, future empirical approaches could focus on studying matching effects not only through the reliance on explicit measures but also by making use of indirect measures (e.g., Implicit Association Test; Greenwald et al., 1998; Evaluative Priming Task; Fazio et al., 1995) or behavioral measures of intuitive decision-making (e.g., CRT; Frederick, 2005).

Cross-culture replication

Because the studies conducted within this thesis reported samples of North-American participants, the replication of these findings to other countries or cultures is of particular importance. Research on cross-cultural differences has suggested differences in the use of intuition by Westerners and East Asians (with East Asians favoring intuition and being more holistic in comparison to Westerners who favor formal reasoning; see Wu, 2020, for a review). Additionally, and with relevant implications for our findings, is the evidence that East Asians

rate intuitive thinking as more important and 'reasonable' than analytic thinking, suggesting cultural differences in the perceived validity of intuitive versus analytic decision-making (Buchtel & Norenzayan, 2008). More than a limitation to our results, such evidence constitutes a unique opportunity for future research, as we illustrate bellow.

First, further analyses of construct validity of our measure of perceived validity of intuition and analysis could be implemented through a known groups approach (Cronbach & Meehl, 1955; Eagly & Chaiken, 1993) by showing that East Asians (i.e., a specific group known to differ on a relevant trait or construct) have higher scores on the proposed measure in comparison to Westerners. Such evidence should also have implications for our findings regarding preferences for intuition and analysis in complex and simple decisions, and the mediating role of perceived validity, which call for future replication in these cultures. Second, based on the reported cross-cultural differences, it could also be hypothesized that Westerners and East Asians differ on the way they perceive the core of intuition. A replication of our prototype analysis of the lay conceptions of intuition within an East Asian culture could provide important insights regarding this hypothesis. Finally, in light of the suggested cross-cultural differences in perceived validity of intuition, it could also be hypothesized that the persuasiveness of intuition as a message appeal should be higher for East Asians. Such a possibility also constitutes an interesting opportunity for replication of our matching effects and further extension of the multiple roles these appeals can adopt in persuasion.

Final remarks

The findings in this thesis provided the first steps toward the study of intuition appeals in persuasion. These results extended previous evidence of matching effects in the literature to a new variable. Intuition appeals within a persuasion context were shown to promote more favorable attitudes for individuals with higher levels of perceived validity of intuition, in comparison to individuals with lower levels of such perceived validity. Interestingly, the detected matching effects seemed to be more likely to occur through a central route – by affecting the favorability of thoughts, both in conditions of unconstrained elaboration and in conditions of high involvement. Finally, and in line with this main result, throughout the findings of this thesis, a consistent outcome was that *intuition* indeed revealed itself as different for the *intuitive*. Namely, intuition seems to be differently conceived by intuitive individuals (i.e., by holding distinct lay conceptions about what intuition is), is explicitly preferred as a

decision-making process by intuitive individuals because these perceived it as a valid process, and, finally, when used as an appeal, it promotes greater persuasion among individuals who perceive greater validity in intuition.

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Section IV

Appendices

Appendix A. Supporting information for Empirical Chapter I

Figure 1

Scree plot for the features of acting intuitively (Study 2)

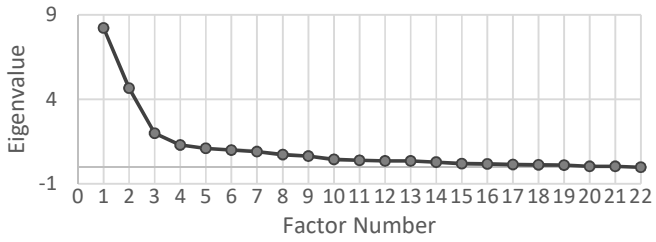


Figure 2

Scree plot for the features of acting analytically (Study 2)

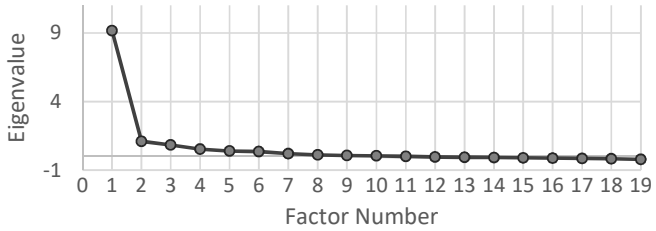


Figure 3

Scree plot for the features of acting analytically (Study 3)

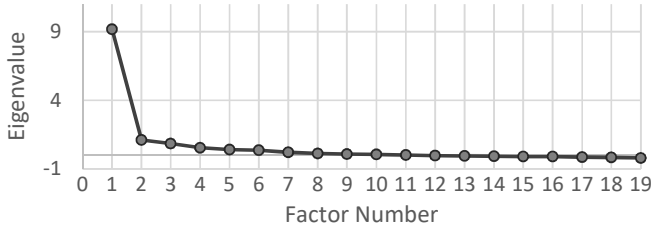
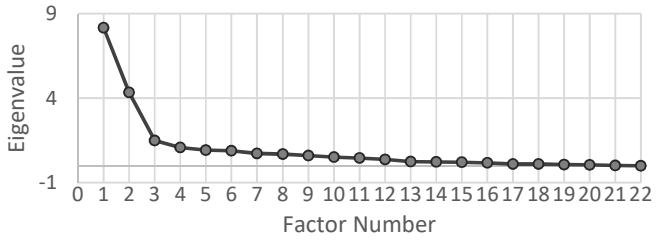


