

# Two minds, three ways: dual system and dual process models in consumer psychology

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**Abstract** Dual system and dual process views of the human mind have contrasted automatic, fast, and non-conscious with controlled, slow, and conscious thinking. This paper integrates duality models from the perspective of consumer psychology by identifying three relevant theoretical strands: Persuasion and attitude change (e.g. Elaboration Likelihood Model), judgment and decision making (e.g. Intuitive vs. Reflective Model), as well as buying and consumption behavior (e.g. Reflective-Impulsive Model). Covering different aspects of consumer decision making, we discuss the conditions under which different types of processes are evoked, how they interact and how they apply to consumers' processing of marketing messages, the evaluation of product-related information, and purchasing behavior. We further compare and contrast theoretical strands and incorporate them with the literature on attitudes, showing how duality models can help us understand implicit and explicit attitude formation in consumer psychology. Finally, we offer future research implications for scholars in consumer psychology and marketing.

**Keywords** Dual systems · Dual process models · Judgment and decision making · Heuristics and biases · Attitudes · Persuasion · Attitude change · Consumer behavior · Impulsive buying · Marketing psychology

## Introduction

The last time you bought a television set, how considered was your purchase? Was it influenced mainly by a careful weighing up of factors like price and product features, or might there have been other less conscious processes that influenced your purchase of a particular brand? How did you evaluate the marketing messages to which you had been exposed prior to your buying decision, and what attitudes had you formed already about the brand as a result? When you entered the electronics store, did your buying intentions guide you or did you suddenly find yourself purchasing a different and more expensive set altogether? Duality models, the subject of this review, can help us understand the psychology of the consumer at different stages of the consumer purchase decision making process.

Over the last two decades, psychologists have distinguished between two systems of thought with different capacities and processes (Evans 2003, 2008; Kahneman 2011; Kahneman and Frederick 2002; Metcalfe and Mischel 1999; Sloman 1996; Smith and DeCoster 2000; Strack and Deutsch 2004), which have been referred to as System 1 and System 2 (Stanovich and West 2000). System 1 (S1) consists of high-capacity intuitive thoughts, draws on associations that are acquired through experience, and computes information quickly and automatically. System 2 (S2), on the other hand, involves low-capacity reflective thinking, draws on rules that are acquired through culture or formal learning, and computes

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information in a relatively slow and controlled fashion. Processes associated with these systems have been referred to as Type 1 (fast, automatic, unconscious) and Type 2 (slow, conscious, controlled), respectively (Frankish and Evans 2009). The dual system perspective has become increasingly popular, even outside of academia following the publication of Daniel Kahneman's book *Thinking, Fast and Slow* (2011).<sup>1</sup>

The contribution of our paper is threefold. First, we provide a structured overview of duality models in the field of consumer psychology. Some scholars have reviewed dual system and dual process theories as they have emerged in different areas of psychology, including social inference, judgment and decision making, and reasoning (Carruthers 2012; Evans 2008; Frankish and Evans 2009). However, these discussions have not included models on buying and consumption behavior and there have been no systematic reviews of duality models through the lens of consumer psychology. We discuss duality models across three different theoretical strands: Persuasion and attitude change, judgment and decision making, and buying and consumption behavior. Our objective is not to provide an exhaustive review of each strand, but to show how different streams of research taken together give a fuller picture of consumer decision making, including the effect of persuasive marketing messages, product evaluations, and purchasing behaviors. We constrain our review of each strand to the aspects necessary to understand how and why each model can be characterized as a duality model, and how it functions as such. Second, we integrate these theories by comparing and contrasting processes and systems across each strand, and then showing how the different areas can be connected to the core marketing concept of attitudes. We further demonstrate how the two types of processes and systems (S1 and S2) can be related in each strand with the formation of implicit and explicit attitudes. Finally, we offer a series of research implications derived from our systematic review of the 'duality of mind' literature.

### Duality models in consumer psychology: an overview

We identify three strands associated with dual process and dual system models that are relevant to consumer psychology: Persuasion and attitude change, judgment and decision making, and buying and consumption behavior. As representatives of the persuasion and attitude change area, we discuss two well-known dual process theories, namely the *Elaboration Likelihood Model* (ELM; Petty and Cacioppo

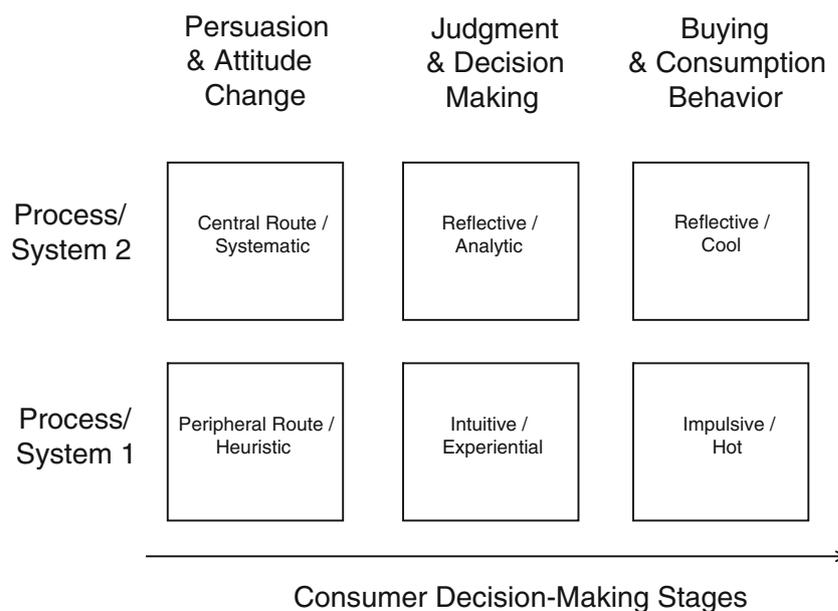
1986) and the *Heuristic-Systematic Model* (HSM; Chaiken 1980). In the judgment and decision making tradition, we focus on two dual system models that have been used to explain the findings of research on general purpose heuristics, namely the *Intuitive vs. Reflective* (Kahneman and Frederick 2002; cf. Kahneman 2011) as well as the associated *Experiential vs. Analytic* (Slovic et al. 2002; cf. Epstein 1994) systems. Finally, we look at buying and consumption behaviors and explain the theoretical context and processes outlined in the *Reflective-Impulsive* dual systems model (RIM; Strack and Deutsch 2004; Strack et al. 2006), which partly draws on the *Hot/Cool* model's dynamics of willpower (Metcalfé and Mischel 1999).

For the purpose of integration, these strands can be mapped onto standard consumer decision making stages, which begin with problem recognition, followed by an (internal and external) information search, consideration set formation, the evaluation of alternatives, choice/purchase, as well as post-purchase evaluation (Blackwell et al. 2006; Hoyer and MacInnis 2003). This process represents an ideal type scenario, since we can expect variations in the time scale, composition and sequence of stages. In the persuasion strand, consumers exposed to marketing communications can rely on peripheral cues and process information heuristically or they can take a central route and process information systematically, which may lead to attitude change. Since the aim of traditional marketing, especially advertising, is to influence consumer memory and attitudes (including wants and perceived needs) (e.g. Blackwell et al. 2006), this strand affects decision making as early as at the problem recognition and information search stages. In judgment and decision making dual system views, consumers evaluate products by relying on easily accessible information in memory or affect (S1) or process information reflectively by weighing up costs and benefits (S2). This strand thus pertains to consumer decision making mainly in the middle stages, especially the evaluation of alternatives. Finally, in the buying and consumption behavior strand, consumer choices may be influenced by processes in impulsive or reflective systems, ultimately leading to considered choices (via reflective, S2, thought) influenced by prior evaluations and intentions, or unplanned choices (via S1 impulses). Figure 1 presents an overview of these strands.

Evans (2007, 2008) further distinguished between two forms of duality models: Parallel-competitive and default-interventionist. The main differences between the two relate to the order and dominance of different cognitive processes. In a parallel-competitive type of model, dual processes can occur in parallel, leading to conflicting or competing attempts to control the results of thinking. In Evans' view, the Heuristic-Systematic (HSM) model and the Experiential vs. Rational perspective (upon which the Experiential vs. Analytic model is based) correspond more closely to a

<sup>1</sup> The distinction between dual process and dual systems theories is mainly one of scope, with dual systems views essentially conceptualizing the operations of two "minds" under which dual processes are subsumed.

**Fig. 1** Overview of duality models in consumer psychology



parallel-competitive type. Default-interventionist theories of dual processing, on the other hand, suggest that automatic and fast (S1) processes propose answers to problems that then enter reflective (S2) processing. This is done by default. If S2 intervenes, the content provided by S1 may or may not be endorsed. Evans cites the Intuitive vs. Reflective model as a default-interventionist type.

Although Evans does not include duality models of consumer behavior in his review and typology, the Reflective-Impulsive Model (RIM) appears to fit his parallel-competitive description, while the Hot/Cool model (upon which the RIM partly builds) resembles a default-interventionist structure. Yet, not all theories reviewed here can be fitted into this distinction—the ELM does not constitute either one of Evans’ processing types. We refer to Evans’ typology throughout our review and further discuss the relevance of this distinction for duality models—including recent challenges—later in this article.

In the following sections, we review the duality strands of persuasion and attitude change, judgment and decision making, as well as buying and consumption behavior. These research domains did not develop in isolation, but can be seen as prototypical streams in which duality theories have emerged. Most of the dual system approaches reviewed here have mainly served as explanatory frameworks for integrating past research findings (the Intuitive vs. Reflective model in judgment and decision making) or existing theories (the RIM in the buying and consumption strand). Dual process views (the ELM and HSM in persuasion and attitude change), by contrast, are the product of more traditional hypothesis testing and theory building. In each section, we discuss the theoretical underpinnings and applications of these models to consumer research, while highlighting the conditions under which

different processes are evoked and how they interact. Finally, we conclude each section with a review of recent developments in the area.

