

Cite as: Greifeneder, R., & Bless, H. (2007). Relying on accessible content versus accessibility experiences: The case of processing capacity. *Social Cognition, 25*, 853-881. doi: 10.1521/soco.2007.25.6.853

Address correspondence to: rainer.greifeneder@unibas.ch

Relying on accessible content versus accessibility experiences:
The case of processing capacity

Rainer Greifeneder

&

Herbert Bless

University of Mannheim, Germany

Abstract

Three studies investigated the interplay between processing capacity and reliance on accessibility experiences versus reliance on accessible content. Participants low in processing capacity were more likely to rely on the experience of ease versus difficulty, whereas participants high in processing capacity were more likely to base their judgment on the accessible content information. This result was robust across two different judgmental domains and was further supported by the assessment of processing latencies during judgment formation as an indicator of the underlying processes. In combination, the reported findings suggest that reliance on ease-of-retrieval experiences is particularly likely in situations of low processing capacity.

Keywords: Ease-of-retrieval, subjective experiences, processing capacity, heuristic

Relying on accessible content versus accessibility experiences:
The case of processing capacity

It has long been suggested that judgments may be based on both accessible content (e.g., Higgins, 1996; Wyer & Srull, 1989) and subjective experiences that accompany information processing (e.g., contributions in Bless & Forgas, 2000). With respect to subjective experiences, the role of accessibility experiences has received particular attention. Starting with Tversky and Kahneman (1973), it has been suggested that the experience of the “ease with which instances or associations could be brought to mind” (p. 208) influences judgments and decisions across a wide range of domains (for an overview see Schwarz, 1998, 2004), including, for example, attitude formation (Wänke, Bless, & Biller, 1996; Haddock, 2000), stereotyping (Dijksterhuis, Macrae, & Haddock, 1999), frequency estimates (Wänke, Schwarz, & Bless, 1995), group perception (Rothman & Hardin, 1997), health-related behavior (Rothman & Schwarz, 1998), or advertising (Wänke, Bohner, & Jurkowitsch, 1997). Despite the highly prominent role of the ease-of-retrieval heuristic in judgment and decision making, and despite the seeming universality of the influence of the experienced ease-of-retrieval, only a handful of research endeavors investigated whether the use of these kinds of cognitive experiences is ubiquitous, or whether it is restricted to certain situational circumstances. The current research set out to further our understanding of this important question.

Previous research on factors that moderate reliance on accessibility experiences

Apart from a small set of investigations, we know little about factors that moderate the reliance on subjective experiences in judgment formation (for notable exceptions, see below). This scarcity is striking, considering both the theoretical (for a review, see Schwarz, 1998) and practical importance (e.g., Wänke et al., 1997; Raghurir & Menon, 1998; Dijksterhuis et al., 1999) of cognitive subjective experiences such as the ease-of-retrieval phenomenon. One obvious reason for this lack of evidence is the fact that both paths of judgment formation addressed here – accessible content versus accessibility experiences –

were long intertwined in research on the ease-of-retrieval phenomenon, thus prohibiting conclusions about moderation (see Schwarz et al., 1991). Only when experimental paradigms separating the two pathways became available, questions of moderation could be addressed convincingly. One such paradigm was introduced by Schwarz and colleagues (1991) by setting up the judgmental stage in such a way that opposing results are hypothesized for the experiential versus the content-based pathway. Specifically, participants were asked to recall differential *amounts* of information, with some recalling few and others many instances of previous self-assertive behavior. Afterwards, participants judged their own self-assertiveness. If individuals relied on the *accessible content* in forming these kinds of judgments, the recall of many as compared to few examples would result in higher perceptions of self-assertiveness. Conversely, if individuals relied on their *accessibility experiences*, the retrieval of few examples (an easy task) as compared to many (a difficult task) would lead to higher ratings of self-assertiveness. After all, if it is easy (difficult) to come up with instances of one's own self-assertiveness, chances are that one is (is not) self-assertive. Given this propensity, and given that the paradigm has been successfully established in various research endeavors (cf. Schwarz, 1998, for an overview), we built upon this methodology in the current set of studies.