Figure 4

Scree plot for the features of acting intuitively (Study 3)



Appendix B. Supporting information for Empirical Chapter II

Appendix B1. Literature review of consumer product dimensions regarding their relevance and operationalization across the existing literature

Consumer products as multiple dimensional percepts

Consumer products are defined as products and services bought by final consumers for their personal use (Cassel et al., 1954; Kotler et al., 2013). Consumer products include physical objects that can be offered for acquisition, use and consumption that might satisfy a want or a need. Services are products that consist of activities, benefits, or satisfactions that are essentially intangible (Kotler et al., 2013). Consumer products can be PCs, foods, cars, etc., and services include hotel stays, experiences, banking, insurance, etc.

These products are multidimensional percepts, and each of their dimensions likely influences how consumers relate with them. We first review some of the consumer product dimensions that have been the focus of research attention before operationalizing them in our normative study.

1. Product complexity

Perceived complexity has been methodologically operationalized in terms of the number of attributes that compose a product. For instance, products have been described as complex when they are characterized by a large number of attributes that are relevant for the purchase decision (Scholz et al., 2010). Similarly, Netzer and Srinivasan (2011) described products and services as complex when they are composed by ten or more attributes. According to Dijksterhuis (2004; see also Dijksterhuis et al., 2006; Dijksterhuis & Nordgren, 2006), complexity is defined by the amount of information and facets a choice entails, meaning that a choice between products for which many attributes are important is complex, whereas a choice between products for which few attributes are important is simple.

Researchers have measured product complexity by assessing the number of attributes that can objectively characterize a product (e.g., Hlédik, 2012; Netzer & Srinivasan, 2011; Park et al., 2008), by asking participants how many aspects of the product they would take into account when making a purchase decision (Dijksterhuis et al., 2006) or by asking participants

how complex they perceived the product on a "simple/not complex – complex" scale (e.g., Cox & Cox, 1994; Wogalter et al., 1991; Wright et al., 1982). Researchers have manipulated complexity by manipulating the number of attributes describing a product (e.g., Dijksterhuis et al., 2006; Huber & Hansen, 1987).

Product complexity is an important dimension of consumer products. Research on product complexity has provided evidence that: people are more willing to read instructions about more complex products (e.g., Wright et al., 1982) and to actually read the instructions longer (Wiese et al., 2004) when the product is relatively complex rather than simple. Consumers also prefer to choose complex products on the basis of rational analysis and simple products on the basis of intuition (Inbar et al., 2010), but are more satisfied with their purchases after choosing complex products intuitively and simple products conscientiously (Dijksterhuis, 2004; Dijksterhuis et al., 2006; Dijksterhuis & van Olden, 2006).

2. Quality objectivity

Product quality has been theoretically and empirically defined in many different ways in the literature. Some definitions focus on product quality as something measurable and usually expressed by measurable product features (e.g., Abbott, 1955; Leffler, 1982). Other definitions focus on *consumers' perceptions* of quality, defining it as the consumer's judgment about a product's overall excellence and superiority (e.g., Bei & Chiao, 2001; Chen & Dubinsky, 2003; Tsiotsou, 2006; Zeithaml, 1988), the customer's perception of the overall quality of a product, with respect to its intended purpose, in relation to alternatives (Aaker, 1991), or as the degree to which a product or service fits the customer's needs and expectations (e.g., Gitlow et al., 1989; H. Yu & Fang, 2009).

For the purposes of the norms here presented, we focus on people's *perceptions* of how a product's quality can be evaluated on the basis of *objective* versus *subjective* dimensions. Whereas *objective product quality* refers to the product's actual performance, reliability, durability and serviceability – that is, objective facts and data - (e.g., Curkovic et al., 2000; Garvin, 1984), *subjective product quality* is reflected by consumers perceptions of subjective attributes and personal tastes, opinions and preferences (Brucks et al., 2000; Creusen & Schoormans, 2005; Mudambi & Schuff, 2010; Zeithaml, 1988).

To the best of our knowledge, only one study, conducted by Inbar and colleagues (Inbar et al., 2010), has measured participants' perceptions of choice quality objectivity. Specifically,

in this study participants were asked to rate 25 choices in terms of the extent to which evaluation of the outcome was an objective or a subjective matter. Despite the fact that little is known about the impact of people's perceptions of choice quality objectivity, existing evidence supports the importance of controlling for such a dimension. Specifically, Inbar and colleagues (Inbar et al., 2010) found that choices with objectively evaluable outcomes led participants to prefer to make their decisions in a rational way, whereas choices with subjectively evaluable outcomes led participants to prefer to make their decisions based on their intuitions. This result has important implications for what kinds of advertisements or information might be effective in advocating purchases of particular kinds of products and for what kinds of settings might enhance versus detract from the effectiveness of such influence attempts.

