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ABSTRACT

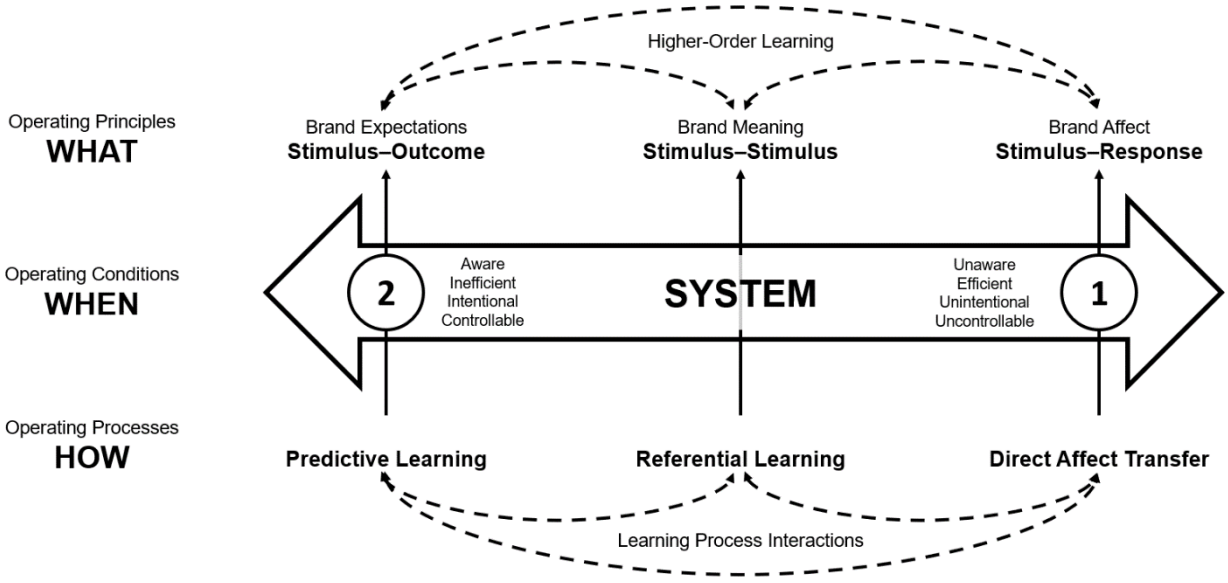
The Continuous Trinity Model (CTM) of brand associations integrates 50 years of consumer learning research with recent conceptualizations of consciousness. Three types of brand associations are proposed at the representational level (expectations, meaning, and affect), corresponding to three types of learning at the process level (predictive learning, referential learning, and direct affect transfer). A core proposition derived from research on automaticity holds that the operating conditions of the learning processes vary on a continuum from mostly System 2 for predictive learning to mostly System 1 for direct affect transfer, with referential learning as a mix of the two. The CTM aims to bring clarity and structure to a complex literature by highlighting the web of interrelations between operating principles ("what" brand associations are learned), operating processes ("how" brand associations are learned), and operating conditions ("when" brand associations are learned). For consumer and learning researchers, the CTM outlines an agenda for future research and guidelines to improve conceptual and methodological clarity. For brand managers, the CTM provides tactical recommendations (a "toolkit") for structuring advertising campaigns to create desired brand associations, and strategic recommendations for managing brand partnerships. For policy makers, the CTM offers guidance on types of advertisements requiring closer scrutiny.

Keywords: Consumer learning, brand associations, attitudes, automaticity, theory building

Brands are the most valuable symbols in the world. They constitute billions of dollars of firm value, often accounting for 20% – 30% of total company market capitalization (Interbrand 2023). Yet, these intangible assets exist only in consumers' minds as a network of interconnected associations. Brand associations can include the benefits of consuming the brand (Keller 1993), the brand's personality (Aaker 1997), and the feelings evoked by the brand (Batra 2019). Because small changes in these associations can have multi-billion-dollar consequences (e.g., the brands sponsoring Tiger Woods lost between $5 – $12 billion in the wake of his extramarital affairs; Knittel and Stango 2014), brands are the most actively managed and closely scrutinized associative networks in the world. Brand managers and marketing scholars alike are keenly interested in uncovering how brand associations are formed, shaped, and maintained.

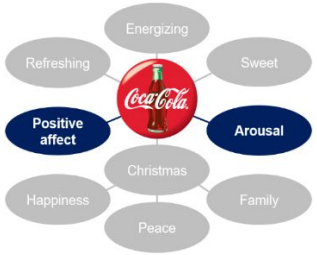
Although researchers have attempted to explain how brand associations form (Keller 1993; McCracken 1989; van Osselaer and Janiszewski 2001), an integrative account remains elusive (Batra 2019) and the role of automatically operating processes in the learning of such associations continues to be debated (Corneille and Stahl 2019). These conflicting perspectives can partly be explained by a lack of conceptual clarity in the literature, as researchers have insufficiently distinguished between *operating principles* at the representational level ("what" gets learned), *operating processes* ("how" learning occurs), and *operating conditions* ("when" the processes operate). These problems have been compounded by the fact that the distinctions proposed at the principle level by leading conceptual models (e.g., between "associations" and "propositions"; Gawronski and Bodenhausen 2006, 2014) are increasingly regarded as problematic and unfalsifiable (Hütter 2022). In response, we propose a new conceptualization, the Continuous Trinity Model (CTM) of brand associations (see figure 1).

FIGURE 1
THE CONTINUOUS TRINITY MODEL OF BRAND ASSOCIATIONS



Rather than starting with an associative-propositional duality, the core tenet of the CTM is that a trinity of operating principles—corresponding to qualitatively different kinds of brand associations—needs to be distinguished at the representational level. The model then posits that a trinity of processes preferentially drive the formation of these brand associations: *predictive learning* drives the formation of brand *expectation* associations, *referential learning* drives the formation of brand *meaning* associations, and *direct affect transfer* drives the formation of brand *affect* associations. The model also proposes higher-order learning at the principle level and interactions at the process level. Finally, the model holds that the operating conditions of the processes vary on a continuum from mostly System 2 (predictive learning) to mostly System 1 (direct affect transfer), with referential learning in between. Table 1 summarizes the characteristics of the three operating processes and uses different possible Coca-Cola® brand associations to illustrate the operating principles. As illustrated in table 1, the CTM may guide brand managers' tactical and strategic decisions because it clarifies the "what," "when," and "how" of each brand association type.

TABLE 1
THREE WAYS OF LEARNING BRAND ASSOCIATIONS

Operating process	Operating principle	Brand association type	Tactical managerial implications	Illustrative example
Predictive learning	Stimulus-outcome (S-O)	**Brand expectations:** The consumer "expects" an outcome to occur when exposed to the brand.	When the aim is to form an association between the brand (e.g., Coca-Cola) and a particular outcome expectation (e.g., sweet, refreshing): ▪ Present/expose the brand to consumers before the outcome (i.e., use forward-pairing conditioning procedures). ▪ Consistently pair the brand with the same outcome (i.e., brand-outcome pairings should be homogeneous). Quality control and product standardization is essential. ▪ Ensure that the brand is a unique and best predictor of the outcome (i.e., statistical contingency between the brand and outcome is important). Other cues (e.g., partner brands, ingredient brands, sub-brands) will compete with the brand for association strength with the outcome. Be wary of overshadowing (e.g., when the ingredient brand is more salient) and blocking (e.g., when the ingredient brand is encountered first) effects. ▪ Once formed, the association still needs to be actively maintained and often repeated. If the brand stops predicting the outcome, the association fades quickly.	
Referential learning	Stimulus-stimulus (S-S)	**Brand meaning:** The consumer "thinks of" another stimulus or concept when exposed to the brand, without expecting that stimulus to occur.	When the aim is to form an association between the brand (e.g., Coca-Cola) and another concept or stimulus (e.g., Christmas): ▪ Present the brand before, after, or simultaneously with the stimulus (i.e., use forward-, backward- or simultaneous-pairing conditioning procedures). ▪ Pair the brand repeatedly with the same stimulus (i.e., brand-stimulus pairings should be homogeneous). ▪ Focus on the frequency with which the brand and stimulus are presented or experienced together. The brand does not need to be a unique predictor of the stimulus (i.e., statistical contingency is not required), but the frequency of co-occurrence (i.e., statistical contiguity) matters. ▪ Once formed, the association is stable for a long time (limited extinction). Whether this is desirable, depends on if the association is positively valued by the consumer.	
Direct affect transfer	Stimulus-response (S-R)	**Brand affect:** The brand triggers an affective response originally evoked by a paired affectively laden stimulus.	When the aim is to form an association between the brand (e.g., Coca-Cola) and an affective response (e.g., positive affect, arousal) originally evoked by an affectively laden stimulus (e.g., a celebrity): ▪ Present the brand and affectively laden stimulus simultaneously in advertising campaigns or on product packaging (i.e., use simultaneous-pairing conditioning procedures). ▪ Present the brand and affectively laden stimulus close in time and space (i.e., close spatio-temporal contiguity is necessary). ▪ Pair the brand with different affectively laden stimuli such as a variety of celebrities (i.e., use heterogeneous pairings). This reduces the risk of revaluation effects (e.g., when the celebrity becomes embroiled in a scandal). ▪ Feature the brand prominently in advertising. This increases affect misattribution likelihood. ▪ Once formed, the association is stable for a long time (limited extinction).	

