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Higher motivation - greater control? The effect of arousal on judgement

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This research examines control over the effect of arousal, a dimension of affect, on judgement. Past research shows that high processing motivation enhances control over the effects of affect on judgement. Isolating and studying arousal as opposed to valence, the other dimension of affect, and its effect on judgement, we identify boundary conditions for past findings. Drawing from the literature on processes by which arousal influences judgement, we demonstrate that the role of motivation is contingent upon the type of judgement task (i.e., memory- versus stimulus-based judgement). In stimulus-based judgement, individuals exert greater control over the effect of arousal on judgement under low compared to high motivation. In contrast, in memory-based judgement individuals exert greater control over the effect of arousal under high compared to low motivation. Theoretical implications and avenues for future research are discussed.

Keywords: Affect; Arousal; Automatic processes; Controlled processes.

Nothing is less in our power than the heart, and far from commanding we are forced to obey it.

Jean-Jacques Rousseau

Tiffany is very excited, having just submitted her dissertation. She now intends to go shopping for a new outfit. When she relates her plans to a friend, she is forewarned with the advice: “Don’t let your excitement influence your judgement!” Will Tiffany be able to control the potential effect of her excitement on her judgement? How much

will the answer to this question depend on Tiffany’s motivation to reach a well thought-out decision—say buying a suit for an important job interview (assumed to be high motivation) versus a casual outfit (assumed to be low motivation)? This scenario raises the question of if and when individuals are able to control the potential effects of their feelings on their evaluative judgement.

This paper deals with the automatic versus the controlled nature of the effect of incidental affect

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on judgement. Based on earlier research (Hasher & Zacks, 1979; Shiffrin & Schneider, 1977), four conditions distinguish between automatic and controlled processes: awareness; intention; controllability; and efficiency. However, later research has suggested that there are processes that are automatic in only some of their characteristics (Bargh, 1989; Moors & De Houwer, 2007). Our focus was on the controlled nature of the process. In other words, we explored conditions under which people can control or correct for the influence of their affect on their judgement.

The two-dimensional view of affect (Russell, 1980) distinguishes between valence and arousal. Valence refers to the direction of affect (i.e., positive vs. negative), and arousal refers to the activation level (e.g., calm vs. excited). As will be discussed, there are similarities in the mechanisms by which arousal versus general affect influences judgement (see Siemer & Reisenzein, 1998). We focus on the arousal dimension of affect, avoiding potential confounding across affect dimensions, and demonstrate the controllability of its effect while controlling for valence.

Past studies have suggested that high motivation will diminish the influence of affect (regardless of its dimension) on judgement (e.g., Albarracín & Kumkale, 2003; Batra & Stayman, 1990; Petty, Richman, Schumann, & Strathman, 1993). This view suggests that Tiffany, from our opening example, should be able to control the effect of her excitement when making an important purchase, such as a suit for an interview (i.e., high motivation), but not when making a less important purchase, such as a casual outfit (i.e., low motivation). Yet, examination of the procedure employed in past studies raises the possibility of variations in judgement tasks across motivation conditions (Petty et al., 1993). Thus, the role of motivation should be examined while taking the type of judgement task into consideration. In the current research we distinguished between two modes of judgement: stimulus-based judgement, in which individuals rely on information directly presented at the time of judgement (Lynch & Srull, 1982), and memory-based judgement, in which individuals rely only on informa-

tion encoded in memory, and no information is presented at the time of judgement (Lynch & Srull, 1982).

In a nutshell, we rely on Forgas' (1995) affect infusion model (AIM), which distinguishes between the various conditions under which attribution versus accessibility mechanisms dominate the influence of affect on judgement. Based on the AIM we propose that the attribution process governs the effect under low motivation, and accessibility mechanisms govern the effect under high motivation. Combining this proposition with other research on the nature of attribution versus accessibility processes, we argue and show that under low motivation, the effect is controllable, but under high motivation, it is uncontrollable. Furthermore, we show that this is true only for stimulus-based judgement; in memory-based judgement, the opposite pattern emerges.

This paper is organised as follows. We first discuss the underlying processes for the effect of arousal on judgement and develop our conceptualisation regarding the role of motivation in controlling the effect of arousal on stimulus-based judgement. Based on our general conceptualisation, we develop hypotheses for specific effects in our setting. The first two studies focus on stimulus-based judgement. Study 1 tests the role of motivation in controlling the effect of arousal on judgement, under conditions that permit various degrees of control. Study 2 examines the effect under high cognitive load, which does not permit control. As such, this study also sheds light on the effortful nature of the effect of arousal and of its correction under low and high motivation. Study 3 compares the pattern of the effect of arousal on stimulus-based judgement to the effect on memory-based judgement. The description of the studies is followed by a general discussion of the implications, limitations, and future research directions.

The effect of arousal on judgement

This section reviews processes by which arousal influences judgement, and the role of motivation

as a boundary condition for these processes, as the basis for our conceptualisation.

Processes by which arousal influences judgement

Arousal may have an effect on judgement through either accessibility (Clark, 1982) or (mis)attribution processes (Schachter & Singer, 1962; Zillmann, 1978). Theories on each of these explanations relate to the effect of general affect (e.g., Bower, 1981; Isen, 1975, 1984, 1987; Rothkopf & Blaney, 1991; Schwarz, 1990; Schwarz & Clore, 1996), and also specifically to the arousal dimension, as discussed below.

The accessibility explanation (Bower, 1981; Isen, 1975) postulates that affective state activates material congruent in affective tone. Due to this accessibility effect, information similar in affective tone to the individual's state will be more salient, and thus more likely than other information to influence judgement. Whereas Bower and Isen dealt with the valence of affect, Clark (1982) focused on the effect of the arousal dimension. According to Clark, the experienced arousal may prime information associated with similar levels of arousal, making it more salient and thus more likely to influence judgement. The accessibility process predicts that when Tiffany (from our opening example) is excited, information related to her outfit associated with excitement will be more salient (e.g., colour, tight cut), and thus will be more likely to impact her judgement. Importantly, the effects of these accessible high-arousal elements may be either negative or positive, depending on the individual's view regarding this accessible information. If these "high arousal attributes" are positive (negative) in Tiffany's view, then her evaluation will be more (less) favourable when she is excited than when she is not.

The attribution explanation (Schwarz, 1990; Schwarz & Clore, 1996) suggests that individuals use their feelings as cues when evaluating targets (i.e., "feeling-as-information"). Individuals may misattribute feelings elicited from one source to another target, and thus may judge a target based on unrelated feelings. Although this explanation relates to affect in general, other theories focus on (mis)attribution of arousal in particular (Schachter

& Singer, 1962; Zillmann, 1978). These theories suggest that because arousal is diffuse, individuals may misattribute their arousal and misinterpret their feelings and judgements. The attribution process would predict that Tiffany might misattribute her excitement onto the outfit, which will polarise her judgement. Here again, it is noteworthy that Tiffany's high arousal due to her excitement may influence her judgement either positively or negatively. If the outfit is generally liked, Tiffany may end up with a more favourable evaluation when excited compared to when she is relaxed; if the outfit is generally disliked, judgement will be even less favourable when excited versus when relaxed.

