

STEVEN SWELDENS

# Evaluative Conditioning 2.0

Direct versus Associative Transfer of Affect to Brands



## Evaluative Conditioning 2.0:

Direct versus Associative Transfer of Affect to Brands



Evaluative Conditioning 2.0:  
Direct versus Associative Transfer of Affect to Brands

Evaluatieve conditionering 2.0:  
Directe versus associatieve transfer van gevoel naar merken

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## Chapter 1

# Introduction and Theory Development

### *Evaluative Conditioning*

Preferences and attitudes play a crucial role in human behavior as people tend to approach the stimuli (objects, other people, products, brands etc...) they like but they reject or avoid the stimuli that they dislike. One way to change preferences and attitudes is through conscious, propositional learning and reasoning. For example, people might start to like Bill Gates once they learn that he has taken an active role in eradicating malaria from this world. Analogously, people might start to like a brand of detergent once they learn that it cleans better than competitors.

Another way to change attitudes relies on a much more automatic and implicit process which is only dependent on the basic ability to detect co-occurrences of stimuli. Since the days of Pavlov (1927), humans and lower animals have been known to be susceptible to ‘conditioning’, changing their behavior towards stimuli (objects, other people, products, brands etc...) depending on the association histories with other stimuli.

Stimuli that co-occur with other stimuli that are already liked (positively valenced stimuli), tend to become more positively liked in the process. Stimuli that co-occur with other stimuli that are already disliked (negatively valenced stimuli) tend to become more negatively liked in the process. This effect has been described using various terms including affective conditioning, attitudinal conditioning, and the classical conditioning of attitudes. More recently, the label ‘evaluative conditioning’ has been proposed as an umbrella term to describe this type of learning (for reviews, see De Houwer, Baeyens, and Field 2005; De Houwer, Thomas, and Baeyens 2001; Walther, Nagengast, and Trasselli 2005). Because the majority of human preferences are learned rather



than innate, and evaluative conditioning is such a basic and universal learning process which is active since early childhood, it is likely to be explanatory for a big chunk of human behavior. For example, we know it influences preferences for words (Staats and Staats 1957), political slogans (Razran 1954), art (Levey and Martin 1975), brand names (Stuart et al. 1987), tastes for beverages (Zellner et al. 1983), products (Gorn 1982), and everyday objects (Hammerl and Grabitz 2000).

The area where evaluative conditioning probably has the largest commercial importance is the multi-billion dollar advertising industry. One of the most basic assumptions in advertising and brand building is that it is good to present brands in positive contexts. Such contexts can consist of a wide variety of positive affective stimuli, such as good-looking people, beautiful nature scenes, celebrity endorsers and so on. Advertisers typically assume that when their brand is perceived along with positive affective stimuli, somehow the brand will become more well-liked in the process. This assumption is warranted as is proven by a long history of consumer research on the attitudinal changes that occur as a consequence of pairing initially neutral stimuli such as new brands with valenced stimuli (e.g., celebrity endorsers, pleasant images, popular music) (Allen and Janiszewski 1989; Bierley, McSweeney, and Vannieuwkerk 1985; Gibson 2008; Gorn 1982; Kim, Allen, and Kardes 1996; Shimp, Stuart, and Engle 1991; Stuart, Shimp, and Engle 1987).

In this dissertation I will deal with the fundamental question of what is causing this change in feelings towards the brand. For a start, the evaluative conditioning procedure needs to be distinguished from the evaluative conditioning effect (De Houwer 2007, 2008). The evaluative conditioning procedure can be characterized as the repeated pairing of stimuli: a so-called *conditioned stimulus* (CS, usually an initially neutral stimulus such as a new brand) is repeatedly paired with one or more *unconditioned, affective stimuli* (USs, stimuli that already carry a certain positive or negative affective valence). The evaluative conditioning effect is the change of the conditioned stimulus' or brand's attitudinal valence in the direction of the valence of the unconditioned, affective stimuli it co-occurred with in the past.

### ***Direct versus Associative Affect Transfer***

It's important to realize that the evaluative conditioning effect can – in principle – be caused by multiple psychological processes (De Houwer et al. 2005; Gawronski and Bodenhausen 2006; Janiszewski and Warlop 1993). In an associative network conceptualization of memory, a stimulus (object, brand ...) can become more positively evaluated either because its own affective valence changes directly, or because its network of associations changes. I refer to the first possibility as direct affect transfer and to the second possibility as associative affect transfer.

*Associative affect transfer* can occur as a consequence of the formation of a new bond between the initially neutral conditioned stimulus (the 'CS', e.g., a new brand) and the unconditioned affective stimulus (the 'US', e.g., a positively valued image). After a sufficient number of pairings of the brand (CS) and the affective stimulus (US), a link between the two is formed in memory. Thereafter, when the brand (CS) is encountered solo it will activate the representation of the affective stimulus (US) in memory, which in turn automatically arouses the positive feelings inherent in the affective stimulus (UR) (see figure 1). Affect transfer is associative because the positive feelings experienced towards the brand are mediated by an increased activation in memory of the affective stimuli that were previously paired with the brand.

In the psychological evaluative conditioning literature, this type of learning has been referred to as S – S (stimulus – stimulus) learning or referential learning (Baeyens et al. 1992b; Baeyens, Hermans, and Eelen 1993; Walther et al. 2009). The referential learning model that was proposed to account for the existing findings on evaluative conditioning presumes this type of affect transfer (De Houwer et al. 2001). To the extent that a person becomes aware of the CS – US association, and endorses it (i.e., attaches a truth value to it), such associative affect transfer can even become propositional in nature (Gawronski and Bodenhausen 2006; Mitchell, De Houwer, and Lovibond 2009).

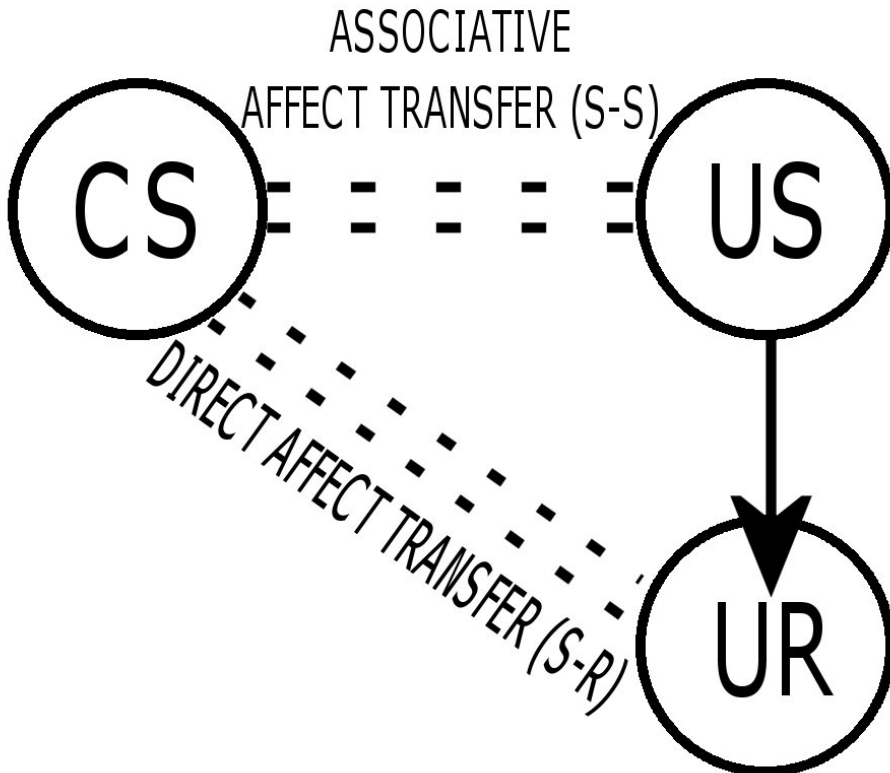
**FIGURE 1**

REPEATED CS-US PAIRINGS CAN RESULT IN ASSOCIATIVE AFFECT TRANSFER (MEDIATED BY CS-US ASSOCIATIONS IN MEMORY) AND DIRECT AFFECT TRANSFER (CS INTRINSICALLY ACQUIRES AFFECT)

CS: CONDITIONED STIMULUS (e.g., BRAND)

US: UNCONDITIONED AFFECTIVE STIMULUS (e.g., CELEBRITY)

UR: UNCONDITIONED RESPONSE (e.g., POSITIVE AFFECT)



The second possibility concerns a *direct transfer of affect* to the new brand (CS). In this case, the brand (CS) would intrinsically acquire the positive affect that was previously generated by the affective stimulus (US), thus without the necessity for the establishment of CS-US associations in memory. Somehow the repeated presentations of the brand with affective stimuli should cause a real ‘rubbing off’ of affect from the affective stimulus (US) to the brand (CS). In this case, the brand intrinsically acquires the unconditioned, affective response (UR) that was generated by the affective stimuli. In the psychological conditioning literature, this type of learning is typified as S – R (stimulus – response) learning (Rescorla 1974; Wickens 1959) and more specifically in the evaluative conditioning literature this possibility has been referred to as intrinsic (as opposed to referential) learning of attitudes (De Houwer et al. 2001). Although several authors explicitly or implicitly assumed that evaluative conditioning leads to a direct transfer of affect to brands or CSs (e.g., Gorn 1982; Staats and Staats 1958; Stuart et al. 1987; Till, Stanley, and Priluck 2008), the empirical evidence thus far has not been on their side. Especially the finding that a post-conditioning change in the valence of the affective stimulus (US) results in an analogous change in attitudes towards the CS – the so-called US-revaluation effect (Baeyens et al. 1992b; Walther et al. 2009) – is incompatible with a direct transfer of affect point of view. The US-revaluation studies led to the (in my view premature) conclusion that evaluative conditioning always occurs through associative affect transfer, relying always on S – S (CS–US) associations (De Houwer et al. 2001; Mitchell et al. 2009; Walther et al. 2009).

I disagree with this conclusion and – based on recent findings regarding the diffuse nature of affect (Ruys and Stapel 2008; Stapel, Koomen, and Ruys 2002) – I propose that it is in fact possible to transfer affect directly to brands (CSs). A demonstration of direct affect transfer would be a fundamental contribution to the literature on attitude formation as up until now, there is no scientific evidence of changes in attitudes that are not associative or propositional in nature. Changes in attitudes are currently believed to be caused either by the updating of the association network of the target stimulus (e.g., a

brand or CS) or by changes in the set of propositions considered to apply to the target stimulus (Gawronski and Bodenhausen 2006). Direct affect transfer would be a substantially different process whereby the affective value of the CS or brand changes directly and automatically, and is independent of cognitive mediation by associations or beliefs.

In the next part of this chapter, I will present a detailed theoretical framework that allows predicting a priori when evaluative conditioning will lead to direct affect transfer, to associative affect transfer or to no transfer of affect at all. The implication is that commercials using the wrong type of brand – positive stimuli pairings, might be ineffective in changing consumers' attitudes towards the brand. This possibility is explored in chapter 2.

In the remainder of this dissertation, I present three types of manipulations that serve a dual purpose: on the one hand they allow us to distinguish direct from associative transfer of affect and on the other hand they demonstrate why this difference matters for advertisers and for understanding consumer behavior. The paucity of research on different sources of evaluative conditioning effects is particularly troubling given its potential to exert an influence in advertising environments. In chapters 3 to 5, I discuss the three ways in which direct affect transfer can be distinguished from associative affect transfer.

In chapter 3, I discuss the so-called '*US-revaluation effect*' or the effect that a post-conditioning change in attitudes towards the affective stimulus (US) has on attitudes towards the brand (CS). This applies to the practical situation of what happens to brands when their endorsers (e.g., a celebrity) fall from grace. If affect transfer is associative, it depends on the association of the brand (CS) and the celebrity (US) in memory. Therefore, when the affective quality of the endorser (US) deteriorates, this will have a negative effect on the attitude towards the brand. If however affect was transferred directly to the brand, it is independent of associations with the celebrity. Therefore, if later the celebrity loses value, the brand attitudes should remain unharmed.

In chapter 4, I discuss the susceptibility of conditioned brand attitudes to *interference from subsequent learning*. If affect transfer is associative, it

depends on the successful establishment of memory associations between brands (CS) and affective stimuli. It follows that when there is an interference with the establishment of the memory traces, this can have a deleterious effect on the brand attitudes. If affect transfer is direct, there is no need for the establishment of CS – US memory associations, hence no possibility for interference. Such interference is very common when consumers engage in new learning after conditioning (the brand – affective stimulus pairings). This has consequences for how well commercials can change consumer attitudes in cluttered advertising environments.

In chapter 5, I investigate *consumers' ability to correct for the effect* that the conditioning procedure has on their brand attitudes. When affect transfer is associative, the formation of CS-US associations in memory implies that the source of the influence on brand attitudes (the co-occurrence with US) is more readily identifiable than when affect transfer is direct. Direct affect transfer is independent of the establishment of memory associations of the US with the CS. Because the source of the influence attempt (the co-occurrence with the US) is more readily identifiable when affect transfer is associative, this implies that consumers will be better able to correct for the influence on their brand (CS) attitudes than when affect transfer is direct.

In every case it appears that there are distinct advantages for marketers to transfer affect directly, rather than associatively (indirectly) to their brands. In chapter 6 I summarize these findings and their implications for consumer behavior. I also delineate the broader contribution to the psychology of associative learning and to existing theories of attitude formation.

## ***Predicting Direct versus Associative Affect Transfer***

### **Simultaneous Presentation is Necessary for Direct Affect Transfer**

*Simultaneous versus Sequential Presentation in the Literature.* The presentation schedule of brand (CS) and affective stimulus (US) has been the subject of research attention before. Research in classical conditioning provided evidence that a *sequential conditioning* procedure (e.g., the CS is presented first, followed by a time gap, followed by the US) is more effective than a *simultaneous conditioning* procedure (the CS and US are presented simultaneously) (Bitterman 1964; Rescorla and Wagner 1972; Smith, Coleman, and Gormezano 1969). This led early consumer researchers to hypothesize that brands (CSs) should be presented before affective stimuli (USs) to achieve optimal conditioning effects (McSweeney and Bierley 1984; Stuart et al. 1987), a position still echoed in many textbooks today (e.g., Hanna and Wozniak 2001 p. 142; Hoyer and MacInnis 2001 p. 162; Schiffman and Kanuk 2007 p. 202; Solomon, Bamossy, and Askegaard 2002 p. 72).

However, this idea needs updating as evaluative conditioning differs crucially from classical (autonomic, Pavlovian) conditioning in that the CS does not need to develop a predictive relation with the US. In classical conditioning, the CS functions as a cue to expect the actual occurrence of the US (e.g., the tone – shock paradigm, Pavlov 1927). In referential evaluative conditioning (associative affect transfer), it suffices to establish a referential relation in which the CS consciously or unconsciously reminds one of the US, without the accompanying expectancy of the US's actual occurrence (Baeyens et al. 1993; De Houwer et al. 2001). For example, the repeated presentations of Pepsi (CS) with Britney Spears (US) might consciously or unconsciously remind consumers of Britney Spears when they see the Pepsi logo in the future (referential relation), but they do not cause them to expect Britney to 'happen' (e.g., walk in the room) as in a predictive relation. Because the CS does not need to predict the occurrence of the US, sequential presentation is not

necessarily superior to simultaneous presentation. In evaluative conditioning studies, sequential (e.g., Baeyens et al. 1992a; Baeyens et al. 1992b; Baeyens et al. 1993; Field and Moore 2005; Levey and Martin 1975; Walther 2002; Walther and Nagengast 2006) as well as simultaneous (e.g., Gibson 2008; Olson and Fazio 2001, 2002; Pleyers et al. 2007; Walther et al. 2009; Zellner et al. 1983) presentation schedules have been successfully used and direct comparisons of the effect sizes they generate showed no differences (Lascelles and Davey 2006). Some well-known experiments in consumer research used a mixed procedure. For example, the ‘forward conditioning’ manipulations in Stuart et al.’s (1987) first three experiments involved first sequential, followed by simultaneous presentations of brands and affective stimuli.

*Why Simultaneous Presentations Do Matter.* I propose that simultaneous versus sequential presentation of brands (CSs) and affective stimuli (USs) is a crucial determinant of direct versus associative transfer of affect during an evaluative conditioning procedure. First, simultaneous conditioning procedures should allow for associative affect transfer (S – S or referential learning) as well as direct affect transfer (S – R or intrinsic learning) to the CS. Associative affect transfer can occur because the close spatio-temporal contiguity of brand (CS) and affective stimulus (US) causes the two to become connected in memory (De Houwer et al. 2001). Direct affect transfer can occur because simultaneous presentation of the CS and US allows the affect associated with the US to attach to the CS. The notion of diffuse affect is crucial in this respect, and goes back to the proposition that affect is faster than cognition (Zajonc 1980). Valenced stimuli generate a fast, non-specific affective response that is not tied to an attitude object (Ferguson 2007; Murphy, Monahan, and Zajonc 1995; Murphy and Zajonc 1993). The affective response is initially (during the first few milliseconds of perception) still uninterpreted, which means that the source of the feeling has not yet been cognitively identified. This fast uninterpreted affective response is called ‘diffuse affect’ and is hypothesized to be able to behave much like a liquid. Diffuse affect can “disperse, scatter, permeate, combine, fuse, blend, spill over, and become attached to totally



unrelated stimuli” (Murphy et al. 1995, 590). However, diffuse affect is limited to the earliest stage of the perception (Ruys and Stapel 2008; Stapel, Koomen, and Ruys 2002). Therefore it is crucial that the brand (CS) is present at the moment the affect is generated. Only then is the affect generated by the affective stimulus (US) still diffuse. This creates an opportunity for *affective confusion*: positive affect is already experienced, but there are two, as of yet uninterpreted, stimuli present that could have generated it. Because cognitive appraisal has not yet followed, the affective system is yet unsure of the exact source of the positive feeling. Therefore, I propose that only with simultaneous presentations, new affect can become directly attached to the brand (CS).

Second, sequential conditioning procedures should allow for associative (S – S, referential) but not direct (S – R, intrinsic) transfer of affect. Associative learning is promoted as long as there remains a close spatio-temporal contiguity between the CS and the US, causing them to become linked in memory (see the referential learning model in De Houwer et al. 2001). However, sequential presentation of the brand (CS) and affective stimulus (US) does not allow direct transfer of affect because the diffuse affective response to the US is not available during the presentation of the CS. Diffuse affective responses to the US should best attach to the CS during the perceptual (initial) stage of US processing. In sequential conditioning, the only stimulus present during the brief period in which diffuse affect can bind to stimuli is the affective stimulus (US) itself. Thus, the diffuse affect will remain tied exclusively to the US and no direct connection will be formed between the affect and the CS.

### **Homogeneous versus Heterogeneous CS–US Pairings**

*Unconditioned Stimulus Heterogeneity in the Literature.* US heterogeneity refers to the consistency of the affective stimulus (US) across repeated CS-US pairings. If during the conditioning procedure a brand (CS) is always paired with the same affective stimulus (US), I refer to this as a *homogeneous pairing procedure*. If however a brand (CS) is always paired with different affective

stimuli (USs) in the different trials of a conditioning procedure, I refer to this as a *heterogeneous pairings procedure*. Although I have found no recommendations on US heterogeneity in the literature, the majority of associative learning procedures use a constant (i.e., homogeneous) US (Baeyens et al. 1996; Baeyens et al. 1988; Baeyens et al. 1992a; Baeyens, Eelen, and Vandenberg 1990; Baeyens et al. 1992b; Baeyens et al. 1998; Baeyens et al. 1993; Dawson et al. 2007; De Houwer et al. 2000; Field and Moore 2005; Gorn 1982; Kim, Lim, and Bhargava 1998; Levey and Martin 1975; Pleyers et al. 2007; Walther et al. 2009). The use of a constant US is consistent with the S – S learning interpretation (associative affect transfer) of learning that has been dominant over the past 50 years.