To our knowledge, only four potential moderators have been investigated in paradigms that allow for a differentiation between content and accessibility experiences. First, addressing the role of *mood*, Ruder and Bless (2003) reported evidence that reliance on experiential information is more likely for individuals in happy versus sad mood states. Second, the influence of participants' *motivation* on the use of subjective experiences has been investigated, though with inconsistent results. Reliance on the experience of ease or difficulty was found to be likely both for people low in processing motivation (Rothman & Schwarz, 1998; Aarts & Dijksterhuis, 1999; Grayson & Schwarz, 1999; Florack & Zoabi, 2003; for related evidence in the domain of personal interest, see Haddock, 2002) and for people high in processing motivation (Wänke & Bless, 2000; Tormala, Petty, & Briñol, 2002). Third, *attitude extremity* has been shown to decrease reliance on accessibility experiences

(Dijksterhuis et al., 1999; Haddock, Rothman, Reber, & Schwarz, 1999). Fourth, it has been demonstrated that individuals cease to rely on the experience of ease-of-retrieval if the validity of these experiences has been called into question by means of a misattribution paradigm (Schwarz et al., 1991, Experiment 3). Thus, the perceived *diagnosticity* can be considered another factor that moderates the use of accessible content versus accessibility experiences. While readily acknowledging this aspect, we argue that the primary contribution of the misattribution studies lies in the demonstration that feelings (here the experienced ease-of-retrieval) may provide a judgmental basis to begin with (see our rationale for Experiment 3).

Processing capacity moderates the reliance on accessibility experiences

The present manuscript investigates the hitherto neglected role of *processing capacity* as a moderator of the impact of accessible content versus accessibility experiences. Specifically, joining two well-established currents of social cognition research, we argue that reliance on accessibility experiences is particularly likely in situations of low processing capacity. The following is to detail our theorizing.

Koriat and Levy-Sadot (1999) proposed that cognitive feelings are meta-summaries of currently activated content or ongoing processes, boiling complex situational data down to single pieces of experiential information. This notion parallels evidence in the realm of affective feelings (Schwarz & Clore, 1996; Clore, 1992), suggesting that cognitive feelings may be used in a *heuristic* manner, allowing for fast and frugal processing. Indeed, Tversky and Kahneman (1973) themselves considered the reliance on subjective experiences in judgment formation a heuristic strategy. From such a perspective, conditions fostering reliance on heuristics should be a fruitful venue for investigating factors that moderate the use of subjective experiences. Consequently, the next question pertains to conditions that render heuristic processing more likely. Consistent with several dual-process models of attitude formation (e.g., Chen & Chaiken, 1999; Petty & Cacioppo, 1986), heuristic processing strategies are particularly likely in situations of low processing intensity, that is, if

either the motivation or the capacity to process are lacking. Conversely, systematic processing strategies are particularly likely in situations of high processing intensity, that is, if the motivation and the capacity to process are given. In a typical experiment on dual-process models, participants are presented with two types of content (e.g., high vs. low quality arguments) that are orthogonally associated with a heuristic cue (e.g., high vs. low expertise of the presenter). Results generally indicate that differential content information is taken into account when processing intensity is high, whereas differential cue information is taken into account when processing intensity is low.

Combining these two lines of research (conceptualization of accessibility experiences and dual-process models of attitude formation), we suggest that situations of *low* processing capacity increase the probability that people will rely on accessibility experiences, while conditions of *high* processing capacity increase the probability that people will rely on the accessible content. Unsurprisingly, similar hypotheses would also pertain to processing motivation as a moderator, because processing motivation and capacity are functionally similar in that they are sufficient for low processing intensity and necessary but not sufficient for high processing intensity. At the same time, however, processing motivation and capacity are generally treated as independent and conceptually different (e.g., Chen & Chaiken, 1999; Petty & Cacioppo, 1986; Fiske & Neuberg, 1990; Fazio & Towles-Schwen, 1999). For the current research, one implication of the functional similarities between processing motivation and capacity is worth noting: To individually investigate the moderating function of processing capacity on the reliance on accessibility experiences, it is necessary to keep processing motivation at a constant high level. The current research established this precondition by motivating participants to process attentively, regardless of experimental condition.

In sum, we propose that reliance on accessible content versus accessibility experiences is moderated by participants' processing capacity, such that lower processing capacity is associated with more pronounced reliance on accessibility experiences.

Experiment 1

Experiment 1 was designed to investigate the central hypothesis that people in conditions of low processing capacity tend to judge based on their subjective experiences, whereas people high in processing capacity tend to go with the content at hand. To this end, we manipulated both the experience of ease, by varying the amount of information (cf. Schwarz et al., 1991), and processing capacity. Specifically, half of the participants were asked to retrieve from memory a few arguments in favor of a certain position (easy condition), the other half was asked to retrieve many arguments (difficult condition). Orthogonally to this manipulation of retrieval ease, half of the participants made their attitudinal judgments while their processing capacity was impaired, whereas no such constraints were imposed on the other half. To assure that the high capacity group not only had the necessary processing capacity, but also the required motivation to process the available information in a systematic manner, *all* participants were motivated to process accurately.

Method

Participants. Eighty-seven students from the University of Mannheim participated in return for EUR 2.50 (approximately USD 2.00) in what was called an experiment on information processing. Forty-six percent were male and the average age was 22.9 years ($SD = 4.0$).