The role of motivation on underlying processes

Forgas (1995) studied affect in general, presenting a framework for understanding the boundary conditions of the accessibility and attribution effects. Forgas suggested that accessibility and attribution processes will take place under different motivation conditions. When individuals are highly motivated to render an accurate judgement, they will perform substantive processing, engaging in an extensive information search. Highly accessible information is more likely to be used in judgement computations. Accessibility of information will be determined based on its congruence with individuals' affect or arousal. This accessibility process is based on the assumption that the individual is indeed motivated to integrate information. Thus, when Tiffany is highly motivated to make an accurate judgement, she will attempt to compute her judgement based on various pieces of information relating to the outfit (e.g., price, colour, brand image). When excited, information associated with high arousal (e.g., bright red colour) will be more salient, and thus more likely to influence her judgement.

As opposed to high-motivation conditions, when individuals have low motivation to render accurate judgement they may perform only a partial search, instead of engaging in an extensive information search. This will lead them to rely on cues. Indeed, according to the attribution process, arousal is involved in such processes as a cue.

Following this line of reasoning, if Tiffany has low motivation to compute accurate judgement, instead of integrating across pieces of information she may use her feelings of excitement as a cue to her judgement. In summary, under high motivation, an accessibility process will underlie the influence of arousal on judgement; under low motivation an attribution process will underlie the effect. Central to the issue in focus here, accessibility and attribution processes may differ in the individuals' ability to control their effects, as suggested next.

Control over arousal effects under various conditions

The review thus far suggests that under high motivation, an accessibility process underlies the effect of arousal on judgement; under low motivation, an attribution process underlies the effect. Here we use past research to explain differences between accessibility and attribution processes, which lead to variations in the individual's ability to control the effect of arousal in low versus high motivation.

Wilson and Brekke (1994) identified two categories of processes by which factors unrelated to judgement targets may influence judgement. The first category is "automatic processes", which refers to processes that are over learned, and may become intuitive and uncontrollable. This category includes various types of accessibility processes, including knowledge and affect accessibility (see Bargh, 1989; Herr, Sherman, & Fazio, 1983; Higgins & Bargh 1992; Lombardi, Higgins, & Bargh, 1987; Martin, 1986; Martin, Seta, & Crelia, 1990). The second category, termed "source confusion", refers to situations in which individuals confuse two or more causes of their thoughts, feelings, or judgement because they cannot identify the exact contribution of the various factors influencing them. Processes of this type occur mainly due to unawareness, and are considered more controlled compared to "automatic processes". Misattribution of arousal is a typical example of a controlled "source confusion" process (see Reizenzein & Gatteringer,

1982; Schachter & Singer, 1962; Zanna & Cooper, 1974; Zillmann, 1978; see also, e.g., Kehner, Locke, & Aurain, 1993; Schwarz & Clore, 1983; Siemer & Reizenzein, 1998, in the context of general affect). Thus, based on Wilson and Brekke's process categorisation and characterisation, arousal misattribution is more likely be controlled than arousal accessibility. This view suggests that forewarning Tiffany about the potential effect of her excitement will be less likely to lead her to modify her judgement when attribution underlies the effect compared to when accessibility underlies the effect.

In summary, the discussion so far suggests that under high motivation, arousal influences judgement through an accessibility process; under low motivation, arousal influences judgement through an attribution process. Furthermore, these processes differ in control; attribution processes are more controllable than accessibility processes. In combination, these arguments lead us to propose that the effect of arousal on stimulus-based judgement is more controllable under low as compared to under high motivation.

Hypotheses

The role of motivation in controlling the effect of arousal on judgement

Control allows individuals to correct the effect of arousal on judgement. This correction may occur when the source of arousal is salient, either because individuals' attention has been drawn to it, or because the conditions permit such attention (even without explicitly attracting one's attention). When individuals do not experience extreme time pressure or cognitive load, and are allowed to take time and think about the judgement target, they can exert at least some degree of control over the influence of arousal. These conditions will result in a correction of the effect of arousal when the effect is mediated through an attribution process, but not when the effect is mediated through an accessibility process. Thus, we expect that arousal and motivation will interact to influence stimulus-based judgement, such that arousal will influence

judgement to a greater degree under high motivation than under low motivation.

Although our focus is on the extent to which arousal impacts judgement rather than on the direction of the effect, the direction of the effect can shed more light on the process by which arousal influences judgement. As per our earlier discussion, the misattribution process may lead to a polarising effect of arousal on judgement, suggesting that the effect can be either negative or positive (Gorn, Pham, & Sin, 2001). Thus, if the judgement target is relatively liked, high arousal will lead to an even more favourable evaluation compared to low arousal; if the judgement target is generally disliked, high arousal will lead to an even more unfavourable evaluation compared to low arousal. On the other hand, the accessibility process suggests that different kinds of information will be salient under different conditions of experienced-arousal (experienced-arousal is used interchangeably with arousal throughout the paper and is distinguished from arousal-laden information, which is specifically referred to in these terms). Under low experienced-arousal, low arousal-laden information (i.e., information associated with low arousal) will be salient; under high experienced-arousal, high arousal-laden information will be salient. The salient information will have a greater influence on judgement, and the resulting judgement will depend on the individual's view of this salient information. If the salient information is positive (negative), it will lead to a more favourable (unfavourable) judgement. Thus, if the salient information under high experienced-arousal is positive (i.e., high arousal-laden information is positive), then *high* experienced-arousal will lead to a more favourable judgement than low experienced-arousal (i.e., positive effect). Conversely, if the salient information under low experienced-arousal is positive (low arousal-laden information is positive), then *low* experienced-arousal will lead to a more favourable judgement than high arousal (i.e., negative effect).

Based on the discussion above, in order to demonstrate effects that are specific to each underlying process, we consider a setting where

the target information is generally positive (such as in advertisements), specifically positive low arousal-laden information. In such a setting, the misattribution process should lead to a positive effect, and the accessibility process should lead to a negative effect. Consequently, according to the misattribution process, more favourable attitudes will be found under high (vs. low) arousal (i.e., a positive effect). In contrast, according to the accessibility process, more favourable attitudes will be found under low (vs. high) arousal (i.e., a negative effect).

These effects, however, are predicted for conditions in which no correction occurs. Yet, as proposed, the misattribution process is assumed to be controllable, and the accessibility process is assumed to be uncontrollable. As a result, in conditions that permit some degree of control (e.g., in the absence of extreme time pressure or cognitive load), participants will be able to correct for the effect of arousal, but only when an attribution process and not when an accessibility process underlies the effect. Because the controllable attribution process is proposed to take place under low motivation, in low motivation when the conditions permit control, the effect of arousal will diminish. In contrast, because the uncontrollable accessibility process is proposed to occur under high motivation, in high motivation the negative effect will persist.