NOTE.—The associative learning literature is characterized by jargon which we aim to minimize in this table. However, when referring to the underlying literature, the following terms are important to know: In associative learning, the learning target is referred to as the *conditioned stimulus* (CS; in a marketing context the brand would take this role). The source of the learning is referred to as the *unconditioned stimulus* (US; in a marketing context one can think of the outcome (e.g., sweet taste) or another stimulus (e.g., Christmas, a liked celebrity) as the US). Other terms refer to important distinctions in how a CS and a US are presented together. In *forward* (vs. *backward*) *pairings*, the CS is presented/perceived/experienced before (vs. after) the US. In *simultaneous pairings*, the CS and US are presented/perceived/experienced simultaneously. In *homogeneous pairing* conditioning procedures, the CS is consistently paired with the same US. In *heterogeneous pairing* conditioning procedures, the CS is presented with a variety of USs that share a characteristic that one desires to transfer to the CS.

THREE WAYS OF LEARNING BRAND ASSOCIATIONS

The CTM is a bottom-up (learning-focused) model of brand associations that differs from previous models by proposing a new distinction at the *operating principle* level. The operating principles of a learning model specify the fundamentals of "what" is being learned, that is, which kind of representations are being formed in memory. Where previous learning models distinguished between the learning of (unqualifiable) *associations* versus (qualifiable) *propositions* (Gawronski 2022; Gawronski and Bodenhausen 2006; 2014; see also Contribution to Bottom-Up Models of Associative Learning in the General Discussion), the CTM starts by distinguishing between three qualitatively different types of associations: *expectations*, *meaning* and *affective responses*. Drawing on this principle-level distinction, the CTM brings structure to the literature by clarifying and systematically specifying the operating processes (predictive learning, referential learning, direct affect transfer) and conditions (awareness, efficiency, intentionality, controllability) underlying each type of brand association.

Brand Expectations and Predictive Learning

Operating Principle. Brand expectation associations are formed when consumers learn to associate a particular outcome or experience with the brand. For example, consumers learn to expect that they will be refreshed and energized after consuming Coke and that the drink will taste sweet (see table 1). Both functional (e.g., tangible and useful advantages of consuming the brand) and experiential (e.g., sensory pleasure or cognitive stimulation derived from consumption) benefits are *outcomes* that consumers come to expect from a brand after a number

of observed co-occurrences or experiences. Essentially, what consumers learn is an association between a *stimulus* (e.g., the brand cue) and an *outcome* (S–O).

Operating Process. Consumers can learn how utilitarian product dimensions (e.g., the energy derived from consuming a beverage) as well as hedonic product experiences (e.g., beverage sweetness) are predicted by various product and brand cues (van Osselaer and Alba 2000; van Osselaer and Janiszewski 2001). Here, consumers learn to predict the likelihood that a particular outcome (i.e., a functional or experiential benefit) will occur when another stimulus or cue (e.g., a product feature or brand, aka the conditioned stimulus or CS) is present. This learning process has been referred to as "cue-outcome learning," "adaptive network models," "causal learning," or "predictive learning"—the term we retain (van Osselaer 2008).

Research has shown that the predictive learning process is unidirectional and forward-looking: consumers make a prediction about an outcome (e.g., sweetness) when made by a particular brand (e.g., Coke), receive feedback by experiencing the outcome (i.e., actual sweetness), and update the association strength based on the feedback. The process is adaptive: the prediction-feedback-update process continues until the predictions are accurate. Predictive learning is facilitated when the consumer encounters the CS (e.g., brand) *before* the outcome, rather than simultaneously or after the outcome. The S–O pairing needs to occur repeatedly and consistently, the CS needs to be the best predicter of the outcome (i.e., *statistical contingency* is required), and—once established—this contingency needs to be maintained and repeated to prevent extinction of the conditioned response (van Osselaer 2008). If multiple cues (e.g., the brand name and product attribute information) co-predict an outcome, one cue may be overshadowed (by the more salient cue) or blocked (by the first-encountered cue). Marketers

should thus be careful of cue competition effects (van Osselaer and Alba 2000).

Brand Meaning and Referential Learning

Operating Principle. Brand meaning associations are formed when a brand is associated with stimuli that give it meaning, personality, or identity. These associations include symbols associated with the brand (e.g., colors, celebrities, reference groups), the brand's identity-reflecting symbolic value (Batra 2019), and inferences about the virtues of the brand (e.g., its green credentials) that stem from the brand's association with specific symbols (e.g., the word earth). Essentially, what consumers learn is a mere association between a stimulus (e.g., the brand cue) and another concept or stimulus (S–S) as a kind of mental reference. Crucially, this mental reference does not contain a prediction component or an actual expectation of occurrence of the other stimulus. For example, the Coke brand might evoke thoughts of Christmas (see table 1), but consumers do not expect Christmas to occur when they open a can of Coke.

Operating Process. Various researchers have investigated consumer learning of brand associations with emotional or meaningful concepts that don't have a prediction or an expectation component. Different names have been used to describe the learning process involved, such as "exemplar-based learning" (van Osselaer 2008), "Human Associative Memory" or "HAM-learning" (van Osselaer and Janiszewski 2001), "indirect affect transfer" (Sweldens, Van Osselaer, and Janiszewski 2010), "inferential belief formation" (Kim, Allen, and Kardes 1996), "attribute conditioning" (Förderer and Unkelbach 2015), and "referential learning" (De Houwer, Thomas, and Baeyens 2001)—the term we retain.

Referential learning creates a bidirectional stimulus-stimulus (S–S) association in memory such that thoughts of one stimulus (e.g., a brand like Coca-Cola) activate thoughts of another stimulus (e.g., Christmas), which can trigger the activation of further associations (e.g., family and happiness). S–S associations form in memory when the two stimuli repeatedly co-occur. Like in predictive learning, the pairing needs to be homogeneous. For example, Coke will have a strong brand meaning association with Christmas only to the extent that the brand is linked repeatedly with Christmas (Sweldens et al. 2010). Unlike in predictive learning, the pairing can be forward, backward, or simultaneous (Kim, Sweldens, and Hütter 2015). Importantly, the formation of a referential association does not depend on statistical contingency and is less sensitive to extinction while the association grows stronger every time two nodes are co-activated (De Houwer et al. 2001). Referential learning does not entail competition between cues for predictive power (i.e., brands can share associations like celebrity endorsers without competing for associative strength; Förderer and Unkelbach 2015; van Osselaer 2008).

Brand Affect and Direct Affect Transfer

Operating Principle. Brand affect associations are formed when consumers associate a particular affective response with the brand. Extant research shows that affective responses can transfer to brands from ads (Gorn 1982) and that ad-evoked feelings directly impact brand evaluations after controlling for attitudes toward the ad and brand beliefs (Burke and Edell 1989). In the CTM, brand affect associations are not limited to unidimensional positive or negative affect but may vary on multiple appraisal dimensions. For instance, Gawronski and Mitchell (2014) found a transfer of arousal alongside the transfer of valence in conditioning

studies. The CTM suggests that a brand like Coca-Cola can be associated with both positive affect and arousal (see table 1) to create a rich mixture of affective responses, a characteristic of strong brands (Batra 2019). Essentially, consumers learn an association between a brand and a physiological response (the unconditioned response, UR) generated by a paired, unconditioned stimulus (the US), denoted as an S–R association (Sweldens et al. 2010). Importantly, the CS and the representation of the US itself do not need to be linked in memory (as in referential learning), and the US does not need to evoke an outcome expectation (as in predictive learning).