Design and manipulations. Participants were randomly assigned to a 2 (few vs. many arguments) x 2 (high vs. low processing capacity) between participants factorial design. The ease-of-retrieval manipulation was based on the methodology introduced by Schwarz and colleagues (1991). Specifically, participants were asked to recall either two or five reasons in favor of the introduction of a new quarterly surgery fee. Independent pre-testing at the University of Mannheim had shown that retrieving two arguments is easy, while retrieving five arguments is rather difficult.

Differences in processing capacity were obtained by means of a dual-task paradigm. Specifically, while responding to the dependent variables, half of the participants (low

capacity group) were asked to complete a secondary task. This secondary task consisted of remembering an eight-digit number that participants were allowed to rehearse for five seconds before the primary task set in (for a successful use of this kind of manipulation, cf. Gilbert & Osborne, 1989). Additionally, processing time was strictly limited to seven seconds per dependent variable to prevent participants from alleviating the processing load by taking more time. Neither the dual-task paradigm nor the time limitation applied to the other half of participants (high capacity group).

Very importantly, the capacity manipulation was instigated *after* the manipulation of retrieval ease. This order of manipulations is decisive, as the paradigm introduced by Schwarz and colleagues (1991) relies on a backward-inference from participants' judgments to the presumed underlying processes. Noticeably, this backward-inference is meaningful only if the experimental groups had similar inputs to begin with. If the inputs between experimental groups were likely to differ (e.g., with low vs. high capacity participants recalling different content information or having different accessibility experiences), differences in participants' judgments could be due to differences in information retrieval *and* to differences in information use. Thus, strong conclusions about factors that moderate reliance on accessibility experiences would be methodologically forestalled. By manipulating processing capacity *after* ease-of-retrieval, we avoided this confound and created conditions that allow for strong conclusions about the moderating impact of processing capacity on the reliance on accessibility experiences.

Materials and Procedure. After entering the laboratory, participants were led to one of six cubicles. Participants were then asked to consent to their participation and were subsequently provided with the experimental instructions.

First, participants were told that they would be working on several tasks, some of which required special instructions. To ensure a maximum of similarity between the two capacity conditions, the load manipulation and timing restrictions were subsequently explained to all participants. That is, all participants learned that there might be tasks during which they had to memorize a number while processing time was restricted. Also, all

participants were subjected to an example task of this manipulation to ascertain a high level of familiarity with the procedure. Finally, participants were told that due to efficiency considerations, not all participants would be working on all tasks, hence the described tasks were not necessarily part of their specific session. Also, it was stressed that processing time was only restricted if explicitly stated.

Second, in line with what was discussed above, we wanted to ensure a sufficiently high level of processing motivation as a necessary precondition for systematic judgment formation. We therefore explicitly instructed all participants to work attentively throughout the experiment.

Third, by asking participants to recall two versus five arguments in favor of the surgery fee, we manipulated the amount of accessible information and the experienced ease, respectively (see Schwarz et al., 1991). Participants stated their experience of ease or difficulty in recalling these arguments on two items, both ranging from 1, 'very easy,' to 9, 'very difficult': 'How easy versus difficult did you experience the retrieval of arguments to be?'; 'How easy versus difficult would the retrieval of further arguments be?' Fourth, participants' processing capacity was manipulated by means of the practiced processing restrictions that were administered to one half of the participants (low capacity group), but not to the other half (high capacity group).

Fifth, participants stated on four 9-point Likert-scaled items their attitude toward the introduction of the quarterly surgery fee. For example, the first item read: 'I consider the introduction of the surgery fee to be ... (very good – very bad).' For participants in the low processing capacity condition, each judgmental item was preceded by a reminder to continue remembering the 8-digit number. This was done to keep the load at a constant high level throughout the judgmental phase.

Sixth, participants in the reduced processing capacity condition were asked to write down the 8-digit number they had to remember during the judgmental phase. Embedded within several unrelated questions to ensure unobtrusiveness, four 9-point Likert-scaled items were administered to all participants in order to measure the success of our capacity

manipulation. Specifically, two items asked for the impairment of participants' ability to concentrate, and two items asked for the subjectively experienced time pressure. The items ranged from 'does apply' to 'does not apply' and read, for example: 'I was able to concentrate on the judgmental task.'¹

Finally, demographic information including age and gender was assessed. Participants were debriefed following APA suggestions, remunerated, and thanked for their participation.