However there are also numerous exceptions to the use of homogeneous US presentations such as the work on meaning conditioning (Staats and Staats 1958, 1959; Staats, Staats, and Biggs 1958; Staats and Staats 1957) and other work on evaluative conditioning (Gibson 2008; Olson and Fazio 2001, 2002, 2006; Shimp et al. 1991; Stuart et al. 1987). The experiments by Olson and Fazio (2001, 2002, 2006) and Gibson (2008) use a purely heterogeneous procedure in the sense that a positively conditioned stimulus is paired with multiple positive USs (words such as ‘awesome’ or images such as puppies) and a negatively conditioned stimulus is paired with multiple negative USs (words such as ‘terrible’ or images such as cockroaches). I refer to it as ‘purely heterogeneous’ because a CS is paired with every US only once. The experiments on meaning conditioning and the work by Olson, Fazio and Gibson used simultaneous presentations of CS and US. Other experiments use manipulations that cannot be classified as purely homogeneous or purely heterogeneous (Shimp et al. 1991; Stuart et al. 1987). For example, the experiments reported by Shimp et al. (1991) employed 20 sequential CS-US presentations involving a single CS (a cola brand) with four different USs (water scenes). Thus each of the four US water scenes (heterogeneous) followed the CS brand five times (homogeneous).

I found no example in the literature of experiments using a strictly sequential CS-US presentation procedure with purely heterogeneous US

pairings. Purely heterogeneous US pairings only occur in the literature when CS and USs were presented simultaneously. This is worth noting because according to the theory I propose, a sequential heterogeneous pairings procedure doesn't facilitate affect transfer of any kind (direct nor associative).

*Heterogeneous CS-US Pairings Inhibit Associative Affect Transfer.*

Heterogeneous and homogeneous presentation schedules may promote different types of learning. The more often a brand (CS) occurs with a certain affective stimulus (US) as in *homogeneous* pairing, the more likely it becomes that in the future the brand (CS) will activate the representation of the affective stimulus (US) in memory. This might be the most common assumption in associative learning models and this US activation in memory upon post-conditioning perception of the CS is a critical component of associative affect transfer. Homogeneous presentation can also allow direct affect transfer, as long as brand and affective stimulus are presented simultaneously. Hence, homogeneous CS–US pairings can allow both types of affect transfer: the same US (supporting associative affect transfer) generates the same affective response (supporting direct affect transfer if CS and US are simultaneously presented) during each learning trial.

When every presentation of a brand (CS) occurs with a different affective stimulus (US) as in *heterogeneous* US conditioning, associative affect transfer should be impaired. Learning the relationship between CS and US should become more difficult if the US is different on each pairing, even if the valence of the US is the same. Therefore it is much less likely that after a heterogeneous conditioning procedure, the CS will generate sufficient activation of a specific US in memory for the accompanying affect to be experienced. Direct affect transfer should not be impaired by heterogeneous US presentations because the diffuse affect required for direct affect transfer is faster than the cognitive identification of the US anyway. As long as the brand (CS) and affective stimuli (USs) are presented simultaneously, and the different affective stimuli generate the same (e.g., positive) kind of affective

response, the diffuse affect can ‘rub off’ from the affective stimuli (USs) to the brand (CS).

### **Summary of the Theoretical Framework**

The discussion of the literature so far treated CS-US scheduling (sequential vs. simultaneous) and US heterogeneity (homogeneous vs. heterogeneous) as two independent events. First, sequential presentation of the CS and US should encourage associative affect transfer, but not direct affect transfer. Second, simultaneous presentation of the CS and US should encourage associative and direct affect transfer. Third, homogeneous US presentation should encourage associative and direct affect transfer. Fourth, heterogeneous US presentation should encourage direct, but not associative affect transfer. Summarized, simultaneous presentation is necessary for direct affect transfer and homogeneous pairings are necessary for associative affect transfer.

In reality, both of these factors interact in an evaluative conditioning procedure. As such, there are opportunities for CS-US scheduling and US heterogeneity to combine in ways that do or do not promote each type of learning. Combining the necessary conditions allows us to anticipate the learning process that underlies evaluative conditioning for each combination of CS-US scheduling and US heterogeneity. A summary is also presented in table 1.

**TABLE 1**

ASSOCIATIVE VERSUS DIRECT AFFECT TRANSFER AS A FUNCTION OF THE CONDITIONING PROCEDURE

	Sequential conditioning		Simultaneous conditioning	
	Homogeneous US	Heterogeneous US	Homogeneous US	Heterogeneous US
Associative	OK	-	OK	-
Direct	-	-	OK	OK
Result	Associative	-	Both possible	Direct

*Sequential CS-US Scheduling and Homogeneous US.* The sequential presentation of brand (CS) and affective stimulus (US) only allows for associative affect transfer (as direct affect transfer requires simultaneous presentation). The homogeneous CS-US pairings are perfectly conducive for associative affect transfer, resulting in a firm CS-US association in memory. Hence, affect transfer should be strictly *associative* in this condition. That homogeneous pairings could also allow for direct transfer does not matter in this condition, because direct affect transfer is not possible with sequential presentation.

*Sequential CS-US Scheduling and Heterogeneous US.* The sequential presentation of brand (CS) and affective stimulus (US) only allows for associative affect transfer. However, the heterogeneous CS-US pairings are not conducive of associative affect transfer. Hence, a sequential heterogeneous conditioning procedure will result in *little or no affect transfer*. This is consistent with the observation that there has been no report in the literature of a successful experiment employing a pure sequential heterogeneous

conditioning procedure. Evidently, an observation of missing procedures in the literature is no proof. Therefore, this will be directly tested in chapter 2.

*Simultaneous CS-US Scheduling and Homogeneous US.* This combination of procedural parameters theoretically allows for both types of affect transfer. Simultaneous presentations facilitate direct as well as associative affect transfer. Homogeneous US pairings also make direct as well as associative affect transfer possible. When both types of affect transfer are possible, I will treat it as an *empirical question* (to be resolved in chapter 3) which one dominates the affective response.

*Simultaneous CS-US Scheduling and Heterogeneous US.* Simultaneous presentation of brand (CS) and affective stimulus (US) allows for associative as well as direct affect transfer. The heterogeneous CS-US pairings are not conducive of associative affect transfer, because not a single CS-US association is reinforced by repetition in memory. Therefore in this procedure, affect transfer should be *direct* in nature.

### ***A Note on Contingency Awareness***

A significant amount of research attention has been devoted to the question of whether evaluative conditioning effects can occur without awareness of the relation between brand (CS) and affective stimulus (US). This question is deemed of significant importance because a demonstration of evaluative conditioning without contingency awareness would be a key difference with classical (autonomic, Pavlovian) conditioning (Lovibond and Shanks 2002) and because it would provide evidence for associative attitude formation that is not propositional in nature (Gawronski and Bodenhausen 2006; Lovibond and Shanks 2002; Mitchell et al. 2009). In fact, the necessity for contingency awareness has been the most heavily contested property of evaluative conditioning and has been studied in at least 50 articles with widely diverging conclusions. Early studies claimed that evaluative conditioning occurred without the need for awareness of the CS-US contingencies (Baeyens et al.

1988; Baeyens et al. 1990; Bierley et al. 1985; Stuart et al. 1987) but these findings were challenged on methodological grounds (Field 2000). More recent findings are often contradictory with one another with some studies showing that evaluative conditioning only occurs when participants are unaware of the CS-US relationship (Fulcher and Hammerl 2001; Hammerl and Fulcher 2005; Walther and Nagengast 2006), whereas others found no relation between awareness and the evaluative conditioning effect (Gibson 2008; Olson and Fazio 2001, 2002, 2006) and still others claim that the evaluative conditioning effect occurs only when participants are aware of the CS-US contingency (Dawson et al. 2007; Pleyers et al. 2007; Walther and Grigoriadis 2004).

Although the goal of this dissertation is not to sort out all conflicting findings, I do think that my updated framework aides in interpreting past research findings and even in answering the basic question that started the entire debate. The answer to the question whether evaluative conditioning can occur without awareness of the CS-US contingency should primarily be that it depends on the underlying process. When affect transfer is *direct* in nature, then yes, it should be possible to observe evaluative conditioning effects without awareness of CS-US contingencies because this type of affect transfer does not depend on the formation of CS-US associations in memory. The type of conditioning procedure that should most clearly lead to direct affect transfer involves simultaneous presentations of a CS with heterogeneous USs. It is particularly revealing that none of the articles that used such a conditioning procedure, reports a significant relation between contingency awareness and the evaluative conditioning effect (Gibson 2008; Olson and Fazio 2001, 2002, 2006). When affect transfer is *associative*, the picture is more complex. Associative affect transfer is promoted by repeated pairings of a CS with a single US and depends on the establishment of a link between the CS and US in memory. The contingency awareness issue then boils down to the question of whether this link needs to be consciously accessible for the evaluative conditioning effect to manifest itself. If this would be the case, it can be argued that evaluative conditioning through the associative route results in propositional instead of associative attitudes (Gawronski and Bodenhausen

2006; Mitchell et al. 2009). The problem is that – at least with supraliminal conditioning procedures – the development of the evaluative conditioning effect through associative affect transfer is naturally correlated with the development of contingency awareness. It can be expected that as contingency awareness measures become increasingly sensitive, a person would be classified as contingency aware as soon as the CS-US association has been formed in memory – even if that person would not need to consciously access this relation for the evaluative conditioning effect to manifest itself. Such sensitive measures might not only reflect the conscious knowledge acquired by participants (or used in their attitude generation), but also their unconscious, implicitly learned knowledge about the CS–US contingencies. This is known as the problem of contamination (De Houwer 2001). Therefore such sensitive measures (e.g., the ones reported by Pleyers et al. 2007) might lead to the exaggerated conclusion that all associative affect transfer is propositional in nature, i.e., driven by consciously accessible brand – affective stimulus relations to which a person has attached a truth value (Mitchell et al. 2009).

Methodologically, contingency awareness measures remain problematic for a variety of reasons. First, it is not at all clear which measure should be used and at least three types of measures (so-called ‘weak’, ‘strong’ and ‘recognition’ measures) have been proposed and used before, each with their own strengths and weaknesses (Field and Moore 2005; Lascelles and Davey 2006). Especially with heterogeneous CS-US pairings, it is not obvious what relevant knowledge a CS-US contingency awareness test should tap into.

Second, there’s the problem of sensitivity. The ideal measure should be sensitive enough to pick up all relevant knowledge consciously accessible for and used by the participant. Otherwise the importance of contingency awareness is understated. However, when too sensitive, the measure starts tapping into the unconscious, implicit knowledge and overstates the importance of contingency awareness (De Houwer 2001; Shanks and St John 1994). Ideally, the contingency awareness measure should be equally sensitive as the attitude measure that is used to assess the evaluative conditioning effect.



It is not at all clear however how two measures which are supposed to assess different constructs can be ‘equally sensitive’.

Third, there’s the problem of using affect as information (Schwarz 2004). A participant who has been successfully conditioned, and as a result feels for example more positive towards a certain brand (CS), is able to consciously or unconsciously make use of his or her attitude towards the CS to determine retrospectively with which kind of affective stimulus (US) it was paired in the past. The affect as information heuristic therefore artificially inflates participants’ contingency awareness scores.

For these reasons, I have chosen not to rely too much on contingency awareness measures to distinguish between the processes I propose, but rather use experimental manipulations that leave much less room for ambiguity. Nevertheless, recognizing the prominent position contingency awareness has in the evaluative conditioning literature, I will use a so-called ‘strong’ measure in chapter 3 to further illuminate the differences between direct and associative affect transfer.

## Chapter 2

# Direct, Associative or... No Affect Transfer at All

### *Introduction*

CS-US scheduling and US heterogeneity combine in ways that do or do not promote each type of learning (see table 1 in chapter 1). For simultaneous CS-US scheduling and a homogeneous US, associative affect transfer should be possible (due to the homogeneous US) and direct affect transfer should be possible (due to the simultaneous presentations). For simultaneous CS-US scheduling and a heterogeneous US, direct affect transfer should be possible (due to the simultaneous presentation). For sequential CS-US scheduling and a homogeneous US, associative affect transfer should be possible (due to the homogeneous US). For sequential CS-US scheduling and a heterogeneous US, associative as well as direct affect transfer should be inhibited. Associative affect transfer is inhibited due to the heterogeneous USs and direct affect transfer is inhibited due to the sequential presentation.

The evaluative conditioning effects reported in the literature are consistent with the predictions of table 1. First, there is evidence for evaluative conditioning with a homogenous US using sequential (Baeyens et al. 1988, 1992a, 1992b, 1993; Field and Moore 2005; Levey and Martin 1975; Shimp et al. 1991; Walther 2002; Walther and Nagengast 2006) and simultaneous (Pleyers et al. 2007; Zellner et al. 1983) presentation schedules. Second, there is evidence for evaluative conditioning with heterogeneous USs using simultaneous presentation schedules (Gibson 2008; Olson and Fazio 2001, 2002, 2006; Stuart et al. 1987; C. Staats and A. Staats 1957; Staats et al. 1958), but not sequential presentation schedules. Despite this evidence, it is difficult to anticipate (1) the relative size of associative affect transfer relative to direct affect affectg transfer and (2) the manner in which associative and direct affect transfer might combine or conflict when both are possible. For these reasons, I

anticipate that evaluative conditioning will be weaker in the sequential CS-US scheduling with a heterogeneous US condition than in the remaining three conditions. Or, more formally:

**H1:** Evaluative conditioning should be weaker in a sequential heterogeneous conditioning procedure than in a sequential homogeneous US or any (homogeneous or heterogeneous) simultaneous conditioning procedure.

In experiment 1, I manipulated CS-US scheduling (sequential vs. simultaneous) and the heterogeneity of the USs (homogeneous vs. heterogeneous) to test hypothesis 1. The learning context involved the presentation of unfamiliar beer brands (CSs) and images of people that could consume the beer (USs).

## *Method*

### **Participants and Design**

Fifty-seven undergraduate business students (35 female, 22 male) at the University of Florida participated in the experiment in exchange for extra credit. The experiment employed a two (CS-US scheduling: sequential, simultaneous) x two (US heterogeneity: homogeneous, heterogeneous) x two (CS valence: neutrally conditioned, positively conditioned) mixed design with the first two factors manipulated between-subjects and the latter factor manipulated within-subjects.

### **Conditioned Stimuli**

Belgian beers were chosen to serve as CSs. To avoid contamination by existing attitudes towards brand names, labels, bottles, etc., I ran a pretest using 74 participants from the same participant population. The pretest measured participant attitudes towards 43 Belgian beers. The eight beers with the most

neutral (i.e., closest to the midpoint of the scale) and most normally distributed attitudes were selected to serve as CSs.

### **Unconditioned Stimuli**

Eight positively valenced and eight neutrally valenced images from the International Affective Picture System (IAPS: Lang, Bradley, and Cuthbert 2005), were selected. Positive images depicted adults having fun in various ways, such as cuddling, waterskiing, or sailing. Neutral images depicted adults with neutral expressions and engaged in such everyday activities as reading a newspaper on a bench or napping on the subway. Pictures were selected that had relatively small standard deviations in their affective ratings. On the IAPS's nine-point affective rating scale, all neutral images scored between 4.5 and 5.5 for both male and female raters, whereas the positive images all scored above 7.0 for both genders. The eight positive IAPS pictures selected were numbers 4599, 4641, 8080, 8185, 8200, 8210, 8461 and 8540. The eight neutral IAPS pictures selected were numbers 2102, 2190, 2200, 2215, 2397, 2440, 2493 and 2570. Examples of the conditioned and unconditioned stimuli are presented in the appendix.

### **Procedure**

The experiment was administered on computers in a behavioral lab. The cover story explained that the study was about assessing college students' spontaneous attitudes towards Belgian beers that could potentially enter the US market. Participants were told that it was unlikely that they had ever seen these brands before, so a slideshow would be used to familiarize them with the brands. Participants were also told that the slideshow included pictures of people engaged in various activities in an effort to make it more interesting.

*Learning Phase.* In the first part of the experiment, four of the eight CS beers were randomly assigned to be paired with positive images (i.e., the four

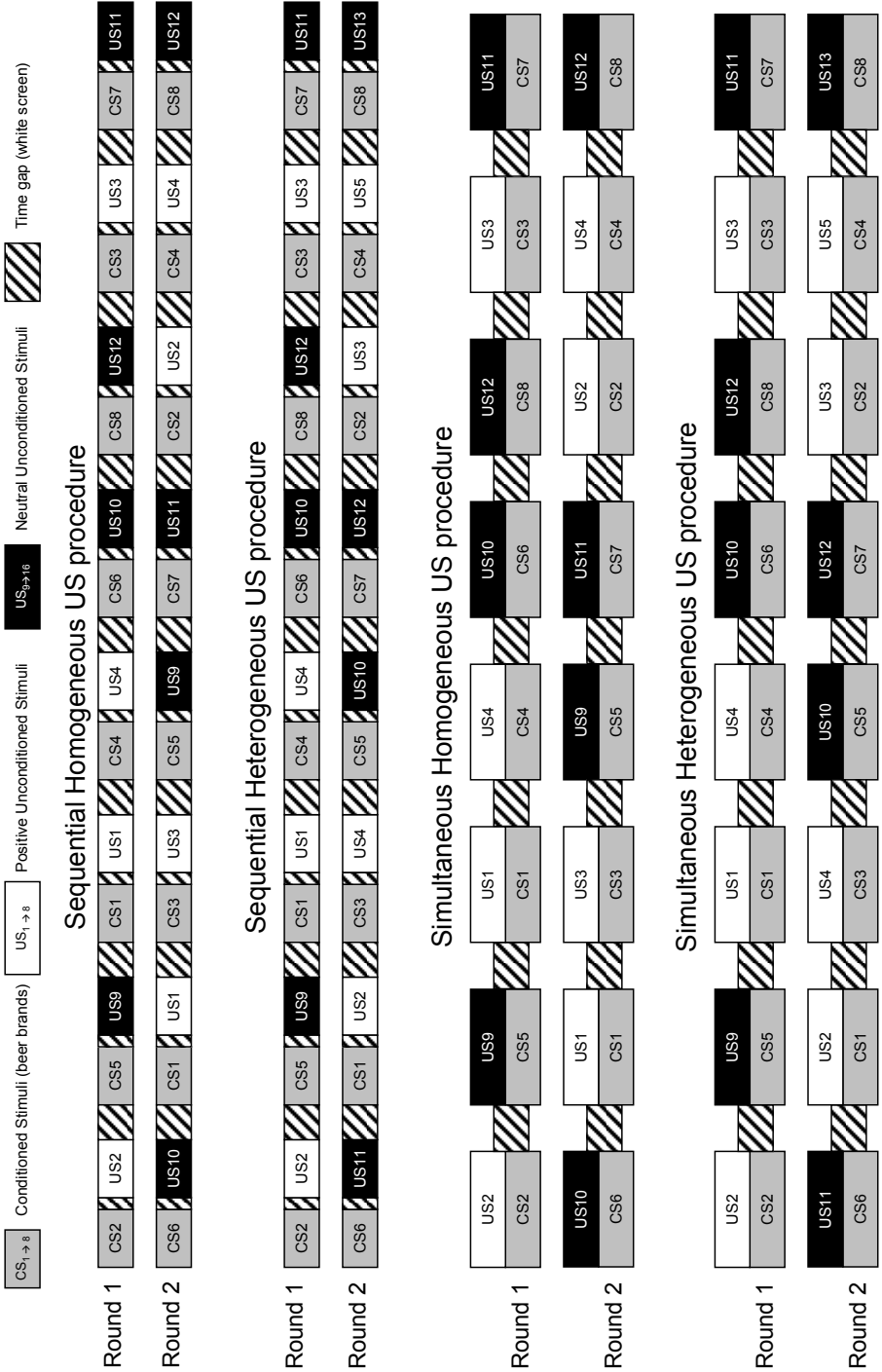
positively conditioned CSs). The remaining four beers were paired with neutral images (i.e., the four neutrally conditioned CSs). The assignment of CSs to a US valence condition was random by participant.