3. Material versus experiential nature of products and purchases

A substantial amount of empirical work has focused on distinguishing material from experiential products and purchases. Van Boven and Gilovich (2003) theoretically defined material products as tangible and material purchases as aimed at acquiring a product that one will keep in their possession. That is, material purchases involve products that one acquires with the intention of obtaining and having a physical good. Examples of material goods include cars, houses, and furniture. In contrast, experiential products are not tangible, and experiential purchases are made with the primary intention of acquiring an experience – an event through which one lives. Purchases of concert tickets, dining at restaurants, taking vacations, and visiting amusement parks are examples of experiential purchases.

The material-experiential distinction can be represented in a continuum by relying on consumers' personal intentions and motivations for the purchase (Van Boven & Gilovich, 2003). For some purchases, delineating a distinction between experiences and material possessions may be difficult, but research suggests that participants and judges alike are able to identify the differences in these categories and reliably categorize purchases as material or experiential (e.g., Carter & Gilovich, 2010; Van Boven & Gilovich, 2003) as well as rate them on the material-experiential continuum (Nicolao et al., 2009; Pchelin, 2011). Further justifying the importance of controlling for the material-experiential dimensions in consumer products and similar to results obtained regarding perceived product complexity and people's preferences for intuition and rationality (Inbar et al., 2010), research has shown that people tend

to weight intuition more heavily with regards to experiential purchases and weight deliberation more heavily when making material purchases (Gallo et al., 2017).

Documenting the relevance of this dimension, research on the distinction between material and experiential purchases has shown, among other findings, that experiential purchases make people happier than material purchases (e.g., Van Boven & Gilovich, 2003), experiences tend to be more closely associated with the self than possessions (Carter & Gilovich, 2012), and the evaluation of experiences is less comparative than that of possessions (Carter & Gilovich, 2010). Also, whereas material purchase decisions are more likely to lead to buyer's remorse, experiential purchase decisions are more likely to lead to regrets of missed opportunities (Rosenzweig & Gilovich, 2012).

4. Perceived Price

The price of a product represents the amount of expenditure in a purchase transaction (Raab et al., 2009). According to Jacoby and Olson (1977), price can be categorized into objective and perceived price. Whereas objective price corresponds to a product's actual monetary cost, perceived price is defined as the consumer's subjective perceptions (Jacoby & Olson, 1977) and feelings (Zeithaml, 1988) regarding the price of a product. Perceived price has also been defined as what the consumer sacrifices in order to obtain a product or service (Athanassopoulos, 2000; Cronin et al., 2000; Voß et al., 1998; Zeithaml, 1988).

Perceived price relates to consumers' judgments of performance (e.g., Zeithaml, 1988) and judgments of product quality (e.g., Oh, 1999; Quareshi, 2017). Perceived price fairness positively influences consumer trust (Suhaily & Darmoyo, 2017), purchase decisions (e.g., Ahmad et al., 2014; Suhaily & Darmoyo, 2017) and repurchase intentions (e.g., Khan et al., 2012; Moslehpour et al., 2017). Perceived price also moderates the relation between quality of food and customer satisfaction (Ryu & Han, 2010). Finally, increases in the perceived price of drinks increases subjective reports and neurological (fMRI) evidence of flavor pleasantness (Plassmann et al., 2007).

Consumers often compare the objective price with an overall prince range they perceive for the product category (Winer, 1986). Research shows that consumers do not always know or remember the objective price of a product or service. Rather, they encode the price in ways that are meaningful to them (Zeithaml, 1982). Hence, consumers tend to remember the price of a product as "cheap" or "expensive" rather than as the dollar amount (Dodds et al., 1991).

Accordingly, researchers have measured perceived price simply by asking participants to assess how inexpensive-expensive (e.g., Chua et al., 2015; Dodds et al., 1991; Jeng et al., 2014; Oh, 2000) or pricey-not pricey (e.g., Chua et al., 2015; Oh, 2000) products are.

Perceived price is also a relevant variable to control in research due to its intrinsic association with product perceived complexity. The more a product is perceived as relatively complex the higher its perceived price (Inbar et al., 2010). Consequently, when manipulating perceived complexity, unless precautions are taken, researchers are also manipulating perceived price.

5. Product familiarity

Product familiarity is defined as the level of previous direct and indirect usage experience accumulated by the consumer (e.g., Alba & Hutchinson, 1987; Johnson & Russo, 1984). Researchers have measured product familiarity by asking participants how familiar-unfamiliar they are with a given product (e.g., Coupey et al., 1998; Darley & Smith, 1993; Freling & Forbes, 2005) or the features of that product (Coupey et al., 1998; Zhou & Nakamoto, 2007).