Results and Discussion

Manipulation checks. The two items assessing experienced ease served as a check for the ease-of-retrieval manipulation. Since the two items intercorrelated to a high degree ($r = .81$), they were combined to form a single measure. This measure was scaled such that higher values indicate lower experienced ease. Indicating a successful manipulation, participants who recalled two arguments experienced the recall task as being easier than participants in the five arguments condition ($M = 5.6$, $SD = 2.19$ and $M = 7.23$, $SD = 1.76$, $F(1, 85) = 14.86$, $p < .01$).

The four items serving as check for the capacity manipulation were coded in the same direction, such that higher values indicate less ability to focus on the judgmental task. As the four items were strongly interrelated, a single measure was formed (Cronbach's $\alpha = .82$). This score was subjected to a 2 (few vs. many arguments) x 2 (high vs. low processing capacity) factorial ANOVA, yielding, as expected, only a significant main effect for processing capacity ($F(1, 83) = 13.58$, $p < .01$). The success of the selected capacity manipulation is underscored by the finding that participants in the low versus high capacity condition reported more concerns about their ability to focus during the judgmental task ($M = 4.21$, $SD = 2.00$ and $M = 2.95$, $SD = 1.18$). Additionally, we analyzed how accurately participants were able to recall the number they had to memorize. This analysis was restricted to low capacity participants, because high capacity participants did not have to recall a number. Results indicate that recall accuracy was similar in the two versus five

arguments condition (42% vs. 32% correct, respectively, $\chi^2(1, N = 38) = .45, p > .50$), thus being a further indication of the success of the selected capacity manipulation.²

Attitude judgments. The four items assessing participants' attitude were rescaled, such that for all items higher values signal more positive judgments. Items were then combined to form a single measure (Cronbach's $\alpha = .93$) and were subjected to a 2 (few vs. many arguments) x 2 (high vs. low processing capacity) factorial ANOVA. This analysis revealed the predicted interaction effect of the two independent variables, $F(1, 83) = 4.08, p < .05$, all other $ps > .21$, see Figure 1. Planned contrast analyses further showed that participants for whom processing capacity had been experimentally impaired endorsed more positive judgments after recalling few as opposed to many arguments ($M = 3.81, SD = 2.15$ and $M = 2.81, SD = 1.91, t(83) = 1.47, p < .07$, one-tailed, Cohen's $d = 0.49$). In line with prior research (e.g., Schwarz et al., 1991), this medium size effect (see Cohen, 1992) indicates experience-wise judgments. Conversely, participants for whom processing capacity was not experimentally reduced, judged the surgery fee less positively after recalling few as compared to many arguments ($M = 3.46, SD = 2.16$ and $M = 4.29, SD = 2.15, t(83) = 1.38, p < .09$, one-tailed, Cohen's $d = 0.39$), thus indicating a content-wise judgment. In sum, results of Experiment 1 provide the first empirical evidence for the outlined hypothesis that processing capacity moderates reliance on accessibility experiences versus accessible content.

Experiment 2

Experiment 2 was designed to shed light on the processes underlying the reported pattern of effects by means of processing latencies. In Experiment 1, we concluded that participants low in processing capacity relied on their subjective experiences because they judged the surgery fee more positively after recalling few as compared to many arguments (Schwarz et al., 1991). Given that cognitive subjective experiences such as the ease-of-retrieval phenomenon have long been conceptualized as single meta-cognitive cues (Koriat & Levy-Sadot, 1999), the underlying judgmental process was assumed to be heuristic in nature. To

investigate such a hypothesis, an analysis of processing latencies provides a powerful tool. Interestingly, there is little evidence about processing latencies and use of ease-of-retrieval experiences (for an exception, see Ruder & Bless, 2003).

If low capacity participants judge in a heuristic manner as hypothesized, their processing latencies should be independent of the number of previously recalled pieces of information. This is because the heuristic cue, the experienced ease or difficulty, is a single piece of information, no matter what the actual amount of accessible information was. Conversely, if high capacity participants rely upon a systematic analysis of the accessible content as suggested, their latencies should depend on the amount of retrieved information. This is because systematically evaluating and integrating various pieces of information with respect to a judgmental question requires more processing time, the more information is available. Thus, participants judging on the basis of a few pieces of information should take less time than participants judging on the basis of many pieces of information.

While we argue that high capacity participants systematically evaluate the available content information, an alternative underlying mechanism is sometimes suggested to account for the attitudinal pattern reported in Experiment 1. Indeed, the very same attitudinal pattern could be hypothesized by assuming that high capacity participants relied on some sort of numerosity cue (Petty & Cacioppo, 1984), judging the surgery fee more positively (negatively) because there were more (fewer) arguments. If this were the case, however, judgmental latencies in the high capacity group should be similar, because the descriptive knowledge about the amount of information (few vs. many) is a single cue, regardless of whether many or few pieces of information were recalled. Thus, while the content- and the numerosity explanation yield a similar attitudinal pattern, they strongly differ with respect to the underlying processes as manifested in participants' processing latencies.