H1. Under conditions that permit control, arousal and motivation will interact to influence stimulus-based judgement such that:

H1a. Under high motivation, arousal will have a negative effect on judgement, and

H1b. Under low motivation, arousal will not influence judgement.

The role of forewarning on the effect of arousal on judgement

Differences in control between arousal attribution and arousal accessibility suggest that these processes differ in the role of forewarning in their effect. If attribution is controllable and accessibility is uncontrollable, then forewarning will

lead to correction when attribution, but not when accessibility, underlies the effect. Combining the motivation conditions for each process would suggest that forewarning will lead to correction under low motivation but not under high motivation.

Furthermore, Hypotheses 1a and 1b were proposed for conditions that may permit some degree of control, even in the absence of forewarning. It was proposed that under low motivation, in a setting that permits thinking about the target, participants may be able to correct for the effect, even without being forewarned. But what will happen when participants are forewarned? According to Wilson, Centerbar, and Brekke (2002), correction attempts may result in over correction. Thus, if without forewarning participants are able to correct for the effect, then forewarning may enhance their attempts at correction, which may result in over correction. If under low motivation the predicted effect with no correction at all should be positive, then when over correction occurs the effect will be negative. These predictions are relevant only under low motivation, when the controllable attribution process is proposed to underlie the effect. In contrast, under high motivation, when the uncontrollable accessibility is proposed to underlie the effect, the negative effect will persist even regardless of forewarning.

H2a. Under high motivation, arousal will negatively influence judgement regardless of forewarning.

H2b. Under low motivation, arousal will interact with forewarning. Arousal will negatively influence judgement with forewarning, but arousal will not have an effect in the absence of forewarning.

Study 1 was designed to test Hypotheses 1 and 2 about the effect of arousal on stimulus judgement when correction and over correction occur. Study 2 was designed to examine the effect under cognitive load conditions, when correction is not expected to occur.

STUDY 1: MOTIVATION AND CORRECTION OF THE EFFECT OF AROUSAL ON STIMULUS-BASED JUDGEMENT

Method

Participants and design. Participants were 178 undergraduate students at a Midwestern university in the USA, who received extra credit points for their classes. Participants were randomly assigned to conditions of a 2 (Arousal: low vs. high) \times 2 (Motivation: high vs. low) \times 2 (Forewarning: with vs. without) between-subjects design.

Arousal. Arousal was manipulated using music. We conducted two pre-tests to identify two musical pieces that would elicit different levels of arousal while controlling for valence. We decided to use positive valence, and therefore sought one piece that would create relaxation (i.e., positive low arousal) and another that would create excitement (i.e., positive high arousal). A preliminary test evaluated 24 musical pieces. Sessions were run for groups of approximately 20 participants each. In each session, participants were asked to listen to six musical pieces for several minutes, and to complete the Mehrabian and Russell (1974) scale and the Affect Grid (Russell, Weiss, & Mendelsohn, 1989) to indicate their affective state after listening to each piece. Based on this preliminary pre-test, 10 musical pieces were selected for assessment in an additional pre-test. In the second pre-test, 165 participants were randomly assigned to 10 groups of 12–19 participants. Each group listened to one piece for five minutes, and then rated how pleasing and how arousing the music was. Results of this pre-test revealed two pieces: “Binary Finary” by Ricky Grant was rated as moderately pleasurable ($M = 5.4$) and highly arousing ($M = 6.3$), on a 9-point scale, and thus was considered as creating excitement. “Closing Time” by Tom Waits was also rated as moderately pleasurable ($M = 5.3$), but much less arousing ($M = 3.5$), and thus was considered as creating feelings of relaxation. *T*-tests confirmed that the two pieces were

different in how arousing they were, $t(29) = 6.16$, $p < .001$, but not in how pleasurable they were, $t(29) = 0.099$, $p = .9$.

Motivation. To manipulate participants' motivation, we used an accuracy goal procedure (Maheswaran & Sternthal, 1990; Petty, Harkins, & Williams, 1980; Suri & Monroe, 2003). Participants in the high-motivation condition were informed that the study was related to a company's market research concerning the distribution of the product, and that their evaluation would be heavily weighted in the manufacturer's decision about distribution of this product. In the low-motivation condition, participants were told that the study was a part of a pilot test. Manipulation checks were conducted in pre-tests. Pre-test participants completed a scale to assess their attitude toward a brand in a print ad that was presented to them. The instructions for the attitude scale contained the scenarios for either the high- or the low-processing motivation condition. After completing the attitude scale, participants completed a 4-item scale to measure their motivation to process information while making the judgement (using a 7-point scale, with four items related to level of interest, involvement with the judgement, understanding of the information in the ad in order to make a judgement, and concentration when making the judgement, $\alpha = .86$; Maheswaran & Sternthal, 1990; Petty et al., 1980; Suri & Monroe, 2003). Based on the pre-test, the ratings of motivation to process information were $M = 5.00$ versus $M = 5.93$, $t(27) = -2.35$, $p < .05$. The magnitude of these means suggests that the two conditions, while being relatively different in level of motivation, could be represented as moderate versus high motivation. Central to testing our hypothesis is the significant difference between the two conditions.

Forewarning manipulation. We used forewarning instructions similar to those used in Bosmans and Baumgartner's (2005) study (modelled after Albarracín & Kumkale, 2003). The instructions were as follows: "Please read the message [in the ad] while trying to become sensitive to your

emotional feelings, and separate your feelings about the message from the mood you are in for other reasons. Use only your reaction to the message as a basis for judging the validity of the message".

Measurement of attitude toward the brand. To measure their attitude toward the brand, participants completed a 7-point, 4-item scale (like/dislike, bad/good, positive/negative, favourable/unfavourable; Miniard, Bhatla, Lord, Dickson, & Unnava, 1991). The responses on the four items were averaged to provide an overall estimate for attitude toward the brand ($\alpha = .82$).