A large amount of work has provided evidence of how product familiarity influences the way consumers process information and make decisions. For instance, product familiarity influences search for product information, depth of processing of such information, and choice confidence in decision-making (Alba & Hutchinson, 1987; Laroche et al., 1996). More specifically, higher levels of product familiarity lead to the simplification of information processing through the use of nonfunctional cues (such as country of origin, brand, price) as heuristics to infer intrinsic product attributes, leading to more confidence in and reliance on such cues (Heimbach et al., 1989; Park & Lessig, 1981). Product familiarity is also negatively associated with willingness to look for and read warnings (Godfrey & Laughery, 1984; Wogalter et al., 1995) and positively associated with purchasing behavior (e.g., Choo et al., 2004).

Another dimension closely related to product familiarity is purchase frequency. In fact, research has combined measures of how familiar people are with certain products along with how frequently they buy these products in order to create a product familiarity index (e.g., Darley & Smith, 1993; Freling & Forbes, 2005). Despite being associated, the use of both measures as an index of product familiarity might be problematic for some products (e.g., one

might be extremely familiar with razor blades and its features but only so often purchase such a product). To that extent, in the present examinations, we measured both product familiarity and purchase frequency and separately present the norms for both dimensions.

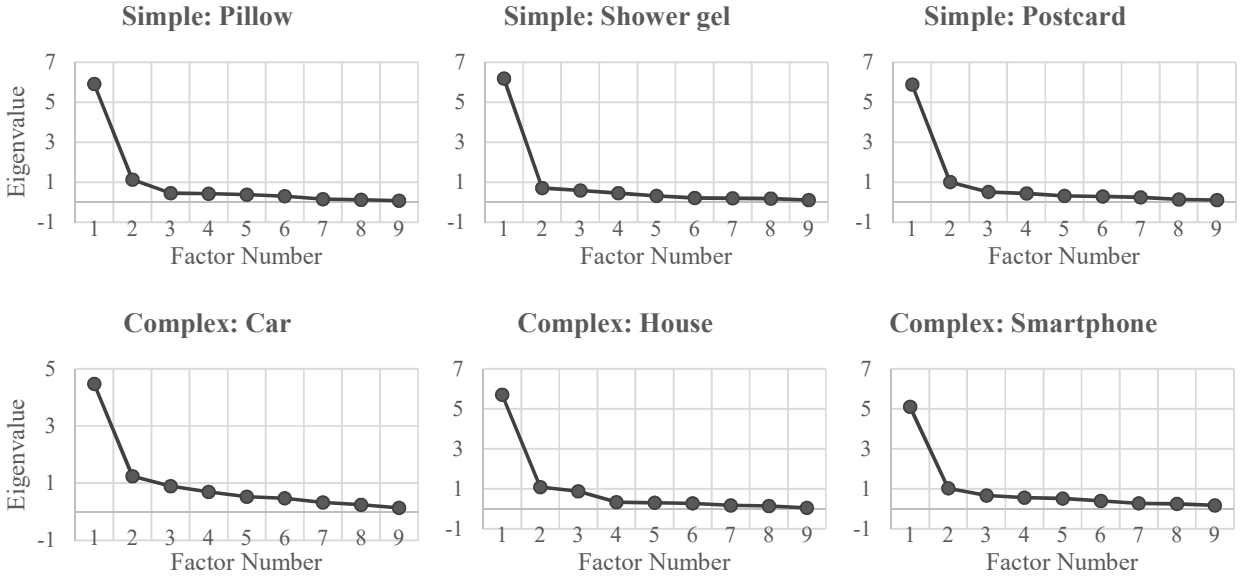
6. Product attitude

The term attitude refers to an overall evaluation of a particular target, such as people, issues and objects (e.g., Petty et al., 1983; Petty & Wegener, 1998a). Accordingly, product attitude has been generally defined as an overall evaluation of a particular product in a favorable or unfavorable manner (e.g., Kim, 1995). Researchers have measured product attitude by asking participants about how much they like the product, feel positive/negative towards it (e.g., Crites et al., 1994; Cui et al., 2014; Leclerc et al., 1994; Wang et al., 2012), and how good/bad and desirable/undesirable (e.g., Crites et al., 1994; Wang et al., 2012) the product is.

Most research on product attitudes has focused on this variable as an outcome. For instance, research has shown that product attitude is influenced by factors such as country of origin (e.g., Bilkey & Nes, 1982), packaging (e.g., Becker et al., 2011), tactile and visual inputs (Balaji et al., 2011), peer communication (Wang et al., 2012), online reviews (Lee et al., 2008), and use of narrative online advertisement (Ching et al., 2013), among other findings. However, product attitude has also been identified as a predictor for relevant outcomes, such as purchase intentions (e.g., Fennis et al., 2015; Kim & Chan-Olmsted, 2005; MacKenzie et al., 1986; Morris et al., 2002; Wang et al., 2012) and actual purchase behavior (e.g., Yu et al., 2007). Product attitude is clearly a key dimension of consumer products. When aiming to control for product features in research, researchers could greatly benefit from having an a priori indicator of how people evaluate different consumer products in a favorable or unfavorable manner.