### Dual process models in attitude change and persuasion

Dual processing is probably best known to marketing scholars in the context of persuasion and attitude change studies, frequently used in advertising research. The concept of attitude has occupied a central place in both social psychology (Allport 1935) and consumer psychology (MacKenzie et al. 1986). Traditional conceptualizations of attitude change and persuasion were known as cognitive-response models of persuasion (Greenwald 1968; Wright 1980), suggesting that persuasion attempts trigger a simple and systematic cognitive response from individuals trying to make sense of new information by confronting it with existing information. These simplistic models, which relied on single-effect and single-process routes and were too often contradicted by empirical data (Petty and Brinol 2008), were quickly abandoned by researchers who turned towards dual process models to better understand persuasion and attitude change. Two key models emerged and offered a better way to distinguish between the processes and the content of persuasion: The Elaboration Likelihood Model (ELM, Petty and Cacioppo 1986), which appears to be more prevalent in the literature,<sup>2</sup> and the Heuristic-Systematic Model (HSM; Chaiken 1980; Eagly and Chaiken 1993).

<sup>2</sup> As of October 2012, a Google Scholar search for the keywords ‘Petty Elaboration Likelihood’ returned 17,200 results, and only 7,560 for a search with keywords ‘Chaiken Heuristic Systematic’.

### The elaboration likelihood model (ELM)

The ELM investigates two types of information processing strategies used by individuals to engage with aspects of the persuasion materials, such as argument content, the source of a message, the design of visual information, or expert opinions. Individuals can engage in effortful information processing in order to construct strong and accurate attitudes (central route), or they can limit cognitive efforts and form weak or imprecise attitudes (peripheral route; Petty and Cacioppo 1986; Petty et al. 1981, 1983). In the central route, consumers usually assess the quality of arguments. For example, people may consider the logic behind a sequence of arguments, or the perceived accuracy of the comparison process of one brand with another in the case of comparative advertising. In the peripheral route, emotional messages, the attractiveness of the source of communication, or product aesthetics are examples of elements that can serve as shortcuts in judging the quality of a product. According to Petty et al. (1983), motivation to process information is the key factor that determines which route will be used.

Petty et al. (1983) introduced the ELM in a classic study on advertising effects, in which participants were exposed to a magazine ad for a razor—endorsed by either an athlete or a non-famous citizen—and subsequently asked for their attitudes and purchase intentions. Participants' involvement was manipulated by telling them that they would receive a razor as a gift and that the advertised razor would soon be test-marketed in their area (high involvement). Alternatively, they were informed that would receive a gift from a different category (toothpaste) and the product would be test-marketed in a different region (low involvement). Results showed an effect of celebrity status on product attitudes when involvement was low, whereas the persuasiveness of the message itself was a strong determinant in product evaluations when involvement was high.

Research also showed that a combination of contextual factors, dispositions, and level of involvement can determine whether a cue is processed using a central or a peripheral route (MacInnis and Jaworski 1989; Payne et al. 1993). A consumer's variation in the degree of involvement in processing messages can be due to the amount of cognitive resources available—in the form of time pressure or cognitive load—or to a feeling that the information to be processed is irrelevant or non-essential to the achievement of her goals. For instance, manipulating individuals' cognitive capacity (by asking participants to perform two simultaneous tasks) or involvement in the task (by suggesting to participants that their answers are more or less important to the researcher) can result in greater use of peripheral cues over central cues (Reinhard and Sporer 2008). Finally, consumer involvement in information processing will vary depending on expertise in the product category. Previous

research has suggested that experts value in-depth information processing, whereas novices tend to find in-depth information processing time-consuming and unhelpful (see Alba and Hutchinson 1987). Consequently, expert consumers are more likely to use the central route when processing information that pertains to their expertise.

Other contextual factors that influence elaboration likelihood and the weight given to different cues are mood variations, where positive moods lead to less message scrutiny (Howard and Barry 1994) or more message scrutiny if the message is mood-enhancing (Wegener et al. 1995); individual goals, where an interest in holding accurate attitudes is related to more judgment correction using the central route (Meyers-Levy and Malaviya 1999); and physiological arousal, where high arousal is associated with greater sensitivity to peripheral cues (Sanbonmatsu and Kardes 1988). With respect to dispositions, individuals who like to engage in extensive information processing (high need for cognition, Cacioppo et al. 1983) process arguments using the central route, compared with individuals who do not (Haugtvedt and Petty 1992). Finally, when a message matches an individual's self-schemas, he is more likely to engage in elaboration (Wheeler et al. 2005).

Some cues in persuasion and attitudes change can be used by both processes (see Multiple Role Model, Haugtvedt and Kasmer 2008). For instance, brand names have been shown to influence attitudes both as a peripheral cue (Maheswaran et al. 1992) or by triggering an elaboration of the message and serving as an argument (Haugtvedt and Rucker 2007). Cues that can be used by both central and peripheral routes in dual process models (i.e. they fulfill multiple roles) include message speed (Moore et al. 1986), affect (Petty et al. 1988), trustworthiness of the source (Kang and Herr 2006), or the interactivity of a website (Liu and Shrum 2009).

### The Heuristic-Systematic model (HSM) and the interaction between dual processes

The ELM assumes that consumers process persuasion information using either a central or a peripheral route. This suggests that consumers would, for instance, look at either a product's brand (peripheral route) or its technical characteristics (central route), when processing a commercial, and then base their decision on one of these two elements. Nevertheless, a consumer could be interested in first evaluating a product's characteristics—in order to decide if it meets target specifications—and then look at the brand, in order to infer quality. In other words, customers may be simultaneously persuaded through central and peripheral cues.

The HSM was the first model to suggest an interaction between the two routes to persuasion by allowing a

simultaneous effect of heuristic and systematic processes in the persuasion process (Petty et al. 1997). As such, it corresponds to what Evans (2007, 2008) describes as a parallel-competitive duality model. While this notably different to the ELM, considerably fewer studies have used the HSM framework than the ELM (see footnote 2). This can be explained by the fact that most studies have tested the propensity of consumers to use one route instead of the other, rather than understanding the consequences of using simultaneous routes. Nonetheless, research using HSM as a framework has revealed interesting findings. For instance, Meyers-Levy and Maheswaran (2004) examined the effect of message framing on persuasion when either a heuristic or systematic information processing strategy is used, or when both types of information processing strategies are employed. Their results showed that allowing for both routes to be used simultaneously offered a better fit to the data. Another HSM approach to understanding persuasion and consumers' reactions to deceptive advertising showed that consumers are more likely to use negative stereotypes as a heuristic processing of messages when they have faced previous deception with a brand (Darke and Ritchie 2007).

Heuristic and systematic processes can interact in sequence, when for instance individuals realize they might have made an incorrect judgment (Martin and Achee 1992). Systematic thought can also be a moderator of heuristic processing effects in persuasion (Ratneshwar and Chaiken 1991). An individual suddenly paying attention to the quality of arguments in an advertisement might start discounting the role of design in forming an impression about the quality of a product. Both processes may also interfere with other information-processing mechanisms. For example, counter-factual thinking can play a role in how individuals use systematic processing when dealing with persuasion messages (Krishnamurthy and Sivaraman 2002). In addition, the accessibility of one's attitudes or emotions (Fazio and Williams 1986; Petty et al. 1993) can bias information processing and lead to distorted attitudes, as discussed previously.

#### Current directions: advances in measurement

Over the last decade, research on persuasion and attitude change in consumer psychology has been influenced by advances in attitude measurement methods (Haugtvedt and Kasmer 2008). The recurring debate surrounding the use of explicit (Krosnick et al. 2005) and implicit measures of attitudes (Greenwald et al. 1998) has implications for understanding the relation between the two processes. Explicit attitudes are self-reported and measured by using standardized scales—usually Likert scales. Implicit attitudes refer to attitudes that are held by consumers prior to any form of mental correction, which could otherwise be due to factors

such as social desirability concerns, majority influence, or cognitive dissonance. Typically, implicit attitude tests (IATs, Greenwald et al. 1998) work by measuring consumers' response times in word associations tasks and comparing the time it takes the respondents to make a stereotypical association (e.g. Mercedes and 'good quality') with a counter-stereotypical association (e.g. Mercedes and 'poor quality').

Following the introduction of a distinction between explicit and implicit attitudes, dual models of attitudes appeared, suggesting that individuals can hold an implicit attitude that differs from an explicit one on the same attitude object (Wilson et al. 2000). Wilson and colleagues (2000) further suggested that implicit attitudes are relatively stable and difficult to replace, whereas explicit attitudes are more subject to change. This led Gawronski and Bodenhausen (2006, 2011) to propose an Associative Propositional Evaluation Model and argue that implicit attitudes could be the results of associative processes, subject to mere activation, and explicit attitudes could be the results of propositional processes, concerned with the validation of beliefs and evaluations. While this model is a useful conceptual attempt to address contradictions observed between implicit and explicit attitudes, it has not, to our knowledge, found its way into empirical testing in consumer research.

#### Dual systems in judgment and decision making

Humans inherently have a limited capacity for controlled, deliberate or systematic thinking. This has been referred to as 'bounded rationality', restrictions in the processing of information to arrive at decisions due to limits in knowledge (information), available time, and computational capacities (Simon 1982; Gigerenzer and Goldstein 1996; Kahneman 2003). Bounded rationality is reflected in different theoretical approaches to judgment and decision making. In the 'fast and frugal' approach, the application of heuristics like recognition has been described as a rational (S2) strategy (Gigerenzer and Goldstein 1996; Goldstein and Gigerenzer 2002). In the 'heuristics and biases' view, on the other hand, heuristics represent intuitive (S1) thinking that often violates normatively correct (S2) judgments (Gilovich et al. 2002; Kahneman and Frederick 2002; Tversky and Kahneman 1974).

Work on heuristics and biases has inspired researchers in the area of consumer decision making.<sup>3</sup> In this section, we first focus on general purpose heuristics used in consumer

<sup>3</sup> The judgment and decision making area of research has given rise to other dual process models, most notably 'fuzzy trace' theory (Reyna 2004). This model's origins were relatively specialized and domain-specific (risk perception in the domain of health) and it has to our knowledge not been adopted by researchers interested in consumer decision making.

research, specifically *availability*, *representativeness*, and *anchoring* (Tversky and Kahneman 1974), which did not adopt a duality of mind perspective. We then introduce Kahneman and Frederick's (2002) Intuitive vs. Reflective systems, a theoretical model for general purpose heuristics that was proposed in retrospect of the heuristics and biases program. Finally, we discuss the *ratio bias* (Kirkpatrick and Epstein 1992) and *affect heuristic*, which reflect the distinction between experiential and analytic systems (Slovic et al. 2002; see also Epstein 1994).