Stimulus. To create stimulus-based judgement conditions and prevent confounding due to pre-existing attitudes, it was necessary to use a target for which participants had neither an existing attitude nor any previously encoded information. We also considered relevance to students and the applicability of the cover story used for the motivation manipulation. Therefore, we used unfamiliar ads for a fictitious sport club. The ad had both pictures and written information about the brand. In line with our previous discussion on the hypothesised effect, in order to demonstrate effects that are specific to the mechanisms involved, we designed the ad so that it portrayed the brand in a generally positive light, and featured a benefit that is associated with low arousal. The written information emphasised the hedonic benefit of being a member of the new centre (e.g., describing it as an "enjoyable investment", inviting consumers to "enjoy a one-month trial", and pointing out that "looking after yourself can be wonderful" in this facility). One large picture featured individuals relaxing at a pool, and other small pictures featured individuals sitting in a sauna, receiving a back massage, and participating in group spinning and kickboxing classes. The emphasis on hedonic benefits (rather than on utilitarian benefits) increased the likelihood that affect would be considered relevant, and thus would be used as a basis for judgement (Adaval, 2001; Pham, 1998; Yeung & Wyer, 2004). Another factor considered when selecting a target ad is affective state ambiguity. This is based on

research by Gorn et al. (2001), which suggests that arousal will influence individuals' judgement only when the affective tone of the ad is clear; when the affective state is ambiguous, the valence of the affective state influences judgement. A pre-test examined ad and brand familiarity, relevance of product, and attitude toward the ad using 7-point scales, and revealed low scores of familiarity with the ad ($M=2.26$) and familiarity with the brand ($M=2.11$), and a moderate attitude toward the ad ($M=4.5$), the latter being important to avoid floor or ceiling effects. Affective tone of the ad was assessed by asking pre-test respondents to rate their feelings after viewing the ads (using four 7-point semantic differential items anchored happy/sad, pleased/displeased, delighted/distressed, and joyful/depressed; Gorn et al., 2001). The pre-test results revealed an average rating of 4.98 ($SD=1.46$). This value is significantly higher than the mid-point of the 7-point scale, and thus indicates a clear affective tone. Further, measurement of attitude toward the brand without any arousal manipulation shows a relatively favourable attitude toward the brand ($M_{\text{low motivation}}=4.76$, $M_{\text{high motivation}}=4.83$, on the 7-point 4-item attitude scale), which was important for the opposite prediction of attribution versus accessibility processes (see hypotheses development section).

Procedure. All sessions were run in a computer lab with one to eight participants in each session. To minimise the salience of the arousal manipulation, different phases of the experiment were disguised as unrelated studies. In the supposed first study, participants were exposed to the arousal manipulation, in which they listened with headphones to one of the two musical pieces. Following the arousal manipulation, participants answered two questions about the music, one concerning their familiarity with the music and the other whether they had ever watched a movie that used this piece. Participants were then

thanked for participating in the first study. The questions about the music and the thanking process were used to strengthen the cover story about separate studies. In what was presented as a second study, participants viewed a print ad. While looking at the ad, they completed the attitude toward the brand scale. The motivation manipulation was embedded in the instructions for this brand scale.

Results and analysis

The role of motivation in the effect of arousal on judgement. To examine Hypothesis 1, the initial analysis included only data of participants in the conditions without the forewarning manipulation. This analysis revealed a significant interaction between affective state and motivation, $F(1, 88) = 6.57$, $p < .05$ (see Figure 1). Under high motivation, arousal significantly influenced attitude toward the brand ($M_{\text{low arousal}} = 5.05$, $M_{\text{high arousal}} = 4.39$), $F(1, 88) = 4.48$, $p < .05$. The negative

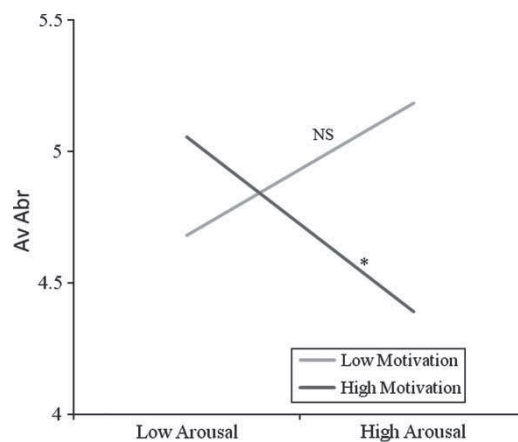


Figure 1. Results of Study 1, without forewarning. The effect of arousal on stimulus-based judgement in low versus high processing motivation. Note: Significant effects are marked with *; insignificant effects are marked as NS.

¹ We ran another study, which had a 2 (Arousal) \times 2 (Motivation) between-subjects design. This additional study produced a similar, but insignificant, effect. Although the two-way interaction between Arousal and Motivation was not significant, $F(1, 233) = 2.383$, $p = .124$, the simple effects were consistent with our hypothesis. Arousal had a marginally significant effect on attitude toward the brand under high motivation ($M_{\text{low arousal}} = 21.47$, $M_{\text{high arousal}} = 19.93$), $F(1, 233) = 3.72$, $p = .055$, but not under low motivation, $F(1, 233) = 0.05$, $p = .817$.

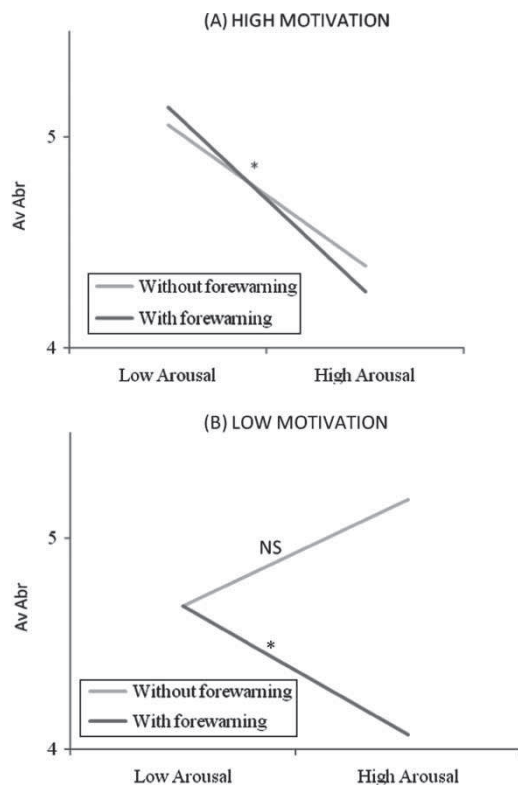


Figure 2. Results of Study 1. The role of forewarning in the effect of arousal on judgement under high versus low motivation. Note: Significant effects are marked with *; insignificant effects are marked as NS.

effect is consistent with Hypothesis 1a. Under low motivation there was no significant effect ($M_{\text{low arousal}} = 4.68$, $M_{\text{high arousal}} = 5.185$), $F(1, 88) = 2.33$, $p = .13$, which is consistent with Hypotheses 1b. Thus arousal did not impact participants' attitude under low motivation, but negatively impacted it under high motivation. These results support Hypothesis 1.¹

The role of forewarning on the effect of arousal on judgement. Figures 2A and 2B indicate the differences in the moderating role of forewarning in the effect of arousal on judgement. In line with

Hypotheses 2a and 2b, under high motivation, arousal negatively influenced judgement regardless of forewarning ($M_{\text{low arousal}} = 5.1$, $M_{\text{high arousal}} = 4.34$), $F(1, 170) = 7.06$, $p < .01$; the interaction between arousal and forewarning was insignificant, $F(1, 170) = 0.03$, $p = .854$. Under low motivation, arousal interacted with forewarning, $F(1, 170) = 5.60$, $p < .01$: arousal negatively influenced judgement with forewarning ($M_{\text{low arousal}} = 4.68$, $M_{\text{high arousal}} = 4.1$), $F(1, 86) = 4.55$, $p < .05$, but it did not have an effect in the absence of forewarning ($M_{\text{low arousal}} = 4.68$, $M_{\text{high arousal}} = 5.185$), $F(1, 88) = 2.33$, $p = .13$.² Thus, forewarning led to a different effect of arousal on judgement under low motivation but not under high motivation.