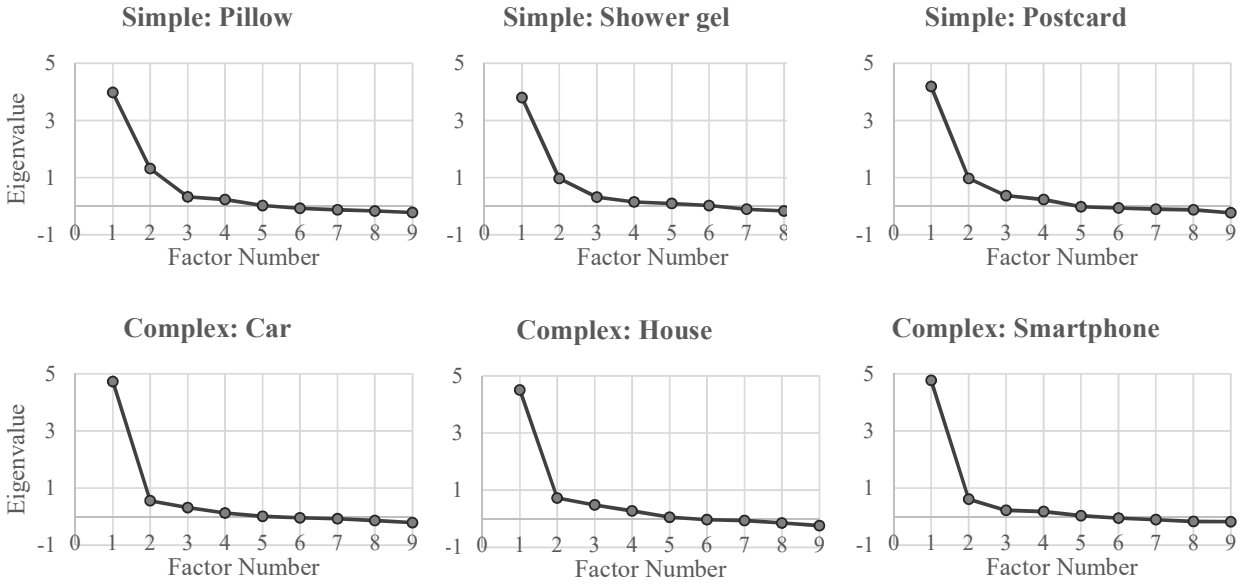
Appendix B2. Figure 1

Scree plots for the features of perceived validity of analysis, for simple and complex products



Appendix B2. Figure 2

Scree plots for the features of perceived validity of intuition, for simple and complex products



Appendix B2. Table 1

Explained variance for each product obtained from Exploratory Factor Analyses for perceived validity items (Cronbach's alphas between brackets)

Context		Intuition	
Simple	Pillow Explained variance: 1st factor: 49.2 2nd factor: 18.8 (.87)	Shower gel Explained variance: 1st factor: 49.3 2nd factor: 14.9 (.87)	Postcard Explained variance: 1st factor: 51.4 2nd factor: 15.8 (.87)
Complex	Car Explained variance: 1st factor: 57.8 2nd factor: 12.2 (.90)	House Explained variance: 1st factor: 54.5 2nd factor: 13.2 (.89)	Smartphone Explained variance: 1st factor: 56.9 2nd factor: 12.9 (.90)
Context		Analysis	
Simple	Pillow Explained variance: 1st factor: 65,704 2nd factor: 12,557 (.93)	Shower gel Explained variance: 1st factor: 68,686 2nd factor: 7,940 (.94)	Postcard Explained variance: 1st factor: 65,349 2nd factor: 11,359 (.93)
Complex	Car Explained variance: 1st factor: 49,718 2nd factor: 13,818 (.87)	House Explained variance: 1st factor: 63,322 2nd factor: 12,128 (.92)	Smartphone: Explained variance: 1st factor: 56,676 2nd factor: 11,523 (.90)

Appendix B3. Tables 2-4

Maximum likelihood Factor Loading Matrix for each product obtained from Exploratory Factor Analyses for items of perceived validity of intuition

Table 2. Pattern Matrix - Pillow

	Factor	
	1	2
Disregarding_objective_and_concrete_facts	,863	
By_avoiding_thinking_too_much	,855	
Based_on_impulse	,829	
Based_on_my_instinct	,666	
Based_on_my_gut	,648	
By_actively_engaging_in_imagination	,572	
Based_on_what_feels_right		,940
Considering_my_prior_experience		,730
Deciding_in_a_personal_and_unique_manner	,422	,432

Extraction Method: Maximum Likelihood.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Table 3. Pattern Matrix – Shower gel