Heuristics and biases: availability, representativeness, and anchoring

According to Tversky and Kahneman (Kahneman and Tversky 1972; Tversky and Kahneman 1974, 1981; see also Griffin et al. 2001), the application of heuristics under conditions of uncertainty can lead to systematic biases as a result of intuitive judgments. Availability and representativeness heuristics are processes whereby a difficult question is substituted by a simpler one (Kahneman and Frederick 2002; Shah and Oppenheimer 2008). Inferences relying on the representativeness heuristic occur when probabilities or frequencies are evaluated based on the similarity of a target object with a comparison object, often ignoring prior probabilities or base rates. The availability heuristic is at work when inferences about the probability of an event or the frequency of a class are based on how easily an instance can be brought to mind. Finally, anchoring is a process whereby an initial, often implicit, value serves as a reference point against which subsequent estimates are made.

*Availability* has been studied in relation to the perceived risk of product failure (Folkes 1988). In a correlational study, the ease of past service failure recall (receiving the wrong order at a fast food restaurant) was associated with judgment about the probability of future service failure, but not success. In a separate experiment, hypothetical scenarios about rust removal products involving distinctive (e.g. "F.P.V.T.") brand names led to higher estimates of product failure than in a condition where failing products had typical names (e.g. "Staino"). The availability heuristic has also been shown to be at work when consumers judge retailers' price levels based on their relative ease in recalling low-priced products (Ofir et al. 2008). Other consumer judgments that have been associated with availability include "ease of retrieval", when the ease of recalling positive product features leads to more favorable product evaluations, independent of actual information available (Menon and Raghurir 2003).

Expected product performance can be subject to *representativeness*-based inferences. In terms of price cognition (e.g. Thomas and Morwitz 2009), it has been suggested that the representativeness heuristic is evident in the perception

of an offered price as relatively lower when it is presented in smaller font (the size congruity effect; Coulter and Coulter 2005). In the perception of packaging, a consumer may notice a similarity in packaging between a generic target product and a familiar brand, inferring that product performance will be comparable (Kardes et al. 2004). When base rates available to customers (e.g. based on actual or experienced performance of generic products) conflict with the apparent similarity between exemplar and target objects, inferior judgments tend to occur.

*Anchoring* effects among consumers have been found in relation to purchase quantities. Anchors, in the form of multiple-unit prices (e.g. "4 cans for \$2"), purchase quantity limits (e.g. "limit of 12 per person"), selling slogans (e.g. "Buy 18 Snickers bars for your freezer"), and even 'expansion anchors' like "101 uses!" can increase sales by making a higher than normal purchase quantity more salient (Wansink et al. 1998). The number of product units shown on a package can also bias consumer perceptions, where a display of greater quantities leads not only to perceptions of greater product quantity, but also to greater actual product consumption (Madzharov and Block 2010). Anchoring is also associated with the integration of other types of numerical information, such as reference pricing. These anchoring effects occur when price claims are easily accessible (Yadav and Seiders 1998), which can affect product evaluations (Elaad et al. 2010).

Studies on availability and anchoring effects among consumers have investigated interactions between heuristic reasoning (S1) and knowledge or expertise, a variable commonly associated with S2 thinking. Consumer knowledgeability affects price estimations (Ofir et al. 2008; Yadav and Seiders 1998) and judgments about expected returns on investment (Jordan and Kaas 2002). For example, less knowledgeable consumers have been found to be more susceptible to anchoring bias when judging the expected annual return of two investments (Jordan and Kaas 2002). While these consumer researchers have not looked at general purpose heuristics from a dual systems or process point of view, Kahneman and Frederick (2002) have proposed a dual systems framework to explain past work in the heuristics and biases domain, which is outlined in the next section.

The intuitive vs. reflective model

There was no explicit discussion of dual processes in Kahneman's early work with Tversky in the heuristics and biases program. Similarly, associated consumer research reviewed in the previous section has been interested in the effects of variables like knowledge and expertise, but has not explicitly tested dual process hypotheses by systematically varying conditions under which judgments are made. Kahneman and Frederick (2002) discussed, for the first

time, the heuristics and biases program in relation to *intuitive* and *reflective* thinking systems. The former system automatically offers intuitive answers to problems, while the latter has a supervisory function by monitoring S1 default proposals. Although there is a certain level of competition between S1 and S2 processes, S2 often quite readily approves intuitive judgments. Even when deliberate judgments override intuitive responses, these are likely to remain anchored on the impressions initially generated by S1. Evans (2007, 2008) refers to this view on dual processing as default-interventionist due to the primacy of preconscious S1 processes that shape deliberative S2 thought.

A number of studies, mainly in cognitive psychology, have identified variables affecting intuitive vs. reflective thinking, especially ease of retrieval and base-rate neglect (see also Kahneman and Frederick 2002; Kahneman 2011 for summaries). Greater reflective dominance has been found as a result of not only acquired knowledge or expertise, as discussed previously, but also formal training (Agnoli 1991; Nisbett et al. 1983), as well as dispositions like general intelligence (e.g. Barbey and Sloman 2007) and critical thinking ability (West et al. 2008). Research specifically looking at anchoring and adjustment has found that anchoring cues were more influential on individuals high in openness-to-experience (McElroy and Dowd 2007).

Further support for two different processes is provided by situational manipulations. Instructing participants to think like statisticians (Schwarz et al. 1991) and the priming of a formal thought mindset (Ferreira et al. 2006) have been associated with greater reliance on S2. Increased cognitive load, experimentally induced by reducing processing resources (Chun and Kruglanski 2006; Ferreira et al. 2006; Greifeneder and Bless 2007), and time pressure (Betsch et al. 2001) favor S1 use. While positive mood appears to lead to a greater intuitive dominance, negative mood seems to foster reflective processing (Bless 2001; cf. Isen et al. 1988; for a review see Schwarz 2002; Kahneman 2011).

From ratio bias to the affect heuristic: the experiential vs. analytic model

While S1 processes in the intuitive-reflective distinction are mainly about easily accessible information in memory, another dual system perspective on judgment and decision making has proposed an *experiential* S1, marked by automatically generated feelings, as evident in the ratio bias and affect heuristic.

The concept of ratio bias (Kirkpatrick and Epstein 1992) is rooted in our difficulties in dealing with proportions or ratios as opposed to absolute numbers. For example, when asked to evaluate two movie rental plans with a contracted

scale (e.g. 7 and 9 new movies per week for Plans A and B, respectively) as opposed to an equivalent offering with an expanded scale (364 and 468 movies per year, respectively), consumers favor the better plan (Plan B) more in the scale expansion than contraction condition (Burson et al. 2009; Study 1). According to Epstein's (1994) cognitive-experiential self theory (CEST), this occurs because the experiential system—unlike the rational system—encodes information as concrete representations, and absolute numbers are more concrete than ratios or percentages. When making choices in experiments, participants often experience conflicts between “knowing” and “feeling” (Denes-Raj and Epstein 1994), reporting that “they had two opposite views... one based on their knowledge that the [two proportions] were equal and the other based on their strong intuitive impression that they were not” (Kirkpatrick and Epstein 1992, p. 544). Evans (2007, 2008) classifies the CEST as an example of parallel-competitive duality structure.

Impressions generated by the experiential system are often strongly linked to *affect*. The affect heuristic (Slovic et al. 2002, 2004; cf. Zajonc 1980, 1997) has been considered another general purpose heuristic (Kahneman and Frederick 2002) and represents a reliance on good or bad feelings experienced in relation to a stimulus. Affect-based judgments occur quickly, automatically, and prior to S2 judgments. Similar to availability and representativeness, affect serves as an orienting mechanism—a cue in judgments akin to memorability, imaginability, and similarity (Slovic et al. 2005).

Slovic and colleagues (2002) adapted Epstein's (1994) distinction between *experiential* and *analytic* (“rational”) modes of thinking. Consumer reliance on the experiential system (affect heuristic) as opposed to analytic thought is most apparent when they are cognitively busy or under time pressure. One notable experiment (Finucane et al. 2000) asked participants to rate the risks and benefits of various technologies (e.g. cellular phones) in time pressure and no-time-pressure conditions. When the participants had to respond within five seconds, correlations across participants between judgments of risks and judgments of benefits were much more strongly negative. According to the authors, the affect heuristic is a more efficient way of processing information under conditions of limited cognitive resources, where positive affect (i.e. liking a product) leads to a perception of low risks and high benefits, while negative affect (disliking) results in an assessment of high risks and low benefits.

The affect heuristic has been used as a possible explanation for a range of product judgments, including differences in product attribute recall (Yeung and Wyer 2004), emotional framing in the media (Sinaceur et al.

2005), option framing effects (Biswas 2009<sup>4</sup>), product “valuation by feeling” (Hsee and Rottenstreich 2004), and zero-price effects (Shampanier et al. 2007).

Current directions: default-interventionist vs. parallel-competitive theories

A small body of research has emerged in response to default-interventionist (Evans 2007, 2008) conceptions of dual processing in heuristics and biases. Results thus far appear to support more closely a parallel process view of the parallel-competitive model (but see Gillard et al. 2009 for evidence to the contrary).

Evans (2007) suggests that the speed and automaticity of S1 processes is one of the reasons why they are considered to be a default response in the default-interventionist view. However, from a parallel-competitive perspective, fast S1 processes would normally wait for the slow S2 processes to be finished before making a decision. S1 processes would then dominate decision making, but only when there is limited time or cognitive capacity. Ferreira and collaborators (2006) challenged the assumption of zero-sum relations between the S1 and S2 processes (as correct responses increase, incorrect responses decrease) of a default-interventionist perspective by applying a Process Dissociation Procedure (PDP).<sup>5</sup> Their experiments used cognitive load, processing goals, priming, and formal training manipulations and investigated their effects on base-rate, conjunction, and ratio-bias problems. As expected by the researchers, manipulations affected processes independently. Instructions to think like scientists affected S2 estimates, while cognitive load decreased S2 judgments. A heuristic prime, on the other hand, increased S1 effects, while formal training affected the subsequent use of S2. The near zero correlation between S1 and S2 estimates provided further evidence for the authors to conclude that there is functional independence between the two processes.