The learning procedure consisted of 64 CS-US pairings. For participants in the *homogeneous US* conditions, the four positive and four neutral USs were randomly selected and matched with CSs. Participants saw one set of four CS – US positive pairings and four CS – US neutral pairings in block one. This same set of eight pairings was presented in the remaining seven blocks. For participants in the *heterogeneous US* condition, each “positive” CS was paired with one of the eight positive US images and each “neutral” CS was paired with one of the eight neutral US images. Over the course of the eight blocks of the slideshow, every positive CS was paired once with each of the eight positive US images and each neutral CS was paired once with each of the eight neutral US images. The order of presentation of CS–US combinations within every round was randomized, but a round had to be completed (i.e., every CS–US combination must have occurred) before the next round of pairings would begin.

In the *simultaneous conditioning* procedures, the picture of the US (which covered the entire screen) was shown with the CS superimposed on the bottom, center of the US for three seconds. Next, there was a two second intertrial interval consisting of a white screen and an animated Microsoft Windows® icon indicating that image files were being downloaded from the network. In the *sequential conditioning* procedure, the CS was presented in the center of the screen for 1.5s, followed by an interstimulus interval of 0.5s (blank screen), followed by the US presented for 1.5s. The intertrail interval was 1.5s, showing the same Windows® icon. Note that this procedure guarantees equal slideshow duration as well as equal total presentation duration of CS plus US across conditions. Two illustrative conditioning rounds are presented for each of the four procedures in figure 2.

FIGURE 2

EXAMPLES OF 2 ROUNDS OF CONDITIONING IN EACH OF THE FOUR PROCEDURES IN EXPERIMENT 1



*Attitude Assessment.* After the learning phase was complete, participants' attitudes towards all CSs were assessed. For every CS, participants were asked to provide their global attitude towards the beer on a nine-point scale (scale endpoints "extremely negative", "extremely positive"). Next, participants indicated how appealing they found the beer (scale endpoints "totally unappealing", "very appealing") and their likelihood of buying the beer if it were available at a reasonable price (scale endpoints "extremely unlikely", "extremely likely") using seven-point scales.

Finally, I included a question to detect participants who had not taken the task seriously. This question asked participants to indicate all factors that had significantly contributed to their attitude ratings. One of the eight answer categories was "Random: You rated most beers by just picking a rating randomly". Other answer categories included "affected by the brand names", "feelings of familiarity", or "trusted my gut feelings".

### ***Results***

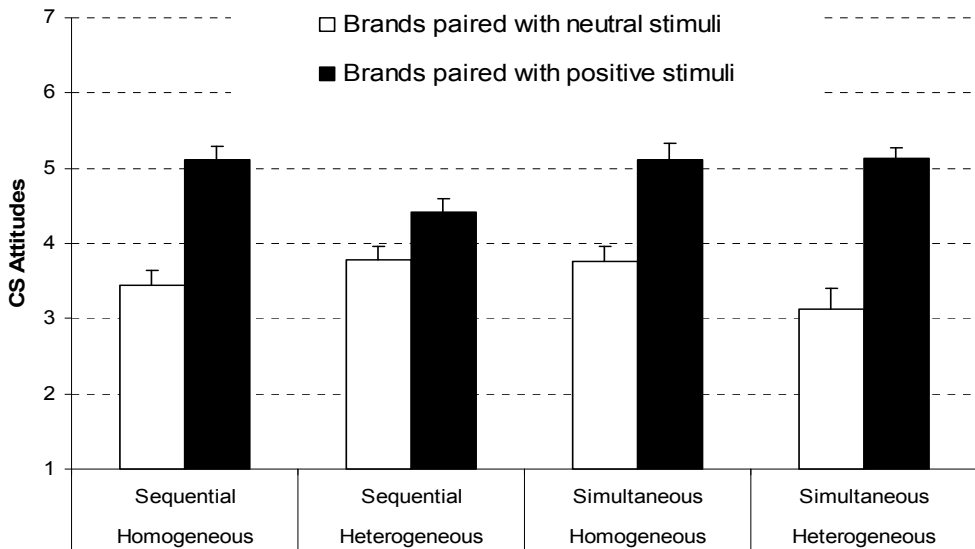
Four participants indicated they had provided their affective ratings in a random fashion and were removed from the data, leaving 53 participants for analysis (32 female, 21 male). The attitudes towards the beer brands (CSs) in this and all subsequent experiments were computed by transforming the global attitude ratings from a nine-point to a seven-point scale and averaging them with the appealingness ratings. The likelihood to buy ratings were left out of consideration because they were influenced more than the other two ratings by idiosyncratic factors such as participants' basic tendencies to buy exotic beers. Cronbach's alpha analyses on the eight CSs' ratings generally confirmed that the most reliable index consisted of these two, rather than all three measures.

The attitudes towards the beers (CSs) were analyzed with a full-factorial repeated measures ANOVA with the CS-US scheduling and US heterogeneity as between-subjects factors and CS valence as within-subject factor. The means and standard errors are represented in figure 3.

There was a main effect of CS valence indicating overall successful evaluative conditioning ( $F(1, 49) = 75.58, p < .001$ ). The predicted three-way interaction between CS-US scheduling, US heterogeneity, and CS valence was significant ( $F(1, 49) = 6.71, p = .01$ ). Follow-up two-way interaction tests showed a significant interaction between US heterogeneity and CS valence in the sequential CS-US scheduling condition ( $M_{\text{Homogeneous Neutral}} = 3.44, M_{\text{Homogeneous Positive}} = 5.12, M_{\text{Difference}} = 1.68; M_{\text{Heterogeneous Neutral}} = 3.79, M_{\text{Heterogeneous Positive}} = 4.42, M_{\text{Difference}} = 0.63$ ), ( $F(1, 49) = 4.99, p = .03$ ). In the simultaneous CS-US scheduling condition, I found only a main effect of US valence ( $F(1, 49) = 54.10, p < .001$ ) that was not qualified by a statistically significant interaction with US heterogeneity ( $M_{\text{Homogeneous Neutral}} = 3.76, M_{\text{Homogeneous Positive}} = 5.12, M_{\text{Difference}} = 1.36; M_{\text{Heterogeneous Neutral}} = 3.12, M_{\text{Heterogeneous Positive}} = 5.13, M_{\text{Difference}} = 2.01$ ), ( $F(1, 49) = 2.03, p > .15$ ).

**FIGURE 3**

ATTITUDES TOWARDS THE BRANDS (CSs) AS A FUNCTION OF THE CONDITIONING PROCEDURE





Simple effect tests showed the difference between the rating of the CSs paired with the neutral USs and positive USs was strongly significant in the sequential homogeneous ( $M_{\text{Difference}} = 1.68$ ), ( $F(1, 49) = 25.88$ ,  $p < .001$ ), simultaneous homogeneous ( $M_{\text{Difference}} = 1.36$ ), ( $F(1, 49) = 18.27$ ,  $p < .001$ ), and simultaneous heterogeneous ( $M_{\text{Difference}} = 2.01$ ), ( $F(1, 49) = 37.16$ ,  $p < .001$ ) conditions, but not in the sequential heterogeneous condition ( $M_{\text{Difference}} = 0.64$ ), ( $F(1, 49) = 3.72$ ,  $p > .05$ ). Finally, a specifically designed contrast proved that the evaluative conditioning effect was on average smaller in the sequential heterogeneous condition than in the other conditions ( $F(1, 49) = 6.71$ ,  $p = .01$ ).

### *Discussion*

Confirming the prediction, evaluative conditioning was least pronounced when heterogeneous USs were used in a sequential conditioning procedure. This is consistent with the hypothesis that sequential CS-US presentation schedules do not promote direct affect transfer and heterogeneous USs do not promote associative affect transfer. Direct or associative affect transfer (or both) was possible in the other three conditions, so a stronger evaluative conditioning effect was observed. This also explains the absence of articles documenting evaluative conditioning effects with a sequential heterogeneous conditioning procedure in the literature.

This experiment provides a powerful warning for advertisers. In advertising strategies that are aimed at influencing brand attitudes through evaluative conditioning, it is important to keep the different possibilities for affect transfer in mind. Not all types of pairing brands with positive affective stimuli will be equally effective in changing attitudes towards the brand. Commercials or advertising campaigns consisting of sequential presentations of brands with many different affective stimuli might be especially ineffective because they promote neither direct, nor indirect affect transfer.

Yet, a limitation of this experiment is that the predictions depend on the claim that different types of affect transfer are occurring under different conditioning procedures. The current experiment does not allow distinguishing between the types of affect transfer (direct vs. associative) in the different conditioning procedures.

One might regard the marginally significant remaining evaluative conditioning effect in the sequential heterogeneous procedure as another limitation of this experiment. It is important however to keep in mind that the crucial prediction of the current experiment is not that there should be no evaluative conditioning effect at all in this condition, but that it should be weaker than in procedures that are more conducive of either direct or associative affect transfer. Because we know from previous research that people can sometimes be successfully conditioned after only a single co-occurrence of a brand with an affective stimulus (Stuart et al. 1987), and in the current experiment the brand occurred no less than eight times with an affective stimulus, it is not unexpected to observe a marginally significant evaluative conditioning effect even in a sequential heterogeneous conditioning procedure.

In the next chapter, I will try to remedy the limitations of this first study as I will employ a manipulation that should allow distinguishing direct from associative affect transfer in the different conditioning procedures.



## Chapter 3

# US Revaluation: What Happens When Endorsers Fall

### *US Revaluation as a Litmus Test*

The US-revaluation procedure probably provides the most straightforward means to distinguish associative affect transfer from direct affect transfer (Mackintosh 1983; Rescorla 1974, 1988). This procedure entails an induced change in the valence of the affective stimulus (US) *after* the initial conditioning procedure in which the brand (CS) and affective stimulus (US) were repeatedly paired. The reasoning is clear-cut. If the change in feelings towards the CS occurred through the associative route (i.e., by means of CS-US associations), then any change in the affect experienced towards the affective stimulus (US) will yield corresponding changes in the affect experienced towards the brand (CS). However, if the conditioning procedure resulted in a ‘rubbing off’ of valence from the US to the CS (direct affect transfer) without the need for mediation by CS-US associations, then later changes in the valence of the US should not affect the attitudes towards the CS anymore.

For example, consider the situation in which a brand (e.g., Pepsi) tries to gain positive affect by repeated co-occurrences with a positively liked celebrity endorser (e.g., Britney Spears). Imagine that during the campaign Britney Spears is at a high in her career, and Pepsi effectively achieves increasing the public’s appreciation of its brand. The US-revaluation issue then translates to the crucial question of what will happen to Pepsi’s brand affect when after the campaign Britney Spears’ career plummets and the affect she generates suddenly deteriorates. If the advertising campaign resulted in an associative transfer of affect from Britney to Pepsi, then when Britney loses her luster, Pepsi will lose brand value because the affect experienced towards Pepsi remains mediated by the activation of Britney Spears in memory and the

affective response generated by her. If however the campaign somehow achieved a direct transfer of affect to Pepsi, then it's immaterial what happens to Britney in the future. Positive affect has rubbed off to Pepsi which has become intrinsically more positive, without the necessity for the activation of Britney in memory.

The US-revaluation procedure played an important role in the transition from an S – R (behavioristic stimulus – response learning) to an S – S (rather more cognitive stimulus – stimulus learning) conceptualization of classical conditioning (e.g., Rescorla 1974, 1988) and in the cognitive revolution in psychology in the second half of the 20<sup>th</sup> century (Gardner 1985). In evaluative conditioning, US-revaluation has been the subject of very few studies even though the findings from classical (aka autonomic, Pavlovian) conditioning research should not be expected to generalize to evaluative conditioning (for an extensive treatment on the differences between classical and evaluative conditioning, see De Houwer et al. 2001). A pioneering article investigating the formation of preferences for visual stimuli by Baeyens et al. (1992b) demonstrated a significant effect of US-revaluation on CS attitudes, leading to the S – S or associative transfer of affect conceptualization of evaluative conditioning by De Houwer et al. (2001). Considering the pivotal importance of Baeyens' article (in which only a single US-revaluation study was reported) for the theory building of evaluative conditioning, a recent replication was conducted using implicit measures of attitudes in three experiments, leading to the same conclusion (Walther et al. 2009). I accommodate these findings as the procedures used by Baeyens et al. (1992) and Walther et al. (2009) are indeed expected to generate associative rather than direct transfer of affect according to the theoretical framework presented in chapter 1. Baeyens et al. used a sequential homogeneous pairings procedure, and Walther et al. used a simultaneous homogeneous pairings procedure.

Because these earlier studies accidentally used CS-US pairing procedures that should lead to associative affect transfer, it was concluded that the evaluative conditioning effect is *always* caused by associative affect transfer. In this chapter, I will show that direct affect transfer is also possible with

evaluative conditioning. Our theory (which was summarized in table 1, p. 28) predicts that when we present a brand (CS) simultaneously with heterogeneous USs, affect will be transferred directly to the brand, in which case no US-revaluation effect will be observed. Given the privileged status of the US-revaluation procedure to investigate the type of learning process going on, it will be the focus of the next experiment.

**H2:** Brand (CS) attitudes generated by associative affect transfer will depreciate when the attitudes towards their associated affective stimuli (US) deteriorate. Brand (CS) attitudes generated by direct affect transfer are immune to this effect.

## *Method*

### **Participants and Design**

Two hundred ninety-four undergraduate business students (166 female, 128 male) at the University of Florida participated in the experiment in exchange for extra course credit. The experiment employed a two (CS-US scheduling: sequential, simultaneous) x two (US heterogeneity: homogeneous, heterogeneous) x three (US valence: neutral, positive, positive with revaluation) mixed design with the first two factors manipulated between-subjects and the latter factor manipulated within-subjects. The experiment was administered in two fall semesters, separated by one year (97 participants in the first fall semester, and 197 in the second). The experimental sessions were procedurally identical, except that the second run included contingency awareness measures at the end of the experiment. The sessions were run on computers in a behavioral lab.

## Stimuli

Belgian beers unknown to the subject population were chosen to serve as CSs. The nine beers with the most neutral (i.e., closest to the midpoint of the scale) and most normally distributed attitudes were selected (out of 43 from a pretest) to serve as CSs.

Ten positively valenced and five neutrally valenced images from the International Affective Picture System (IAPS: Lang, Bradley, and Cuthbert 2005) were selected as USs. They were analogous to the images used in chapter 2. The ten positive IAPS pictures selected were numbers 4599, 4608, 4610, 4623, 4626, 4641, 8080, 8185, 8186 and 8200.

For every participant, the computer program would determine randomly which five positive pictures would remain positive throughout the experiment (the standard positive USs), whereas the remaining five would be made more negative over the course of the experiment (the to-be-revaluated positive USs). The five neutral IAPS pictures selected were numbers 2102, 2397, 2440, 2493 and 2570 (the neutral USs). Examples of the conditioned and unconditioned stimuli are presented in the appendix.

## Procedure

The cover story was identical to the one in chapter 2. Participants would go through different phases in the experiment in the following order: a conditioning phase, a US-revaluation phase, attitude assessment towards the CSs (the beer brands), a demand awareness questionnaire, a manipulation check of the US-revaluation, a contingency awareness measure (only for the 197 participants in the second fall semester) and finally some demographic questions.

*Conditioning Phase.* In the first part of the experiment, a random three of the nine CS beers were assigned to be paired with the neutral USs (i.e., the three control brands). Three other CS beers were randomly selected to be paired with standard positive USs (i.e., USs that would remain positive

throughout the experiment). The remaining three beers were paired with to-be-revaluated positive USs (i.e., positive affective stimuli towards which the attitude would be changed in a later phase).

The conditioning procedure consisted of five rounds of pairings. Every CS would appear once in every round, paired with a US. Therefore, the total procedure consisted of 45 CS-US pairings: nine CSs (beer brands), each of which would be paired with a US five times. The presentation order of CS-US pairs within a round was randomized.

For participants in the *homogeneous US* conditions, each CS would appear five times with the same US. In five rounds of pairings, the same nine CS-US pairings would be shown. The three control brands (neutrally conditioned beers) would appear five times with a fixed neutral US. The three standard positively conditioned brands would appear five times with a fixed standard positive US. The three positive-but-revaluated brands would appear five times with a fixed to-be-revaluated positive US. Hence, three neutral USs, three standard positive USs and three to-be-revaluated positive USs were randomly selected by the program out of their respective sets of five. It might be worth emphasizing that from a participant's point of view, there was no difference between the standard positive and to-be-revaluated positive USs (or per consequence CSs) until the second phase of the experiment.

For participants in the *heterogeneous US* condition, each CS would appear only once with a particular US. Over the five rounds of the conditioning procedure, it would appear five times with different USs belonging to a certain category (neutral, standard positive or to-be-revaluated positive). The three control brands (neutrally conditioned beers) would appear with the five different neutral images over the five rounds. The three standard positively conditioned brands would appear once with each of the five standard positive USs. The three positive-but-revaluated CSs would appear once with each of the five to-be-revaluated positive USs.

The manipulation of *simultaneous* versus *sequential* CS-US scheduling was analogous to chapter 2.



*US-Revaluation Phase.* In this phase, participants would only see the affective stimuli (USs) from the conditioning phase again. The beer brands (CSs) were not shown again. Immediately after the evaluative conditioning phase, participants read the following:

“You've just seen pictures of different people you've probably never met. Illustrating the conventional wisdom that looks can deceive, it's informative to see the felonies that some of the men in these pictures have been convicted for. Therefore we will again show you the people from the previous slideshow. Only this time, criminal records (if applicable) will be provided as well.”

In this second phase, all affective stimuli (USs) were shown three more times. Felonies were displayed at the bottom of the to-be-revaluated positive USs. For the three to-be-revaluated positive USs in the homogeneous condition, these felonies were “murdered his ex”, “committed bestiality”, and “raped a teenager”. In the heterogeneous condition, the two additional USs were paired with “arsonist” and “drove while intoxicated and killed a child”. The neutral USs and standard positive USs were shown equally often (thrice), but without accompanying felony information.

*Attitude Assessment.* After the US-revaluation phase was complete, participants' attitudes towards all nine beer brands (CSs) were assessed in an identical fashion as in chapter 2.

*Demand Awareness Assessment.* I assessed the possible influence of experimental demand characteristics in two ways. First, I asked participants to indicate all the factors that had contributed significantly to their ratings of the beers. They could place check marks next to eight answer categories, one of which was “Experimental demand: You rated the beers in the way you thought the experimenter wanted you to rate them”. Other answer categories allowed them to indicate that they were influenced by the brand names, by first impressions, by the pictures, by feelings of familiarity, by their gut feelings, by packaging characteristics or that they had just picked ratings randomly.

Second, I used a funneled debriefing technique in which participants responded to four progressively revealing questions regarding the nature of the experiment. The questions were “Summarize below what you believe was the purpose of this study”, “What do you think are the hypotheses being tested in this study”, “During the study, did you ever have a thought that its purpose might be something other than you were told? If so, when did this occur to you, and what were you thinking?” and finally “Did you notice any regularities in the presentation of the beers and the human pictures? If so, please describe what struck you as remarkable.”

*Manipulation Check.* To verify the effectiveness of the US-revaluation manipulation, I assessed participants’ attitudes towards all the affective stimuli (USs) that were presented to them over the course of the experiment (nine in the homogeneous pairings conditions versus 15 in the heterogeneous pairings conditions). I used a nine-point scale with endpoints labeled “extremely negative” and “extremely positive”. If the US-revaluation manipulation is effective, it should result in lower attitudes towards the revaluated positive USs than towards the standard positive USs.