Operating Process. One mechanism that has been proposed to underlie the direct transfer of affect is the implicit misattribution account, according to which transfer occurs when an affect-rich US causes the consumer to experience a rapid affective response that is diffuse enough to be misattributed—specifically, to the co-occurring CS (Jones, Fazio, and Olson 2009). For example, the co-occurrence of the Coke brand (the CS) with Penelope Cruz (the affective US) leads consumers to attribute the positive feelings evoked by the celebrity (the UR) to the brand (the CS). Affect is diffuse enough to be misattributed only at the time of exposure to the US, so the CS must occur *simultaneously* for direct affect transfer to occur (Hütter and Sweldens 2013; Sweldens et al. 2010). Factors that increase the likelihood that the CS is mis-interpreted as the source of the affective response (e.g., close spatio-temporal contiguity or a greater relative CS salience), will promote direct affect transfer (Jones et al. 2009). Unlike in predictive and referential learning, the CS-US pairing does not have to be homogeneous—direct affect transfer can occur as long as the varied USs (e.g., Penelope Cruz, Muhammad Ali, Courtney Cox, Lance Armstrong) evoke similar affective responses (Sweldens et al. 2010). Creating S–R associations can help firms circumvent a common issue with S–S associations where a later drop in the

symbolic value of the US (e.g., a celebrity) negatively impacts the CS (i.e., the brand), which can be costly for firms (e.g., the Lance Armstrong doping scandal).

Direct affect transfer depends on *spatio-temporal contiguity* rather than statistical contingency—the CS (e.g., brand) and US (e.g., celebrity) must be encountered together, but consumers do not need to be aware that the two stimuli tend to co-occur (Hütter and Sweldens 2013). Because direct affect transfer depends on simultaneous co-occurrences (rather than the statistical contingency and predictive value of the CS), extinction is expected to be limited and brand affect associations should be resilient to cue competition.

The Continuity of Operating Conditions

The CTM provides insight into *when* each learning process will operate. It specifies the extent to which each process is reliant on *awareness* (i.e., of the CS-US pairing), and is *efficient* (i.e., reliant on cognitive resources), *intentional* (i.e., dependent on the learning goal), and *controllable* (i.e., can be stopped or altered by the consumer). A substantial portion of research conducted in the last 50 years explores the bewildering complexity of associative learning's sensitivity to these operating conditions. As conflicting findings have proliferated for most automaticity features applied to associative learning (Corneille and Stahl 2019), we believe the CTM can offer a much-needed fresh perspective. The CTM's primary claim that the analysis needs to start at the principle level, along with its specification of the three types of associations, allows a reconceptualization of this debate centered around the notion that the learning process operating conditions vary on a *continuum* of automaticity, in line with the conceptualization of consciousness introduced by Williams and Poehlman (2017). In this article's web appendix A

(summarized in table 2), we make a substantiated case for why this continuum is thought to vary with the type of association being formed, from mostly System 2 (brand expectation associations) to mostly System 1 (brand affect associations), with brand meaning associations in between. There we outline the theoretical and empirical reasons for the CTM specification that the learning mechanisms underlying the different brand associations vary on this automaticity continuum. Next, we present a brief, high-level summary only.

We argue that predictive learning is governed mostly by System 2 operating conditions to encode a causal relation between the CS (brand) and an outcome (e.g., a great quality experience). Consumers must be aware of the CS-US pairing to minimize prediction error (van Osselaer 2008), must attend closely to stimuli to encode their causal relation (van Osselaer 2008), should be motivated to learn to predict an outcome (van Osselaer and Janiszewski 2001), and may exert control over the established associations (Gawronski and Bodenhausen 2006, 2014). Direct affect transfer, on the other end of the spectrum, relies mostly on System 1 operating conditions because the misattribution of an affective response to the CS (brand) might be *least dependent* on awareness (Hütter and Sweldens 2013; Sweldens et al. 2010). Further, direct affect transfer may drive decision-making when preference formation is unintentional (Gorn 1982), and it cannot be controlled by consumers even when they are incentivized to resist its influence (Hütter and Sweldens 2018). Finally, the CTM characterizes referential learning as a mix of System 2 and System 1 operating conditions: it requires awareness of and attention to the CS-US association (Kim et al. 1996; Sweldens et al. 2010) but not a prediction goal (van Osselaer 2008). Referential learning can be partially controlled (Förderer and Unkelbach 2012).

TABLE 2
CONCEPTUAL AND EMPIRICAL ARGUMENTS LINKING OPERATING CONDITIONS TO LEARNING PROCESSES

Operating condition	Predictive learning	Referential learning	Direct affect transfer	CTM proposition
Awareness [a]	Predictive learning is more dependent on awareness than referential learning and direct affect transfer because: ▪ Attention to predictor, outcome, and temporal order needed. ▪ Storage of causal relation between CS and US required. ▪ Error-related events and unexpected outcomes drive process.	Referential learning is less dependent on awareness than predictive learning because: ▪ Awareness of temporal/causal relation between CS and US not needed. ▪ Statistical contingency not necessary. ▪ Some empirical evidence that meaning transfer can occur when CS presented subliminally. Referential learning is more dependent on awareness than direct affect transfer because: ▪ Awareness of US identity conducive to meaning transfer.	Direct affect transfer is less dependent on awareness than predictive learning and referential learning because: ▪ Origin of affective responses can be diffuse and therefore misattributed. ▪ Affect transfer can be caused by different, same valence USs. Thus, awareness of US identity not necessary, though awareness of US valence (a lower level of awareness) may be conducive/necessary. ▪ EC effects [e] appear less dependent on awareness of affective response source under conditions facilitating direct affect transfer (vs. referential learning).	***Proposition 1:*** Formation of brand expectation associations is more reliant on awareness than formation of brand meaning associations. Formation of brand affect associations is least dependent on awareness.
Efficiency [b]	Predictive learning is less efficient than referential learning and direct affect transfer because: ▪ Process involves comprehension of propositional information. ▪ Learning impaired by high processing demands. Attention to stimulus-outcome relation needed.	Referential learning is more efficient than predictive learning because: ▪ Encoding of causal relations not needed. ▪ Updating of stimulus-outcome predictive relations not needed. Referential learning is less efficient than direct affect transfer because: ▪ Encoding of stimulus-stimulus relations requires some processing resources. ▪ EC effects eliminated by concurrent tasks posing high demands on attentional system (e.g., digit monitoring in 2 back task), but minimally affected by lower demands on working memory (e.g., remembering 4 digit number) that interfere only with controllable part of effect. ▪ EC effect attenuated by retroactive interference after conditioning procedures aiding referential learning (i.e., when CS-US pairings are sequential and homogeneous).	Direct affect transfer is more efficient than predictive learning and referential learning because: [f] ▪ Attention to and identification of precise source of affective response (US identity) not necessary and may even disrupt direct affect transfer. ▪ EC effect not attenuated by retroactive interference after conditioning procedure aiding direct affect transfer (i.e., when CS-US pairings are simultaneous and heterogeneous).	***Proposition 2:*** Formation of brand expectation associations requires more processing resources than formation of brand meaning associations. Formation of brand affect associations is least reliant on processing resources.
Intentionality [c]	Predictive learning is more intentional than referential learning and direct affect transfer because: ▪ Motivation to improve prediction accuracy drives learning process.	Referential learning is less intentional than predictive learning because: ▪ Process drives learning in absence of prediction goal. ▪ Process drives choice in absence of product evaluation goal. [g] ▪ Process may have intentional antecedents but unintentional consequences. ▪ Processing goals may influence what is learned via the allocation of attention.	Direct affect transfer is less intentional than predictive learning because: ▪ Limited empirical research discriminates intentionality of referential learning and direct affect transfer. Findings listed under referential learning apply equally to direct affect transfer. Direct affect transfer is less intentional than referential learning because: ▪ If direct affect transfer requires lower levels of awareness and less processing resources than referential learning, and is less controllable than referential learning, then process may also be less intentional if automaticity features are not completely orthogonal.	***Proposition 3:*** Formation of brand expectation associations is more intentional than formation of brand meaning associations. Formation of brand affect associations is least intentional.
Controllability [d]	Predictive learning is more controllable than referential learning and direct affect transfer because: ▪ Externally provided/self-generated propositions can be invalidated through motivated reasoning. ▪ Process sensitive to occasion setting and causal inference.	Referential learning is less controllable than predictive learning, but more controllable than direct affect transfer because: ▪ EC effects partially reversed if consumer believes that CS has "negative" relation to US (e.g., when a celebrity turns against a brand). ▪ Process-dissociation studies find evidence of controllable and uncontrollable meaning transfer [h]. ▪ Persuasion knowledge attenuates EC effects when conditioning procedures aid referential learning (i.e., when CS-US pairings are sequential and homogeneous).	Direct affect transfer is less controllable than predictive learning and referential learning because: ▪ Process-dissociation studies find evidence of controllable and uncontrollable affect transfer [h]. ▪ MPT [i] modelling studies show US valence directly impacts CS attitudes even when conceptual relation between CS and US implies opposite effect on attitude. ▪ EC effects not attenuated by persuasion knowledge when conditioning procedures aid direct affect transfer (i.e., when CS-US pairings are simultaneous and heterogeneous).	***Proposition 4:*** Formation of brand expectation associations is more controllable than formation of brand meaning associations. Formation of brand affect associations is least controllable.