With respect to the competitive aspects of the parallel-competitive model, De Neys and Glumicic (2008) pitted the default-interventionist assumption of lax S2 monitoring

against that of flawless S2 monitoring and S1-S2 conflict, as suggested by a parallel competitive view. Participants had to solve a base-rate neglect problem while thinking aloud. The results showed that giving heuristic responses was less likely to be due to insufficient conflict detection, as implied by the default-interventionist view, but rather a failure to resolve the conflict after its detection. The authors suggest that a shallow analytic monitoring process may be at work, where both processes operate simultaneously, but S2 thinking is not full-fledged analytic thinking. Subsequent research by Bonner and Newell (2010; see also Denes-Raj and Epstein 1994) using a ratio bias task came to similar conclusions.

### Dual systems in buying and consumption behavior

Psychologists have long been interested in the tension between human impulse and self-control, beginning with Sigmund Freud’s (1961/1989) notion of the struggles between the *id*, the seat of drives or impulses, vs. the *super-ego*, an internalization of culturally derived authority. Strack and colleagues (2006; see also Strack and Deutsch 2004) proposed a comprehensive *Reflective-Intuitive Model (RIM)* dual system model of consumer behavior that integrates a number of theoretical antecedents, mainly from social psychology.

We first discuss the RIM’s theoretical building blocks that link stimuli, affective and conceptual content, and behavioral outcomes. Specifically, we introduce research on priming and automatic goal pursuit, suggesting a connection between conceptual content and behavioral schemata (Bargh 2002). We then describe the link between perception and behavior through the S1 concept of approach avoidance (Staats 1996), relating impulsiveness to the approach of positively valenced stimuli. Moreover, we introduce the S2 ideas of delayed gratification (Mischel 1974) and self-regulation (Vohs and Baumeister 2004) and show how the Hot/Cool model integrates the dynamics between S1 affective impulse and S2 willpower or self-control (Metcalf and Mischel 1999). Finally, we discuss the Reflective-Impulsive (RIM) model in more detail, which represents the integration of these ideas into a larger framework.

Priming and automatic goal pursuit: a link between conceptual content and behavior

Much of the foundation of the RIM can be found in theories on social cognition. Researchers in this area have approached consumer decision making as a result of environmental cues that often affect behavior non-consciously, without relying on the traditional information processing model that has informed the ELM and HSM. In social

<sup>4</sup> In option framing, consumers tend to choose a higher number of options when using a delete mode (starting from a fully loaded model, then removing undesirable options) vs. an add mode (starting from a base model, and then adding desirable options). A study by Biswas (2009) showed this bias to be more pronounced when participants were motivated to make decisions in a strictly emotional rather than a logical manner.

<sup>5</sup> PDP is a methodological tool designed to separate the contributions from automatic and controlled processes by means of an inclusion condition (both processes acting together) and exclusion condition (processes acting separately). Whereas problems used in judgment research are usually exclusion problems (a S1 response is in opposition to a S2 response, for example, one product with a high base failure rate resembling another product with a lower rate), inclusion versions can be constructed by changing the original version so that S1 and S2 judgments lead to the same response output.

cognition, priming refers to a non-conscious process in which existing memories are activated as a result of perceiving a stimulus, which can affect subsequent perceptions, thoughts (in the form of both attitudes and goals), and actions (e.g. Bargh et al. 1996; Dijksterhuis et al. 2005; Higgins 1996). Physical or social cues in the environment non-consciously influence choices and may even bypass attitudes altogether by directly activating goals or behaviors (Dijksterhuis et al. 2005; Chartrand and Bargh 1999).

Both subliminal primes, where people are not aware of the prime, and supraliminal primes, where people are aware of the prime but not its influence, can affect behaviors (Bargh 2002). A well-known field experiment using a supraliminal prime exposed shoppers to either stereotypically German or French music in a retail environment (North et al. 1999). Hearing French music led to significantly greater French wine purchases, while the same relationship was found for German music and wines. Customers reported no awareness of the effect that music had on their choices. Goal-directed behavior like buying can thus be the result of a link between conceptual content and behavioral schemata (Strack et al. 2006) without consumer awareness (Chartrand 2005).

Approach-avoidance, delay of gratification, and self-regulation

At the center of the choice environment encountered by consumers are objects of consumption, which can elicit a conditioned emotional response. According to Staats' (1996) psychological behaviorist learning theory, such stimuli have three functions. First, they elicit an emotional response. Second, the stimuli can act as behavioral reinforcers. Third, they are directive (incentive) stimuli, leading to approach behavior in the positive and avoidance behavior in the negative case. Impulse buying can be the result of a direct link between a positive valence of the stimulus and motor response (e.g. reaching for a product in the supermarket) or verbal response.

Impulse buying is a spontaneous behavior that reflects immediate gratification occurring as a result of an urge to buy (Strack et al. 2006). The power of impulsivity is evident in experiments investigating immediate gratification, which suggest that drawing attention away from the tempting qualities of stimuli can enhance a delay in gratification (e.g. Mischel and Baker 1975; Mischel et al. 1989). Cognitions with the potential to act as sources of self-control are the hallmark of S2 processes, the dominance of which increases with maturation.

The study of self-regulation posits that cognitive resources are limited and can become depleted temporarily as a result of situational self-control demands (Baumeister et al. 2008; Faber and Vohs 2004; Vohs and Faber 2007). In the

laboratory, ego depletion has been manipulated in different ways, ranging from arithmetic problem-solving to suppressing emotional responses to a film. Ego depletion has been shown to affect the choice of unhealthy over healthy food, trashy over highbrow entertainment, greater food intake among dieters, and an increase in spending, as indicated by the price people are willing to pay for a particular consumer good (see Baumeister et al. 2008 for a summary).

The hot/cool model and the dynamics of willpower

The tension between impulse and reflective knowledge is evident in Metcalfe and Mischel's (1999) Hot/Cool dual system framework, where the dynamics of willpower are played out between a cool, cognitive "know" and a hot, emotional "go" system. The hot system is reflexive, impulsive, and controlled by the stimulus, which is often characterized by conditioned responding, while the cool system is slow, episodic, and strategic. With respect to the delay of gratification, a yielding to temptation by the hot system is the default. Akin to Evans' (2007, 2008) default-interventionist type of dual processing, the default state of the system is set to hot: Individuals succumb to temptation unless external or internal (S2) control strategies are applied. External control strategies include obscuring the stimulus, presenting physical distractions, or re-framing the stimulus in a cool rather than a hot way; internal strategies include an avoidance of paying attention to the stimulus, changing its salience by producing self-generated cognitive distractions, or thinking about the cool properties of the object.

According to Hofmann et al. (2009), a hot and cool systems perspective holds that impulses are strong and "primitive hedonic reactions" to tempting stimuli (p. 163). The dynamic framework acknowledges that self-control is a demanding effort requiring attention, self-discipline, and willpower, while impulses emerge when perceptual or imagined stimuli activate associative memory clusters. A self-control dilemma emerges if the two systems produce incompatible behavioral implications—a tension between temptation and motivation for restraint. The *Reflective-Impulsive Model* (RIM; Strack et al. 2006), discussed in the next section, integrates hot-cool tensions in a larger theoretical framework.

The Reflective-Impulsive Model (RIM)

The *Reflective-Impulsive Model* (RIM) of consumer behavior, proposed by Strack et al. (2006), is congruent with research in the area of automatic goal pursuit, reviewed earlier, by suggesting that stimuli, conceptual content, and behavioral schemata are connected. It also accounts for the link between affective reactions evoked by objects and ensuing motor responses, as proposed by approach-avoidance theories and

outlined in the hot/cool dual system model. Finally, it acknowledges the competing forces of impulse and willpower suggested by self-regulation theory.

Unlike other dual system frameworks, the RIM suggests that behavioral processes are integrated into affective and cognitive structures, behavioral schemata that “connect frequently co-occurring motor representations with their antecedent conditions and their consequences” (Strack et al. 2006, p. 208). In the impulsive system, the simplest source of behavioral activation is perceptual input (e.g. seeing a chocolate bar), which not only evokes conceptual and affective content (e.g. anticipatory pleasure of a chocolate taste), but also activates behavioral schemata (e.g. related to grabbing or eating the treat). In the associative network of the impulsive system, the close spatial or temporal proximity of a stimulus will strengthen links in this network.

In the rule-based, flexible, and slowly operating reflective system outlined by Strack and colleagues, the desirability and feasibility of a behavior are evaluated (e.g. based on knowledge that the candy bar’s price has been reduced, or that it’s unhealthy). This system has a regulatory function that relies on planning and putting intention into action. As it is more easily disrupted by other processes, its operation is subject to the availability of cognitive resources. For instance, Shiv and Fedorikhin (1999; Study 1) found that consumers were more likely to choose chocolate cake over fruit salad when cognitive processing resources were limited. When processing resources were unrestricted, consumers were more likely to choose fruit salad. This effect was absent when the stimuli consisted of photographs rather than the real items.

In the RIM (Strack et al. 2006), the reflective system is more influential when the target is important (e.g. buying a car rather than toothpaste) or when the consumer expects to be held accountable for his/her decision. The impulsive system, on the other hand, can be more dominant, not only if cognitive resources are limited or depleted, or when the consumer is in a positive mood, but also if buying decisions are facilitated by habitual schemata or the consumer is in a state of need deprivation (e.g. craving, hunger).

According to Strack and colleagues, impulse and reflection may compete if activated schemata are not compatible. However, impulsive and reflective processes often operate in parallel and jointly influence behavior. Thus, the RIM is an approach to dual processing that resembles a parallel-competitive form (Evans 2007, 2008). For example, the decision process for a house purchase may include an evaluation of functional costs and benefits, but also feelings about architectural design. Moreover, the two systems may influence each other. The impulsive system affects reflection through priming processes, discussed earlier, or visceral states, such as hunger or thirst (e.g. Aarts et al. 2001). Conversely, the reflective system can influence impulse

through the process of intending and the regulation of perceptual input or cognition, as proposed by the Hot/Cool model (Metcalf and Mischel 1999). This is particularly relevant if the consumer is conscious of the link between environmental cues and behavioral outcomes, even though the intervening process usually remains unconscious (Chartrand 2005).