*Contingency Awareness.* This part was only administered with the 197 participants in the second fall semester. In order to assess participants’ awareness of the CS-US pairings in the conditioning phase of the experiment, I asked them to indicate for every beer (CS) a picture (US) that it had occurred with. This is a so-called ‘strong’ measure of contingency awareness, because it assesses participants’ specific knowledge of the content of the US, rather than merely asking about the valence of the US, as a ‘weak’ measure would (Baeyens et al. 1990; Field and Moore 2005; Lascelles and Davey 2006; Pleyers et al. 2007). In nine consecutive screens, each beer (CS) was presented on the left side of the screen with on its right side large icons of all the affective stimuli in the experiment’s set. The participants were asked to click on a picture that the beer had occurred with at least once.

Finally, after responding to demographic questions, the participants were fully debriefed.

## ***Results***

The attitudes towards the beer brands (CSs) were computed analogously to chapter 2. All the analyses reported in this experiment were first conducted with the fall semester in which the data were gathered as an extra factor that was allowed to interact with all the experimental factors. This factor never yielded any main nor interaction effects, so the data were collapsed over the two semesters.

### **Manipulation Check**

Using a mixed design, I analyzed the attitudes towards the reevaluated positive USs and towards the standard positive USs as a function of the CS-US scheduling and the US heterogeneity factors. The within-subject effect of US-revaluation (normal positive vs. positive reevaluated) on the evaluation of the US was significant ( $F(1, 290) = 83.65, p < .001$ ), indicating that participants liked the standard positive USs better ( $M = 6.84$ ) than the reevaluated positive USs ( $M = 5.93$ ). The main effect of US-revaluation was not moderated by any of the between-subjects factors (all  $ps > .20$ ). Hence, the revaluation manipulation was equally successful in every condition of the experiment (the  $p$  values from simple contrasts per condition are all  $< .001$ ).

### **Conditioning Impaired In Sequential Heterogeneous Procedure (H1)**

Because this experiment's design encompasses and extends the design of the experiment in chapter 2, it allows a replication test of H1 from chapter 2. Specifically, evaluative conditioning should be impaired in a sequential heterogeneous conditioning procedure, compared with other conditioning

procedures. The mean attitudes and standard errors towards all the CS types are shown in figure 4.

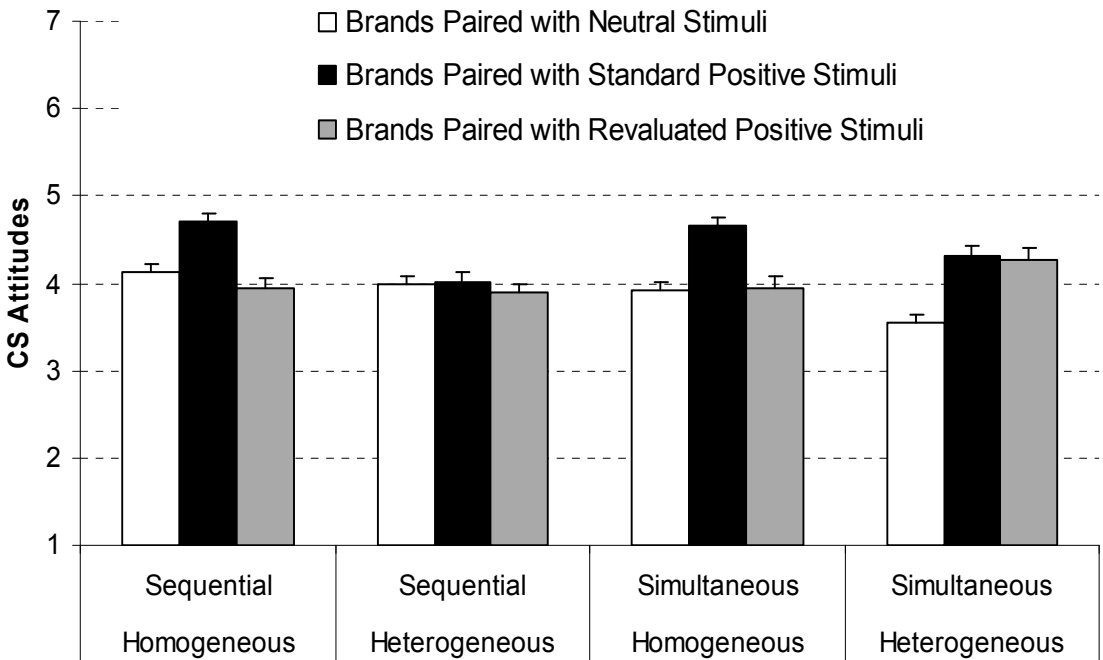
For this analysis, I do not consider the attitudes towards the brands (CSs) paired with positive USs which were revaluated later. The basic evaluative conditioning effect concerns the difference in attitudes towards the standard positively and neutrally conditioned brands. To test the sequential heterogeneous procedure's inferiority to transfer affect, I analyzed the attitudes towards the standard positively versus neutrally conditioned brands (CSs) as a function of the CS-US scheduling (sequential vs. simultaneous) and the US heterogeneity factors (homogeneous vs. heterogeneous) using a mixed design with the first factor (type of CS: standard positive vs. neutrally conditioned) manipulated within subjects and the latter two between. First, there was a main effect of the type of CS ( $F(1, 290) = 69.57, p < .001$ ), indicating overall successful evaluative conditioning. This effect was qualified by an interaction both with the CS-US scheduling factor ( $F(1, 290) = 12.62, p < .001$ ), and with the US heterogeneity factor ( $F(1, 290) = 4.27, p < .04$ ). Most importantly, the predicted three-way interaction between the type of CS (standard positive vs. neutrally conditioned), CS-US scheduling and US heterogeneity was significant ( $F(1, 290) = 5.40, p < .03$ ). Follow-up two-way tests showed a significant interaction between US heterogeneity and type of CS in the sequential CS-US scheduling condition ( $M_{\text{Homogeneous Neutral}} = 4.12, M_{\text{Homogeneous Positive}} = 4.70, M_{\text{Difference}} = 0.58; M_{\text{Heterogeneous Neutral}} = 3.99, M_{\text{Heterogeneous Positive}} = 4.02, M_{\text{Difference}} = 0.03$ ), ( $F(1, 290) = 9.97, p < .01$ ), but not in the simultaneous condition ( $M_{\text{Homogeneous Neutral}} = 3.92, M_{\text{Homogeneous Positive}} = 4.65, M_{\text{Difference}} = 0.73; M_{\text{Heterogeneous Neutral}} = 3.54, M_{\text{Heterogeneous Positive}} = 4.31, M_{\text{Difference}} = 0.77$ ), ( $F(1, 290) = 0.03, p > .85$ ). Only the main evaluative conditioning effect of CS type was significant in the simultaneous condition ( $F(1, 290) = 68.41, p < .001$ ).

Simple effect tests showed the difference between the rating of the CSs paired with the neutral USs and standard positive USs (the CS type or evaluative conditioning effect) was significant in the sequential homogeneous ( $M_{\text{Difference}} = 0.58; F(1, 290) = 22.38, p < .001$ ), simultaneous homogeneous ( $M_{\text{Difference}} = 0.73; F(1, 290) = 33.21, p < .001$ ), and simultaneous

heterogeneous ( $M_{\text{Difference}} = 0.77$ ;  $F(1, 290) = 35.20$ ,  $p < .001$ ) conditions, but not in the sequential heterogeneous condition ( $M_{\text{Difference}} = 0.03$ ;  $F(1, 290) = 0.04$ ,  $p > .80$ ). Finally, a specific contrast confirmed that the evaluative conditioning effect was on average smaller in the sequential heterogeneous condition than in the other conditions ( $F(1, 290) = 21.14$ ,  $p < .001$ ).

**FIGURE 4**

ATTITUDES TOWARDS THE BEER BRANDS (CSs) AS A FUNCTION OF THEIR ASSOCIATED US's VALENCE AND THE CONDITIONING PROCEDURE. US-REVALUATION REVEALS WHERE AFFECT TRANSFER IS INDIRECT (US-REVALUATION IMPACTS CS ATTITUDES) VERSUS DIRECT (US-REVALUATION HAS NO EFFECT ON CS ATTITUDES).



## **Direct versus Associative Transfer of Affect (H2)**

The framework predicts that there is associative affect transfer in the sequential homogeneous condition, no affect transfer in the sequential heterogeneous condition, the potential for associative transfer of affect, direct transfer of affect, or both in the simultaneous homogeneous condition, and direct transfer of affect in the simultaneous heterogeneous condition. Thus, a devaluation of the affective stimulus (US) should reduce evaluations of the positively conditioned CSs in the sequential homogeneous condition, have no influence in the simultaneous heterogeneous condition, and be diagnostic of the type of affect transfer in the simultaneous homogeneous condition.

I first ran a full model on the attitudes towards the three types of conditioned beer brands as a function of the conditioning procedure. Thus, I analyzed the attitudes towards the CSs as a function of their associated US valence (CS type: normal positive vs. revaluated positive vs. neutral), the CS-US scheduling and the US heterogeneity factors using a mixed design with the first factor manipulated within subjects and the latter two between. I observed significant main effects of the CS type factor ( $F(2, 580) = 35.62, p < .001$ ) and of the US heterogeneity factor ( $F(1, 290) = 6.49, p = .01$ ). The CS type factor interacted significantly with the CS-US scheduling factor ( $F(2, 580) = 9.21, p < .001$ ), and with the US heterogeneity factor ( $F(2, 580) = 12.90, p < .001$ ). Most importantly, the previous effects were qualified by a significant three-way interaction between CS type, CS-US scheduling and US heterogeneity ( $F(2, 580) = 3.75, p < .03$ ), indicating that the attitudes towards neutrally conditioned brands, standard positively conditioned brands and brands conditioned positively with a posteriori revaluated USs differed relative to each other in the different conditioning procedures.

The nature of affect transfer (direct versus associative) is revealed by the effect that a post-conditioning devaluation of the affective stimuli (USs) has on the attitudes towards the brands (CSs) that were previously paired with those USs. Therefore, I conducted simple contrast analyses on the difference in attitudes towards the standard positive CSs and the revaluated positive CSs to

test the US-revaluation effect for each of the conditioning procedures separately. As expected, US devaluation reduced evaluations of the positively conditioned CSs in the sequential homogeneous condition ( $M_{\text{Standard Positive}} = 4.70$ ,  $M_{\text{Revaluated Positive}} = 3.94$ ,  $M_{\text{Difference}} = -0.76$ ;  $F(1, 290) = 37.17$ ,  $p < .001$ ), indicating that affect transfer was associative in this condition. As expected, US devaluation did not reduce the evaluations of the positively conditioned CS in the simultaneous heterogeneous condition ( $M_{\text{Standard Positive}} = 4.31$ ,  $M_{\text{Revaluated Positive}} = 4.28$ ,  $M_{\text{Difference}} = -0.03$ ;  $F(1, 290) = 0.05$ ,  $p > .80$ ), showing direct affect transfer in this condition. In the hitherto ambiguous simultaneous homogeneous condition I also found that a devaluation of the US significantly reduces the evaluations of the positively conditioned CS, indicating associative affect transfer in this condition ( $M_{\text{Standard Positive}} = 4.65$ ,  $M_{\text{Revaluated Positive}} = 3.93$ ,  $M_{\text{Difference}} = -0.72$ ;  $F(1, 290) = 31.03$ ,  $p < .001$ ). Corroborating the above findings, I found that a significant positive evaluative conditioning effect (as measured by the difference between revaluated positive CS and neutral CS attitudes) remained only in the simultaneous heterogeneous condition ( $M_{\text{Neutral}} = 3.54$ ,  $M_{\text{Revaluated Positive}} = 4.28$ ,  $M_{\text{Difference}} = 0.74$ ;  $F(1, 290) = 27.18$ ,  $p < .001$ ; all other conditions  $p > .20$ ).

### Contingency Awareness

These analyses could only be conducted on the 197 participants in the second fall semester. Contingency awareness should be more related to the evaluative conditioning effect when affect transfer is associative than when it is direct, because associative affect transfer relies on the activation of the US in memory upon post-conditioning perception of the brand (CS) whereas direct affect transfer does not.

For a first analysis, I computed an overall contingency awareness score by counting the number of correctly identified CS-US contingencies. For every CS (the nine different beer brands), the participant had to choose one affective stimulus that had appeared with that CS at least once. The choice set consisted of the 15 affective stimuli in the experiment. For participants in the

homogeneous CS-US pairings conditions, a CS had been consistently paired with the same US. Hence, for every CS there was only one correct US picture. For participants in the heterogeneous pairings conditions, every CS had been shown with all five USs of a particular category (neutral, standard positive or revaluated positive). Hence, for every CS there were five correct answer possibilities. Yet, despite the five times higher probability for correct guesses, an analysis of the contingency awareness score as a function of the CS-US scheduling and the US heterogeneity factors revealed a main effect of US heterogeneity ( $F(1, 193) = 19.60, p < .001$ ) in the opposite direction (contingency awareness scores were lower in the heterogeneous than in the homogeneous pairings conditions), which was not qualified by an interaction with CS-US scheduling ( $p > .15$ ). Because the sequential heterogeneous conditioning procedure does not yield evaluative conditioning effects it was disregarded and a specific contrast tested and confirmed that contingency awareness was lower in the simultaneous heterogeneous conditioning procedure ( $M_{\text{Simultaneous Heterogeneous}} = 5.30$ ) than in the homogeneous conditioning procedures ( $M_{\text{Simultaneous Homogeneous}} = 6.23, M_{\text{Sequential Homogeneous}} = 5.93; F(1, 193) = 4.06, p < .05$ ). However, an analysis on evaluative conditioning's effect size (defined as the difference in attitudes towards standard positively vs. neutrally conditioned brands) as a function of these three conditions yielded no significant differences ( $M_{\text{Simultaneous Heterogeneous}} = 0.67, M_{\text{Simultaneous Homogeneous}} = 0.66, M_{\text{Sequential Homogeneous}} = 0.51; F(2, 145) = 0.40, p > .65$ ). Hence, consistent with the theoretical framework, I observed a dissociation between contingency awareness and evaluative conditioning. Procedures that stimulate direct affect transfer (as the simultaneous heterogeneous conditioning procedure) can generate the same size of evaluative conditioning effects with lower levels of contingency awareness than procedures that lead to indirect affect transfer (as both the homogeneous conditioning procedures do).

For a second analysis, I performed an item-based contingency awareness analysis, a methodological improvement in the study of contingency awareness that was recently promoted by Pleyers et al. (2007). Because participants are



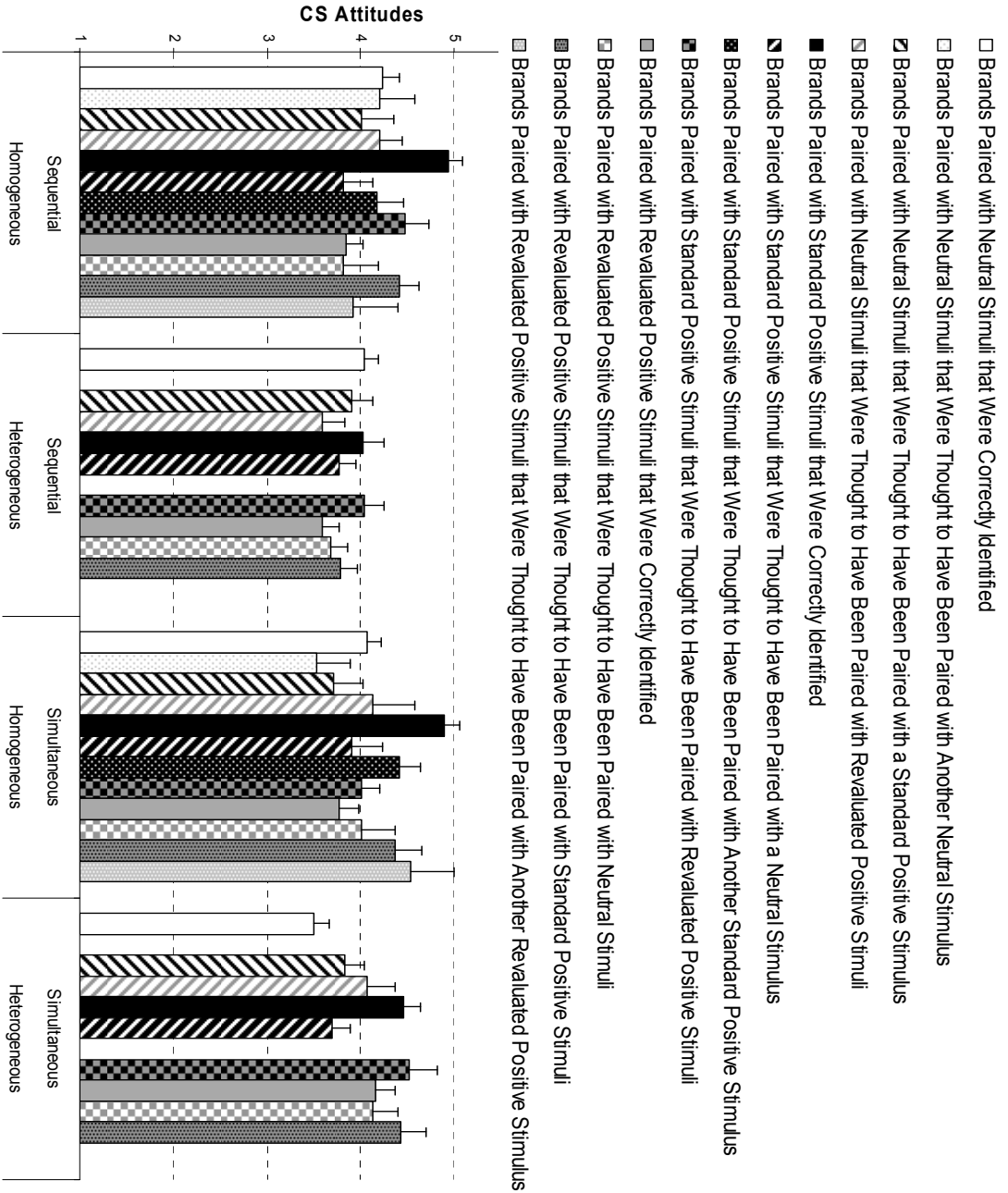
seldom aware or unaware of all the contingencies, it makes most sense to compare directly the attitudes towards brands (CSs) that are classified as ‘aware’ (i.e., of which the participant correctly identified the US) versus attitudes towards those brands that are classified as ‘unaware’. I conducted an even more fine-grained analysis than the one conducted by Pleyers et al. because by grouping all CSs of which the US was incorrectly identified into the same ‘unaware’ category, important information is lost. Especially the fact that participants are likely to use their feelings towards the brands (CSs) as input in deciding which affective stimulus (US) was most likely paired with it (the affect as information problem) calls for a more fine-grained approach. Consider for example the case of a positively conditioned brand (CS+) that for idiosyncratic reasons is disliked by the participant (e.g., because s/he doesn’t like the package or label or product in general). Affect as information predicts that for such CSs, a neutral or negative US will be chosen in the contingency awareness test, hence such a CS will more likely be classified as ‘unaware’. This phenomenon leads to a suppression of evaluative ratings for ‘unaware’ positively conditioned brands (CS+s). Analogously, a neutrally (or negatively) conditioned CS-, that for idiosyncratic reasons is liked by the participant, will more likely be thought of as previously associated with a positive US in the awareness test (and thus classified as ‘unaware’). This phenomenon leads to an inflation of evaluative ratings for ‘unaware’ neutrally (or negatively) conditioned brands. The suppression of evaluative ratings for ‘unaware’ positively conditioned brands, combined with the inflation of evaluative ratings for ‘unaware’ neutrally conditioned brands might lead to the artifactual conclusion that there is no attitudinal difference between ‘unaware’ conditioned stimuli, a potential problem in interpreting the results proposed by Pleyers et al. (2007). To prove convincingly that awareness of the exact CS-US contingency *contributes* to evaluative conditioning effects, one should demonstrate that for positively conditioned brands (CS+s), the ‘aware’ CS+s (i.e., the ones thought associated with the correct US) are significantly more well-liked than other CS+s that were thought associated with an incorrect US of the correct valence (in this case positive). To further claim that awareness of

the exact CS-US contingency is a *necessary condition* for evaluative conditioning effects to materialize (as Pleyers et al. do), one should further demonstrate that ‘unaware’ CS+s that were thought associated with an incorrect but still positive US, are not liked better than control stimuli such as the neutrally conditioned stimuli (which Pleyers et al. don’t).