	Factor	
	1	2
Based_on_impulse	,837	
Disregarding_objective_and_concrete_facts	,797	
Based_on_my_gut	,784	
Based_on_my_instinct	,659	
By_avoiding_thinking_too_much	,472	,307
By_actively_engaging_in_imagination	,448	
Considering_my_prior_experience		,871
Deciding_in_a_personal_and_unique_manner		,807
Based_on_what_feels_right	,352	,425

Extraction Method: Maximum Likelihood.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Table 4. Pattern Matrix - Postcard

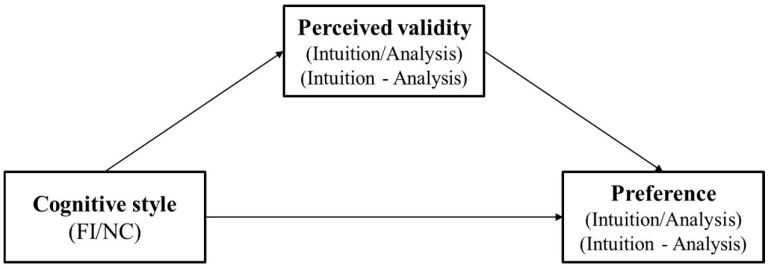
	Factor	
	1	2
By_avoiding_thinking_too_much	,916	
Based_on_impulse	,860	
Based_on_my_instinct	,854	
Disregarding_objective_and_concrete_facts	,538	
Based_on_my_gut	,504	
Considering_my_prior_experience		,883
Deciding_in_a_personal_and_unique_manner		,757
By_actively_engaging_in_imagination	,323	,675
Based_on_what_feels_right		,567

Extraction Method: Maximum Likelihood.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Appendix B3. Detailed description of the mediation analysis

Figure 1

Tested mediation model for simple and complex contexts



As depicted in Figure 1, above, the mediation was defined in 4 different models tested for Complex and Simple products.

Model 1a: For simple products – Approaching the effects of FI in preference for intuition (Pref-I) and its mediation by perceived validity of Intuition (PVI).

Model 1b: For complex products – Approaching the effects of FI in preference for intuition (Pref-I) and its mediation by perceived validity of Intuition (PVI).

Model 2a: For simple products – Approaching the effects of NC in preference for analysis (Pref-A) and its mediation by perceived validity of analysis (PVA).

Model 2b: For complex products – Approaching the effects of NC in preference for analysis (Pref-A) and its mediation by perceived validity of analysis (PVA).

Model 3a: For simple products – Approaching the effects of FI in preference for analysis relatively to intuition (Pref-IA) and its mediation by the differences in perceived validity of intuition and analysis (PV-IA).

Model 3b: For complex products – Approaching the effects of FI in preference for analysis relatively to intuition (Pref-IA) and its mediation by the differences in perceived validity of intuition and analysis (PV-IA).

Model 4a: For simple products – Approaching the effects of NC in preference for analysis relatively to intuition (Pref-IA) and its mediation by the differences in perceived validity of intuition and analysis (PV-IA).

Model 4b: For complex products – Approaching the effects of NC in preference for analysis relatively to intuition (Pref-IA) and its mediation by the differences in perceived validity of intuition and analysis (PV-IA).

We conducted these analyses, using SPSS's PROCESS extension Model 4 (Hayes, 2017), and obtained the indirect effect (IE) of the distal predictor FI/NC on preferences via perceived validity, and the bias corrected 95% confidence interval (CI) from 5,000 bootstrap samples – accepting the indirect effect as greater than zero when the bias corrected 95% CI excluded zero.

Table 1

Summary table of the conducted mediation analysis

Context	Predictor (X)	Mediator (M)	Path X to M	Outcome (Y)	Path M to Y	Total effect	Direct effect	Indirect effect & CI
Simple	FI	PVI	0.69**	Pref-I	0.09	0.30	0.24	IE = 0.06 [-0.21, 0.33]
		PV-IA	1.11**	Pref-IA	0.76**	0.15	-0.69†	**IE = 0.84** [0.34, 1.57]
	NC	PVA	0.15	Pref-A	0.58**	0.09	0.00	IE = 0.08 [-0.22, 0.40]
		PV-IA	-0.38	Pref-IA	0.65**	0.19	0.44	IE = -0.24 [-0.71, 0.14]
Complex	FI	PVI	0.75**	Pref-I	0.59**	1.04**	0.59†	**IE = 0.44** [0.11, 0.90]
		PV-IA	0.84*	Pref-IA	0.67**	1.16*	0.60	**IE = 0.57** [0.17, 1.14]
	NC	PVA	0.28*	Pref-A	0.56*	0.15	-0.01	**IE = 0.16** [0.02, 0.38]
		PV-IA	-0.71*	Pref-IA	0.73**	-0.71†	-0.19	**IE = -0.52** [-1.03, -0.15]