Current directions: predicting impulsive consumer behavior

Impulsiveness is about an inability to forgo immediate benefits (e.g. owning a new TV set now) in favor of future payoffs (e.g. waiting for the post-holiday sales). Behavioral economic theories have studied impulsiveness from the perspective of present bias and a discounting of the future, which has informed a dual self theory of impulsiveness (Fudenberg and Levine 2006). Establishing a connection and interaction between present and future self by means of age-progressed photographs can increase people’s likelihood to accept delayed monetary rewards over immediate rewards (Hershfield et al. 2011).

Past research suggests that normative and dispositional variables can predict consumer impulsiveness (Rook and Fisher 1995). Nenkov et al. (2008) developed an elaboration on potential outcomes (EPO) scale and show that consumers with high EPO levels self-regulate more effectively with respect to choices in the domains of health and money management. From a dual processing perspective, Hofmann et al. (2009) expanded the RIM by outlining a framework for the prediction of self-control outcomes based on impulsive and reflective antecedents, as well as dispositional and situational boundary conditions.

An experiment conducted by Hofmann and colleagues (2009), using an emotion suppression task to induce a depletion of self-regulatory resources, shows that candy consumption can be better predicted by automatic affective reactions (implicit attitudes) among participants in a depletion but not control condition. Candy consumption was more strongly regulated according to participants’ dietary restraint standards (based on explicit self-reports) in a non-depletion condition (for further evidence see Friese et al. 2008, Studies 2 & 3). Similar evidence has been produced using cognitive load (Friese et al. 2008, Study 1) and alcohol intoxication (Hofmann and Friese 2008) manipulations. As dispositional moderators of consumption behavior, studies have also found an effect of working memory capacity (Oberauer et al. 2000) and trait self-control (Tangney et al. 2004) on consumption behavior, ranging from sexually tempting images to eating behaviors, where automatic attitudes toward tempting stimuli had a stronger effect on behavior for low rather than high working memory capacity (Hofmann et al. 2008, Study 1) and trait self-control individuals (Friese and Hofmann 2009).

## Discussion

We have offered a structured review of three different strands of research on dual systems and dual process models in psychology, which can account for different stages of the consumer decision making process, namely persuasion and attitude change, judgment and decision making, and buying and consumption behavior. Duality models hold that S1 processes are automatic, fast, and experience-based, whereas processes in S2 are deliberate, slow, and reflective. This dualism, however, has been questioned (e.g. Keren and Schul 2009) and alternative models have been proposed, particularly in the domain of social inference (Kruglanski and Orehek 2007). Proposed alternatives to the ‘dual minds’ view have ranged from simplified uni-process models (Kruglanski et al. 2006) to more nuanced quad models (Sherman 2006). In the persuasion and attitude change area, an experiential route has been suggested, in which emotions triggered by a message can be used to determine whether and how different cues are processed (Meyers-Levy and Malaviya 1999). Fishbein and Middlestadt (1995, 1997) argued in favor of uni-dimensional models of attitude change. They proposed that most non-belief changes in attitudes, i.e. changes that did not appear to be directly related to the conscious process of a change of beliefs about an attitude object, could in fact be accounted for by traditional expectancy value models of attitudes, which suggest that consumers develop attitudes as a function of their beliefs about attitude objects (e.g. this TV has a good quality image) and the value that they attribute to these beliefs (e.g. a good quality image is an important TV attribute).

Advocates of a two-system view of the mind have emphasized its usefulness as an explanatory framework with substantial empirical support that can account for research findings across different strands of psychology (Deutsch and Strack 2006; Evans 2008; Kahneman 2011). At worst, the duality of mind view is a helpful conceptual model or “psychodrama with two characters”, as described by Daniel Kahneman in *Thinking, Fast and Slow* (2011, p. 21). We can expect duality of mind research to benefit from advances in neuroscience, which offers supporting evidence for a dissociation of S1 and S2, particularly processes that approximate automatic and controlled processing in decision making (Monsell and Driver 2000; Sanfey and Chang 2008).

We now turn to a summary of the core ideas of each duality strand, after which we will compare and contrast the models and strands by looking at the way dual systems and processes have been conceptualized, interactions between these systems or processes, and their conditions and moderators. Finally, we show how duality models can be related to implicit and explicit attitudes.

## Summary of the three strands

In the area of persuasion and attitude change, dual processes refer to the way consumers process persuasion material either extensively or non-extensively. Consumers’ motivation to engage with persuasion material and to form and hold correct attitudes are key determinants of the use of either route. Two key models emerged, with the ELM model suggesting the use of only one route (either central or peripheral) to persuasion, and the HSM model allowing for the possibility of a simultaneous use of both the systematic (central) and heuristic (peripheral) routes to persuasion. Information typically relied upon in central or systematic processing includes argument-quality related indicators. For example, a consumer may look at the technical characteristics of TV sets presented to her and process this information extensively in order to determine if a TV set matches target characteristics. Peripheral or heuristic processing tends to rely on cues like emotions linked to the persuasion message, the perceived credibility or attractiveness of the message source, and the design and aesthetics of the advertisement (e.g. being drawn to the nice living room and gender of the actor in a TV advertisement).

In the judgment and decision making literature, S1 is home to general purpose (domain-independent) heuristics characterized by the accessibility of information (Intuitive vs. Reflective Model) and affective responses (Experiential vs. Analytic Model). The former model has largely served as a framework to explain findings on heuristics and biases that precede most dual system theories. Consumer researchers—primarily in marketing—have focused on general purpose heuristics applied to judgments about goods and services, including brand, packaging, product risk, and price perceptions. Consumers can attempt to analyze costs and benefits by relying on existing knowledge (reflected in consumer expertise) and available information, as exemplified by online tools that allow for a side-by-side comparison of televisions. At the same time, consumers are also likely to take shortcuts that rely on easily accessible memories and gut-feelings. For instance, affect towards a television brand, as well as price anchors or anecdotal evidence about brand performance, may influence judgments when alternatives are evaluated.

In the area of buying and consumption behavior, the RIM model represents the integration of existing theories around automatic goal pursuit, self-control, approach-avoidance, and associated Hot/Cool systems framework. In the impulsive system, consumers’ perception of a stimulus becomes linked to affective and conceptual content that activates goals and behavioral schemata, ultimately influencing purchasing or consumption behaviors. For example, when browsing TV sets in-store, customers may imagine themselves in actual usage contexts, leading to an approach response. Prior knowledge and intentions provide the basis for regulatory S2 processes, which are dominant in the planning of behavior and the

overcoming of habitual action. Similar to the concept of relevance and involvement in dual process theories of persuasion, S2 processes are strengthened if the purchase is important or the consumer is held accountable for his actions. As shown across duality models, a reduction in cognitive resources and positive mood can increase the dominance of S1. Similarly, need deprivation and habitual mechanisms (e.g. tending to browse through technology sections at department stores) also strengthen impulsive processes.

Towards an integration of duality theories in consumer psychology

We now turn to comparing and contrasting the different strands. More specifically, we focus on the nature of dual processes and systems over the three strands, their interaction as well as conditions, and moderating variables that have been found to favor one process over the other. Finally, we show how the connection between the different strands can be further enhanced by looking at how dual processes and systems connect with implicit and explicit attitudes across the duality models. Table 1 includes a summary of the dimensions used to compare and contrast the different strands.

#### *Nature and origins of the two systems*

*System 1* The conceptualization of S1 varies across the persuasion and attitude change, judgment and decision making, and buying and consumption strands. The heuristics and biases tradition (Intuitive vs. Reflective model) adopted a perceptual analogy to explain intuitive judgments: “Illusions” in both perception and judgment occur when some attributes of objects are more accessible than others (Kahneman 2003). S1 is a combination of automatic and parallel operations evident in perception and the conceptual content that enters the reflective S2 (Kahneman and Frederick 2002). In the Experiential vs. Analytic distinction (Slovic et al. 2002), S1 is characterized by affect. Regarding the origin of the two processes, both approaches within this strand theorize an evolutionarily old S1, marked by automatically and easily retrieved content (either information or affect) that may serve as a substitute for more complex processing. In the persuasion literature, by contrast, peripheral or heuristic processes have been related to an associative memory system (S1) (Smith and DeCoster 2000). They are often evident in automatic social cognition based on salient cues, such as the likability, expertise, or attractiveness of the communicator (HSM: Chaiken 1980; ELM: Petty and Cacioppo 1986).

S1 in models explaining impulsive and reflective processes is firmly rooted in the concept of approaching positively valenced stimuli and the avoidance of negatively valenced stimuli. These can be either perceived or imagined. The Experiential vs. Analytic model in judgment, built around the

affect heuristic, shares this focus on automatically generated emotional associations, which can be acquired through experience or learning. Indeed, Shiv and Fedorikhin’s (1999) study on the choice of chocolate cake vs. fruit salad under limited processing resources, discussed previously, exemplifies this connection and has been cited in both the affect heuristic (Slovic et al. 2005) and RIM literature (Strack et al. 2006).

The persuasion and attitude change as well as judgment and decision making strands overlap with respect to the concept of *heuristics* in S1 processing. Scholars working with persuasion models applied to consumer attitudes, however, have focused on the development of domain-specific heuristics, while the heuristics in the judgment and decision making strand discussed in this review (i.e. availability, representativeness, anchoring and affect) are domain-general in nature. Examples of marketing heuristics rooted in the persuasion (HSM) literature include the brand name heuristic (Maheswaran et al. 1992), the price heuristic (Mitra 1995), and the scarcity heuristic (Brannon and Brock 2001). Shah and Oppenheimer (2008) argue that many persuasion and marketing heuristics rely on a range of cues indicating positive or negative associations to be used in evaluating items. However, “these heuristics are implicitly defined as cues that are used when they are *present*, rather than processes that reduce effort by using certain cues” (p. 209; emphasis added). General purpose heuristics, on the other hand, not only rely on easily retrievable mental content, but also tend to examine fewer cues and integrate less information (Shah and Oppenheimer 2008). Indeed, it has been argued that cues in models like the HSM may enter a form of recognition-based decision making—essentially low-effort S2 processing (Evans 2008). However, if the processing of heuristic cues is conceptualized in terms of well-learned and automatic associations rather than rules, its similarity to S1 processes becomes clearer (Smith and DeCoster 2000).