In sum, the assessment of latencies appears to be a necessary step towards understanding the kind of judgmental process low and high capacity participants relied upon. Given the scarcity of evidence with respect to processing latencies and reliance on ease-of-

retrieval experiences, assessing latencies is important both for the outlined hypotheses, and for research on ease-of-retrieval in general.

Apart from assessing processing latencies, the experimental material was altered in two respects. First, the judgmental domain was changed from attitudinal judgments to self-judgments in order to demonstrate the general nature of the reported effect. Second, all participants were put under load, though with differing levels of taxation. By means of this change in manipulation, all instructions and the sequence of tasks were rendered similar across the two capacity conditions.

Method

Participants. Eighty students from the University of Mannheim participated in a study on information processing. Fifty-seven percent of participants were male and the average age was 22.5 years ($SD = 2.8$). Participants were paid EUR 2.50 (approximately USD 2.00) for their participation.

Design and manipulations. In Experiment 2, we replicated the design and manipulations reported in Experiment 1, except for the following two changes. First, participants in Experiment 2 had to recall a small or a large amount of information about their own past self-assertiveness. This manipulation closely parallels the original set-up used by Schwarz and colleagues (1991). Based on the results of an independent pre-testing at the University of Mannheim, we contrasted two instances (the small, easy amount) with eight instances (the large, difficult amount). Second, to render instructions and the sequence of events exactly similar across the two capacity conditions, *all* participants had to make their judgments while working on a dual-task paradigm, though with varying degrees of taxation. In particular, participants in the high capacity group were instructed to remember a 2-digit-number (compared to no number in Experiment 1), whereas participants in the low capacity group had to remember an 8-digit-number (identical to Experiment 1).

Materials and Procedure. Materials and procedures closely resembled those in Experiment 1, with the following modifications. First, the retrieval task in Experiment 2 asked

for instances of self-assertiveness instead of arguments for the surgery fee as in Experiment 1. Accordingly, the wording of the ease manipulation check items was changed to ask for the experienced ease of recalling instances instead of arguments. Second, the manipulation check for processing capacity was changed, now entailing five items. Three of these targeted participants' capability to concentrate and two asked for the subjectively felt time pressure. The five items were anchored on 'does not apply' versus 'applies.' For instance, the first item read: 'My attention was severely impaired because of remembering the number.' Third, the dependent variables in Experiment 2 were changed due to the new topic, all being anchored on 'does not apply' versus 'applies.' The wording of the three items was: 'Overall, I'm a very self-assertive person,' 'In unexpected situations I always know what to do,' 'I believe I can cope well even in surprising situations.' Fourth, processing latencies were recorded.

Results and Discussion

Manipulation checks. A single score was formed based on the two items measuring accessibility experiences ($r = .73$). This index was scaled such that higher values indicate lower experienced ease. Paralleling results in Experiment 1, recalling two instances was experienced as being easier than recalling eight ($M = 4.78$, $SD = 1.94$ and $M = 6.64$, $SD = 1.45$, $F(1, 78) = 23.69$, $p < .01$), thus speaking to the success of the selected manipulation.

The five items measuring capacity impairment were recoded, such that for all items higher values indicate lower degrees of available capacity. Again, the items were combined to form a single index (Cronbach's $\alpha = .88$) that was subjected to a 2 (few vs. many instances) x 2 (high vs. low processing capacity) factorial ANOVA. This analysis solely yielded a significant main effect for processing capacity $F(1, 76) = 49.01$, $p < .01$, with people in the high as compared to the low capacity condition reporting less impairment ($M = 2.42$, $SD = 1.29$ and $M = 4.89$, $SD = 1.83$). Thus, the capacity manipulation was entirely successful in instigating two different levels of (subjectively felt) processing capacity.

Importantly, this was the case even though all participants were subjected to a dual-task paradigm, which did vary in the degree of taxation, however.

Again, accuracy of recall was assessed. As all participants had to recall a number in Experiment 2, this measure was submitted to a 2 (few vs. many instances) x 2 (high vs. low processing capacity) factorial ANOVA, yielding only a main effect for capacity ($F(1, 76) = 47.64, p < .01$). As expected, recall accuracy was higher in the high (97% correct) as compared to low capacity condition (40% correct). Given that no other effect reached significance (all $F < 0.1$), the accuracy measure may serve as an additional indicator for the success of the selected capacity manipulation.