FI: Faith in intuition; NC: Need for Cognition; PV-I: Perceived validity of intuition; PV-A: Perceived validity of analysis; PV-IA: Index of the difference between perceived validity of intuition and analysis; Pref-I: Preference for intuition; Pref-A: Preference for analysis; Pref-IA: Index of the difference between preference for intuition and analysis;
*$p < .05$, **$p < .01$, †$p < .10$; bolded significant indirect effects (95% CI's excluding zero)

Preference for intuition in simple contexts. The model integrating perceived validity of intuition as mediator rendered no significant mediation effect (IE = 0.06, 95% CI [-0.21, 0.33]). The regression of the effect of FI on perceived validity of intuition was significant (b = 0.69, $t(47)$ = 3.35, p = .002). However, the total effect of FI on preference for intuition (b = 0.30, $t(47)$ = 1.28, p = .207) and of perceived validity on preference for intuition (b = 0.09, $t(47)$ = 0.54, p = .590) were, in this model, non-significant.

Preference for intuition in complex contexts. The effect of FI on preferences for intuition in complex contexts was fully mediated by the perceived validity of intuition in these contexts (IE = 0.44, 95% CI [0.11, 0.90]). The total effect of FI on preference for intuition, ignoring the mediator, was significant (b = 1.04, t(47) = 2.97, p = .005). Controlling for the mediator, perceived validity of intuition, the direct effect of FI on preference for intuition was rendered non-significant (b = 0.59, t(47) = 1.71, p = .095). Replicating the effects observed for simple contexts, the effect of FI on perceived validity of intuition was significant (b = 0.75, t(47) = 2.96, p = .005). For this model, the effect of perceived validity of intuition on preference for intuition was also significant (b = 0.59, t(47) = 3.23, p = .002).

Preference for analysis in simple contexts. The indirect effect of NC on preference for analysis in simple contexts via perceived validity of analysis in these contexts was non-significant (IE = 0.08, 95% CI [-0.22, 0.40]), providing no evidence for a mediation effect. The effect of NC on perceived validity of analysis (b = 0.15, t(47) = 0.65, p = .516) and its total effect on preference for analysis (b = 0.09, t(47) = 0.34, p = .739) were non-significant. In this model, preference for analysis was significantly predicted by its perceived validity (b = 0.58, t(47) = 3.96, p < .001).

Preference for analysis in complex contexts. Perceived validity of analysis mediated the effect of NC on preferences (IE = 0.16, 95% CI [0.02, 0.38]). The total effect of NC on preference for analysis was non-significant (b = 0.15, t(47) = 0.84, p = .408). Controlling for the mediator, the direct effect of NC on preference was also non-significant (b = -0.01, t(47) = -0.04, p = .970). Here, the effect of NC on perceived validity of analysis was significant (b = 0.28, t(47) = 2.64, p = .011). And, also for this model, preference for analysis was significantly predicted by its perceived validity (b = 0.56, t(47) = 2.38, p = .022).

Next, we replicate the above mediation analyses, with FI/NC as predictor and the index of the difference between perceived validity of intuition and analysis (in simple and complex contexts) as the mediating variable. The indexes of preferences for intuition-analysis, in simple and complex contexts, were introduced as the dependent variable in different models.

Preference for intuition-analysis in simple contexts: FI as predictor. The effect of FI on the preference index was mediated by the perceived validity index in simple contexts (IE = 0.84, 95% CI [0.34, 1.57]). The total effect of FI on the preference index, ignoring the mediator, was non-significant (b = 0.15, t(47) = 0.37, p = .711), and its direct effect, controlling for the mediator was marginally significant, albeit in an opposite direction (b = -0.69, t(47) = -1.78, p

= .082), suggesting a competitive mediation. The effect of FI on the perceived validity index was significant (b = 1.11, t(47) = 3.91, p < .001), and the effect of this mediator on the preference index was, too, significant (b = 0.76, t(47) = 4.36, p < .001).

Preference for intuition-analysis in simple contexts: NC as predictor. We replicate the above model with NC as the predictor. NC's indirect effect on the preference index via the perceived validity index was non-significant (IE = -0.24, 95% CI [-0.71, 0.14]). The effect of NC on the mediator (b = -0.38, t(47) = -1.40, p = .168) and its total effect on the preference index (b = 0.19, t(47) = 0.58, p = .566) were non-significant. Finally, the preference index was significantly predicted by the perceived validity index (b = 0.65, t(47) = 4.19, p < .001).

Preference for intuition-analysis in complex contexts: FI as predictor. The effect of FI on the preferences index was fully mediated by the perceived validity index in complex contexts (IE = 0.57, 95% CI [0.17, 1.14]). While the total effect of FI on the preference index was significant (b = 1.16, t(47) = 2.63, p = .012), when controlling for the mediator, the direct effect of FI was rendered non-significant (b = 0.60, t(47) = 1.42, p = .162). The effect of FI on the perceived validity index was significant (b = 0.84, t(47) = 2.66, p = .011), and the effect of this mediator on the preference index was also significant (b = 0.67, t(47) = 3.72, p = .001).