NOTE.—See web appendix A for references supporting table 2 claims.
[a] Introspective access to mental processes or mental components.
[b] Extent to which process requires processing resources and interferes with other ongoing mental tasks.
[c] Degree to which process requires intention to start. Unintentional processes are stimulus driven.
[d] Extent to which process can be altered or stopped. Uncontrollable processes continue despite intention to alter or terminate them.
[e] Evaluative conditioning (EC) is an effect where the valence of a stimulus (a CS such as the brand) changes because of pairing it with another stimulus (a US such as Christmas or a liked celebrity). EC effects are driven by both referential learning and direct affect transfer (Kim et al. 1996; Sweldens et al. 2010).
[f] Findings do not imply that direct affect transfer is resource independent. Attention to either US (for affective reaction to occur) or CS (for affect misattribution to occur) required.
[g] Unclear if EC effects in these studies are driven by direct affect transfer or referential learning. Thus, findings considered evidence that *both* processes are less intentional than predictive learning.
[h] Research does not compare conditioning procedures aiding direct affect transfer versus referential learning.
[i] Multinomial processing tree (MPT) models are statistical models that can be applied to categorical data. They are often used as data analysis tools capable of disentangling and measuring the separate contribution of different cognitive processes to observed data.

GENERAL DISCUSSION

Contribution to Top-Down Models of Brand Equity

Consumer research has long studied how to build, measure, and manage brand equity. To date, a variety of top-down models of brand associations exist. Some of these models provide a conceptual overview of brand equity (e.g., Keller 1993) while others hone-in on a specific brand association to elucidate its role in consumer-brand relationships (e.g., Aaker 1997; McCracken 1989). Conceptually, different kinds of associations are often grouped indiscriminately. Take, for example, the concept of brand image (Keller 1993) which can refer to associations including celebrity endorser-derived brand meaning (McCracken 1989), brand personality (Aaker 1997), and brand affect (Gorn 1982). Similarly, brand meaning associations have ranged from cultural meanings, to values, to emotions (Batra 2019). Established models, like the customer-based brand equity (CBBE) model (Keller 1993) or the brand knowledge model (Keller 2003) have so far insufficiently considered which associations are similar or different in terms of how they are acquired and which behavioral effects they have. The CBBE model, for example, views the formation and representation of all brand associations from the perspective of a general associative network memory model (Keller 1993), in which all connections are strengthened each time two events co-occur. The CTM demonstrates this assumption needs to be revisited.

Leading scholars in this domain have recognized the need for greater refinement of brand equity models. Keller (2003) highlights eight sources of brand knowledge (awareness, attributes, benefits, images, thoughts, feelings, attitudes, and experiences) that are transferred from other stimuli, but notes that a better understanding of their "transferability" is "especially critical" (p.

599) and that research on their "interactions" is of "paramount importance" (p. 597). Because the learning process driving each association remains opaque, the model, though informative, does not clarify how researchers or practitioners should distinguish between different association types or how the formation of one association may influence the acquisition of other associations. Here, the CTM can provide guidance as a parsimonious framework that synthesizes the plethora of brand associations into three overarching classes with different fundamentals. By considering whether associations are of the S–O, S–S or S–R type, future brand equity models can make clearer and more grounded predictions regarding the transferability and longevity of different sources of brand equity (see managerial implications) and potential interactions among different brand associations (see future directions).

Contribution to Bottom-Up Models of Associative Learning

Contemporary theoretical perspectives on learning can be divided into two broad classes: dual-process theories and single-process theories. Briefly, dual-process theories such as the APE model (Gawronski and Bodenhausen 2006, 2014) posit an associative and a propositional learning process mechanism. In contrast, single-process theories propose that purely non-automatic propositional reasoning processes drive learning. Yet, the validity of both classes of theories continues to be heavily debated (Corneille and Stahl 2019). It is also increasingly clear that associative and propositional process theories cannot be empirically distinguished based on their operating conditions as both classes of theories can accommodate mere co-occurrence effects and conditioning effects under suboptimal learning conditions. Instead, researchers increasingly recognize that the proper way to distinguish between learning processes is based on

the operating principles (i.e., "what" is learned; Hütter 2022).

Recent theory updates have therefore introduced the associative versus propositional duality at the principle level (rather than just the process level as before; Gawronski 2022): when validity or relational information about the CS–US association can be incorporated (i.e., when people can qualify the association with meaning or endorse its validity), it is considered a *propositional representation*; when it cannot, it is considered an *associative representation*. Yet, at the empirical level, this approach confounds the operating principle and operating conditions levels of analysis because the same criterion is used to describe both what kind of association is formed (associative versus propositional representations: an operating principle) and the conditions under which it is formed (controllability: an operating condition).

The CTM thus contributes to bottom-up theories by proposing a novel trichotomy of operating principles based on *what* stimulus characteristics are linked in memory (i.e., S–O, S–S or S–R) to differentiate learning processes. The CTM thereby provides a method for distinguishing between processes that does not rely on differentiating their operating conditions. Instead, the operating conditions are allowed to vary on a continuous basis between the processes while researchers are encouraged to refine their measures of *what* is learned—expectations, meaning, or affect—to gain more insight into *how* and *when* brand associations are formed.

Directions for Future Research

By identifying and characterizing brand associations into different types (i.e., S–O, S–S, or S–R associations), the CTM highlights important considerations and opportunities for future research. Three research priorities stand out.

Priority 1: *Better Differentiate "What" Is Learned and Embrace the Continuity of the Operating Conditions.* We believe that many of the conflicting findings plaguing associative learning research (Corneille and Stahl 2019; Hütter 2022) are caused by a combination of two underlying problems. First, researchers have insufficiently discriminated between "what" is being learned at the principle level, often relying on *overall* explicit or implicit evaluation measures that conflate changes over the different association types (e.g., Hasford, Kidwell, and Hardesty 2018; Sweldens et al. 2010). As outlined by the CTM, this could lead to conflicting findings as the operating conditions of each association type are characterized by a unique mix of automaticity features. More fine-grained measures and analyses at the principle level are therefore needed to make progress. Yet, just like measures and manipulations are never process pure (Hütter et al. 2012), they are likely not representation pure either (e.g., affective responses towards brands are likely influenced by brand performance expectations and vice versa). Though this poses a challenge, progress may still be possible if researchers more explicitly target the operating principle being studied. For example, a measure like the IAT can be tailored to measure associations of a brand with a specific concept (i.e., to investigate the development of specific S–S brand associations) while other measures are better suited to study affective responses (e.g., affective priming measures or physiological measures). Mediation analyses could further clarify the extent to which responses on one level of representation (e.g., brand liking) are driven by changes at another level (e.g., brand meaning; Kim et al. 1996).

A second problem characterizing past research is that it has insufficiently embraced the *continuity* of operating conditions. Instead, research often took a dichotomized, all-or-nothing approach, investigating, for example, if a particular conditioning procedure can change brand attitudes in the complete absence of contingency awareness, with the scholarly debate focusing

on how awareness should then be defined and measured (Sweldens, Corneille, and Yzerbyt 2014). Such approaches are likely self-defeating as they are ultimately empirically unattainable (e.g., observations of learning without awareness could always be criticized for not being rigorous enough in measuring awareness) and therefore theoretically not the most generative. As specified by the CTM, mental process awareness is assumed to vary in intensity and scope between the various types of brand associations, but even processes operating at the lowest levels of awareness could still be characterized by some level of awareness (e.g., awareness of stimulus valence). Therefore, in keeping with recent conceptualizations of consciousness (Williams and Poehlman 2017) and earlier recommendations for its study (Sweldens, Tuk, and Hütter 2017), the key CTM propositions to be tested (see table 2) are all expressed in continuous terms. The greatest challenge will be to see whether recent methodological innovations in the study of operating conditions (Béna, Mauclet, and Corneille 2023; Hütter and Sweldens 2018; Hütter et al. 2012) could be tailored to allow a continuous analysis across the principle levels. See web appendix B for additional considerations on how to test the key CTM propositions.