Reported self-assertiveness. The three items assessing participants' own self-assertiveness were strongly interrelated and were therefore combined to form a single index (Cronbach's $\alpha = .74$). Higher values on this measure indicate higher degrees of self-assertiveness. The combined index was submitted to a 2 (few vs. many instances) x 2 (high vs. low processing capacity) factorial ANOVA. Paralleling results of Experiment 1, this analysis revealed only the predicted interaction effect, $F(1, 76) = 8.07, p < .01$ (all other $F < 1$), see Figure 2. Planned contrast analyses further showed that low capacity participants rated themselves as more self-assertive after recalling few as opposed to many instances ($M = 5.46, SD = 1.22$ and $M = 4.82, SD = 1.77, t(76) = 1.36, p < .10$, one-tailed, Cohen's $d = 0.42$), presumably because they based their judgment on the ease or difficulty they experienced while retrieving instances from memory. Contrarily, high capacity participants judged their own self-assertiveness lower after recalling few as compared to many instances ($M = 4.40, SD = 1.65$ and $M = 5.65, SD = 1.24, t(76) = 2.65, p < .02$, Cohen's $d = 0.86$), presumably because they based their judgment on the accessible content.

Taken together, the observed judgmental pattern reflects that processing capacity moderated participants' reliance on accessible content versus accessibility experiences. Experiment 2 therefore replicated the results observed in Experiment 1, however, within in a different judgmental domain (self-assertiveness vs. attitudes), thus speaking to the general nature of the hypothesized effect.

Judgmental latencies. Apart from replicating the results obtained in Experiment 1, the main goal of Experiment 2 was to investigate the processes underlying the observed judgmental pattern. This was accomplished by analyzing the time participants needed for making judgments. In particular, the latencies for the three self-assertiveness judgments were averaged (Cronbach's $\alpha = .64$) and subjected to a 2 (few vs. many instances) x 2 (high vs. low processing capacity) factorial ANOVA, revealing two significant effects. First, a main effect for processing capacity reflects that low capacity participants took less time than high capacity participants ($M = 3.98$ s, $SD = 0.88$ and $M = 5.28$ s, $SD = 1.61$, $F(1, 76) = 21.84$, $p < .01$), thus indirectly supporting the success of the chosen capacity manipulation. This finding is in line with the assumption that individuals are more likely to rely on heuristic processing when their processing resources are constrained, whereas a more systematic, content-based processing is likely given sufficient processing capacity and motivation (see Chen & Chaiken, 1999; Petty & Cacioppo, 1986).³

Second, and more importantly, we obtained a significant interaction effect ($F(1, 76) = 5.38$, $p < .03$). As can be seen in Figure 2, for low capacity participants, a pattern of similar processing latencies was observed regardless of whether two or eight pieces of information had to be recalled ($M = 4.05$ s, $SD = 0.88$ and $M = 3.91$ s, $SD = 0.89$, $t < 1$). This finding suggests that low capacity participants did not elaborate substantially on the activated content. Had they done so, latencies should have been longer the more information was activated. Moreover, latencies should have been correlated with the reported judgments, which, however, was not the case ($r = -.12$, $p > .45$). Rather, the current result corroborates the hypothesis that low capacity individuals judged in a heuristic manner, relying on their experiences of ease or difficulty as single meta-cognitive cues (Koriat & Levy-Sadot, 1999).

Note that the reported similarity of processing latencies for low capacity participants rules out content-based alternative explanations for the obtained judgmental pattern. For example, it has sometimes been suggested that information retrieved later is of less quality than information retrieved first. As a consequence, one could argue that average information quality is lower in the many as compared to few condition, and hence that the seeming ease-

of-retrieval pattern is a disguised content-effect. However, given that processing latencies were similar for the few- as compared to many-condition and uncorrelated to the reported judgments, such a content-based explanation seems highly unlikely.

In contrast to participants low in capacity, those high in capacity took less time to form their judgments after recalling two rather than eight instances of their own self-assertive behavior ($M = 4.70$ s, $SD = 0.99$ and $M = 5.86$ s, $SD = 1.90$, $t(76) = 2.93$, $p < .01$). This difference is in line with the hypothesis that high capacity participants systematically evaluated the content retrieved from memory and therefore needed more time to integrate eight as compared to two pieces of information. Supporting this conclusion, processing latencies and reported judgments were significantly related in the condition of low processing capacity ($r = .34$, $p < .04$).

Again, note that the reported latency difference for high capacity participants renders alternative accounts for the obtained judgmental pattern less likely. For example, while a numerosity explanation would suggest a judgmental pattern similar to the one hypothesized based on a content-wise explanation, the numerosity explanation would imply that individuals relied on a simple number cue (here, number of instances recalled), thus taking similar amounts of time regardless of the number of pieces recalled. This, however, was not the case.