Rather than merely dichotomizing into ‘aware’ and ‘unaware’ CSs, I computed individual attitudes for every possible type of CS, depending on the type of US (neutral, standard positive or revaluated positive) that the CS was actually paired with in the conditioning phase, and on the type of US that the participant believed the CS was paired with in the contingency awareness test. For participants in the homogeneous pairings conditions, this resulted in four different classes of neutrally conditioned CSs (i.e., neutrally conditioned CSs of which the correct US was identified, neutrally conditioned CSs that were thought to be associated with an incorrect but still neutral US, neutrally conditioned CSs that were thought to be associated to a standard positive stimulus, and neutrally conditioned CSs that were thought to be associated to a revaluated positive stimulus). Analogously, there are four different categories of standard positively conditioned stimuli, as well as four different classes of revaluated positively conditioned stimuli. For participants in the heterogeneous pairings conditions, there were only three instead of four classes of neutrally, standard positively and revaluated positively conditioned stimuli. This is due to the fact that in the heterogeneous conditions, a CS had appeared with all the USs of a particular class. Hence, there were no ‘neutrally conditioned CSs that were thought to be associated with an incorrect but still neutral US’ and analogously so for the standard positively conditioned CSs and revaluated positively conditioned CSs. This resulted in a more detailed contingency awareness analysis than ever reported before, and the resulting means and standard errors are depicted in figure 5.

FIGURE 5

ITEM-BASED CONTINGENCY AWARENESS ANALYSIS



Of all the possible comparisons, only a few are of immediate theoretical interest (any other comparisons of interest to the reader can always be obtained from the author). First, I tested whether awareness of the exact CS-US contingency increased evaluative conditioning in the homogeneous pairings conditions – both of which lead to associative affect transfer according to the analysis above. As associative affect transfer occurs through the establishment of CS-US associations in memory, such an effect might be expected. I tested this hypothesis by analyzing the attitudes towards standard positively conditioned brands (CS+s) as a function of the awareness factor (US correctly identified vs. an incorrect US of positive valence identified), the CS-US scheduling factor (sequential vs. simultaneous presentation) and their interaction on the data from the homogeneous pairings conditions. I found a main effect only of the awareness factor ( $F(1, 114) = 7.72, p < .01$ ) indicating that positively conditioned brands (CS+s) of which the exact US was identified ( $M = 4.92$ ) were liked significantly more than CS+s that were thought to be associated with another positive, but incorrect US ( $M = 4.30$ ). This effect was not qualified by an interaction with the CS-US scheduling factor ( $F(1, 114) = 0.38, p > .50$ ) so it occurred both in the sequential and simultaneous homogeneous conditioning procedures. Next, I checked whether contingency awareness was a necessary condition for evaluative conditioning effects to emerge. I tested this by investigating attitudes towards such ‘unaware’ CS+s that were thought associated with an incorrect but still positive US versus neutrally conditioned CSs with CS-US scheduling (simultaneous vs. sequential presentation) as between-subjects factor on the data from the homogeneous pairings conditions. I found a main effect of CS type only ( $F(1, 24) = 8.41, p < .01$ ) indicating that such ‘unaware but correct valence’ CS+s ( $M = 4.30$ ) are still more well-liked than neutrally conditioned CSs ( $M = 3.81$ ). Again, this effect was not qualified by an interaction with the CS-US scheduling factor ( $F(1, 24) = 0.08, p > .75$ ). Hence, it seems possible that even when affect transfer is associative (i.e., mediated by CS-US associations in memory), one does not need to be fully aware of these associations to experience the attitudinal effects.

These data further show that awareness of exact CS-US contingencies is not important for direct affect transfer (in the simultaneous heterogeneous condition). Again I will look at the attitudes towards the standard positively conditioned brands (CS+s). In the simultaneous heterogeneous condition, I cannot compare ‘aware’ CS+s (i.e., of which one of the correct positive USs was identified) with CS+s that were thought associated with another, but incorrect standard positive US (because every CS+ had appeared with all the standard positive USs). I can however perform an even stronger (more conservative) test, by comparing attitudes towards ‘aware’ CS+s with attitudes towards CS+s that were thought associated with a devaluated positive US. These devaluated positive USs were liked less than the standard positive USs (see the manipulation check). Therefore, showing that ‘aware’ CS+s are equally well-liked as CS+s that were erroneously thought to have been associated with a devaluated positive US, and that both types of CS+s are more well-liked than control stimuli (e.g., neutrally conditioned brands) would be a powerful demonstration of the non-importance of contingency awareness in conditions that promote direct affect transfer. This is exactly what I observed. First, I analyzed the attitudes towards CS+s as a function of the awareness factor (correct US identified vs. incorrect, devaluated US identified) for participants in the simultaneous heterogeneous condition. There was no effect of the awareness factor ( $F(1, 63) = 0.03, p > .85$ ), indicating that ‘aware’ CS+s ( $M = 4.46$ ) were equally well liked as CS+s that were thought associated with an incorrect, devaluated US ( $M = 4.51$ ). Next, I performed a within-subjects analysis on the attitudes towards ‘aware’ CS+s compared with neutrally conditioned brands for participants in the simultaneous heterogeneous condition. I observed a significant difference ( $F(1, 41) = 22.98, p < .001$ ), indicating that ‘aware’ CS+s ( $M = 4.46$ ) were better liked than neutrally conditioned brands ( $M = 3.59$ ). I also conducted a within-subjects analysis on the attitudes towards CS+s that were erroneously thought to have been associated with a devaluated US compared with neutrally conditioned brands. This difference too was significant ( $F(1, 22) = 4.79, p < .04$ ), indicating that

these ‘unaware’ CS+s were also liked better ( $M = 4.51$ ) than control brands that were neutrally conditioned ( $M = 3.73$ ).

### **Demand Awareness**

Although proposing an explanation based on experimental demand characteristics (i.e., participants guessing the experimental hypotheses and acting their best to make them true) for the predicted and obtained results in this experiment seems far from straightforward, I conducted a hypothesis awareness analysis for two reasons. First, conditioning studies often give participants no realistic sense of purpose and therefore elements of the procedure may serve as clues for discerning the study’s objectives (Allen and Janiszewski 1989). Second, conditioning studies suffer from the so-called ‘repetitions-dilemma’. On the one hand, a researcher is tempted to increase the number of CS-US pairings to increase the conditioning effect. On the other hand, this increases simultaneously the risk that these pairings function as a cue to participants about what is expected (Sawyer 1975).

First, on the ‘indicate factors that contributed to your ratings’ checkmark question, only 18 out of 294 participants indicated that they had tried to provide their evaluative ratings in the way they thought the experimenter expected them to. Omitting these participants from the analysis leaves the results unchanged. For example, the three-way interaction underlying the hypothesis test that there would be no affect transfer in the sequential heterogeneous conditioning procedure remains significant ( $F(1, 272) = 4.72, p = .03$ ). Also, the three-way interaction that underlies the testing of direct versus indirect affect transfer remains unchanged ( $F(2, 544) = 3.36, p < .04$ ).

Second, two independent coders who were blind to the experimental conditions sorted the participants in four different categories of hypothesis awareness according to the qualitative responses on the open-ended hypothesis awareness questions. The coders’ initial classification was the same in 84% of the cases. The conflicting cases were resolved through discussion. The majority of participants (148) were classified in the first category, as not

hypothesis aware. The second category consisted of 21 participants who had noted that some brands were systematically paired with more positive images than others, and speculated that this might affect their opinions. The third category contained 89 participants who expressed the belief that brands that were associated with images of people who later turned out to be felons might become less well-liked. Finally a fourth category was made up of 36 participants who expressed both of the previous beliefs. Incorporating the level of hypothesis awareness as a covariate in the analyses actually increases the critical significance levels. The three-way interaction underlying the hypothesis test that there would be no affect transfer in the sequential heterogeneous conditioning procedure now reaches the  $\alpha = .01$  level ( $F(1, 287) = 6.72, p = .01$ ). The three-way interaction that underlies the testing of direct versus indirect affect transfer remains unchanged ( $F(2, 578) = 3.76, p < .03$ ). Furthermore, the same overall pattern of results was observed at every level of hypothesis awareness. Incorporating the level of hypothesis awareness as a full factor in both of these analyses (allowing for interactions with every other factor) revealed no interaction effects of the hypothesis awareness factor with any experimental factor (all  $p$ 's  $> .10$ ).

### *Discussion*

This experiment provides evidence for the core aspects of the theory. First, replicating the findings from chapter 2, I predicted and found that a conditioning procedure which stimulates neither direct nor associative affect transfer would lead to limited or no evaluative conditioning effects. This was the case for the procedure in which brand (CS) and affective stimulus (US) were sequentially presented – prohibiting direct affect transfer – and the CS was paired with heterogeneous USs of a certain (e.g., positive) valence – interfering with associative affect transfer. As opposed to the other conditioning procedures (which promote at least one type of affect transfer), attitudes towards positively conditioned brands did not differ from attitudes

towards neutrally conditioned brands in the sequential heterogeneous conditioning procedure.

Second, the design of this experiment allows to unambiguously distinguish associative affect transfer from direct affect transfer by means of the US-revaluation manipulation (Rescorla 1988; Walther et al. 2009). After the CS-US pairings, half of the positive USs were revaluated by incriminating the protagonist in the picture (a manipulation check proved that this was equally effective in all the conditioning procedures). With *associative affect transfer*, the positive affect experienced towards a brand (CS) is mediated by the activation in memory of the USs that it has previously appeared with. Hence, a revaluation of the US should result in a revaluation of the CS. This is exactly what was observed in the sequential homogeneous and simultaneous homogeneous conditioning procedures which promote associative affect transfer according to the theoretical framework proposed in chapter 1. With *direct affect transfer* on the other hand, the positive affect becomes intrinsically part of the brand (CS), without the necessity for mediation through US activation in memory. Hence, a revaluation of that US should not influence attitudes towards the brand. This is exactly what was observed in the simultaneous heterogeneous conditioning procedure which was theorized to generate purely direct affect transfer.

The results of a contingency awareness analysis bolstered the theory further. I found that associative affect transfer (which occurs through the establishment of CS-US associations in memory) leads to higher levels of contingency awareness than direct affect transfer (which does not rely in the establishment of such associations). I found a dissociation between contingency awareness and evaluative conditioning, indicating that despite the higher levels of contingency awareness with associative affect transfer, this does not lead to stronger evaluative conditioning effects than direct affect transfer. With associative affect transfer I found that awareness of the CS-US association increases the evaluative conditioning effect, but it is not a necessary condition for it. Hence the CS-US associations that need to be established for affect transfer do not need to be consciously accessible. This



finding is important for the positioning of associative affect transfer in the associative-propositional evaluation (APE) model proposed by Gawronski and Bodenhausen (2006), an issue I will return to in the conclusions in chapter 6.

With direct affect transfer, I found that contingency awareness was not related to the evaluative conditioning effect. Positively conditioned brands of which a correct US was recalled were not liked better than positively conditioned brands that were thought associated with an incorrect, and even less positive (because devaluated) US.

Together these findings have important implications for marketers. A first implication is that with direct affect transfer it is possible to influence consumers' attitudes towards brands in a relatively automatic manner, i.e., independent of consumers' conscious knowledge of what is causing this changing attitude. Associative affect transfer occurs outside of conscious awareness to a much lower extent as we find that associative affect transfer is much stronger when consumers are aware of the associations between the brand and the affective stimuli. This might have implications for the extent to which the consumer is able to resist or counter argue advertising campaigns that transfer affect directly to brands. After all, when one is not aware of what is causing a change in evaluation, it is more difficult to resist this change. I will return to this issue in chapter 5 of this dissertation.

A second important implication applies to the potentially disastrous effects on brand equity from celebrity endorsers falling from grace, which is a literal application of the US-revaluation logic and findings. Annually, companies spend millions of dollars on celebrity spokespersons to endorse their brands and feature in commercials. This strategy is potentially rewarding as such associations can indeed make the brand more positively evaluated, but companies are also well aware of the risks involved. Celebrity endorsers have fallen from grace frequently in the past (famous examples include Michael Jackson, Floyd Landis, Britney Spears, Michael Vick and O.J. Simpson), and if brands derived value by establishing an *association* with these celebrities, their brand value will be reduced as well. It is much safer to develop advertising strategies that attach the positive affect generated by endorsers directly to the

brand. This can be done by hiring a more diverse set of endorsers for a shorter period of time, and – crucially – presenting them absolutely simultaneously with the brand in commercials. The current data indicate that in that case, all of a brand’s endorsers can fall from grace without having a negative effect on the positive feelings that have now become a part of the brand itself.



## Chapter 4

### Stability of Conditioned Attitudes

#### *Associative Affect Transfer Is Susceptible to Interference*

A second way in which direct affect transfer can be distinguished from associative affect transfer relates to the susceptibility of the conditioned attitudes to interference from subsequent learning. More recently learned material interferes with the successful establishment in memory of material learned about earlier (Wixted 2004a, b, 2005), a phenomenon called ‘retroactive interference’. Retroactive interference is a central concept in theories of why people forget over time. People forget some target material because the new associations formed by more recently learned material make the earlier learned material less accessible (Postman and Underwood 1973) or interfere with its consolidation (McGaugh 2000).

When affect transfer is associative in nature, it is crucially dependent on the successful consolidation (and later retrieval) of CS-US (brand – affective stimulus) associations in memory. Associative affect transfer implies by definition that the affective response to the CS (brand) needs to be mediated by the activation in memory of the US (affective stimulus). Therefore, manipulations that hinder the successful establishment or retrieval of CS-US associations in memory – such as retroactive interference by new learning – should have a disrupting effect on conditioned attitudes when affect transfer is associative.

With direct affect transfer on the other hand, the successful establishment of CS-US associations in memory is not necessary since according to this process, the repeated co-occurrences of CS and US cause a ‘rubbing off’ of affective valence from the US to the CS. The diffuse affective response generated by the affective stimuli can attach directly to the CS (brand). This causes the CS to gradually become intrinsically more positive, without the

need to establish traces in memory linking the CS to the US. Therefore I propose that direct affect transfer should not be vulnerable to retroactive interference from new learning after conditioning.

The implication is that advertisements which try to influence consumer attitudes by establishing brand (CS) – affective stimulus (US) associations might be ineffective if the consumer engages in learning a second set of information immediately afterwards (for example when engaged with a new, potentially more interesting advertisement). If however affect can be transferred directly to the brand, without the need for brand – affective stimulus associations, such interference from subsequent learning should not be observed. This proposition will be the focus of this chapter's experiment.

From the theoretical framework (summarized in table 1, p. 28), we learn that there are two conditioning procedures in which the type of affect transfer is theoretically unambiguous. The sequential homogeneous conditioning procedure should strictly lead to indirect affect transfer and the simultaneous heterogeneous conditioning procedure should strictly lead to direct affect transfer. Therefore, this experiment will test whether a sequential homogeneous conditioning procedure differs from a simultaneous heterogeneous conditioning procedure in the susceptibility of the conditioned affective response to interference by new learning episodes.

**H3:** Brand (CS) attitudes generated by associative affect transfer [sequential homogeneous procedure] are vulnerable to new learning after the conditioning procedure that disrupts the establishment of brand – affective stimulus (CS–US) associations. Brand attitudes generated by direct affect transfer [simultaneous heterogeneous procedure] are immune to this effect.

## ***Method***

### **Participants and Design**

Forty undergraduate business students (13 female, 27 male) at RSM Erasmus University participated in the experiment in exchange for extra credit. The experiment employed a two (conditioning procedure: sequential homogeneous, simultaneous heterogeneous) x two (secondary learning: no, yes) x two (CS type: neutrally conditioned, vs. positively conditioned) mixed design with the first two factors manipulated between-subjects and the latter factor manipulated within-subjects.

### **Stimuli and Procedure**

*Conditioning Phase.* The stimuli and procedure were analogous to the corresponding conditions (sequential homogeneous and simultaneous heterogeneous) of the experiment in chapter 2, except that there were only five rounds of pairings (as in chapter 3). Again I used eight Belgian beers as CS, with four to be positively conditioned and four to be neutrally conditioned. A subset of five positive and five neutral pictures was selected from the USs in chapter 2. In the sequential homogeneous condition, four of these five were randomly chosen to be consistently paired with a CS assigned to that US valence category (neutral versus positive). In the simultaneous heterogeneous condition, all five USs were paired once with each CS that was assigned to their respective valence category (neutral versus positive). Presentation style and duration of the stimuli was analogous to the previous experiments.

*Second Learning Phase.* After the conditioning phase, there was a second learning phase in which participants were asked to learn the brewers of a new set of eight Belgian beers. None of these beers had served as CS in the first part of the experiment. There were four Belgian breweries (e.g., “Van

Honsebrouck” or “Brasserie Union”) that each brewed two of the new beers. The learning phase consisted of three presentation rounds, during which a picture of every beer was presented with a brewery name (underneath) for three seconds, with one second between the pairs. After three presentation rounds, participants were asked to indicate the brewery that produced each beer. Participants who correctly identified the brewer in 6 or more instances moved on to the attitude assessment phase, whereas the others were presented with two additional pairings of the beer-brewery information (this was the case for 65% of the subjects who were in the secondary learning condition). Afterwards, these participants were tested again. Regardless of the result, these participants moved on to the attitude assessment phase.

*Attitude Assessment Phase.* The explicit attitudes towards the brands (CSs) were assessed analogously to the previous experiments on a combination of 9-point and 7-point scales. Only attitudes towards the beers that served as CS in the conditioning phase were assessed. Beers from the second learning phase were not shown again. After the attitude assessment, only the multiple-options question described under the ‘demand awareness’ section of the procedural section of chapter 3 was assessed, before asking for demographic details.

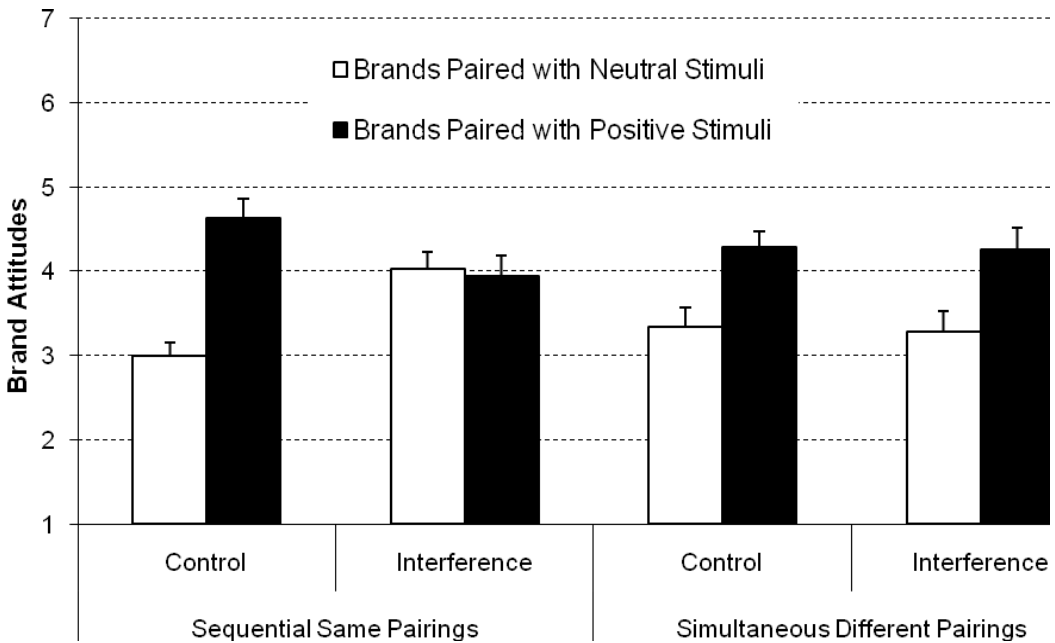
## ***Results***

The same attitudinal index was computed as in the previous experiments. I used a mixed design to analyze the attitudes towards the brands (CSs) as a function of CS type (positively conditioned vs. neutrally conditioned), the conditioning procedure, and the presence of a second learning phase. The significant main effect of CS type ( $F(1, 36) = 28.32, p < .001$ ) was moderated by an interaction with the second learning phase factor ( $F(1, 36) = 6.74, p = .01$ ). Most importantly, this effect was further qualified by the predicted three-way interaction between CS type, conditioning procedure and presence of a

second learning phase ( $F(1, 36) = 7.40, p = .01$ ). Means and standard errors are presented in figure 6.