Priority 2: Investigate the Behavioral Consequences of the Different Association Types. Strong brands consist of multiple synergistic association types. Consider, for example, an endorsement of a brand like Nike® by Michael Jordan. To the extent that Jordan triggers affective responses and that the pairings are simultaneous, S–R associations (e.g., positive affect) are created. If the pairing is consistent and repeated over time, S–S meaning associations that link the brand with the endorser (and related concepts, e.g., athleticism) are created. Finally, if the pairing triggers performance expectations (e.g., by seeing Jordan dunk or naming the product Nike Dunk®), S–O associations might be created. Currently, little is known about the relative

impact of each association type on consumer behavior. This relative impact is likely contingent on the consumer's stage in the decision-making process (e.g., brand expectations could be crucial in consideration set formation, while brand meaning and brand affect could prove decisive when formulating a purchase intention), on individual differences (e.g., a consumer's sense of self-efficacy could determine the effectiveness of brand expectation associations), on the product category (e.g., brand affect and brand meaning associations may influence hedonic choices more than utilitarian choices), and other variables (e.g., e.g., S–O associations could be a particularly powerful source of brand placebo effects).

Priority 3: Investigate Higher-Order Learning and Interactions between Operating Processes. Brand association learning never takes place in a vacuum. As visualized in figure 1, higher-order learning and interactions between the operating processes may complicate brand association formation. Every US or concept that can be associated with a CS (brand), is itself characterized by its own network of associations. These secondary associations can become associated with the brand through what is known as higher-order learning (Honey and Dwyer 2022). For example, associating Nike with the concept of Michael Jordan (an S–S association) can result in Nike also being linked with other Michael Jordan associations such as the concept of basketball (another S–S association) or positive feelings (S–R associations; Sweldens et al., 2010). Since parts of Michael Jordan's own associative network may transfer too, these secondary associations could potentially reinforce other association types attached to Nike (e.g., the expectation of improved sports performance, an S–O association). The learning processes may also interact. For example, a relatively automatic learning process (e.g., direct affect transfer) could pave the way for a relatively less automatic learning processes (e.g., predictive

learning), if the presence of positive emotional responses to a brand increases the attention it receives (e.g., a liked brand may receive more attention in cue-interaction contexts where the brand competes with other cues, such as ingredient brands, in predicting outcomes; van Osselaer and Alba 2000). The possible process interactions and higher-order learning effects illustrate the complexity inherent in the empirical study of brand association formation. Recognizing these layers of complexity is a crucial first step in advancing empirical research and interpreting complex (or even conflicting) data patterns.

Implications for Brand Managers and Policy Makers

The CTM has both tactical and strategic implications for managers, and highlights areas of special attention for policy makers and regulators. Tactically, the CTM's principles should play a major role in designing marketing campaigns. Because the CTM proposes a link between types of brand associations and learning processes, marketers and advertisers can identify the parameters that will aid or impede learning of the brand association they strive to form (see table 1). When designing a marketing campaign, it is therefore essential that brand managers first clearly identify the type of brand association they want to create (expectations, meaning, or affect) as this will determine the necessary campaign characteristics for the desired association. Consider, for example, the design of the next Kleenex® ad campaign. Kleenex's brand manager should first consider which brand association they desire to create or reinforce in Kleenex' network of associations. Imagine they decide on puppies, a stimulus Kleenex has used often in the past which gives rise to numerous desirable secondary associations (e.g., friendliness, playfulness, softness etc.). Since this is a brand meaning (S–S) association, copywriters can be given relatively free reign in how the Kleenex brand and puppy stimuli are presented in the ad,

while the brand manager can be confident that the consistent co-occurrence of the brand with puppies is all that is required for the desired brand meaning association to be formed. As detailed in table 1, copywriters do not need to stick to a certain temporal order between the brand and the puppy appearances in the commercial, nor do they need to worry about potential interference from sub-brands or ingredient brands as cue-interaction effects (e.g., blocking) are minimal in referential learning. This implies that if the campaign is centered on Kleenex Tissues, the resulting association with puppies should also positively impact brand perceptions in other product categories (e.g., toilet paper). As summarized in table 1, other association types (S–R and S–O) require much tighter control of the creative process.

The CTM also implies important strategic considerations for brand managers, most notably in the domain of brand alliances and partnerships. The CTM indicates when brands can partner with other brands and for which kind of associations brands need to compete for exclusivity. Brand expectation associations (e.g., the performance expectations of a watch brand such as Audemars Piquet) are proposed to be more sensitive to cue interaction effects (e.g., blocking and overshadowing) than brand meaning and brand affect associations, and thus cannot be shared. When it is necessary to include an ingredient brand name (e.g., an automatic movement originally created by Jaeger-LeCoultre), the CTM suggests that marketers must be extremely cautious as the ingredient brand may capture much of the association strength if it is seen as a better predictor of the outcome. The CTM also suggests ways to prevent this from happening. For example, Audemars Piguet could present its brand name first or, as the company did, purchase the movement license from Jaeger-LeCoultre. In contrast, cue interaction effects are not characteristic of referential learning or direct affect transfer. Thus, the CTM predicts that brand meaning associations and brand affect associations can be shared by multiple brands. For

example, because referential learning is not subject to blocking, numerous brands (e.g., Audemars Piguet and Wilson) can partner with the same celebrity endorser (e.g., Serena Williams) and become successfully associated with the same prototypical characteristics of that endorser (e.g., winning and excellence).

Finally, the CTM also gives guidance to policy makers and regulators about the type of advertisements and brand associations that need special care. The CTM proposes that consumers may lack control over whether they can stop, override, or otherwise influence the learning of certain brand associations, implying serious repercussions for consumer autonomy and free will. Consider direct-to-consumer advertising (DTCA) of pharmaceutical products. The elements in these advertisements closely mimic those in evaluative conditioning studies: there is liberal use of positive images comparable to those used in conditioning studies, and the brand logo is often presented simultaneously with these images (Biegler and Vargas 2016). The targets of these advertisements are often distracted and under cognitive load because they are in pain or distress, suggesting that direct affect transfer might drive brand association formation. The CTM proposes that, because direct affect transfer is most uncontrollable and unintentional, consumers will be less able to stop, override, or prevent the formation of positive brand affect associations based on these ads. Thus, informing consumers about the risks of a drug or telling them to consult with their physician will likely be ineffective. Instead, censorship may be a better solution.

These threats to consumer autonomy likely extend to other domains with significant implications for consumer welfare such as financial investments, health insurance, alcohol, and fast food. Given these potentially wide-ranging implications and the sparsity of research on the controllability and intentionality of different learning processes (see web appendix A), further research is both timely and essential.

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HEADING LIST

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WEB APPENDIX

The Science of Creating Brand Associations: A Continuous Trinity Model Linking Brand Associations to Learning Processes

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Steven Sweldens

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WEB APPENDIX A: ANALYSIS OF RELATION BETWEEN OPERATING CONDITIONS AND LEARNING PROCESSES

The CTM proposes that the learning processes driving the formation of the trinity of brand associations vary in automaticity, on a continuum from "mostly System 2" to "mostly System 1." The automaticity of a process is captured by four operating conditions: the extent to which the process is dependent on the consumer's awareness of the CS-US pairing (i.e., the pairing of the conditioned stimulus with the unconditioned stimulus; *awareness*), requires an intention to learn the brand association (*intentionality*), demands cognitive resources (*efficiency*), and can be altered or overridden by the consumer (*controllability*). System 2 processes are characterized by awareness, inefficiency, intentionality, and controllability, while System 1 processes are characterized by unawareness, efficiency, unintentionality, and uncontrollability. Our study of the literatures in consumer research, psychology, and neuroscience suggests that the operating conditions of predictive learning are mostly System 2, while the operating conditions of direct affect transfer are mostly System 1, and referential learning is a mix of the two.

Two important assumptions underlie our proposed framework. First, we assume that the three learning processes vary in their *degree* of automaticity; each process is neither fully automatic nor fully deliberative. This assumption is based on recent criticism of the dichotomization of consciousness and the subsequent reconceptualization of consciousness as a continuum (Plassmann and Mormann 2017; Sweldens, Tuk, and Hütter 2017; Williams and Poehlman 2017) . Second, we assume that the four operating conditions (i.e., the four features of automaticity; Bargh 1994; Gawronski and Bodenhausen 2014; Melnikoff and Bargh 2018) are independent of one another, so they are not necessarily (fully) aligned. In other words, evidence

that a process is characterized by awareness does not imply that the process is also inefficient, controllable, and intentional (Melnikoff and Bargh 2018). Next, we define the four features of automaticity, briefly outline advances in the methods used to assess them, and then describe how the three learning processes are thought to vary on each feature.