Discussion

When not forewarned, participants' arousal influenced their judgement when motivation was high, but not when it was low. This pattern supports Hypothesis 1 about the differential effect of arousal on judgement under low versus high motivation. This pattern is consistent with the explanation that the control over the effect of arousal on judgement is greater under low compared to high motivation.

Results of the role of forewarning under low and high motivation provide support for Hypothesis 2. Under high motivation, arousal influenced judgement even when participants were forewarned. This reinforces the premise that under high motivation, the effect of arousal takes place through the automatic (uncontrollable) accessibility process. In contrast, participants with low motivation were influenced by their arousal to a different degree when forewarned compared to when not forewarned, indicating that forewarning led to a modified judgement. This pattern may support our premise that in low motivation, the effect of arousal takes place through the controllable attribution process.

² Planned comparisons are appropriate for examining the directional hypotheses 2a and 2b (see Rosnow & Rosenthal, 1995, p. 4). We note, however, that the three-way interaction of the overall experimental design (between arousal, motivation, and forewarning) was not significant, $F(1, 170) = 2.115$, $p = .148$.

The effects of arousal under low motivation with and without forewarning reveal an additional insight. When low-motivated participants were not forewarned, arousal did not significantly influence their attitude. This suggests that even without being forewarned, participants were able to correct for the effect of arousal. But when forewarned under low motivation, arousal had a negative effect on judgement. This negative effect is in an opposite direction to the expected effect under low motivation, when no correction occurs. This indicates that forewarning under low motivation led to an over correction. Researchers have provided various explanations for the nature of correction. Wilson and Brekke (1994) assumed that correction processes are “fairly conscious processes involving awareness of the bias and deliberate attempts to reduce it” (p. 133). Yet, some corrections (e.g., arousal effects; Schachter & Singer, 1962; Schwarz & Clore, 1983; Zillmann, 1978) may occur less consciously. Foster, Witcher, Campbell, and Green (1998) suggested that correction is an inefficient process that requires cognitive resources. To shed more light on the underlying process of correction, we conducted an experiment in which participants were placed under cognitive load. Based on Foster et al. (1998), we assumed that when cognitive resources are limited no correction will occur. Yet, following our conceptualisation, if the process is uncontrollable the effects under no load should be similar to those under high load. Study 2, described next, addresses these issues.

STUDY 2: EXAMINING THE UNCORRECTED EFFECTS

The goal of this study was to examine the effect of arousal on stimulus-based judgement when no correction occurs. This study was identical to Study 1, except that all participants performed the judgement task without forewarning and while under a cognitive load. The absence of forewarning and the presence of cognitive load should have prevented participants from correcting the effect of arousal on their judgement. Following our

conceptualisation, we predicted that, because under high motivation the effect of arousal takes place through an “automatic” accessibility process, the negative effects would persist under high cognitive load. However, because under low motivation the effect takes place through a controlled misattribution process, when participants have no cognitive capacity to correct the potential effect, an uncorrected effect will occur. In line with our previous discussion, the uncorrected effect of the misattribution process should be positive.

H3a. Under high motivation, when participants experience high cognitive load, arousal will negatively influence judgement.

H3b. Under low motivation, when participants experience high cognitive load, arousal will positively influence judgement.

Method

Fifty-seven undergraduate students at a Midwestern university in the USA participated in exchange for extra credit points. A 2 (Arousal: low vs. high) \times 2 (Motivation: low vs. high) between-subjects design was employed. All participants were under a high cognitive load. To ensure that cognitive load did not interfere with the motivation manipulation, the load induction appeared immediately after the motivation manipulation, and just before participants completed the judgement task. The cognitive load was induced based on a well-established procedure (Gilbert & Osborne, 1989). Participants memorised an eight-digit number while responding to the attitude items. After completing the scale, participants were asked to write down the number they memorised. This served as an indication of the extent to which they, indeed, followed the cognitive load induction.

Results

Data from three participants who failed to memorise the number from the cognitive load induction were excluded, with data retained from

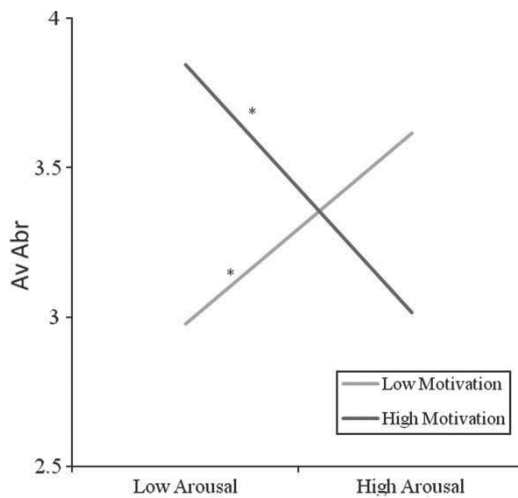


Figure 3. Results of Study 2. The effect of arousal and motivation on stimulus-based judgement when participants are under high cognitive load. Note: Significant effects are marked with *.

54 participants. Analysis of variance (ANOVA) revealed a significant two-way interaction between arousal and motivation on attitude, $F(1, 50) = 6.145$, $p < .05$ (see Figure 3). Consistent with Hypothesis 3a, under high motivation there was a significant positive effect of arousal on attitude ($M_{\text{low arousal}} = 3.85$, $M_{\text{high arousal}} = 3.02$), $F(1, 50) = 4.06$, $p < .05$. This effect is in line with the prediction of the “uncorrected” accessibility effect. The direction of the effect under high motivation was similar to that observed in Study 1, in which no cognitive load was induced. The occurrence of the effect under high cognitive load suggests that under high motivation, the effect is effortless and uncontrollable. Consistent with Hypothesis 3b, under low motivation with high load, results show a marginally significant positive effect of arousal on judgement ($M_{\text{low arousal}} = 2.975$, $M_{\text{high arousal}} = 3.625$), $F(1, 50) = 2.14$, $p = .08$ (1-tail). This effect is in line with the prediction of the “uncorrected” misattribution effect.