**FIGURE 6**

**CS ATTITUDES AS A FUNCTION OF THE CONDITIONING PROCEDURE AND THE PRESENCE OF A SECOND LEARNING PHASE**



In the sequential homogeneous condition, there was a CS type by presence of a second learning phase interaction ( $F(1, 36) = 14.88, p < .001$ ). Analyses of the simple effects revealed successful evaluative conditioning in the sequential homogeneous condition without a second learning phase ( $M_{\text{Neutral}} = 2.99, M_{\text{Positive}} = 4.64, M_{\text{Difference}} = 1.65; F(1, 36) = 28.09, p < .001$ ), but not in the



sequential homogeneous condition with a second learning phase ( $M_{\text{Neutral}} = 4.03$ ,  $M_{\text{Positive}} = 3.94$ ,  $M_{\text{Difference}} = -0.09$ ;  $F(1, 36) = 0.08$ ,  $p > .75$ ). In the simultaneous heterogeneous conditioning procedure, there was a significant main effect of CS type ( $F(1, 36) = 16.46$ ,  $p < .001$ ) which was not moderated by the presence of a second learning phase ( $F(1, 36) = 0.01$ ,  $p > .90$ ). Analyses of the simple effects revealed successful evaluative conditioning in the simultaneous heterogeneous condition both without a second learning phase ( $M_{\text{Neutral}} = 3.34$ ,  $M_{\text{Positive}} = 4.29$ ,  $M_{\text{Difference}} = 0.95$ ;  $F(1, 36) = 7.49$ ,  $p < .01$ ), as well as with a second learning phase ( $M_{\text{Neutral}} = 3.28$ ,  $M_{\text{Positive}} = 4.26$ ,  $M_{\text{Difference}} = 0.98$ ;  $F(1, 36) = 9.06$ ,  $p < .01$ ).

Only three participants (two in the sequential homogeneous condition without a second learning phase, one in the sequential homogeneous condition with a second learning phase) indicated they had provided their attitudinal to satisfy experimental demand. Omitting them from analysis does not change any of the reported significance levels.

## *Discussion*

### **Summary and Implications for Advertising Practice**

In this experiment I demonstrate that associative affect transfer (in the sequential homogeneous procedure) is critically susceptible to retroactive interference from subsequent learning episodes. When the CS-US associations in memory are interfered with, for example through new learning after the conditioning episode, nothing remains of the evaluative conditioning effect (the positively conditioned brands are not liked better than neutrally conditioned brands anymore). This finding provides further evidence for the theory that associative affect transfer is dependent on the successful establishment and retrieval of memory traces linking the CS (brand) to the US (affective stimulus).

This experiment also confirms the finding from chapter 3 that direct affect transfer (in the simultaneous heterogeneous procedure) does not rely on the establishment of memory traces that link a CS (brand) to an affective stimulus (US). The new learning task, which disrupted the CS-US associations in the associative affect transfer condition, has no effect on the conditioned attitudes when affect transfer is direct, in the simultaneous heterogeneous condition. With direct affect transfer, brands can become more positive without the need for underlying memory traces linking the brands to specific affective stimuli.

This greater dependence on successful establishment of memory traces when affect transfer is associative has immediate repercussions for advertising practice. Advertisers can seldom profit from the undivided attention of their target audience and in fact have to deal with competition from other messages that might be more centrally processed, with advertisements from competing brands, with mental tiredness, distraction, cognitive load, etc. All of these have the potential to interfere with the consolidation of the brand – affective stimulus (CS–US) association in memory that needs to be established for the associative affect transfer to occur. Therefore it seems particularly valuable to identify conditions in which evaluative conditioning can lead to a direct transfer of affect (i.e., with simultaneous heterogeneous presentation of brands and affective stimuli), which are not susceptible to such interference.

### **Note: Interference at Encoding or Retrieval?**

One might wonder whether the interference by subsequent learning disrupts evaluative conditioning's effect at the encoding or retrieval stage of the process. Interference at encoding would imply that the second learning task interferes with the successful establishment of CS – US associations in memory from the conditioning phase. Because the associations formed in memory between CS and US are most fragile and disruptable in the earliest stage of their existence (McGaugh 2000), a new learning task following the conditioning procedure immediately should interfere with the consolidation

period that is necessary for the successful encoding of CS-US associations in memory.

An alternative theoretical account might propose that the interference by the subsequent learning episode only takes place at the point of retrieval, i.e., at the moment participants are asked to provide their attitudes towards the brands (CSs). Such an account implies that the association between CS and US was in fact successfully established in memory, but due to the new learning following it, has become less accessible for retrieval.

Although such a difference might at first sight seem tangential, it has profound implications for theory as well as practice. Interference at encoding implies that the advertiser's investment is completely wasted as no trace remains of the association between brand (CS) and affective stimulus (US). Interference at retrieval is less ominous, as the crucial CS-US association is actually established in memory, and thus could still be retrieved under the right circumstances (analogous to the spontaneous recovery of conditioned responses, Pavlov 1927). I assume that the interference occurred at the encoding stage for two reasons.

First, this is consistent with recent cognitive theories about the operation of memory, which (after a long absence and trailing insights from neuropsychology) once again put the need for consolidation of memory traces central in the conceptualization of long-term memory. Consolidation refers to the fact that newly learned material initially exists in an unstable state, and needs some time to become entrenched in long-term memory. If during this time, there is interference by new learning, the target material does not become entrenched in memory (McGaugh 2000, Wixted 2004a, b, 2005). Interference at retrieval also exists, but is theorized to be a more marginally occurring phenomenon, especially active when the learning of an initial association (e.g., A – B) is followed by learning a new association involving the same target material (e.g., A – C). In such cases the new association (A – C) interferes with the retrieval of the original association (A – B), despite the fact that the original association was successfully encoded (Bower, Thompson-Schill and Tulving 1994). In the current study, the second learning phase that followed the

evaluative conditioning phase involved only new beers that had not been presented or learned about before. Hence, no new associations were formed with the beers (CSs) from the evaluative conditioning phase. Therefore, the interference was not caused by the establishment of new associations to the CSs, which could interfere with the successful retrieval of earlier associations. Rather, it was a relatively nonspecific interference that most probably interfered with the consolidation of the associations formed in the evaluative conditioning phase.

Second, interference at encoding is more consistent with other findings regarding evaluative conditioning. A hallmark property of evaluative conditioning is that it is relatively impervious to extinction (De Houwer et al. 2001). Previous research has demonstrated that evaluative conditioning can lead to long-lasting changes in attitudes enduring over weeks and months. This is true even for procedures that lead to associative affect transfer, i.e., using sequential homogeneous pairings (Baeyens et al. 1988; Diaz, Ruiz, and Baeyens 2005; Grossman and Till 1998; Till et al. 2008; Vansteenwegen et al. 2006). Because such prolonged periods are extremely likely to include new learning episodes, and apparently these did not interfere with the evaluative conditioning effect, it is apparently crucial that the new learning episode follows the original learning very closely in time (as was the case in the current experiment). Interference effects that are observed only when they follow the original learning closely in time are much more consistent with ‘interference at encoding’ than with an ‘interference at retrieval’ theory.

Considering the theoretical as well as practical importance of this distinction, I consider this an area worthy of future research. An experiment designed to solve this issue should manipulate the timing of the new learning episode. In the first condition, the new learning should follow the evaluative conditioning procedure immediately (as in the experiment reported in this chapter) and there should be a relaxing time period (i.e., with little mental activity of the participant) before the attitude assessments. In the second condition, there should be a relaxing time period between the conditioning episode and the new learning, and the new learning should precede the attitude

assessments immediately. If the new learning episode interferes with the consolidation of memory traces, it should have a maximal effect when it follows the conditioning procedure immediately. If however it interferes with the successful retrieval of the associations when attitudes are asked for, it should have a maximally interfering effect when it immediately precedes the attitude assessment.

## Chapter 5

# Correcting for Evaluative Conditioning

### *Persuasion Knowledge Activation*

Consumers have developed a set of knowledge and skills – often referred to as their persuasion knowledge – that allows them to deal with the many influencing attempts they are the subject of on a daily basis (Friestad and Wright 1994). The evaluative conditioning procedure can be seen as an influencing attempt as the repeated pairings of brands with positive affective stimuli are designed to make those brands more well-liked. However, these positive affective stimuli contain no real or valuable information about the taste or quality of the beer brands they are paired with. The persuasion knowledge model predicts that consumers, who recognize the evaluative conditioning procedure as an unjustified influence attempt, will try to correct their brand attitudes for the influence which the affective stimuli might have had. Such correction processes should be more effective with associative affect transfer because the source of the influence (the affective stimulus or US) is more readily identifiable with associative affect transfer than with direct affect transfer, as exemplified by the higher levels of contingency awareness reported in chapter 3. To test this proposition, in the current experiment I incorporated a manipulation that would increase the likelihood that participants would regard the repeated pairings of beer brands with affective stimuli as an unjustified persuasion attempt. Specifically, after the conditioning procedure, half of the participants would be warned that the affective stimuli carry no valuable information concerning the taste or quality of the beer and that therefore it would be unwise to base their brand attitudes on them.

In this experiment I will also assess implicit attitudes towards the brands because, contrary to the earlier experiments, there are now theoretical reasons to expect that the effects might be different for explicit and implicit attitudes.

Explicit attitudes are more under conscious control than implicit attitudes (Gawronski and Bodenhausen 2006; Greenwald et al. 1998), hence to the extent that correction of the attitudes is possible (with associative affect transfer), this should mainly be the case for explicit attitudes. I only expect a divergence of implicit and explicit attitudes in this experiment, because this is the first time that the manipulation (here: persuasion knowledge activation) leaves the associative structure of the conditioned stimuli intact. In the US-revaluation experiment described in chapter 3, I observed a negative effect on brand attitudes resulting from a decrease in valence of the affective stimulus in the associative affect transfer conditions (i.e., using homogeneous pairings). The associative network of the CS was changed in the sense that the valence of the affective stimuli (USs) associated to the brand was changed. Because the affective response to the brand (CS) is theorized to be mediated by the activation of the affective stimuli (USs) in memory, explicit and implicit attitudes are both expected to follow the change in the valence of the affective stimulus. In fact, in three recent evaluative conditioning experiments using homogeneous pairings, a US-revaluation effect was indeed observed with implicit measures of attitudes (Walther et al. 2009). The findings by Walther et al. lead us to believe that also in the second (consolidation-disruption) experiment implicit attitudes would mirror the findings on the explicit attitudes. In this experiment, associative affect transfer was interfered with by disrupting the participants' memory of the brand – affective stimulus associations. Because Walther et al. showed that the implicit attitudes in homogeneous conditioning procedures also depend on the brand (CS) – affective stimulus (US) associations, disrupting these associations should also interfere with implicit attitudes.

The current experiment is a different case however. This time there is no interference with the establishment in memory of CS – US associations, nor a change of valence of the USs, hence the associative CS-US network that underlies the brand (CS) attitudes remains intact. This time the participants' activation of persuasion knowledge instills a desire to actively correct their established brand attitudes, hence to 'overrule' the underlying associative

structure in the case of associatively conditioned positive brands. Such correction processes are expected to be more efficient at the explicit than at the implicit level.

**H4:** When evaluative conditioning occurs through associative affect transfer [sequential homogeneous procedure], consumers will be better able to defy the evaluative conditioning effect on their explicit (but not implicit) brand (CS) attitudes than when evaluative conditioning occurs through direct affect transfer [simultaneous heterogeneous procedure].

## *Method*

### **Participants and Design**

The participants in this experiment were 216 undergraduate students (150 male, 66 female) at RSM Erasmus University who were rewarded with partial course credits. Two participants were omitted from analysis, one because his reaction times were not properly recorded due to a keyboard malfunction, the other because she was extremely visually impaired. This left 214 participants in a 2 (CS type: positively conditioned, neutrally conditioned) x 2 (attitude assessment: explicit, implicit) x 2 (conditioning procedure: sequential homogeneous, simultaneous heterogeneous) x 2 (persuasion knowledge activation: no, yes) x 2 (counterbalancing factor: explicit attitudes first assessed, implicit attitudes first assessed) mixed design, with the first two factors manipulated within subjects, and the latter three between subjects.

### **Stimuli and Procedure**

The first (evaluative conditioning) part of this experiment was completely analogous to the experiments in chapters 2 and 4. Participants were assigned either to a sequential homogeneous or a simultaneous heterogeneous



conditioning procedure. Again there were eight beer brands (CSs), four of which would be paired with positive affective stimuli (the positively conditioned brands) and four would be paired with neutral affective stimuli (the neutrally conditioned brands).

After the evaluative conditioning procedure, participants in the persuasion knowledge activation condition read the following: “WARNING: You just saw these beers in combination with pictures. It’s important to realize that these pictures contain no valuable information about the taste or quality of the beer. Therefore, it might be advisable not to rely too much on the pictures the beers were shown with, when you determine your attitudes towards the beers.” Participants in the control condition received no such warning.

Immediately afterwards, participants’ explicit as well as implicit attitudes towards the beers were assessed. Which type of attitudes was assessed first, was counterbalanced across participants. The explicit attitude assessment occurred analogously to experiments in previous chapters. For the implicit attitude assessment, I relied on an affective priming task (Fazio et al. 1986; Wittenbrink 2007). In an affective priming procedure, primes are paired with target words of polarized valence. I used six positive words (love, peace, humor, friend, glory, success) and six negative words (anger, failure, garbage, vomit, traitor and disgust). The participants’ task is to categorize the target words according to their evaluative connotation (positive vs. negative). Of interest is whether, across a series of trials, the primes (CSs) facilitate responding to positively valenced targets or to negatively valenced target words. Through the mechanism of response competition (Klinger, Burton, and Pitts 2000), positively valenced primes (CSs) will facilitate the correct classification of positive words and inhibit the correct classification of negative words, whereas the reverse holds true for negatively valenced primes. For example, a CS (prime) that has acquired positive valence will generate a positive feeling when perceived. If the following target stimulus (the word) is positive, classifying it as such is easier when the participant is already experiencing a positive feeling. If however the target word is negative,

classifying it as such is slowed because of the inconsistent feeling that is caused by the prime.

A trial in the affective priming task would consist first of a presentation of the prime (i.e., the CS) which was presented for 0.5 seconds. Next there would be a short time interval (50 ms) before the target word would be presented. Participants were instructed to press the 'P' button as fast as possible when the word was positive, and the 'N' button when it was negative. Upon a correct response, they would move on to the next trial. With an incorrect response, an error sign appeared (a red cross) and the participant still needed to enter the correct response. There was a two second pause between trials. First there were 12 practice trials during which each of the six positive and six negative words was presented once, every time preceded by one of the CSs (randomly picked). Next, there were 96 experimental trials: each of the eight CSs would be presented with every positive and negative word once. From the participants' point of view, there was no demarcation between the practice and the experimental trials. However, response latencies were only recorded for the experimental trials.

Before the demographic questions, I used the same set of open-ended questions from chapter 3 to assess awareness of the purpose and hypotheses of the study.

## ***Results***

### **Explicit Attitudes**

The same attitudinal index was computed as in the previous experiments. A mixed design was used to analyze the attitudes towards the CS as a function of CS type (positively conditioned vs. neutrally conditioned), the conditioning procedure (sequential homogeneous vs. simultaneous heterogeneous), the persuasion knowledge factor (activated vs. not activated) and the counterbalancing factor (explicit vs. implicit attitudes first assessed). The

counterbalancing factor did not interact with any other factor; hence the data were collapsed over its levels. The basic evaluative conditioning effect of CS type ( $F(1, 210) = 72.68, p < .001$ ) was moderated only by an interaction with the persuasion knowledge factor ( $F(1, 210) = 6.54, p = .01$ ). Unfortunately, the three-way interaction between CS type, conditioning procedure and persuasion knowledge activation was not significant ( $F(1, 210) = 0.73, p < .40$ )<sup>1</sup>. Because I predict a stronger effect of persuasion knowledge activation on conditioned attitudes in the sequential homogeneous condition than in the simultaneous heterogeneous condition (and the footnoted auxiliary analysis indicates this test is justified), I investigated the two-way interactions between the evaluative conditioning effect (the CS type factor) and the persuasion knowledge factor in the two conditioning procedures separately.

In the sequential homogeneous conditioning procedure (associative affect transfer), the main effect of CS type ( $F(1, 210) = 35.44, p < .001$ ) was qualified by a significant interaction with persuasion knowledge activation ( $F(1, 210) = 5.93, p < .02$ ), indicating that the evaluative conditioning effect is larger in the

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<sup>1</sup> This is not completely unexpected, because strictly speaking we do not expect participants to be completely unable to use their persuasion knowledge in the simultaneous heterogeneous condition. In the extreme case, a participant who realizes his/her attitudes have been unjustifiably influenced can always correct by rating all brands (CSs) neutrally, whatever the type of affect transfer. What is predicted though, is that such a correction process should be more powerful when the source of the influence is more readily identifiable, as is the case with associative affect transfer. Because the effect is likely to be directionally the same in both conditioning procedures (just stronger in one), the statistical power to demonstrate this three-way interaction is expected to be low. Therefore, I also conducted a more powerful analysis in which I aimed to maximally reduce the model's error variance. In this analysis the counterbalancing factor (implicit vs. explicit attitudes first assessed) as well as the dichotomized hypothesis awareness factor (see below p. 83) were allowed as full factors (interacting with the other predictors) to reduce error variance, and the data from the 5% fastest responders on the explicit attitude questions were removed. These participants were most likely not to have taken the experiment seriously, and this left us with 203 respondents for the analysis. In this analysis, the three-way interaction between CS type (positively vs. neutrally conditioned CS), the conditioning procedure (simultaneous heterogeneous vs. sequential homogeneous) and the persuasion knowledge factor (activated vs. not activated) on the explicit CS attitudes was significant ( $F(1, 187) = 4.17, p = .04$ ). This three-way interaction was itself not further qualified by the hypothesis awareness or counterbalancing factors (all  $p$ 's  $\geq .10$ ).

control condition ( $M_{\text{Neutral}} = 3.71$ ,  $M_{\text{Positive}} = 4.63$ ,  $M_{\text{Difference}} = 0.92$ ) than in the persuasion knowledge active condition ( $M_{\text{Neutral}} = 3.96$ ,  $M_{\text{Positive}} = 4.34$ ,  $M_{\text{Difference}} = 0.38$ ). Although significantly reduced, participants in the persuasion knowledge active condition did not completely eliminate the evaluative conditioning effect on their brand (CS) attitudes as the attitudinal difference between positively and neutrally conditioned brands remains significant ( $F(1, 210) = 6.12$ ,  $p = .01$ ). This is consistent with my finding in chapter 3 that even when affect transfer is associative, awareness of the CS-US relationship is not necessary for the evaluative conditioning effect to appear. It can be expected that especially when participants are unaware of the CS-US relation, they will be unable to correct for the evaluative conditioning effect on their brand attitudes.