*System 2* The role of S2 across duality models and strands is to compute, compare, plan, and choose (Kahneman 2011), and this system has been conceptualized more homogeneously in the literature than S1 (D. Kahneman, personal communication, May 31, 2012). S2 processes across all strands share an emphasis on a logical evaluation of evidence, arguably rooted in an understanding of reflective thought as the evolutionarily younger part of the brain and home to general purpose reasoning (cf. the “Standard Social Science Model” in Tooby and Cosmides 1992).

In duality models concerned with either consumer judgment or behavior, an important role of S2 is to direct attention. S2 can correct S1 impressions when a consumer reminds herself to consider only product features that are relevant (e.g. price and nutritional information instead of the resemblance of its packaging to another brand) to the

**Table 1** Comparison of duality models in persuasion & attitude change, judgment & decision making and buying & consumption behavior

	Persuasion and attitude change	Judgment and decision making	Buying and consumption behavior
Model [Structure]	Elaboration Likelihood (ELM) [N/A] Heuristic vs. Systematic (HSM) [Parallel-Competitive]	Intuitive vs. Reflective [Default-Interventionist] Experiential vs. Analytic [Parallel-Competitive]	Reflective-Impulsive (RIM) [Parallel-Competitive] Hot/Cool [Default-Interventionist]
Process			
Inputs	Information and cues (acquired from brand initiated communication, other customers or expert sources)	Information and cues (e.g., product features)	Information and internal (imagination) or external (perception) consumption stimuli or cues
Process/System 1	Automatic associations; reliance on salient cues and easily accessible information/heuristics (e.g., source attractiveness, message length, design and aesthetics)	Automatic and easily retrieved content; impressions and gut feelings (general purpose heuristics)	Automatic activation of content (conceptual and affective clusters), leading to approach or avoidance
Process/System 2	Logical evaluation of evidence; computation and comparison (e.g., scrutiny of message content, quality of arguments, accuracy of comparison process)	Logical evaluation of evidence; computation and comparison (e.g., weighing of costs and benefits)	Logical evaluation of evidence; computation, comparison, planning and choice (e.g., evaluating desirability and feasibility; purchasing intentions)
Output	Attitudes	Judgments	Behaviors
Conditions and moderators affecting S1 vs. S2 Processing			
Enduring	Need for cognition Knowledge & expertise Goals Self-schemas  Counter-factual thinking Regulatory focus	Intelligence Critical thinking ability Cognitive Reflection Test Knowledge & expertise	Trait self-control Working memory capacity Self-regulation (e.g., restraint standards) Regulatory focus Habit
Situational	Cognitive load, time pressure Involvement/Relevance Regulatory focus Arousal Mood	Cognitive load, time pressure Training Regulatory focus Priming Mood	Cognitive load, time pressure Involvement (purchase importance) Accountability Visceral states (e.g., intoxication) Need deprivation Regulatory focus Priming Mood
Marketing applications			
Typical place in consumer decision process	Information exposure/search	Evaluation of alternatives	Choice/purchase
Potential marketing domains	Marketing communications (esp. advertising) Word-of-mouth Branding Packaging design  Customer satisfaction	Product design (features)  Branding Product mix Pricing  Packaging design Website (ecommerce) design Sales promotion	Product design Packaging design Sales promotion Store layout and website (ecommerce) design Customer loyalty

judgment task at hand. Similarly, as proposed by the Hot/Cool model of willpower and the RIM, S2 can be used to cope with a tempting situation by applying strategies like redirecting attention away from a tempting stimulus or producing thoughts that emphasize its cool properties.

While the S2 emphasis is on computation and comparison in both the persuasion and attitude change as well as the judgment and decision making areas, the buying and consumption behavior strand expands S2's main purpose to planning and choice (Strack et al. 2006) and the related concept of self-control (Metcalfe and Mischel 1999). More particularly, S2 in the RIM is in charge of both intending (by assessing desirability and feasibility) and implementing previously formed intentions. Intending represents the bridge between making a behavioral decision and actual buying behavior (Strack et al. 2006).

#### *Interaction between S1 and S2 processes*

The nature of S1 and S2 interaction differs both within and across duality strands. The ELM specifies no interaction between dual processes (i.e. the use of one route or the other), while the HSM, Experiential vs. Analytic, and RIM models can be classified as examples of parallel-competitive duality structures (Evans 2007, 2008). The Intuitive vs. Reflective and Hot/Cool models, by contrast, appear to represent Evans' default-interventionist operations.

The HSM allows for parallel and sequential uses of both processes. This means that, for example, a consumer might first evaluate a product claim in a marketing message against a predetermined standard, and then look at the brand to infer quality heuristically. In the judgment and decision making tradition, experiential vs. analytic processes may not only interact, but outcomes are subject to a conflict between “knowing” and “feeling” (Denes-Raj and Epstein 1994). These tensions are less apparent in the Intuitive vs. Reflective model, where S1 proposals occur by default and S2 gains the upper hand only if it both intervenes and adjusts initial S1 impressions. (As discussed in “[Current directions: default-interventionist vs. parallel-competitive theories](#)”; however, this default-interventionist view has been challenged by some researchers.) Finally, Strack and colleagues (2006) explicitly critique the strict S1 and S2 distinction in the ELM. They argue that even a seemingly reflective purchase like a car is likely the result of more than just an evaluation of costs and benefits. Feelings elicited by other cues, such as the car's design and color, may also influence a purchase decision.

Unlike the Hot/Cool model, where giving in to temptation is the default setting, the RIM makes a stronger case for parallel-competitive dual mechanisms in consumer behavior. Impulses in the RIM constitute an immediate and direct influence on behavior, which may intervene after judgments have been made and intentions formed. In contrast to

Intuitive vs. Reflective systems, intervention in the RIM may occur through both S1 and S2 at different points in time. S1 may affect S2 through activated goals, for example, such as satisfying needs like hunger or thirst. (In the case of hunger, lowered blood glucose levels may further impair S2's ability to control attention and impulses [Gailliot and Baumeister 2007].) Conversely, S2 may hamper S1 impulses by active regulation (e.g. distraction) strategies, as well as making impulsive behavior more likely by merely considering a behavioral option. The competitive nature of systems outlined in the RIM is most apparent in the regret-based tensions that can form once an impulsive behavior has been performed. Overall, and apart from the ELM in the persuasion and attitude change strand, all models suggest some form of S1 and S2 interaction, where S2 often acts as a ‘corrector’ of S1 processes.

#### *Conditions and moderators of S1 and S2 processing*

Empirical work across the three strands discussed in this review has identified the situational availability of cognitive processing resources (due to time constraints or cognitive load) as a condition enabling S2 processing. In addition, positive mood is a facilitator of S1 processing and negative mood a facilitator of S2 processing.

Due to their common study of how people evaluate information in the formation of either attitudes or judgments, scholars in both the persuasion and judgment and decision making strands have been interested in individuals' ability to process information in an S2 manner, not only due to the situational ability (e.g. availability of cognitive resources), but also acquired *expertise* or knowledge. Expertise provides consumers with cognitive tools or content to process information deliberatively.

Traits like self-control or restraint standards are unique moderators of S2 processing in research on impulsive vs. reflective behavior. A link between judgment and decision making and impulsive vs. reflective behavior may be evident in reasoning ability, as measured by the Cognitive Reflection Test (Frederick 2005), which relies on tasks akin to those that have been used to demonstrate the default nature of S1 impressions in the Intuitive vs. Reflective model (e.g. the famous bat-and-ball problem). CRT scores turn out to be significant predictors of present bias in intertemporal choice (e.g. choosing to receive \$3,400 this month rather than \$3,800 next month). This relationship demonstrates that S2 reasoning ability may be a useful measure of S2 control across duality strands. Put another way, the generally “trigger happy” nature of S1 may at least in part account for both intuitive judgments and impulsive consumer behavior.

A focus on consumer *motivation*—especially with respect to relevance or involvement—is an important similarity between the persuasion and attitude change and buying behavior

strands. Aside from thinking ability and knowledge, motivational factors are positively related to S2 processing in persuasion and include variables like personal relevance and need for cognition. The RIM also stresses the importance of motivation. While some motivationally-rooted variables, such as need deprivation, are unique to a duality view of consumer behavior, others favoring S2, most notably product/purchase importance and accountability, appear to be equally significant in both strands.

Another motivational dimension that links duality models related to product evaluation with those in the area of purchasing behavior is evident in regulatory focus theory (Higgins 1998). According to the theory, people can be promotion or prevention focused. Promotion involves the pursuit of goals with an achievement or advancement orientation, characterized by an eagerness to get there, while prevention focus entails security and protection with a pursuit characterized by vigilance. Research suggests that promotion focus is associated with S1 and prevention focus with S2 at different stages of the consumer decision making process (Pham and Higgins 2005), including the evaluation of marketing messages (Pham and Avnet 2004), product evaluations (Pham and Avnet 2009), and actual consumer choices (Florack et al. 2010; Sengupta and Zhou 2007).

#### *The duality of mind and implicit vs. explicit attitudes*

Given the importance of the concept of attitudes in consumer psychology—illustrated by the central role played by variables such as attitudes towards brands and customer satisfaction—understanding attitude formation has long been the focus of a great deal of consumer research. Over the last decade, the literature on implicit social cognition has introduced the idea of a duality of attitude structure. Bargh (2002, see also Greenwald et al. 2002) suggested the existence of both explicit (i.e. conscious) attitudes and implicit (i.e. non-conscious) ones. This distinction helps to explain the dissociation between traditional verbal measures of attitudes and actual behavior. Duality models can be directly—in the case of the persuasion and attitude change strand—and indirectly—in the case of the two other strands—related to the formation of implicit and explicit attitudes. According to a meta-analytic study, implicit and explicit attitudes are more strongly correlated in the consumer domain than socially sensitive domains, such as stereotypes (Hofmann et al. 2005). In this section, we show how duality models can be conceptually linked to attitudes at both an implicit and explicit level. In addition to contributing to the formation of attitudes, duality models are also likely to affect the retrieval of implicit vs. explicit attitudes, depending on the type of cognitive processes individuals use (S1 or S2).