Discussion

The effect of arousal on judgement under cognitive load represents the conditions in which no

correction can occur. Under high motivation, when participants engage in an effortful task the predicted negative effect takes place. This is consistent with the argument that under high motivation, arousal influences judgement through an automatic accessibility process. Furthermore, the occurrence of this negative effect under high cognitive load suggests that the effect is not only uncontrollable but also effortless. In contrast, the positive effect under low motivation, when participants are under high cognitive load, indicates an underlying controllable attribution process under low motivation. Interestingly, although controllable, the effect of arousal misattribution on judgement seems to be effortless. This is in line with the findings from earlier research (Schwarz, 1990; Siemer & Reisenzein, 1998).

The opposite effects in low versus high motivation under high cognitive load provides further support for the argument that different processes drive the effects under different motivation conditions. The positive effect under low motivation is in line with our prediction for the polarisation misattribution effect, when no correction occurs; the negative effect under high motivation is in line with our prediction for the accessibility effect (in our experimental context).

In summary, the results of the first two studies support our explanation of a controllable attribution process under low motivation, and an automatic (effortless) and uncontrollable accessibility process under high motivation. Furthermore, this study suggests that the correction process that occurs under low motivation is effortful, and that forewarning may lead to over correction. Overall, the first two studies suggest that arousal influences stimulus-based judgement to a greater extent under high motivation as compared to low motivation. Yet, our results seem to contradict past studies showing that high motivation diminishes the influence of affect on judgement (e.g., Albarracín & Kumkale, 2003; Batra & Stayman, 1990; Petty et al., 1993). We argue that this different pattern is due to variation in the judgement task: namely, stimulus- versus memory-based judgement. Next, we developed and tested our hypothesis regarding the differential role of

motivation in memory-based judgement as compared to stimulus-based judgement.

STUDY 3: THE EFFECT OF AROUSAL ON MEMORY-BASED JUDGEMENT

Control over arousal effects in memory-versus stimulus-based judgements

This study assessed the prediction of an opposite pattern for the role of motivation in the effect of arousal on memory-based judgement compared to stimulus-based judgement.³ Our line of reasoning draws a parallel from research by Schul and colleagues (Schul & Burnstein, 1985; Schul & Mazursky, 1990), who studied individuals who acquired information and were then instructed to either use it or ignore part of it when making judgements. Schul and Burnstein suggested that the timing of processing the instructions relative to information encoding plays a role in the ability to use or ignore information. When instructions to ignore are presented prior to the encoding of all other information, it might be easier to ignore the irrelevant information. In contrast, when instructions to ignore are presented after all other information has been encoded, it might be more difficult to ignore the irrelevant information. The difference in control over effects in these two situations stems from differences in the integration of pieces of information. In this regard, researchers have argued that lack of correction is more likely to occur when the information is encoded integratively (Srull & Wyer, 1989; Wilson & Brekke, 1994; Wyer & Budesheim, 1987; Wyer & Unverzagt, 1985). In stimulus-based judgement, exposure to information and

the experience of arousal occur simultaneously. As a result, individuals have difficulty separating their arousal from other information. On the other hand, in memory-based judgement, information encoding and experienced arousal take place at different points in time.⁴ Therefore, it might be easier to separate arousal from other information. Hence, compared to memory-based judgement, in stimulus-based judgement incidental arousal is more likely to influence judgements.

The time interval between information encoding and the experienced arousal, however, may not be sufficient to enable correction (Schul & Burnstein, 1985; Wilson & Brekke, 1994). Even if individuals have the ability to control the effect of arousal, they may not do so unless they are motivated. As noted, under memory-based judgement it is relatively easy to separate previously encoded information from the arousal experienced during judgement. Yet, only when individuals are motivated to render accurate judgement will they be likely to control the effect of their arousal; when individuals are not motivated to render accurate judgement, it is unlikely that they will be able to successfully correct for the effect. Therefore, we argue that arousal will influence memory-based judgement to a greater degree under low motivation as compared to high motivation.

H4. In memory-based judgement, motivation and arousal will interact to influence judgement, such that arousal will influence judgement to a greater degree under low as compared to high motivation.

³ Stimulus-based judgement should be distinguished from on-line judgement (i.e., judgement formation when no information or judgement has been previously encoded vs. updating previously-formed judgement, respectively; Hastie & Park, 1986), and also between memory-based judgement and judgement retrieval. In memory-based judgement, individuals first encode information without making any judgement, and, when applicable, retrieve the previously-encoded information and compute their judgement. In judgement retrieval (also known as direct access), individuals have previously-formed judgements encoded in their memory, and, when applicable, retrieve these judgements (Hastie & Park, 1986). Studies have shown that affect does not influence judgement in judgement-retrieval situations (Forgas, 1995; Srull, 1983, 1984). Thus, we focus here on memory- compared to stimulus-based judgement.

⁴ Note that in the context of memory-based judgement, we focus on the effect of arousal experienced during judgement and not during encoding of the information, which is a distinct case, and is beyond the scope of this paper.

Our line of reasoning suggests that high motivation is likely to lead to successful correction, and low motivation may lead to unsuccessful correction. Research on factors influencing (un)successful correction is lacking (Wilson et al., 2002), and thus there is lack of a sufficient basis for arriving at a specific hypothesis on whether unsuccessful correction will result in over correction or insufficient correction. The current study also explored this specific question.

Method

Participants and experimental design. Participants were 201 undergraduate students at a Midwestern university in the USA, who participated in the experiment for extra class credit. A 2 (Arousal: low vs. high) \times 2 (Motivation: low vs. high) between-subjects design was employed. The dependent variable, stimulus, arousal, and motivation manipulations were similar to those in the previous studies. The procedures were designed to assess memory-based judgement.

Memory-based judgement. To facilitate memory-based judgement, it was necessary to create situations in which participants were exposed to the ad and encoded the information without forming judgements. Then, in a separate session, participants formed judgements using the previously encoded information. Because our focus in this research was on the effect of arousal during judgement, the arousal manipulation took place at the judgement session. To ensure memory-based judgement, participants had to (1) avoid forming judgements during their initial exposure to the information, and (2) subsequently form judgements without being exposed to the target information. If these requirements were ignored, participants would either make stimulus-based judgements or simply retrieve their previously formed judgement (Wyer & Srull, 1989). These issues were resolved in the experimental setting by using two sessions: one for encoding and the other for judgement. In the first session, participants viewed an ad for one minute, and were instructed to memorise as many details from it as possible.

In addition, to remove the participants' focus from the ad or brand evaluation, this memorising task was embedded between other mundane tasks. This procedure has been used in previous research dealing with memory-based judgement, and has been shown to be effective (see Lichtenstein & Srull, 1987). A pre-test assessed adherence to the memorising instructions. The pre-test was conducted in two sessions—one for encoding and the other for retrieval. The encoding session was identical to the first session of the main experiment. Twenty-four hours after the encoding session, participants arrived for the retrieval session. They were asked six aided-recall questions. Results revealed aided recall of approximately 70%, indicating that participants indeed learned information from the ad while being exposed to it. If participants had formed judgements when exposed to the ad, they would have encoded the impression rather than the details of the ad, and when asked about the brand would have only retrieved their judgement, and thus would be unlikely to be affected by their arousal (Srull, 1983, 1984). The relatively high recall suggests that the procedure was effective in creating memory-based judgement.