In the simultaneous heterogeneous conditioning procedure (direct affect transfer) on the other hand, only the basic evaluative conditioning effect (CS type) was significant ( $F(1, 210) = 37.24$ ,  $p < .001$ ), not moderated by the persuasion knowledge activation ( $F(1, 210) = 1.42$ ,  $p > .20$ ), indicating that the evaluative conditioning effect did not differ significantly in the control condition ( $M_{\text{Neutral}} = 3.54$ ,  $M_{\text{Positive}} = 4.35$ ,  $M_{\text{Difference}} = 0.81$ ) and the persuasion knowledge active condition ( $M_{\text{Neutral}} = 3.85$ ,  $M_{\text{Positive}} = 4.40$ ,  $M_{\text{Difference}} = 0.55$ ). Finally, I conducted two specific contrast analyses which confirmed that the evaluative conditioning effect was smaller in the sequential homogeneous condition with activated persuasion knowledge than in the other conditions ( $F(1, 210) = 4.35$ ,  $p < .04$ ), whereas this was not the case for the simultaneous heterogeneous condition with activated persuasion knowledge ( $F(1, 210) = 0.75$ ,  $p > .35$ ).

## **Implicit Attitudes**

Prior to analysis of the affective priming data, I eliminated response times from incorrect responses (2.8%) and truncated outlier latencies higher than 1500 ms or lower than 200 ms (1.8%). Next, the response latencies were log-transformed in order to achieve normal distribution (Fazio 1990; Gawronski,

Bodenhausen, and Becker 2007). For every brand (CS), a positivity index could then be computed by subtracting the average response latency when the brand primed a positive word from the response latency when the brand primed a negative word. This is called a positivity index because it indicates the extent to which seeing the brand (CS) facilitates responding 'positive' to a positive word versus inhibits responding 'negative' to a negative word. By averaging the positivity indices of their constituting brands, one positivity index was obtained for the positively conditioned brands and one for the neutrally conditioned brands.

I analyzed the positivity indices as a function of the CS type (positively vs. neutrally conditioned), the conditioning procedure (sequential homogeneous vs. simultaneous heterogeneous), the persuasion knowledge factor (activated vs. not activated) and the counterbalancing factor (explicit vs. implicit attitudes first assessed) as a mixed model with the first factor within subjects and the latter three between. The counterbalancing factor showed no interactions with evaluative conditioning's implicit effect size (the CS type factor; all  $p$ 's > .50), hence the data were collapsed over this factor for further analysis. The resulting model revealed a significant main effect of evaluative conditioning (CS type) only ( $F(1, 210) = 8.07, p < .01$ ), which was not qualified by interactions with the conditioning procedure, the persuasion knowledge activation, or both (all  $p$ 's > .50). To allow a comparison with the effects on the explicit attitudes, I analyzed the effect of the persuasion knowledge activation on the implicit brand attitudes separately for the two conditioning procedures. In the sequential homogeneous condition, there was a main effect of CS type only ( $F(1, 210) = 4.00, p < .05$ ), which was – contrary to the explicit attitudes – not moderated by the persuasion knowledge factor ( $F(1, 210) = 0.60, p > .40$ ), indicating that positively conditioned brands (CSs) had a higher implicit positivity index than neutrally conditioned brands in the control condition ( $M_{\text{Neutral}} = 0.02, M_{\text{Positive}} = 0.04, M_{\text{Difference}} = 0.02$ ) as well as in the persuasion knowledge active condition ( $M_{\text{Neutral}} = 0.03, M_{\text{Positive}} = 0.04, M_{\text{Difference}} = 0.01$ ). Also in the simultaneous heterogeneous condition, there was a main effect of CS type only ( $F(1, 210) = 4.07, p < .05$ ), which was – this time analogous to

the explicit attitudes – not moderated by the persuasion knowledge factor ( $F(1, 210) = 0.00, p > .95$ ), indicating that positively conditioned brands (CSs) had a higher implicit positivity index than neutrally conditioned brands in the control condition ( $M_{\text{Neutral}} = 0.04, M_{\text{Positive}} = 0.06, M_{\text{Difference}} = 0.02$ ) as well as in the persuasion knowledge active condition ( $M_{\text{Neutral}} = 0.03, M_{\text{Positive}} = 0.05, M_{\text{Difference}} = 0.02$ ).

### **Hypothesis Awareness**

Two independent coders who were blind to the experimental conditions sorted the participants in four different categories of hypothesis awareness according to the qualitative responses on the open-ended hypothesis awareness questions. The coders' initial classification was the same in 93% of the cases. The conflicting cases were resolved through discussion. The majority of participants (152) were classified as not hypothesis aware (the first category). Sixty participants had noted that some brands were systematically paired with more positive images than others, and speculated that this might affect their opinions (the second category). Only two participants expressed any suspicion that the 'warning' (the persuasion knowledge manipulation) was intended to influence their attitudes (the third category). No participant was classified in the fourth category of hypothesis awareness, which was reserved for participants who would qualify for both of the previous categories. Due to the low  $N$  in categories 3 and 4, I dichotomized participants into not hypothesis aware at all ( $N = 152$ ) or aware at some level ( $N = 62$ ). This hypothesis awareness factor never interacted with any of the experimental factors in the previously reported models and when incorporated as a full factor in the analyses, it generally increased the significance levels of the other factors.

### ***Discussion***

This experiment illustrates another important difference between direct and associative affect transfer. When people become aware that their brand

attitudes have been unjustifiably influenced by the repeated co-occurrences with positive affective stimuli (i.e., when their persuasion knowledge becomes activated), they are better able to correct for this influence on their brand attitudes when the source of the persuasion attempt is more readily identifiable. With direct affect transfer, the brand has become intrinsically more positive, independent of established memory associations with the affective stimuli (see chapters 3 and 4). With associative affect transfer on the other hand, the positive brand affect remains mediated by brand (CS) – affective stimulus (US) associations in memory. Hence, the source of the influence (the affective stimuli that occurred with the brand) is more readily identifiable with associative affect transfer. Consistent with this I only found a significant attenuating effect of persuasion knowledge activation on explicit brand attitudes when affect transfer was associative (in the sequential homogeneous conditioning procedure). When affect transfer was direct (in the simultaneous heterogeneous conditioning procedure) the activation of persuasion knowledge did not result in a significant attenuation of conditioned brand attitudes.

An important qualification of these findings relates to the difference between explicit and implicit attitudes. Notably, persuasion knowledge activation never had an effect on people's implicit brand preferences. Direct and associative affect transfer both resulted in positively conditioned brands becoming more positively liked on the implicit level. Increasing people's awareness that their attitudes had been unjustifiably influenced by the affective stimuli did not reduce their implicit preference for positively conditioned brands. This is logical because implicit attitudes depend most on the underlying associative structure (Gawronski and Bodenhausen 2006), which remains unchanged by the persuasion knowledge activation. Thus even when people are able to actively correct their explicit brand attitudes (with associative affect transfer), evaluative conditioning's effect on their implicit attitudes is not attenuated.

From a managerial or advertisers' perspective, these results have clear implications. Once more it appears beneficial to aim for direct affect transfer to brands. Compared to associative affect transfer, the brand affect acquired

through direct affect transfer appears to be much less susceptible to consumers' active correction strategies. However, the results of persuasion knowledge activation are much less dramatic from a brand managers' perspective than for example the interference with memory that was explored in chapter 4 or the effect of a devaluation of the endorsers (USs) found in chapter 3. Even after consumers' correction for the influence of the affective stimuli, the positively conditioned brands remained more positively liked than the neutrally conditioned brands, also when affect transfer was associative. Furthermore, people's implicit brand attitudes are never affected by persuasion knowledge activation and both direct as well as associative affect transfer resulted in more favorable implicit attitudes towards positively conditioned brands. This is favorable for brand managers because implicit attitudes are predictive of product choice when consumers experience mental load (Gibson 2008).

These findings might have serious repercussions for public policy and advertising regulation. Specifically, they simultaneously illustrate the power of advertising based on evaluative conditioning and the relative inefficacy of informing of the public about its potentially biasing effects. Consumers who were warned that the positive affective stimuli were uninformative of the quality of the brand, still had more positive feelings towards those brands that had been paired with positive stimuli. When affect transfer was associative in nature, consumers were able to correct for the conditioning effect to some extent, but only on their consciously held explicit attitudes. No correction of the effect took place however at the more unconscious, implicit level. When affect transfer is direct, correcting for evaluative conditioning's effect proved impossible both at the explicit and at the implicit level of brand attitudes.





## Chapter 6

### General Discussion

#### *Summary and Implications for Advertising*

Evaluative conditioning is an important determinant of consumers' likes and dislikes and has recently garnered much attention as the main source of implicitly learned attitudes (Gawronski and Bodenhausen 2006). Despite its importance, not much is known about the types of learning processes involved in evaluative conditioning. In their review of the available evidence, De Houwer et al. (2001) concluded that attitude transfer through evaluative conditioning is associative (referential) in nature. The referential learning model that was proposed to account for the existing findings in evaluative conditioning holds that the affect experienced towards the brand (CS) is mediated by associations in memory with the affective stimuli (USs) that previously co-occurred with the CS. In this dissertation, I introduce a new theory and show that in addition to associative affect transfer (mediated by CS-US associations), evaluative conditioning can also lead to direct affect transfer. With direct affect transfer, the positive affect from the affective stimuli becomes directly attached to the brand, without the necessity to establish brand (CS) – affective stimulus (US) associations in memory.

In the first chapter, I have identified two hitherto neglected but crucial properties of conditioning procedures that jointly determine the type of affect transfer taking place. First, I distinguish between simultaneous brand – affective stimulus presentations versus sequential presentations in which the brand is presented first, followed by the affective stimulus. Simultaneous presentations are a necessary condition for direct affect transfer because only when brand and affective stimulus are presented simultaneously, there exists an opportunity for 'affective confusion', a prediction which is based on the primacy of affect and the diffuse nature of affective responses during the first

milliseconds of perception (Stapel et al. 2002; Zajonc 1980). Second, I also distinguish between homogeneous CS-US pairings, in which a brand (CS) is repeatedly paired with the same affective stimulus (US) versus heterogeneous CS-US pairings, in which a brand is always paired with different affective stimuli. Associative affect transfer occurs through the strengthening of specific CS-US links in memory; hence it is promoted by a homogeneous pairings procedure.

In order to achieve successful evaluative conditioning, it is important to keep in mind the different routes through which affect can be transferred. In chapter 2 (replicated in chapter 3) I demonstrated that not all ways of pairing brands with positive affective stimuli lead to increased liking of the brand. Specifically, a sequential heterogeneous pairings procedure which was theorized to be conducive of neither direct nor associative affect transfer was in fact found to be inferior at transferring affect. Furthermore, I have argued and shown that direct affect transfer differs from associative affect transfer on three dimensions that are important for the understanding of consumer behavior with significant practical implications.

First, the most straightforward way to distinguish direct from associative affect transfer is to investigate what happens to brand attitudes when after the repeated co-occurrences of brands with affective stimuli, the person's attitudes towards the affective stimuli change. In the literature, this is referred to as the US-revaluation effect (Baeyens et al. 1992b; Mackintosh 1983; Rescorla 1974, 1988; Walther et al. 2009) and it was the focus of chapter 3. With associative affect transfer, the brand attitudes remain mediated by the associations with the affective stimuli. Hence, a devaluation of the affective stimuli leads to a devaluation of the brand attitudes. With direct affect transfer on the other hand, the brand has directly acquired the positive affect, without the need for associations with the affective stimuli. Hence, a devaluation of the affective stimuli leaves the brand attitudes unharmed. This discovery is relevant for brand managers because it applies directly to the situation in which spokespersons or celebrity endorsers fall from grace. Millions of dollars are spent annually on celebrity endorsements and brand managers are well aware

of the potential risk they pose. Generally, companies try to distance themselves as soon as possible from fallen endorsers in an effort to minimize the collateral damage to their brand. The results from chapter 3 suggest that brands can increase their brand equity in a relatively risk-free manner by using simultaneous heterogeneous brand – affective stimulus presentations. In this case, affect transfer does not rely on establishing specific brand-endorser links. Rather, affect is transferred directly to the brand such that even when all its endorsers would subsequently fall from grace (as happened in chapter 3), the brand still retains the positive affect it acquired earlier.

In chapter 4, I explored a second way to distinguish direct from associative affect transfer. By definition, associative affect transfer is dependent on the formation of new CS-US associations in memory, whereas direct affect transfer is not. Therefore, associative affect transfer should be vulnerable to manipulations which interfere with the consolidation or retrieval of memory traces whereas direct affect transfer is not. A powerful way to interfere with memory associations is engaging in new learning immediately after the learning episode in which the target associations are formed (Müller and Pilzecker 1900). In chapter 4 I found indeed that associative affect transfer is extremely vulnerable to new learning after the conditioning procedure, whereas direct affect transfer is not. This finding too provides straightforward recommendations to advertisers. After all, advertisers can seldom profit from the undivided attention of their target audience and they compete constantly against interfering influences and subsequent learning. Because direct affect transfer does not depend on memory traces linking the brand to the affective stimuli, it is pre-eminently suited to influence brand attitudes in cluttered advertising environments.

Finally, in chapter 5 I explored a third way to distinguish direct from associative affect transfer by investigating consumers' ability to correct for the conditioning effect on their brand attitudes. Consumers should be better able to correct for a persuasion attempt when the source of the influence is more readily identifiable (e.g., Campbell and Kirmani 2000). With associative affect transfer, the source of the influence is etched in memory by establishing CS-

US associations. Therefore the source of the influence (the affective stimulus or US) is more readily identifiable than with direct affect transfer which doesn't rely on establishing CS-US associations in memory. In chapter 5 I found indeed that consumers whose persuasion knowledge has become activated, are better able to disregard the evaluative conditioning effect on their explicit brand attitudes when affect transfer is associative. With direct affect transfer on the other hand, explicit brand attitudes are relatively immune to consumers' use of persuasion knowledge. Implicit brand attitudes remain unaffected by persuasion knowledge activation regardless of the type of affect transfer (direct or associative). This is consistent with the idea that implicit attitudes are a direct reflection of the underlying associative network, and are less susceptible to correction strategies.

### *Implications for Associative Models of Attitudes*

#### **Updating the Associative-Propositional Model of Evaluations: From APE to DAPE**

A landmark article by Gawronski and Bodenhausen (2006) proposed a dual process model for attitude formation based on associative learning and propositional reasoning. The Associative and Propositional processes in Evaluation (APE) model essentially holds that explicit attitude judgments are derived jointly from an implicit, underlying associative structure and from a set of consciously held, propositional beliefs with truth values attached to them. When a stimulus is encountered, the associative system quickly presents an automatic affective reaction which is based on the activation pattern in memory. The associative affective reaction has propositional implications which can be consistent or inconsistent with other more consciously held propositional attitudinal information. Implicit attitudes are more purely reflective of the underlying associative structure than explicit attitudes.

Gawronski and Bodenhausen (2006) discuss several ways in which the associative and propositional processes can interact in attitudinal judgments.

Their ‘Case 1’ example discusses the situation in which evaluative conditioning imposes changes on the underlying associative network, while the propositional system has no reason to discard the input from the associative system. This case matches the basic evaluative conditioning effect in my studies. The CSs in my studies are new (beer) brand names, about which the participants hold no pre-existing beliefs. In that case, the input from the associative system doesn’t get contested by the propositional system and forms the basis for the final (explicit, propositional) attitude judgment. Gawronski and Bodenhausen also discuss the case in which a given factor leads to a change in pattern activation or associative structure, but other relevant propositions lead to a rejection of the associative evaluation as a valid basis for the evaluative judgment (‘Case 2’). My findings on associative affect transfer’s susceptibility to persuasion knowledge activation (chapter 5) fit in this case. The evaluative implications of the associative system (e.g., ‘I like this beer because it reminds me of beautiful nature scenes’) are discarded, because the validity of the associative system input is questioned (e.g., ‘wait a minute, that doesn’t mean anything regarding the taste or quality of the beer’). Gawronski and Bodenhausen also argue that in this case, the implicit attitudes might still be unaffected by the propositional correction process. This is exactly what I found in chapter 5.

The associative affect transfer fits perfectly in the APE framework as conceptualized by Gawronski and Bodenhausen (2006). Where I break new ground is in the discovery of the alternative possibility for direct affect transfer. Gawronski and Bodenhausen agree with the referential learning model from De Houwer et al. (2001) that evaluative conditioning’s effect on attitudes is mediated by changes in the associative network of the conditioned stimulus. According to these authors, evaluative conditioning can only cause a CS (e.g., a brand) to become more positively evaluated by adding new associations with positively valenced affective stimuli (USs), or – in the case of CSs (brands) with a rich set of pre-existing associations – by changing the probability that only a subset of these associations (e.g., positive ones) are activated upon perception of the CS (e.g., Gibson 2008). In addition, I have shown that with

simultaneous heterogeneous CS-US pairings, it is possible to directly change the attitudinal valence of a CS or brand, without the need to establish new associations in memory. Affect can indeed scatter and become attached to new stimuli (as originally proposed by Murphy and Zajonc 1993), provided the conditioned stimulus (brand) is perceived simultaneously with the affective stimulus. Therefore, to get a full view on the different processes involved in attitude formation, it is necessary to consider direct affect transfer next to associative affect transfer and propositional reasoning. With direct affect transfer, the affective valence of the node (concept, CS, brand... ) itself is changed in the network. The APE model should therefore be updated to a DAPE model which would stand for 'Direct, Associative and Propositional processes in Evaluation'.

### **One, Two, Three, Processes Spree**

Not all authors agree that associative and propositional processes are really distinct types of processing, as many processes that have been described as associative may actually be propositional (Mitchell et al. 2009; Osman 2004). Gawronski and Bodenhausen (2006, p. 714) already discussed this possibility and argue that evaluative conditioning might be one of the last remaining strongholds in which a dual process conceptualization is justified. Mitchell et al. are less certain about this and identify the contingency awareness question as a crucial one to make the distinction. If evaluative condition can occur without contingency awareness, it would be evidence for a distinction between associative and propositional systems. Given the large number of conflicting findings, they leave evaluative condition the benefit of the doubt but argue that the more parsimonious theory involves only a single system. The reasoning by Mitchell et al. is supported by recent findings with more advanced contingency awareness measures which also cast doubt on the possibility for evaluative conditioning to occur without awareness of the CS-US contingencies (Pleyers et al. 2007).

I disagree with the extreme reductionism in the theory of Mitchell et al. (2009). First, they disregard evidence that evaluative conditioning can occur when the affective stimulus (US) has been subliminally presented (e.g., experiment 2 by Field and Moore 2005). Subliminal presentations can hardly give rise to consciously accessible propositional knowledge about the CS. Second, among the admittedly chaotic set of findings on contingency awareness, they also disregard a consistent set of studies that found no relation between evaluative conditioning and contingency awareness (Gibson 2008; Olson and Fazio 2001, 2002, 2006). These studies all employed a simultaneous heterogeneous conditioning procedure (leading to direct affect transfer) and repeatedly reported that awareness of the CS-US pairings was not related to the evaluative conditioning effect. This is consistent with my own finding that evaluative conditioning is not related to contingency awareness in the simultaneous heterogeneous pairings condition (with direct affect transfer) in chapter 3. Direct affect transfer is not related to contingency awareness because it is not associative (i.e., reliant on CS-US associations), nor propositional (i.e., reliant on consciously accessible and endorsed statements) in nature. Therefore, I believe that at the very minimum in evaluative conditioning there must be two separate processes possible: direct affect transfer on the one hand and associative-propositional affect transfer on the other. Whether the associative-propositional route also consists of two separate learning processes (as argued by Gawronski and Bodenhausen 2006) or is actually completely propositional in nature (as argued by Mitchell et al. 2009) depends on the findings regarding the importance of contingency awareness in homogeneous pairings procedures. I have discussed (a subset of) the methodological problems involved in contingency awareness analyses in chapter 1, and argued that any conclusion based contingency awareness analyses should be approached with extreme caution. Nevertheless, in the margin of chapter 3 I have conducted a more fine-grained contingency awareness analysis than earlier studies have. I found that awareness of the CS-US contingency amplifies the evaluative conditioning effect in homogeneous pairings procedures, but also that awareness was not absolutely necessary for



the effect to emerge. This suggests that associative learning can occur independently of propositional reasoning in homogeneous pairings procedures. This is consistent with the findings of Field and Moore (2005) who successfully used undetectable (subliminal) US presentations in a sequential homogeneous pairings procedure. I therefore suggest that the empirical evidence warrants a distinction between three processes active in attitude formation: Direct, Associative and Propositional processes in Evaluation (DAPE). In this dissertation I have introduced the evidence for direct affect transfer. Evidently more research is needed to tease associative and propositional processes apart.