In sum, the reported processing latencies strongly support the hypothesized underlying mechanisms of heuristic processing for low capacity individuals, and systematic processing for high capacity individuals. Together with Experiment 1, the results of Experiment 2 clearly demonstrate that processing capacity moderates the reliance on accessible content versus accessibility experiences, with the latter being most likely in situations of low processing capacity.

Experiment 3

Experiments 1 and 2 suggest that individuals' cognitive capacity moderates their reliance on subjective experiences in the form of the experienced ease-of-retrieval. We have argued that

under high processing capacity, individuals rely on the activated content. Beyond the results obtained, this assumption was supported by the associated latencies. With respect to the low capacity condition, we have argued that the pattern of more positive judgments after recalling few rather than many instances is presumably due to individuals using their experiences of ease or difficulty as input in judgment making. This conclusion seems straightforward and is in line with prior research that has relied on similar methodological paradigms (e.g., Tversky & Kahneman, 1973; Schwarz et al., 1991; Wänke et al., 1996). One may argue, however, that more evidence is needed to support the notion that the observed effect was indeed due to the reliance on the experienced ease-of-retrieval. To address this legitimate objection, we followed prior research that has relied on misattribution paradigms to tackle this question (see Ruder & Bless, 2003; Schwarz et al., 1991; for a conceptually similar strategy in the domain of affective experiences, see Schwarz & Clore, 1983).

The misattribution paradigm is based on the logic that the experienced ease is only used for judgment making if its informational value is not called into question (Schwarz et al., 1991). If one's experiences are considered undiagnostic for the judgments to be made, these experiences should no longer be used as informational source. For instance, Schwarz and colleagues (1991, Experiment 3) informed participants that the music played during the retrieval of self-assertive behaviors from memory could change the ease of this recall. Participants whose experiences were thus rendered undiagnostic ceased to rely on the experienced ease or difficulty, with the result that judgments were no longer based on accessibility but on content. Therefore, using a misattribution manipulation allowed us to test whether or not participants in the experimental settings of Experiment 1 and 2 were relying on their accessibility experiences in the first place.

The misattribution paradigm serves a second purpose with respect to the current research: it allows for the investigation of how flexible individuals' processing strategies are under capacity constraints. Such an investigation seems crucial both because heuristics generally – but not necessarily – lead to correct responses, and because conditions of low processing capacity seem to dominate in everyday life. Consider, for example, driving a car

while listening to the radio, or reading the newspaper while your children are transforming their playroom into a soccer stadium. All of these situations are characterized by a lack of processing capacity. Given that the results of Experiments 1 and 2 suggest that reliance on cognitive subjective experiences is most likely in such situations, we were intrigued by the question of how rigid a default experience-based processing is. On the one hand, one may argue that due to capacity constraints, individuals need to rely on heuristic processing. On the other hand, one could propose that capacity constraints only increase the likelihood for, but do not restrict individuals to, reliance on retrieval experiences. As long as the imposed constraints are not too severe, individuals may still have the flexibility to resort to content-based judgments.⁴ Note that this latter possibility, the switching to an alternative strategy, would render the adaptive aspects of the heuristic even more powerful.

In sum, Experiment 3 addressed the consequences of rendering the experienced ease undiagnostic for the judgment to be made. Given the results of Experiments 1 and 2, we focused on low capacity participants who presumably relied on the experienced ease-of-retrieval. Keeping processing capacity low across all conditions, we orthogonally manipulated the number of items to be recalled and the diagnosticity of the experienced ease-of-retrieval. We hypothesized that low capacity participants rely on their retrieval experiences if the diagnosticity of these experiences is not called into question – that is, more favorable judgments should be obtained following the recall of few rather than many arguments. According to the outlined logic, rendering the experienced ease-of-retrieval undiagnostic should attenuate or even reverse this effect.

Method

Participants. Forty-three male students from the University of Mannheim participated in return for EUR 2.50 (approximately USD 2.00). Participants' average age was 23.17 years ($SD = 3.26$).

Design and manipulations. Participants were randomly assigned to a 2 (few vs. many arguments) x 2 (experiences diagnostic vs. undiagnostic) between participants factorial

design. Furthermore, all participants were put under load by means of the 8-digit dual-task paradigm introduced in Experiments 1 and 2. Thus, the condition of diagnostic experiences was identical to the conditions of low processing capacity in the previous two experiments. To further enhance the similarity between the studies, we reused the ease-of-retrieval manipulation developed for Experiment 1 (two vs. five arguments in favor of the surgery fee).