The retrieval session, conducted 24 hours later, was identical to "no forewarning conditions" in Study 1, with two modifications: here, participants evaluated the brand from the ad they had viewed at the encoding session the day before. In addition, half of the subjects rated the feelings elicited by the music before completing the attitude scale, as an additional manipulation check. Our analysis (see next section) showed that this manipulation check did not have an impact on participants' responses. At the end of the judgement session, participants were asked to indicate on a 7-point scale the extent to which they followed the instructions in the encoding session. The purpose of this question was to ensure that participants indeed tried to memorise the information and hence performed memory-based judgement.

Results

Arousal manipulation check. This manipulation check supplemented the manipulation check conducted in the pre-test as described in Study 1. To rule out the possibility of the participants being affected by these questions, only half of the subjects completed this scale. Analysis showed no significant interaction between arousal, motivation, and completion of the manipulation check in influencing judgement, $F(1, 185) = 1.526$, $p = .218$. Thus, the manipulation check did not impact judgement. The manipulation check included data from 94 participants, 51 of whom were in the low arousal (relaxing) condition and 43 in the high arousal (exciting) condition. The exciting music induced higher arousal ($M = 6.63$) than the relaxing music ($M = 3.52$), $t(92) = -11.8$, $p < .001$. Although both pieces were rated as pleasant, there was a significant difference in their valence rating. The relaxing piece's valence score was higher ($M = 6.76$) than the exciting piece's valence score ($M = 5.90$), $t(92) = 2.584$, $p < .05$. This issue will be addressed in the analysis of the results.

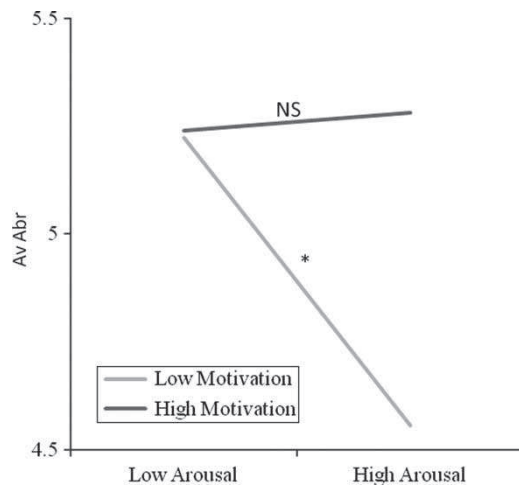


Figure 4. Results of Study 3. The effect of arousal on memory-based judgement under low versus high motivation. Note: Significant effects are marked with *; insignificant effects are marked as NS.

Judgement. Out of the 201 participants, nine indicated that they did not fully follow the instructions in the encoding sessions (a score lower than five on the 7-point scale that measured the extent to which they followed the instructions). Using this consistent criterion, we eliminated the data of these participants from the analysis. The hypothesis testing was therefore based on data from the remaining 192 participants. An ANOVA revealed significant interaction between arousal and motivation to influence attitude, $F(1, 188) = 5.953$, $p < .05$ (see Figure 4). Consistent with Hypothesis 4, results for memory-based judgement revealed an opposite pattern than for stimulus-based judgement (Figure 1). In memory-based judgement, arousal influenced attitude only under low motivation ($M_{\text{low arousal}} = 5.23$, $M_{\text{high arousal}} = 4.56$), $F(1, 188) = 10.56$, $p < .01$, and not under high motivation ($M_{\text{low arousal}} = 5.24$, $M_{\text{high arousal}} = 5.28$), $F(1, 188) = 0.033$, $p = .86$.

Additional analysis: The role of valence versus arousal. The pre-test conducted to select the musical pieces for the arousal manipulation showed that, indeed, the musical pieces differed significantly only in the level of arousal they elicited ($M_1 = 3.5$; $M_2 = 6.3$), $t(29) = 6.16$, $p < .001$, but not in the level of valence ($M_1 = 5.3$; $M_2 = 5.4$), $t(29) = 0.099$, $p = .9$. Nevertheless, the additional manipulation checks conducted in this study (using half of the sample) showed a significant difference in the level of arousal ($M_1 = 3.52$; $M_2 = 6.63$), $t(92) = -11.8$, $p < .001$, and also a small but significant difference in the level of valence ($M_1 = 6.76$; $M_2 = 5.90$), $t(92) = 2.584$, $p < .05$. To counter the alternative explanation that our findings are due to valence, we used an empirical test of covariate analysis on the subset of the sample that conducted the manipulation check. For the covariate analysis the dependent variable, attitude toward the brand (A_{br}), was regressed first on valence only, and then on both arousal and valence (scores from the manipulation check). This analysis was performed on the simple effect where arousal is expected to influence A_{br} (i.e., low motivation in the case of memory-based judgement). The analysis revealed that the con-

tribution of arousal to explained variance was greater than that of valence ($R^2_{\text{for valence-only model}} = .017$, $R^2_{\text{for valence \& arousal model}} = .15$). Further, the coefficient for valence was not significant for the valence-only model ($\beta_{\text{valence}} = 0.129$, $p = .394$) or for the valence and arousal model ($\beta_{\text{valence}} = 0.162$, $p = .257$), whereas the coefficient for arousal was significant ($\beta_{\text{arousal}} = -0.366$, $p = .013$). The non-significant coefficient for valence, the significant coefficient for arousal, and the larger contribution of arousal to the explained variance in the regression model strongly support our inference that our findings are due to arousal and not valence.

Our interpretation is also consistent with research by Gorn et al. (2001), suggesting that valence influences evaluation only when the ad's affective tone is ambiguous, and that arousal influences evaluation when the affective tone of the ad is clear. As discussed earlier, a pre-test examined affective tone ambiguity, and ads were selected such that the affective tone was clear (rather than ambiguous). The large effect of the manipulation on arousal when compared to valence, the empirical analysis above, and the nature of the stimuli in light of past research (Gorn et al., 2001), all provide compelling evidence that the observed effects were due to arousal and not valence.

Discussion

Motivation plays a different role in the influence of arousal on memory-based judgement as compared to stimulus-based judgement. Our previous studies showed that arousal influenced stimulus-based judgement to a greater degree under high than under low motivation. In contrast, in memory-based judgement, arousal influenced judgement to a greater degree under low motivation as compared to high motivation. These results resolve the apparent contradiction between the results of Study 1 and past research, and help clarify the boundary conditions for the role of motivation in controlling effects on judgement.