### ***Limitations and Directions for Future Research***

This updated theory of evaluative conditioning suggests many interesting areas for further research. For a start, I argued in chapter 4 that manipulations that interfere with the consolidation or retrieval of memory traces will interfere with associative but not with direct affect transfer. I demonstrated that new learning episodes following an evaluative conditioning procedure disrupt affect transfer when it is associative (not when it is direct), but it might be worthwhile to investigate to what extent this interference by subsequent learning can be generalized. For example, it might be worthwhile to investigate the influence of cognitive load on each type of evaluative learning.

Traditionally, evaluative conditioning has been framed as an incidental learning process that relies on limited cognitive resources (Gawronski and Bodenhausen 2006). However, it is possible that the encoding and recollection of associations between conditioned stimuli and specific unconditioned stimuli in associative affect transfer requires more cognitive resources than the less specific transfer of affective value in direct affect transfer. I have also indicated in chapter 4 that it is important to investigate exactly at which stage subsequent learning episodes interfere with associative affect transfer (at the encoding or retrieval stage of the CS – US associations).

Another pertinent matter for further research concerns the functional properties of direct versus associative affect transfer. In this dissertation, I have not investigated whether there are functional differences in the required number of presentations, differential sensitivity to classic extinction manipulations, generalization of evaluations to stimuli similar to but different from the CS (think of brand extensions), and context-specificity of the conditioned attitude (the extent to which the attitudinal effects hold in contexts other than the learning environment). In fact, most of the established properties of evaluative conditioning have been investigated with paradigms favoring associative affect transfer, ultimately leading to the referential (associative) learning model of evaluative conditioning (De Houwer et al. 2001). It remains to be seen to what extent the presumed characteristics of evaluative conditioning hold when affect transfer is direct. Some of them may very well be characteristics that are specific to associative affect transfer instead of being characteristics of evaluative conditioning *per se*.

The question about the optimal number of repetitions has implications for the phenomenon of advertising wear out. There is a limit to the amount of repetition that will aid evaluative conditioning's effects. In a study by Baeyens and colleagues (Baeyens et al. 1992a), a quadratic relation was found between evaluative conditioning's effect size and the number of repetitions. In their sequential homogeneous conditioning procedure (i.e., leading to indirect affect transfer), the conditioning effect increased until 10 repetitions, but started to decrease afterwards. Very related is the phenomenon of advertising wear out: at some point individuals become satiated with numerous exposures to the same advertisement (Campbell and Keller 2003). Marketers are well aware of this and try to moderate wear out by using cosmetic variations of advertising campaigns. Using the same general advertising theme they bring variation to their ads by using different backgrounds, font types, different spokespersons etc, comparable to a heterogeneous conditioning procedure. This suggests another area in which direct affect transfer might be superior to associative affect transfer as the simultaneous heterogeneous conditioning procedure might lead to lower satiation or advertising wear out.

In addition, a seminal paper by Kim et al. (1996) has shown that in conditioning procedures other elements of meaning beyond affect can be conditioned. For example, pairing a pizza delivery service with pictures of a race car increased the perceived speed of the pizza delivery service. It is unclear if this type of learning can be associative or is necessarily propositional. This might have implications for the automaticity with which such learning can occur. My contingency awareness findings seem to suggest that at least associative learning of affect can occur independently of propositional reasoning. The question then becomes to what extent non-affective properties (such as the meaning elements in the studies by Kim et al.) can be learned associatively rather than propositionally.

Finally, taking a broader perspective and abstracting away from the terminology of evaluative conditioning, my findings raise interesting questions about the nature of consumer attitudes. They suggest that brands can be evaluated positively for different reasons. Brands can be evaluated positively because they trigger the recollection of positive stimuli but may also become intrinsically positive, independent of the stimuli that created the positive attitude. These two types of brand attitudes might have very different implications for consumer behavior. Intrinsically positive brand attitudes may be more robust, rely less on situation-specific memory cues, and have more automatic behavioral implications than associatively positive brand attitudes. For example, when consumers in a buying situation are in a hurry or under mental load, the pattern activation underlying associative affect may be (partly) impaired while intrinsically positive brand attitudes remain unaffected.

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## Samenvatting

Een van de meest universele technieken in de reclamewereld behelst de presentatie van een merk in combinatie met affectieve stimuli, zoals beelden die positieve gevoelens opwekken. Denk bijvoorbeeld aan merken die vertoond worden in combinatie met prachtige landschappen, lachende mensen, bewonderde beroemdheden enzovoort. Dat deze techniek zinvol is, bewijzen eerdere studies over een fenomeen genaamd ‘evaluatieve conditionering’. Evaluatieve conditionering bestaat uit het herhaaldelijk samen voorkomen van een merk (de geconditioneerde stimulus) en een positieve affectieve stimulus (de ongeconditioneerde stimulus), wat ervoor zorgt dat de gevoelens ten opzichte van het merk positiever worden. In dit proefschrift onderzoek ik wat de onderliggende psychologische processen zijn waardoor dit effect kan optreden. Ik toon aan dat er minstens twee manieren zijn om dit effect te bereiken: een associatieve en een directe.

Volgens de huidige theorievorming over evaluatieve conditionering, verloopt deze transfer van gevoel altijd op een *associatieve* manier. Dat betekent dat door de herhaalde gezamenlijke presentatie van het merk met de positieve affectieve stimulus, er een associatie tussen de twee gevormd wordt in het geheugen. Deze associatie zorgt er vervolgens voor dat wanneer men in de toekomst het merk percipieert, de affectieve stimulus automatisch mee geactiveerd wordt in het geheugen. Denk bijvoorbeeld aan Pepsi cola dat in verschillende advertentiecampagnes zijn merk presenteerde in combinatie met de populaire artieste Britney Spears. Volgens de associatieve verklaring wordt hierdoor een verbinding gevormd tussen Pepsi en Britney Spears in het geheugen, zodat in de toekomst wanneer consumenten het Pepsi logo zien, ze bewust of onbewust herinnerd worden aan Britney Spears. Het is vervolgens deze verhoogde activering van Britney Spears in het geheugen die zorgt voor het positieve gevoel dat ervaren wordt ten opzichte van Pepsi.

In dit proefschrift toon ik aan dat er ook een tweede proces mogelijk is waarbij het positieve gevoel *direct* overgedragen wordt op het merk, zonder dat het dus nodig is om associaties in het geheugen te vormen tussen het merk en

de affectieve stimulus die het positieve gevoel veroorzaakte. In het eerder gegeven voorbeeld van Pepsi en Britney, zou dit betekenen dat de herhaalde blootstelling aan Pepsi samen met Britney ervoor zorgt dat het positieve gevoel dat gegenereerd wordt door Britney rechtstreeks afstraalt op Pepsi, op een dusdanige manier dat Pepsi daar zelf positiever van wordt. Wanneer consumenten dan in de toekomst het Pepsi logo zien, zouden ze het positieve gevoel direct moeten ervaren, zonder dat dit afhangt van een verhoogde activering van Britney Spears in het geheugen.

In het eerste hoofdstuk van dit proefschrift maak ik een theoretische analyse van de belangrijkste presentatie karakteristieken die leiden tot associatieve dan wel directe overdracht van gevoel wanneer merken samen voorkomen met affectieve stimuli. Een cruciale eerste eigenschap behelst de simultane dan wel sequentiële presentatie van het merk en de affectieve stimulus. Ik argumenteer dat een simultane presentatie essentieel is om directe gevoelsoverdracht te kunnen bewerkstelligen. Onderliggend hieraan zijn eerdere bevindingen waaruit bleek dat de affectieve waarde van een stimulus (het positieve of negatieve gevoel) al ervaren wordt nog voor die stimulus cognitief geïdentificeerd is. Dit houdt in dat consumenten gedurende enkele milliseconden al positieve gevoelens kunnen ervaren voor ze weten waardoor die veroorzaakt worden. Dit opent de deur voor affectieve verwarring: wanneer op het moment dat positief gevoel ervaren wordt maar de bron ervan nog niet geïdentificeerd is, het merk ook aanwezig is, kan het profiteren van deze affectieve verwarring en kan gevoel rechtsreeks overgedragen worden op het merk. Daarom is een simultane presentatie van het merk met de affectieve stimulus essentieel. Bij een sequentiële presentatie worden het merk en de affectieve stimulus afwisselend vertoond, bijvoorbeeld eerst het merk en dan pas de affectieve stimulus. Dan is het merk dus niet aanwezig gedurende de kostbare enkele milliseconden dat het positieve gevoel van de affectieve stimulus nog niet geïnterpreteerd is, en zich zou kunnen hechten aan het merk. Bij sequentiële presentatie zal er daarom enkel de mogelijkheid voor associatieve gevoelstransfer bestaan. Voor associatieve gevoelstransfer volstaat

het namelijk dat consumenten leren dat het merk en de affectieve stimulus samen voorkomen, en dit kan zowel bij simultane als bij sequentiële presentaties.

Een tweede belangrijke eigenschap betreft de constantheid waarmee een merk vertoond wordt met een bepaalde affectieve stimulus. Voor associatieve gevoelstransfer is het belangrijk dat een merk herhaaldelijk met dezelfde affectieve stimulus gepresenteerd wordt, omdat dit de associatie tussen de twee in het geheugen versterkt. Voor directe gevoelstransfer is dit niet belangrijk. Zolang een merk simultaan vertoond wordt met positieve stimuli, kan het positieve gevoel overgedragen worden op het merk. Directe gevoelstransfer is namelijk afhankelijk van het positieve gevoel dat optreedt in de milliseconden voordat de affectieve stimulus geïdentificeerd is. Zolang de stimulus positief gevoel genereert, maakt het dus niet uit welke stimulus gebruikt wordt.

In het tweede hoofdstuk van dit proefschrift onderzoek ik een eerste voorspelling volgend uit deze theorie. Sequentiële presentatie van merken met telkens verschillende positieve stimuli, zou een slechte methode moeten zijn om te proberen gevoel te transfereren naar een merk. De sequentiële presentatie verhindert namelijk de directe transfer van gevoel, en het feit dat het merk telkens met andere affectieve stimuli wordt gepresenteerd, verhindert ook de associatieve transfer van gevoel. Andere combinaties (bvb. simultane presentatie met verschillende affectieve stimuli, of sequentiële dan wel simultane presentaties met altijd dezelfde positieve stimuli) leiden wel tot directe of associatieve gevoelstransfer en zouden dus superieur moeten zijn aan sequentiële presentaties met steeds verschillende positieve stimuli. Dit is inderdaad wat ik vond, en deze bevinding heeft belangrijke implicaties voor de praktijk. Hieruit volgt bijvoorbeeld dat televisiespotjes waarin een merk afwisselend (maar niet simultaan) vertoond wordt met allerlei verschillende positieve beelden, weinig effectief zullen zijn in het beïnvloeden van de attitudes ten opzichte van het merk.



Het derde hoofdstuk bevat de meest uitgebreide test van de voorspellingen uit onze theorie. Hierin wordt een methode gebruikt die ons in staat stelt na te gaan of de gevoelsoverdracht associatief dan wel direct van aard is. Behalve het theoretische belang van het testen van dit onderscheid, heeft deze methode ook belangrijke praktische implicaties. Zoals gezegd is associatieve transfer van gevoel afhankelijk van een associatie in het geheugen tussen het merk en de affectieve stimulus die het positieve gevoel veroorzaakt. Dit impliceert meteen dat wanneer die positieve stimulus op een of andere manier zijn positieve waarde verliest, dit negatieve gevolgen zal hebben voor de waarde van het merk. Wanneer het positieve gevoel echter direct werd overgedragen van de affectieve stimulus naar het merk, dan kan verwacht worden dat het merk positief blijft – onafhankelijk van wat er later gebeurt met het gevoel ten opzichte van de affectieve stimulus. In het Pepsi – Britney voorbeeld kan je denken aan het geval waarin na een advertentiecampaignede waarin Pepsi herhaaldelijk gekoppeld werd met Britney, de carrière van Britney in het slop raakt. Wanneer de gevoelsoverdracht verliep via de associatieve route, dus door het vormen van een associatie tussen Pepsi en Britney in het geheugen, zal de attitude ten opzichte van Pepsi negatiever worden wanneer de attitude ten opzichte van Britney negatiever wordt. Wanneer echter het positieve gevoel dat gegenereerd werd door Britney tijdens de campagne rechtstreeks overgedragen werd naar Pepsi, zal het merk positief gewaardeerd blijven zelfs wanneer later de attitude ten opzichte van Britney negatiever wordt. Rechtstreekse overdracht van gevoel betekent namelijk dat het merk (Pepsi) positiever wordt zonder dat er sprake moet zijn van een geheugenspoor naar de affectieve stimulus (Britney) die het gevoel oorspronkelijk veroorzaakte.

De resultaten gerapporteerd in hoofdstuk 3 bevestigen dat simultane presentaties van merken met telkens verschillende affectieve stimuli leiden tot directe gevoelsoverdracht. In dit geval maakt het niet uit wanneer nadien de attitude ten opzichte van al deze affectieve stimuli verandert: het merk blijft even positief. Opnieuw vinden we dat sequentiële presentatie van merken met steeds verschillende affectieve stimuli niet leidt tot gevoelsoverdracht, aangezien sequentiële presentatie geen directe gevoelsoverdracht toestaat, en

steeds verschillende affectieve stimuli gebruiken in de weg staat van associatieve gevoelsoverdracht.

De implicatie voor de praktijk is dat directe gevoelstransfer merken immuun maakt voor de potentieel desastreuze effecten van bijvoorbeeld beroemdheden verbonden aan hun merk die uit de gratie raken.

In het vierde hoofdstuk wordt een ander belangrijk verschil tussen directe en associatieve gevoelsoverdracht onderzocht. Ook dit onderscheid komt voort uit het feit dat associatieve gevoelsoverdracht afhangt van associaties in het geheugen tussen het merk en de affectieve stimulus, en directe gevoelsoverdracht niet. We weten namelijk dat associaties in het geheugen onstabiel kunnen zijn, zeker in situaties waarin consumenten iets nieuws leren nadat ze de associatie tussen het merk en de affectieve stimulus geleerd hebben. In de cognitieve wetenschappen staat dit fenomeen bekend als retroactieve interferentie: het leren van nieuw materiaal interfereert met het onthouden van materiaal dat je eerder leerde. Dit leidt tot de voorspelling dat gevoelsoverdracht die associatief van aard is, kwetsbaar zal zijn voor interferentie door nieuwe leerepisodes na het zien van de advertentiecampagne waarin een merk gekoppeld werd met een affectieve stimulus. Daar tegenover staat dat directe gevoelsoverdracht niet afhankelijk is van associaties in het geheugen, en dus ook niet kwetsbaar zal zijn voor interferentie door nieuwe leerepisodes die volgen op de advertentiecampagne. De experimentele resultaten in hoofdstuk 4 bevestigen deze voorspelling.

De implicatie voor de praktijk is dat directe gevoelsoverdracht superieur is aan associatieve gevoelsoverdracht in omstandigheden waarin consumenten na het zien van een advertentiecampagne hun aandacht richten op het verwerken van andere informatie. Dit is op zijn zachtst gezegd een vaak voorkomende situatie.

In hoofdstuk vijf onderzoek ik de mogelijkheden die consumenten hebben om te weerstaan aan de effecten van directe versus associatieve gevoelstransfer. De verwachting was dat consumenten wel eens minder in staat

zouden kunnen zijn weerstand te bieden aan de effecten van directe gevoelsoverdracht dan aan associatieve gevoelsoverdracht. Bij associatieve gevoelsoverdracht is er namelijk een associatie in het geheugen van het merk naar de affectieve stimulus die het positieve gevoel genereert. Dat impliceert dat consumenten enigszins inzicht kunnen hebben in wat hun positief gevoel ten opzichte van het merk veroorzaakt (bijvoorbeeld ‘ik houd van Pepsi want Pepsi is geassocieerd met Britney’). Directe gevoelsoverdracht is onafhankelijk van dergelijke associaties, zodat het voor consumenten minder toegankelijk is wat hun positieve gevoel ten opzichte van het merk precies veroorzaakt. Ik toon aan dat consumenten iets beter in staat zijn hun expliciete merkattitudes te corrigeren wanneer die beïnvloed werden door associatieve gevoelstransfer dan wanneer ze beïnvloed werden door directe gevoelstransfer. Attitudes kunnen zich echter ook op een veel onbewuster (impliciet) niveau bevinden, en ook deze meer automatische attitudes ten opzichte van de merken werden gemeten. Daaruit blijkt dat consumenten niet in staat zijn hun automatische, onbewuste attitudes te corrigeren voor associatieve, noch voor directe gevoelsoverdracht.

Ik besluit deze dissertatie in hoofdstuk 6 met een korte samenvatting van de bevindingen en de implicaties ervan voor de psychologische literatuur over attitudevorming. Het vinden van “directe gevoelstransfer” is waarschijnlijk de grootste theoretische bijdrage van dit proefschrift. Eerder onderzoek concludeerde immers dat transfer van gevoel noodzakelijkerwijze gebeurt op een associatieve manier, dus door het vormen van verbindingen in het geheugen tussen het merk en de affectieve stimulus. Deze eerdere bevindingen passen in het raamwerk van mijn theorie aangezien de procedures die daarbij gebruikt werden inderdaad zouden moeten leiden tot associatieve en niet tot directe gevoelstransfer.

## Curriculum Vitae



Steven Sweldens (1978) obtained his master's degree in Psychology in 2004 at the Catholic University of Leuven. In the same year he started his PhD research at the Erasmus Research Institute of Management in the field of Marketing. His main research interests are in the formation of consumers' attitudes and in the motivational determinants of consumers' health risk perceptions. He presented his research at various international conferences and part of his work is under review at the *Journal of Consumer Research*. He was a visiting research scholar at the University of Florida in 2008. From July 2009 he will start as an Assistant Professor in Marketing at INSEAD.



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## EVALUATIVE CONDITIONING 2.0 DIRECT VERSUS ASSOCIATIVE TRANSFER OF AFFECT TO BRANDS

A basic assumption in advertising is that brands become more well-liked after they were presented in positive contexts. This assumption is warranted because studies on 'evaluative conditioning' have demonstrated that when a brand is repeatedly presented together with positive affective stimuli (e.g., beautiful people, nature scenes, celebrity endorsers ...), this results indeed in a long-lasting positive effect on the evaluation of the brand. This dissertation deals with the primary question of what is causing this change in attitudes. It is shown that there are at least two fundamentally different psychological processes that can cause this change in brand attitude. First, it is possible that through the establishment of memory associations between the brand and the positive affective stimuli, the brand becomes more positively evaluated (associative affect transfer). Second, it is also possible to transfer positive affect directly to the brand. In this case, affect 'rubs off' to the brand without the need to establish memory associations (direct affect transfer). The conditions under which affect transfer will be associative versus direct are identified. It is also demonstrated that achieving direct affect transfer carries distinct advantages for advertisers. With direct affect transfer – as opposed to associative affect transfer – the brand becomes immune to the negative effects of its endorsers falling from grace, to interference of the memory traces and to consumers' counter arguing strategies.

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