Awareness

What Is Awareness? No other feature of automaticity has been studied as intensively—or generated as much controversy—in the associative learning literature as awareness, due in no small part to the fact that awareness is a multi-layered construct and has been defined in many partially overlapping ways. In more than seven decades of research, researchers have alternately studied (with varying methodologies) whether consumers are aware of the CS or US stimuli as they are presented (e.g., by manipulating subliminal vs. supraliminal presentation times), whether they remember if a CS was paired with a particular US (i.e., remember US identity), if they can recall the affective quality of the paired US (i.e., remember US valence), or whether they can remember the statistical and predictive relation between a CS and US (i.e., contingency memory; Sweldens, Corneille, and Yzerbyt 2014). Perhaps unsurprisingly, one overarching finding from years of research, is that the lower one's threshold for what it means to be "aware," (e.g., remembering mere the valence of a US is a less strict criterion for awareness compared with remembering its precise identity) and the greater one's sophistication in the measurement of that state, the less evidence remains of learning-without-awareness (Corneille and Stahl 2019).

While we applaud the increasing sophistication in definitions and measurement of awareness, the CTM deliberately applies a very *broad* definition of awareness. In line with

recent conceptualizations of consciousness, we define awareness generically as "introspective access to mental processes or mental components." This may involve awareness of the cause of a process, the effect of a process on judgment and behavior, or the cause-effect relationship (Williams and Poehlman 2017). Applying such a broad overall definition of awareness, allows the CTM to discuss the multiple layers inherent in the construct (i.e., contingency awareness, awareness of US identity, awareness of US valence etc.) and make an argument for why the overall level of awareness, which is composed of all these aspects, will vary in a continuous fashion between the three main paths of the model.

What Is the Role of Awareness in Each Operating Process? At the most "aware" end of the spectrum lies predictive learning and the resulting formation of brand expectation associations. Three characteristics of predictive learning inform this proposition. First, predictive learning cannot occur unless the consumer pays attention to the pairing of a predictor (e.g., a brand) with a relevant outcome (e.g., the quality of the product). Without a clear distinction between the predictor and the outcome (van Osselaer 2008), the consumer cannot encode the temporal order and, therefore, cannot understand the causal relation between the stimuli. Second, predictive learning involves the storing of the causal relation between two stimuli (van Osselaer 2008), which requires the consumer to be aware of the CS-US contingency (Alonso, Fuentes, and Hommel 2006; Shanks and Lovibond 2002). Finally, predictive learning is driven by prediction errors, and the rate of learning depends on the discrepancy between what is predicted based on prior experiences and what occurs (Gluck and Bower 1988; Rescorla 1972). Error-related events in predictive learning attract attention (Wills et al. 2007), and predictive learning is facilitated by outcomes that are at least somewhat unexpected (Kamin 1969; Wills et al. 2007).

The size of the discrepancy between the prediction and reality depends on the amount of attention paid to the CS-US pairing, so effective predictive learning tends to involve high attention to the pairing. Taken together, the evidence suggests that predictive learning and the subsequent formation of brand expectation associations is characterized by overall high levels of awareness.

We argue that referential learning and the formation of brand meaning associations is less dependent on awareness than predictive learning. Consumers do not need to be aware of a temporal/causal relation to form a bidirectional representation of two stimuli in memory (i.e., thinking about the CS activates thoughts about the US, and vice versa; Alonso et al. 2006; Förderer and Unkelbach 2015; Kim, Sweldens, and Hütter 2015). Förderer and Unkelbach (2015) showed that a CS and US do not need to co-occur more frequently than either stimulus occurs alone for an attribute (e.g., athleticism) to be conditioned. Rather, the two stimuli merely need to co-occur. In other words, statistical contingency is not necessary for referential learning to occur. There is even some evidence that referential learning may occur when the CS is presented subliminally. For example, Galli and Gorn (2011) subliminally presented Chinese ideographs (the CSs) with an attribute that carried semantic meaning (black vs. white; the US) and used a lexical decision task to test whether the semantic meaning transferred to the ideographs. The pairing was found to influence the speed with which participants recognized the words that were semantically related to the previously associated attributes, such that participants reacted slower when the target word was preceded by the ideograph that had been paired with the mismatched (vs. matched) color during the learning phase.

Meanwhile, referential learning is more dependent on the consumer's awareness of the CS-US pairing than direct affect transfer because the transfer of semantic meaning is less

ambiguous than affect and thus less likely to be "misattributed" to a target (Galli and Gorn 2011; Jones, Fazio, and Olson 2009; Olson, Kendrick, and Fazio 2009; Sweldens, Van Osselaer, and Janiszewski 2010). Using evaluative conditioning (EC) procedures, Kim, Allen, and Kardes (1996) showed that the transfer of implicit meaning (e.g., speed) from a US (e.g., a race car) to a CS (e.g., a Pizza brand) was more effective when participants were contingency aware.

At the "unaware" end of the spectrum lies the formation of brand affect associations. The CTM proposes that direct affect transfer will be the process contributing most to the formation of brand affect associations. Direct affect transfer occurs because the affective response evoked by a US is misattributed to a CS, and the misattributed affect influences attitudes toward the CS (Jones, Olson, and Fazio 2010), consistent with past research that attributional processes are important in the experience of affect (Russell 2003; Schachter and Singer 1962). Emotions arise when we make causal attributions about the basic cognitive and physiological processes of valence and arousal. The misattribution of affect and arousal has been documented in both psychology (Dutton and Aron 1974; Schwarz and Clore 1983; Storms and Nisbett 1970; Zanna and Cooper 1974) and consumer behavior (Cesario, Grant, and Higgins 2004; Mukhopadhyay and Johar 2007). For example, Cesario et al. (2004) found that messages were more persuasive when framed congruently with the recipient's regulatory state because the high regulatory fit produced positive feelings (Higgins 2005), which were misattributed to the arguments. Cesario et al. (2004) demonstrated that the effect of fit on persuasion is eliminated when attention is drawn to the true source of the positive feelings.

It has even been argued that contingency awareness may *decrease* direct affect transfer (March, Olson, and Fazio 2018): when individuals are aware of the contingency between the US (cute kittens) and the CS (brand), they might be less likely to attribute a positive affective

response to the CS if they are aware that the US is the affect source, although it should be noted that empirical evidence for such claims is sparse and contested (Corneille and Stahl 2019). Sweldens et al. (2010) showed that direct affect transfer drives EC effects under conditions that facilitate affective confusion: the simultaneous presentation of the US and CS and heterogeneity in the CS-US pairing. Under such conditions, awareness of the specific CS-US identity associations was not above the chance level. The finding supports the idea that direct affect transfer is less dependent on awareness than referential learning. At least three other articles with different methodological approaches have now shown that EC effects depend less on one's awareness of the source of the affective response under conditions that facilitate direct affect transfer (vs. conditions that facilitate referential learning; Hasford, Kidwell, and Hardesty 2018; Hütter and Sweldens 2013; Stahl and Heycke 2016). Taken together, the evidence suggests that the formation of brand affect associations, through direct affect transfer, is likely less dependent on awareness of the CS-US pairing than the formation of the other two brand association types.

Interestingly, evidence suggests that both direct affect transfer and referential learning may depend on the supraliminal presentation of at least one (and possibly both) of the CS and US stimuli (Högden, Hütter, and Unkelbach 2018; Stahl, Haaf, and Corneille 2016). The caveat illustrates the need for researchers to carefully distinguish between types and levels of awareness in theories and operationalizations (i.e., between awareness of the identities of the stimuli, valence of the stimuli, and relation between the stimuli; Sweldens et al. 2017).

Efficiency

What Is Efficiency? The efficiency of a process is the extent to which it requires

processing resources and interferes with other ongoing mental tasks (Bargh 1994; Moors and De Houwer 2006). System 1 processes are relatively efficient: they require less resources and interfere less with ongoing mental tasks than System 2 processes (Melnikoff and Bargh 2018).

What Is the Role of Efficiency in Each Operating Process? Predictive learning likely requires the most processing resources because it involves the comprehension of propositional information (Gawronski and Bodenhausen 2014; van Osselaer 2008). Cunha and Laran (2009) found that the highlighting effect[1], a type of cue interaction effect that involves predictive learning (van Osselaer 2008), is stronger among consumers who focus attention narrowly during learning than among consumers who more fully process their surroundings and are prone to distraction. The authors suggest that attention moderates the highlighting effect because consumers who allocate attention broadly in the learning phase focus less on the relevant predictor-outcome pairings. Corroborating these findings, Waldmann and Walker (2005) found that predictive learning is impaired by high processing demands. Thus, we propose that predictive learning and the formation of brand expectation associations impose relatively high demands on attention and working memory.