The distinction between implicit and explicit attitudes is most directly applicable to the first dual processing tradition,

namely persuasion and attitude change. Comparing duality models and dual structure attitudes, previous research has suggested the existence of a relationship between implicit vs. explicit attitudes and corresponding associative (S1) vs. propositional (S2) processes (Gawronski and Bodenhausen 2006, 2011). In a dual attitude model, *implicit* attitudes are *automatic*, and *explicit* attitudes necessitate *capacity and motivation* (Wilson et al. 2000). The work by Gawronski and Bodenhausen (2011) suggests that information processed using the peripheral/heuristic route could result in changes to implicit attitudes, whereas information processed using the central/systematic route is likely to result in changes to explicit attitudes.

In judgment and decision making, previously formed attitudes in the form of an affect heuristic can be a source of information used by consumers evaluating products. Given the automatic nature of affect and evaluations (Zajonc 1980, 1997), the affect heuristic and implicit attitudes both posit spontaneously evoked affective evaluations linked to the experiential system (Spence and Townsend 2008). While implicit attitudes are a measure of the content of the experiential system, the affect heuristic refers to the application of that content in decision making (Spence and Townsend 2008). The relationship between judgment and attitudes can be reversed, and judgments may also make a more direct contribution to the formation of attitudes when a consumer reasons about product attributes and the desirability of each attribute (Albarracín et al. 2008). For instance, consumers might make judgments about the quality of goods sold in store X being higher than for those sold in store Y. If the quality attribute is important to the consumer, low quality will contribute more to a negative explicit attitude towards store Y.

As discussed previously (see “[Current directions: default-interventionist vs. parallel-competitive theories](#)”), cognitive psychologists have recently pitted the default-interventionist against the parallel-competitive characterization of the Intuitive vs. Reflective model of judgment and found evidence mostly in favor of parallel-competitive operations. Evans (2008, p. 271) notes that “parallel-competitive forms of dual process models seem to be rooted in the idea of two forms of learning, leading to two forms of knowledge (implicit and explicit), which can then lead to competing attempts to control behavior” (see also Reber 1993; Sloman 1996; Smith and DeCoster 2000). To our knowledge, there have been no attempts to study the implications of default-interventionist and parallel-competitive processing in relation to implicit and explicit attitudes. One possible speculation could be that parallel-competitive operations in the Intuitive vs. Reflective model would lead to a greater dissociation between the resulting implicit and explicit attitudes. Default-interventionist processes, on the other hand, where S1 judgments are the default that may or may not be

overruled by S2 deliberation, imply that S1 may be a key contributor to the formation of implicit attitudes, whereas S2 plays a much weaker role. This would suggest that understanding and assessing consumers' implicit attitudes might be more important than measuring explicit, self-reported attitudes when trying to relate judgment and attitudes.

The connection between attitudes and the impulsive system can be explained by the experiential nature of S1 (see, for example, Epstein and Pacini 1999; Evans and Over 1996; Reber 1993), which triggers implicit learning and subsequently the formation of implicit attitudes (Evans 2008, p. 261). Similarly, in the RIM, behavioral schemata are learned implicitly and activated through experience. Past research indeed suggests a relationship between implicit attitudes and spontaneous behaviors (Rydell and McConnell 2006). On an explicit level, attitudes towards brands have been shown to influence intentions to purchase (Spears and Singh 2004). There is emerging evidence supporting a relationship between explicit attitudes and reflective behaviors, on the one hand, and implicit attitudes and impulsive behaviors on the other (see “Current directions: predicting impulsive consumer behavior”). In addition, the RIM principle of bi-directionality holds that “behavior may influence evaluative judgments and experiences even if no inferences are drawn... people’s attitudes are influenced by what they are doing even if they do not recognize its meaning” (Strack et al. 2006, p. 210). Consumers’ actions thus feed back into evaluations (see Fig. 2).

As mentioned previously, the competitive nature of systems outlined in the RIM is perhaps most apparent in regret-

based tensions that may occur after a behavior has been performed. Hence, the model implies a connection between impulsive behaviors and attitudes via post-purchase or post-consumption processes, most notably cognitive dissonance (Festinger 1957). For example, a consumer may consider himself health-conscious but then purchase unhealthy food; another person might have bought a television that she thought had great image quality but then sees a negative review about that television set. The experienced dissonance can be reduced if the consumer changes his or her explicit attitudes (Gawronski and Bodenhausen 2006).

Overall, implicit and explicit attitudes provide an integrative way to understand how the three strands can be connected together. From persuasion and attitude change to judgment and decision making and eventually consumer behavior, S1 processes are likely to contribute to the formation or retrieval of implicit attitudes, while S2 processes are likely to contribute to the formation or retrieval of explicit attitudes (Albarracín et al. 2008).

Summary

While debates persist about the extent to which duality models from different domains map on to each other (e.g. Evans 2008), our discussion of similarities and differences—as well as our integration of duality models with implicit and explicit attitudes—has shown that they can arguably be connected in several ways, via the inputs and outputs of attitudes, judgment, and behavior formation processes. Figure 2 summarizes our propositions and offers a conceptual model that integrates

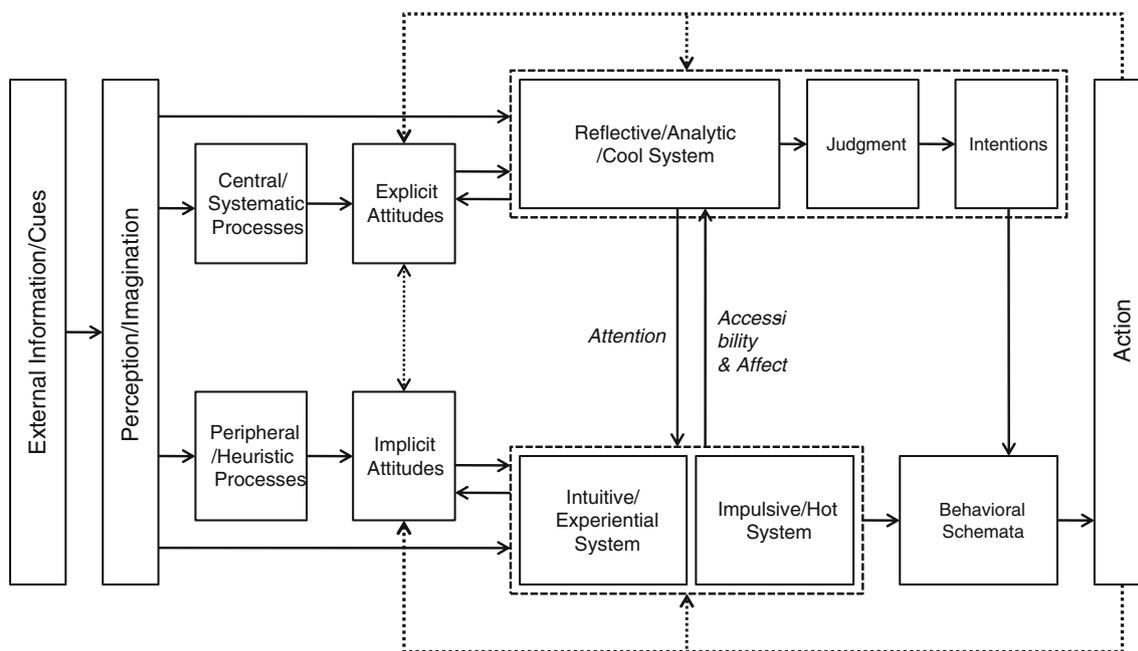


Fig. 2 Integration of duality models in persuasion & attitude change, judgment & decision making and buying & consumption behavior, including dual attitudes

duality models from a consumer psychology perspective. As argued previously, there is a greater conceptual differentiation at the S1 level (intuitive/experiential vs. impulsive/hot) than at the S2 level (reflective/analytic/cool) for dual system theories.

In sum, we suggest a mutual influence between explicit and implicit attitudes, which may be formed as a result of the central (systematic) and peripheral (heuristic) processing of marketing communications, as well as processes in the dual systems of judgment and buying behavior. The left side of our model shows that explicit attitudes affect intentions directly, via S2 reflective processing. Implicit attitudes are connected indirectly to intentions in the form of automatically generated affect in the experiential S1. S2 judgments (e.g. in the evaluation of alternatives), on the other hand, contribute to explicit attitudes (e.g. depending on the desirability of evaluated information such as product attributes). In addition, experiential S1 is related to implicit attitudes through the concept of implicit knowledge.

The dual system view on the right of the model shows that conceptual and emotional content, generated automatically by S1, feeds into S2 processes via ease of access and automatic affect. S2, in turn, can influence S1 by directing attention. Our model depicts intentions and behavioral schemata as antecedents of action, as outlined by Deutsch and Strack (2008). Thus, S2 can also keep S1 in check by regulating behavior via intentions, while conceptual and emotional cues are linked to behavioral schemata directly on an S1 level. Since behavioral schemata are intermediate between intentions and action, impulses may intervene late in the decision making process. Finally, consumer behavior feeds back into S1 and S2 evaluations. This may occur both on an experiential S1 level, in the form of implicit learning, and on an S2 level, where evaluations can be made explicit by the consumer (e.g. as a result of cognitive dissonance reduction).

### Future research directions

For marketing scholars, understanding the duality of mind and the role of deliberative and automatic processes in consumer persuasion, judgment, and buying behaviors means capturing more of the phenomena that consumer psychologists are trying to explain, allowing us to deepen our understanding of the different aspects of the consumer decision making process. In addition, for marketing practitioners—who have traditionally assumed that consumers would consciously and reflectively react to marketing stimuli—this means improving the efficiency of marketing practices by allowing for the effective two-way processing of product-related information. The aim of this section is to discuss research implications that could help to solve some

of the issues identified in our review and in the consumer research literature.