Our explanation for the different patterns in memory- versus stimulus-based judgement relies

on the proximity between the experienced arousal and the exposure to brand information. An alternative explanation may be suggested by the model of affect identification and discounting (Albarracin & Kumkale, 2003). According to this model, affect (in general) influences judgement only when a moderate amount of thought is generated. Albarracin and Kumkale defined the amount of thought in terms of ability and motivation. Low ability and motivation will produce a low amount of thought, low ability and high motivation or high ability and low motivation will produce a moderate amount of thought, and high ability and motivation will produce a high amount of thought. Rottenstreich, Sood, and Brenner (2007) argued that memory-based choices require more cognitive resources than stimulus-based choices. This is because recalling relevant information (in memory-based judgement) is effortful, and not needed under stimulus-based judgement. Combining Rottenstreich and colleagues' argument with the model of affect identification and discounting suggests that: (1) in memory-based judgement, arousal will influence judgement under high but not under low motivation; and (2) in stimulus-based judgement, arousal will influence judgement under low but not under high motivation. These predictions are in direct contrast to the pattern found in our studies, suggesting that the alternative explanation does not apply. The discrepancies between these explanations may stem from the types of processes involved. As Albarracin and Kumkale (2003) noted, their line of reasoning is limited to an attribution process, and does not apply to more automatic processes.

Interestingly, the effect of arousal on judgement under low motivation is negative. Our conceptualisation suggests that the effect of arousal under low motivation is mediated by an attribution process. The predicted effect, when no correction occurs, is positive, and thus the effect of arousal on memory-based judgement appears to be taking place in an opposite direction, perhaps stemming from over correction. Indeed, examining the effects of arousal under low motivation in the various conditions across our studies revealed a

pattern, as follows. In a stimulus-based condition, when participants experienced cognitive load, the effect was positive (i.e., the predicted “uncorrected effect”; Study 2). In stimulus-based judgement, when participants do not experience cognitive load, some degree of control led to successful correction, even without forewarning; however, forewarning led to over correction (Study 1). In memory-based judgement, in which the experience of arousal is separate from exposure to the information, more control may have also led to over correction (Study 3). Therefore, the over correction explanation is in line with the logic for the entire conceptualisation—suggesting that different degrees of control lead to different degrees of correction, which may sometimes result in over correction. Thus, the greater degree of controllability in a memory-based judgement task leads to successful correction of the effect with the accessibility process (which takes place under high motivation, and is assumed to be less controllable), and to over correction with the attribution process (which takes place under low motivation, and is assumed to be more controllable). In other words, conditions that permit control may lead to over correction. The findings from our studies on the various degrees of correction (e.g., successful correction, insufficient correction, over correction) add insights to an under-researched area (Wilson & Brekke, 1994; Wilson et al., 2002), and suggest directions for further examination of this topic. Additional directions for future investigations are discussed subsequently.

GENERAL DISCUSSION

This research contributes to the literature on affect and cognition by identifying the factors that moderate the impact of arousal, a dimension of affect, on judgement, as well as the nature of the processes involved. It also contributes to the judgement literature by clarifying conditions under which control over factors unrelated to the judgement task is enhanced or diminished. The role of motivation in controlling the effect of arousal on judgement is contingent upon the type

of judgement task. In stimulus-based judgement, different levels of motivation lead to different processes by which arousal influences judgement. Under high motivation, an uncontrollable effortless accessibility process underlies the effect of arousal on judgement; under low motivation, a controllable attribution process underlies the effect. Our research suggests boundary conditions for the role of motivation in the nature of the process by which arousal influences judgement, and shows that the role of motivation varies in memory- versus stimulus-based judgement. Past studies show that salience of the source of arousal nullifies its influence on judgement (e.g., Bosmans & Baumgartner, 2005; Reizenzein & Gatteringer, 1982; Schwarz & Clore, 1983; Zanna & Cooper, 1974; Zillmann, 1978). Our findings suggest conditions where salience may not be sufficient to lead to control.

Limitations and future directions

Our study was restricted to incidental arousal (as opposed to task-related arousal). Dealing with general affect (unrelated to specific dimension), Garg, Inman, and Mittal (2005) showed that incidental and task-related affect may interact. In addition, different conditions may moderate the impact of task-related versus incidental affect. This possibility should be investigated in future research. Further, in the context of memory-based judgement, our research is limited to the role of arousal experienced during judgement, as opposed to encoding. Future research should study the influence of arousal experienced during encoding. In addition, our motivation manipulation resulted in relatively low as opposed to high levels, although they were moderate versus high in absolute terms. Future research should examine the full range of motivation.

The distinction between automatic and non-automatic processes refers to several factors: control; awareness; effort; and intention (Bargh, 1989). Our discussion focuses on the controllability and efficiency (i.e., effort) aspects of the process. To advance our understanding of the underlying processes by which arousal influences

judgement, other aspects of automaticity should be considered in future research. It would be particularly interesting to assess the extent to which individuals are aware of the potential effects on their judgement, as these may have important implications in the controllability of unwanted influences (Wilson & Brekke, 1994).

Throughout our studies we attributed the null effects of arousal on judgement to correction. Yet attempts at correction do not always result in null effects; sometimes an over correction or insufficient correction may occur (Wilson et al., 2002). And, indeed, our research provides evidence for this possibility, as does other research (e.g., Petty & Jarvis, 1996). Wilson and Brekke (1994) delineated the general conditions that will result in successful correction. We add to their research by showing that the correction of arousal misattribution is effortful. Future research should examine other types of corrections beyond the one related to the effect of arousal, and should also identify specific conditions that will lead to successful correction, insufficient correction, or over correction.

Finally, this study focused on the effect of the arousal dimension of affect. As such, the present research goes beyond the role of valence in the research of affect. In this regard it is similar to other research in the area (e.g., Garg et al., 2005; Gilet & Jallais, 2011; Lerner & Keltner, 2000; McConnella & Shorea, 2011; Raghunathan & Pham, 1999; Raghunathan, Pham, & Corfman, 2006; Reisenzein & Gatteringer, 1982) showing that affective states of the same valence can also influence cognition and behaviour. Understanding the effect of arousal may contribute to research on specific emotions (Bosmans & Baumgartner, 2005; Raghunathan et al., 2006). Our conceptualisation combines insights from the arousal literature as well as from literature concerning general affect. Whereas some aspects of the effects of general affect and of arousal were found to share common assumptions (see a note in Siemer & Reisenzein, 1998, p. 784), other research suggests that each of the two dimensions of affect may have distinct influences on individuals (e.g., Gorn et al., 2001; Shapiro, MacInnis, & Park, 2002).

Future research should extend the investigation to control over arousal versus valence dimensions of affect. Control of arousal related to other sources should also be studied, such as arousal related to target affect (Shiv & Fedorikhin, 2002) or to other types of incidental arousal, such as time pressure, mental effort, or diurnal variations (Eysenck, 1982; Kahneman, 1973).

In conclusion, this research on the conditions under which individuals can control the effect of arousal on judgement provides valuable theoretical implications for other studies on affect and cognition, as well as interesting directions for future research.

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