Referential learning is likely more efficient than predictive learning but less efficient than direct affect transfer. In referential learning, consumers do not need to encode explicit causal relations or update stimulus-outcome predictive relations based on their experiences. Yet, the encoding of stimulus-stimulus relations in memory likely requires at least some processing resources. EC effects are driven by referential learning and direct affect transfer (Kim et al.

[1] The highlighting effect shows that when two brands have common and unique attributes, consumers tend to develop the strongest associations between the first-introduced brand and the common attribute and between the later-introduced brand and its unique attribute.

1996; Sweldens et al. 2010). While EC effects are eliminated by concurrent tasks that pose relatively heavy demands on the attentional system (e.g., when continuously monitoring a stream of digits in a 2 back task; Dedonder et al. 2010), they are minimally affected by lighter burdens on working memory (e.g., remembering a 4 digit number), which interfere with only the controllable part of the effect (Hütter and Sweldens 2018).

We propose that direct affect transfer is the most efficient of the three learning processes (Hütter and Sweldens 2018; Sweldens et al. 2010) because it is assumed to be driven by affect diffusion and misattribution which are attenuated when consumers pay attention to the affect source (Cesario et al. 2004; Jones et al. 2010; Schwarz and Clore 1983). Sweldens et al. (2010, experiment 2) added a learning task immediately after a conditioning procedure and found that EC effects were attenuated when the CS-US pairings were sequential and homogeneous (which facilitates referential learning) but not when the CS-US pairings were simultaneous and heterogeneous (which facilitates direct affect transfer). The results do not imply that direct affect transfer is resource *in*dependent—although affect misattribution seems efficient, some resources may be required in the form of attention to either the US (for an affective reaction to occur) or to the CS (for affect to be misattributed; March et al. 2018). This may explain why direct affect transfer attenuates when cognitive resources are taxed to the point of preventing the explicit encoding of stimuli in memory (Corneille and Stahl 2019). In sum, the formation of brand affect associations likely is more efficient than the formation of brand expectation and brand meaning associations but still requires some cognitive and attentional resources.

Intentionality

What Is Intentionality? The intentionality of a process is defined as the degree to which it requires the consumer's intention to get started; an unintentional process is completely stimulus driven (Bargh 1994; Melnikoff and Bargh 2018; Moors and De Houwer 2006). System 2 processes are intentional, whereas System 1 processes are triggered by a stimulus and do not require intention to get started (Melnikoff and Bargh 2018).

What Is the Role of Intentionality in Each Operating Process? Our review of the literature suggests that predictive learning is relatively intentional, while referential learning is relatively unintentional (van Osselaer and Janiszewski 2001; van Osselaer, Janiszewski, and Cunha 2004). For example, van Osselaer et al. (2004) showed cues about a wine (e.g., its country of origin and the type of vineyard) to some participants and instructed them to predict the wine's quality based on the cues. Other participants did not predict the outcome before receiving outcome feedback. Participants who made predictions during learning engaged in predictive learning (characterized by broad generalization; van Osselaer 2008), whereas participants who did not make predictions during learning showed evidence of referential learning (characterized by configural stimulus representation with narrow generalization; van Osselaer 2008).

Direct affect transfer, like referential learning, may be unintentional, as it occurs in the absence of a goal to form a new association. For example, Gorn (1982) found significant conditioning effects of pleasant music (the US) in a non-decision-making group (when participants were not told that they would have to choose between a black and blue pen) but not in the decision-making group (when participants were told that they would have to select a pen). In other words, participants relied more on the affective associations created by pairing a pen with an affect-rich stimulus when they could form the associations unintentionally. Likewise,

Dempsey and Mitchell (2010) found that pairing positive images with an inferior pen increased participants' likelihood of selecting the inferior pen over a superior pen, but only in a non-evaluative-goal condition (when participants were not told to evaluate the pen). Note that it is not clear whether direct affect transfer or referential learning was the process underlying the EC effects in these studies. Future research should therefore compare the intentionality of the processes by contrasting the outcomes of conditioning procedures with procedural parameters that are more likely to evoke each of the two processes.

Although direct affect transfer and referential learning seem less intentional than predictive learning, they may have intentional antecedents. For example, consumers may intentionally expose themselves to repeated co-occurrences of a particular brand (e.g., Lululemon) and meaning (e.g., inclusiveness) by following the brand on social media. Here, the antecedent of the learning process (following Lululemon on social media) is intentional, though the result (learning about Lululemon's inclusiveness credentials) may not be. Further, direct affect transfer and referential learning may be influenced by processing goals even if they are not dependent on intentions to form an evaluation. For example, Gast and Rothermund (2011) showed that EC effects were stronger when participants focused on affective valence than when they focused on other stimulus characteristics, indicating that where attention is directed will influence what is learned.

Controllability

What Is Controllability? While intentionality involves a goal to start the process, controllability involves a goal of altering or stopping the process or modifying its output;

uncontrollable processes continue to operate despite a person's intention to alter or terminate them (Melnikoff and Bargh 2018).

What Is the Role of Controllability in Each Operating Process? Based on the existing evidence, we propose that the formation of brand expectation associations via predictive learning is more controllable than the other two processes. In predictive learning, the consumer can intentionally invalidate an externally provided or self-generated proposition (Gawronski and Bodenhausen 2014). Goal-dependent invalidation can be seen in the effects of motivated reasoning (Agrawal and Maheswaran 2005; Kunda 1990), where consumers may wish to confirm or disconfirm the validity or accuracy of a given impression. Research in animal learning also shows that predictive learning is sensitive to occasion setting (e.g., Swartzentruber 1995) and causal inference; Beckers et al. (2006) showed that blocking (a type of cue interaction effect that is characteristic of predictive learning) is flexible and sensitive to the constraints of causal inference, indicating that predictive learning is relatively controllable even in rats.

Referential learning seems less controllable than predictive learning but more controllable than direct affect transfer. Though referential learning may occur in the absence of a goal to associate the relevant stimuli (Gawronski, Balas, and Creighton 2014), several studies suggest that associations learned through referential learning can be partially but not completely altered. For example, EC effects can be partially reversed if the consumer believes that the CS has a "negative" relation to the US (e.g., when a celebrity associated with a brand seems to turn against the brand). The fact that antagonistic reversals lead to reversed EC effects that are weaker than the effects in the non-antagonistic conditions (Fiedler and Unkelbach 2011; Förderer and Unkelbach 2012) suggests that referential learning is only partially controllable. Recent studies

have applied MPT modelling to provide further empirical evidence that the meaning of a CS-US pairing can independently contribute to EC effects (Heycke and Gawronski 2020; Kukken, Hütter, and Holland 2020). When participants were instructed to attend the conceptual relation of the US with the CS, a significant reversed EC effect emerged in incongruent conditions (e.g., when a CS stops or prevents a positive US), dependent on memory for relational information.

Finally, we propose that direct affect transfer is the most uncontrollable of the three processes—consumers may be unable to stop brand affect associations from forming and may not be able to change the nature of established associations even when they want to. Hütter and Sweldens (2018) used a process-dissociation method to provide evidence for the existence of both controllable and uncontrollable EC effects. Furthermore, other process dissociation studies show that evaluations of a CS continue to be influenced by the valence of the US even when participants successfully encode an antagonistic relation between the CS and the US (e.g., that the CS prevents or stops a positive US; Heycke and Gawronski 2020; Kukken et al. 2020). Further suggesting that direct affect transfer may be less controllable than referential learning, Sweldens et al. (2010) used an EC paradigm with a persuasion knowledge manipulation (warning participants that the images paired with beer brands contained no valuable information about the taste or quality of the brands). They found that the manipulation attenuated EC effects when the CS-US pairings were sequential and homogeneous (aiding referential learning) but not when the CS-US pairings were simultaneous and heterogeneous (aiding direct affect transfer).

WEB APPENDIX B: EXTENDED DISCUSSION OF FUTURE RESEARCH PRIORITY 1

The CTM's primary contribution lies in its proposal that brand associations need to be divided in three fundamental types to make sense of the wide-ranging, complex, and often inconsistent literature on the operating conditions characterizing associative learning. In culmination, four propositions specify these relations (see table 2 in the main article). Critical to these propositions is the continuity they propose for each operating condition in its relation to the three types of brand associations. But how could this continuity take shape or be studied? Here, we offer a few additional thoughts on these propositions.