Preference for intuition-analysis in complex contexts: NC as predictor. NC's effect on the preference index was also mediated by the perceived validity index in complex contexts (IE = -0.52, 95% CI [-1.03, -0.15]). The total effect of NC on preference was marginally significant (b = -0.71, t(47) = -1.88, p = .066), but when controlling for perceived validity, its direct effect was rendered non-significant (b = -0.19, t(47) = -0.54, p = .595). The effect of NC on the perceived validity index was significant (b = -0.71, t(47) = -2.75, p = .008), and the effect of this mediator on the preference index was also significant (b = 0.73, t(47) = 3.93, p < .001).

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Appendix C. Supporting information for Empirical Chapter III

Figure 1

Scree plot for the items of Perceived Validity of Intuition (Study 3.1)

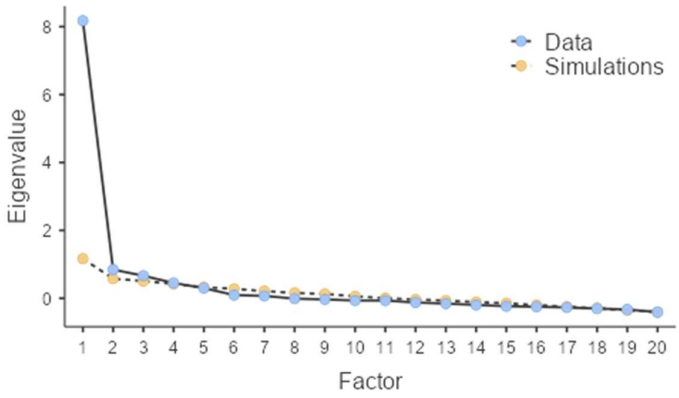
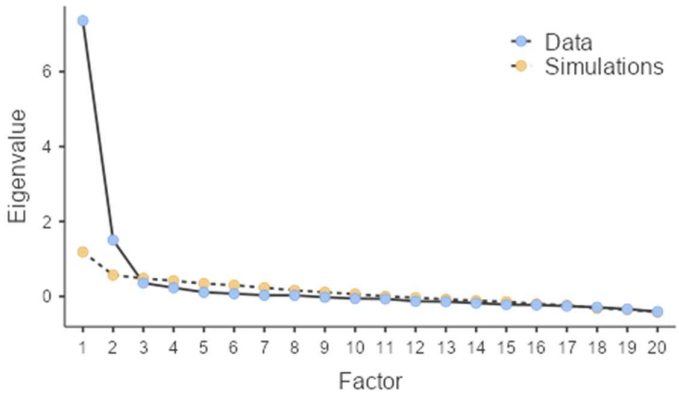


Figure 2

Scree plot for the items of Perceived Validity of Analysis (Study 3.1)



Appendix D. Supporting information for Empirical Chapter IV

Figure 1

Mini advertisement

Figure 2

Peugeot advertisement

Figure 3

Peugeot advertisement

Figure 4

Mercedes advertisement

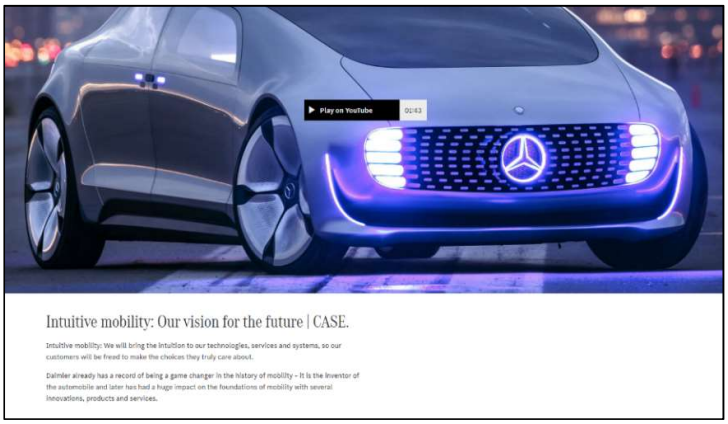


Figure 5

Audi advertisement

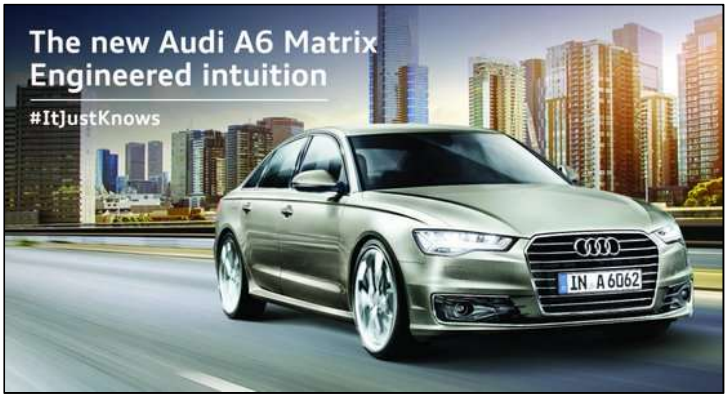


Figure 6

Lexus advertisement