- 1) *Should dual processing in consumers' intuitive vs. reflective judgments about products be characterized as default-interventionist or parallel-competitive? What is the implication of this for the formation of implicit vs. explicit attitudes?* While the nature of S1 and S2 in each of the three strands is relatively unquestioned, the relation between S1 and S2, especially with respect to the order and simultaneity of the two systems, is still being debated (Evans 2007, 2008). A number of cognitive psychologists have tested whether Evans' default-interventionist or parallel-competitive view is more characteristic of dual processing in the heuristics and biases tradition (Intuitive vs. Reflective model). Evidence thus far seems to favor parallel-competitive operations (see “[Current directions: default-interventionist vs. parallel-competitive theories](#)”). In order to clarify this issue further, consumer psychologists could engage in domain-specific tests, for example by replicating research conducted on the ratio bias (Ferreira et al. 2006; Bonner and Newell 2010) to consumer judgments (Burson et al. 2009). To achieve this aim, individual differences in the functional dependence of S1 vs. S2 processing (Ferreira et al. 2006) could be connected to implicit vs. explicit attitudes, testing whether a dissociation between S1 and S2 judgments can be related to a dissociation between implicit and explicit attitudes. This would not only contribute to the emerging debate on the dynamics of S1 and S2 processes, but also could enhance our understanding of duality in attitudes (see “[Towards an integration of duality theories in consumer psychology](#)”; see also Wilson et al. 2000).
- 2) *Do attitudes towards brands moderate intuitive vs. reflective judgments in consumers' evaluation of products?* One of the key issues to address in order to understand how the different strands of research can be integrated together is to look at how the three strands can be related to common consumer variables, such as attitudes (see [Towards an integration of duality theories in consumer psychology](#)). In our paper, we have outlined ways in which implicit and explicit attitudes can be connected with duality models, showing for instance how the Experiential vs. Analytic model in judgment and decision making focuses on the role of implicit attitudes in the form of an affect heuristic. Yet, consumer research on other general purpose heuristics (i.e. availability, representativeness, and anchoring) has not considered the moderating effect of relevant implicit or explicit attitudes, formed

as a result of past marketing exposure, non-marketer input, or consumption experience. Consequently, future research could investigate how consumer attitudes relate to anchoring mechanisms, for instance. It might be expected that consumers who hold strong (either negative or positive) attitudes towards a brand would be less susceptible to anchors (e.g. Madzharov and Block 2010; Wansink et al. 1998) designed to influence purchase quantity of that brand.

- 3) *How is cognitive dissonance experienced in a post-purchase phase, as well as consumer satisfaction, related to dual processes?* The three strands discussed in this paper can be mapped on to consumer decision making stages, but a clear understanding of how duality models can inform the final, post-consumption stage is still lacking. Given previously suggested relations between impulse buying, regret, and cognitive dissonance, and the fact that a change in explicit attitudes can ease cognitive dissonance (Gawronski and Bodenhausen 2006), investigating this area should help researchers to clarify the role of S1 and S2 in post-purchase cognitive dissonance. Could S1 dominance at each of the steps of the consumer decision making process increase the likelihood of experiencing post-purchase cognitive dissonance? Does a reliance on S2 processes, by contrast, reduce the experience of dissonance? Another interesting area for future research would be to look at the way consumers process advertising for a product that they already own, and then investigate how this is related to their product satisfaction. Are satisfied customers more likely to use an S1 route when processing information for a product they already own, due to reduced situational involvement? Owning a product could also trigger a temporary high involvement with the product and its category, leading to an increased reliance on S2 processes to establish whether or not the purchase decision was a good one.
- 4) *How do S1 and S2 processes contribute to the formation of personal vs. extra-personal associations?* Olson and Fazio (2004) argue that individuals sometimes hold associations that are salient in their memories but may not contribute to the formation of attitudes, which they label *extra-personal* associations. Conversely, *personal* associations are associations of thoughts that are linked with consumers' attitudes towards a particular object. Existing evidence supports Olson and Fazio's typology in a consumer context, suggesting that brand attitudes and brand associations are two different concepts which are not necessarily related (Czellar et al. 2009). The role of S1 and S2 processes in understanding how personal and extra-personal brand associations are formed and retrieved in processes of attitude formation is currently unknown. Understanding whether S1 and S2 processes contribute to brand attitudes, and do so in the form of personal and/or extra-personal associations, will enhance the current understanding of the concept of personal vs. extra-personal associations, and of consumers' knowledge structure. A possible relationship between the concepts would be that S1 contributes to the formation of extra-personal associations, while S2 contributes to the formation of personal associations. This could also further inform our understanding of dual attitudes, as previously discussed (Wilson et al. 2000).
- 5) *What is the role of consumer expertise in moderating impulsive vs. reflective consumer behavior?* Duality models in the areas of both persuasion and judgment typically show the importance of expertise in the evaluation of information, thus strengthening systematic/reflective processes at the expense of heuristic ones. Although knowledge is a factor in the RIM's conceptualization of S2 processes, an understanding of the role of category/domain-specific or general consumer expertise in reducing impulsive behavior appears to be lacking in empirical research building on this model. General marketplace expertise (e.g. Feick and Price 1987) may be particularly relevant to understanding behaviors independently of product categories. Does consumer expertise have a similar (positive) effect, as personal relevance or involvement, on S2 processing? Is there an interaction effect between expertise and available cognitive resources in predicting impulsive consumer behavior? Answering these questions will improve our understanding of the moderators of S1 and S2 in the buying and consumption behavior strand, as well as the integration of different duality strands.
- 6) *What is the role of personal relevance or purchase importance in moderating intuitive vs. reflective and experiential vs. analytic judgments in consumers' evaluation of products?* Duality models in the persuasion strand and the RIM on consumer behavior assign an important role to consumer motivation, as evident in personal relevance or purchase importance, which increases the likelihood of S2 processing. It appears, however, that no empirical work on general purpose heuristics applied to product judgments has taken these variables into account. Similar to the previous question (5), researching the moderating role of these variables would improve our understanding of S1 and S2 processing in the judgment and decision making area, as well as contribute to the integration of the three duality strands.

- 7) *What is the role of retail adjacencies in predicting impulsive vs. reflective consumer choices?* While retail environments have been used for field experiments by marketing scholars, many consumer psychologists—especially those researching impulsiveness—still prefer to rely on laboratory studies using isolated target objects, usually in the form of traditional virtue vs. vice (i.e. hedonic) stimuli. Although research on impulse buying has been interested in the wider choice environment and marketer-controlled cues (e.g. Youn and Faber 2000), future dual processing research on impulsive vs. reflective consumer behavior could investigate the effect of adjacencies—the proximity of other types of products to the target product (e.g. Underhill 2008)—on consumer choices. For example, researchers may explore how perceptual input and attention (e.g. via eye tracking technology in shelf display studies), as suggested by the Hot/Cool model, allows the reflective S2 to regulate consumer behavior vis-à-vis S1 impulses. This would inform researchers on how characteristics from the retail environment interact with duality models.
- 8) *How does S1 vs. S2 buying relate to behavioral brand loyalty?* Marketing scholars interested in predicting repeat purchasing behavior typically consider impulse buying and variety seeking as factors that are negatively associated with behavioral loyalty (Uncles et al. 2003). Both of these behaviors can be driven more by feelings than reasoning, but people who are high self-monitors are more likely to seek variety and are less likely to buy impulsively (Sharma et al. 2010). This suggests that impulse buying and variety seeking can be mapped on to different S1 and S2 processes, with impulse buying reflecting S1 behaviors, and variety seeking reflecting relatively more motivated (S2) behaviors. Habitual buying and planned purchasing behavior, on the other hand, could be seen as respective S1 and S2 counterparts that are positively related to loyalty. Given the connection between S1 and implicit attitudes, as well as S2 and explicit attitudes (see “Towards an integration of duality theories in consumer psychology”), future research could clarify the relationship between S1 behaviors (impulse buying, habitual buying) and implicit attitudes towards brands, as well as S2 behaviors (variety seeking, planned purchasing) and explicit attitudes towards brands. Ultimately, research might allow practitioners to better understand repeat purchasing (i.e. behavioral loyalty) as a result of dual processing alongside other relevant attitudes like satisfaction, commitment, and involvement (e.g. Rundle-Thiele and Bennett 2001).
- 9) *How does habit affect S1 vs. S2 processing across duality models? Are there emerging behavioral patterns that favor S1 processing across models?* Habit is a potential facilitator of S1 impulse in the RIM. For example, a consumer may habitually go to a supermarket to purchase dinner only 5 min before having to catch the train home after work, making impulse purchases more likely to occur. Although we are not aware of persuasion dual process studies that have incorporated habit, some behaviors can indirectly affect peripheral/heuristic processing by reducing cognitive resources. Habitually surfing the Internet whilst watching television, for instance, should decrease the ability of S2 to process TV ads systematically and increase S1 reliance. Given the emerging behavioral patterns in favor of unplanned purchases that have been noted at a societal level (e.g. Underhill 2008), and simultaneous media consumption at a generational level (e.g. Nicholas et al. 2011), it would be interesting to explore cross-generational differences in these potentially interrelated habits or behavioral trends in relation to consumer duality models.
- 10) *How consistent are consumers in relying on S1 vs. S2 strategies across the three strands?* Since our review is the first to connect duality models in persuasion, judgment, and buying behavior, it opens up an interesting—albeit ambitious—avenue for future research to integrate different aspects of dual processing across consumer decision making stages. More specifically, consumer psychologists could investigate the degree to which consumers’ propensity to rely on either type of processing (S1 vs. S2) is associated across the three strands. A possible way of testing this would be to set up a series of experiments involving exposure to advertisements, product judgments, and eventually actual choice under known conditions affecting the use of S1 vs. S2 processing (e.g. limited vs. unlimited time). This could also lead researchers to examine the relationship between typical dispositional variables used in the literature (e.g. need for cognition, consumer expertise, or cognitive ability) and dual processing across models. Conducting this type of research would be subject to methodological challenges, such as target category and task selection, stimuli design, and cross-model equivalency in measurement levels, but it has the potential to make a valuable contribution to our understanding of duality of mind among consumers.

## Conclusion

The aim of this paper was to advance knowledge on duality models in consumer psychology. We offered a systematic review of duality models across three strands: Persuasion and attitude change, judgment and decision making, and

buying and consumption behavior. For each strand, we presented an overview of the two systems or processes as well as recent advances in the field. We further integrated the literature by comparing and contrasting the nature of S1 and S2 processes, their interaction, and the nature of their moderators. We also discussed how the three strands can be connected to implicit and explicit attitudes. Finally, we offered an overview of the research questions that could be addressed in order to deepen our understanding of duality models applied to consumer psychology and marketing.

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