CTM Proposition 1: Testing the Role of Awareness in Brand Association Learning

Recent scholarly debate on the role of awareness has often been characterized by discussions on which is the "best" measure of awareness (e.g., between process dissociation measures or item-based measures of US identity or US valence; Hütter et al. 2012; Stahl, Unkelbach, and Corneille 2009). While we greatly appreciate the increasing sophistication and refinement in the measurement of awareness that characterizes the progression of research in this area over the past decades, we argue that it might be time to take a step back and look at awareness more holistically, measuring it more broadly while also tapping into its various components to better appreciate how this multi-layered construct really varies between learning processes. For example, Stahl and colleagues (2009) argued that measuring awareness of the *valence* of a US paired with a brand is sufficient to explain changes in brand attitudes, while

awareness of US *identity* offered no further explanatory value. From the perspective of the CTM, it would be better to assess awareness on multiple dimensions and acknowledge the inherent continuity that is present in the measures. Changes in brand meaning (new S–S associations) might well require a more detailed level of awareness at the level of US identity, while changes in brand affect (S–R associations) might not need awareness of US identity, but might still be accompanied by awareness of valence (though establishing the causality of that relation would remain a thorny empirical issue; Hütter et al. 2012). Changes in expectations (S–O associations) require the highest levels of awareness, characterized by awareness of the predictive relation (contingency) between the stimuli, their identities, and their valence.

CTM Proposition 2: Testing the Role of Efficiency in Brand Association Learning

Relative to the research on awareness, research on efficiency is scarcer, and the empirical findings are equivocal. Efficiency is difficult to study because different learning processes may rely on different aspects of working memory (Baddeley 1992, 2010). Consequently, different cognitive load manipulations may have divergent effects on the three learning processes. For example, direct affect transfer may not be affected by capacity constraints on episodic memory (e.g., concurrent rehearsal of a complex digit string) but may be impeded by capacity constraints on perceptual processing and attention (e.g., concurrent attention to numbers in a 2-back task), which undermine the perceptual encoding of relevant stimuli (Custers and Aarts 2011; Field and Moore 2005; Gawronski and Bodenhausen 2014). By contrast, predictive learning may be impeded by capacity constraints on episodic memory, which interfere with the storage of the causal relation between stimuli. When testing the relative efficiency of different learning

processes, future research should identify the aspect of working memory that is most likely to be involved to enable the selection of relevant cognitive load manipulations.

CTM Proposition 3: Testing the Role of Intentionality in Brand Association Learning

Researchers can use secondary task paradigms to investigate the intentionality of the operating processes driving the formation of the different CTM brand associations. In secondary task paradigms, participants complete a distracting, highly intentional task (e.g., monitoring for the occurrence of a particular event) while unintentionally engaging in the focal learning task. One famous and widely used example is the surveillance procedure introduced by Olson and Fazio (2001). In surveillance tasks, participants are instructed to monitor a stream of stimuli for the occurrence of a particular stimulus (e.g., a Pokémon character), while they unintentionally engage in a simultaneous ongoing conditioning procedure (e.g., some Pokémon characters are associated with positive images, while others are associated with negative images). Olson and Fazio (2001) showed that participants display EC effects in the absence of the intention to process the stimulus pairings, providing preliminary evidence for the role of intentionality in affect formation.

Comparison of the intentionality of the brand associations proposed by the CTM is, however, lacking. Researchers could potentially use secondary task paradigms to investigate the intentionality of the operating processes driving the formation of the different brand associations. For example, participants could be instructed to complete a distracting, highly intentional task (e.g., monitoring for the occurrence of a particular event) while unintentionally engaging in a focal learning task of brand expectation, brand meaning, or brand affect associations.

CTM Proposition 4: Testing the Role of Controllability in Brand Association Learning

Process dissociation procedures used to study the role of awareness in EC effects have recently been adapted to study the controllability of affect (Hütter and Sweldens 2018) and meaning (Heycke and Gawronski 2020; Kukken et al. 2020) transfer. Hütter and Sweldens (2018), for example, used an MPT model to test the simultaneous contribution of uncontrollable and controllable processes to EC effects. Two research teams extended this approach to study the controllability of affect and meaning transfer (Heycke and Gawronski 2020; Kukken et al. 2020). Kukken et al. (2020), for example, used MPT modelling to show the extent to which participants relied on affect versus meaning transfer when evaluating different CSs. These authors manipulated the valence of the US (positive or negative) and the relation between the CS and US (the CS either started or stopped the US) in the conditioning procedures of their studies, and then invited participants to complete a memory task. MPT modelling was then used to estimate the influence of affect versus meaning transfer on memory task performance.

Future research could make similar modifications to process dissociation procedures to compare the controllability of the processes driving the trinity of brand associations. For example, researchers could pair brands with stimuli that are more suited to the formation of brand expectations, brand meaning, or brand affect and compare the uncontrollable and controllable parameters in the MPT model across the pairings. Researchers could also use conditioning procedures with different procedural parameters (e.g., sequential versus simultaneous pairings, blocking procedures) to compare the controllability of the brand association trinity.

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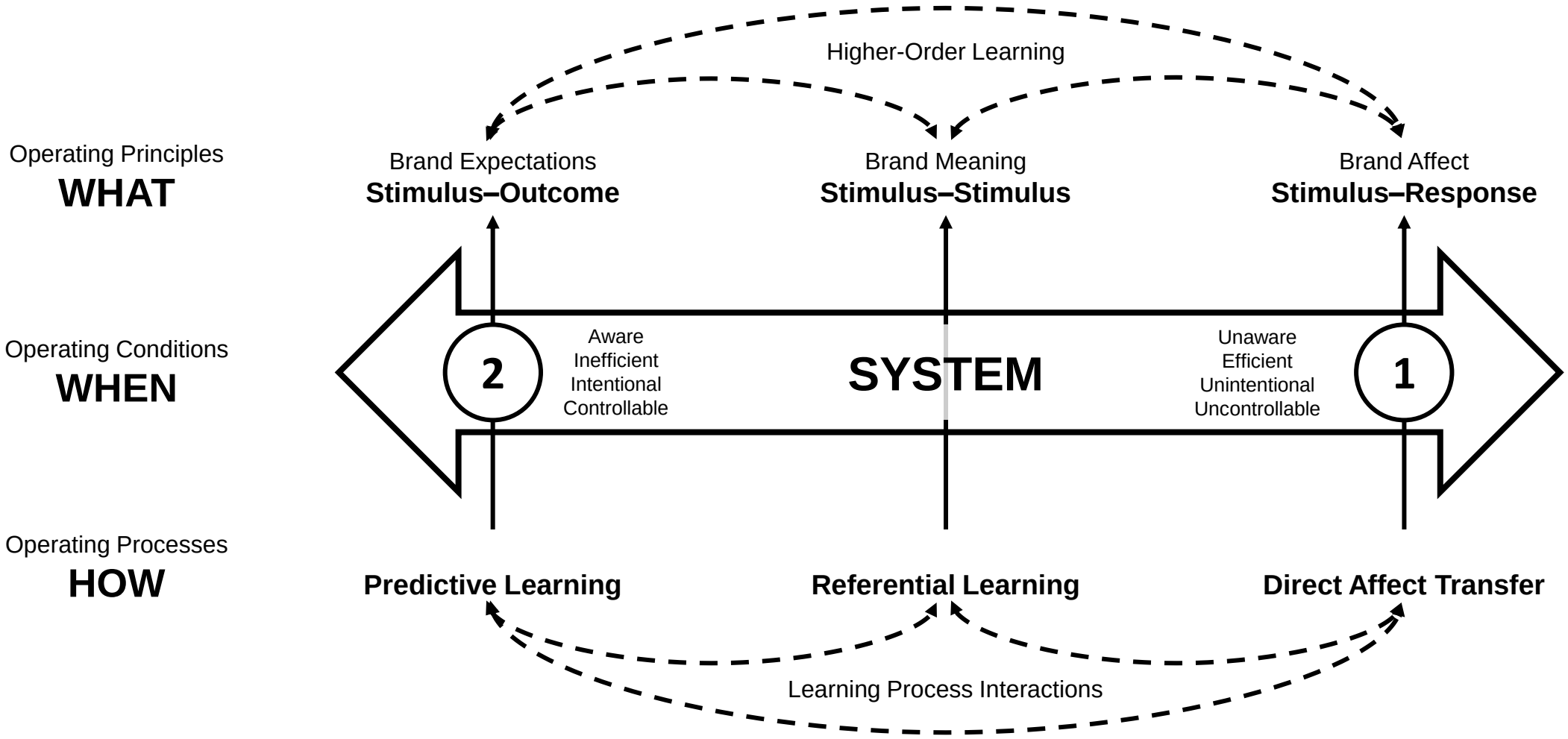
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