Diagnosticity was manipulated by means of a misattribution paradigm. While participants recalled arguments from memory, the background color was switched from white to yellow. To differentially influence the diagnosticity of accessibility experiences, we informed participants that this change in background color did (or did not) influence their verbal creativity. Specifically, participants in the condition of *undiagnostic* experiences were informed that the yellow background changed their verbal creativity. Importantly, this information needed to be tailored with respect to the actual experiences participants supposedly had. That is, participants in the difficult condition (five arguments) needed to be informed that the yellow background rendered verbal creativity worse (thus reducing the diagnosticity of the experience of difficulty), and participants in the easy condition (two arguments) were told that the yellow background promoted verbal creativity (thus reducing the diagnosticity of the experience of ease). In the condition of *diagnostic* experiences, participants were informed that the yellow background had no impact on their verbal creativity.

Materials and Procedure. Materials and procedure in Experiment 3 closely resembled those of Experiment 1, except for the following modification: After the retrieval of arguments from memory, *all* participants were subjected to the dual-task paradigm introduced in the previous studies to establish conditions of low processing capacity.

Results and Discussion

Manipulation checks. The two items assessing the experienced ease versus difficulty in recalling arguments from memory were averaged to form a single index ($r = .72$). This index was scaled such that higher values indicate lower experienced ease. Paralleling the

results of the previous studies, participants recalling two arguments experienced the retrieval task as significantly easier ($M = 4.82$, $SD = 2.0$) than participants recalling five arguments ($M = 7.00$, $SD = 1.60$, $F(1, 41) = 15.50$, $p < .01$).

The four items assessing impairment in processing capacity were recoded, such that for all items higher values indicate lower degrees of available capacity. Again, the items were combined to form a single index (Cronbach's $\alpha = .66$) that was subjected to a 2 (few vs. many arguments) x 2 (experiences diagnostic vs. undiagnostic) factorial ANOVA. As expected, capacity impairment was similar in all four conditions ($F_s < 0.5$). More importantly, the grand mean was $M = 4.05$ ($SD = 1.51$), and thus similar to those reported for the low capacity condition in Experiment 1. Even though cross-study comparisons are not necessarily meaningful, this similarity may indicate that participants' capacity in Experiment 3 was comparably low.

Attitude judgments. The four items assessing participants' attitude about the surgery fee were averaged to form a unitary measure (Cronbach's $\alpha = .95$), with higher values indicating more positive judgments. This measure was submitted to a 2 (few vs. many arguments) x 2 (experiences diagnostic vs. undiagnostic) factorial ANOVA, yielding the predicted significant interaction ($F(1, 39) = 6.11$, $p < .02$; all other $p_s > .14$), see Figure 3. Specifically, participants in the condition of diagnostic experiences evaluated the surgery fee more positively after recalling few rather than many arguments ($M = 6.11$, $SD = 2.49$ and $M = 4.79$, $SD = 1.95$, $t(39) = 1.45$, $p < .08$, one-tailed, Cohen's $d = 0.59$), presumably reflecting reliance on the experienced ease or difficulty. This result is in line with the findings of Experiments 1 and 2 for the low capacity groups and with a large body of prior research (e.g., Schwarz et al., 1991; Wänke et al., 1996; Rothman & Schwarz, 1998), suggesting that accessibility experiences may be used as valuable pieces of information in judgment making. Such a conclusion is further supported by the finding that the ease effect was eliminated if experiences were perceived to be undiagnostic for the judgment in question. Indeed, when participants assumed that their experiences were due to the change in background color (experiences undiagnostic), they evaluated the surgery fee less positively after recalling few

rather than many arguments ($M = 3.59$, $SD = 2.17$ and $M = 5.41$, $SD = 1.61$, $t(39) = 2.05$, $p < .05$, Cohen's $d = 0.95$). Presumably, this was because participants relied on the retrieved content as the only diagnostic piece of information they had. Given that constraining processing capacity only reduces the likelihood of, but does not preclude, systematic content processing, the current result is very much in line with general models of attitude formation (e.g., Chen & Chaiken, 1999; Petty & Cacioppo, 1986).

Besides examining whether low capacity participants were relying on their retrieval experiences, the misattribution paradigm allows for some conclusions about individuals' flexibility. As participants ceased to rely on their experiences once diagnosticity was called into question, the results of Experiment 3 suggest that reliance on accessibility experiences in situations of low processing capacity is not a rigid but an adaptive default that takes situational variation into account – at least as long as the capacity constraints are not too severe. Given that daily life is replete with situations of low processing capacity, the findings reported in Experiment 3 are of considerable interest.

Noticeably, the present experiment was not first to investigate the implications of perceived undiagnosticity in conditions of low processing capacity. In particular, in the process of demonstrating that accessibility experiences are automatically relied upon, Menon and Raghurir (2003, Experiment 4) reported that low capacity participants did not cease to rely on their accessibility experiences despite these being questioned. Thus, in contrast to the present results, low capacity participants in Menon and Raghurir's experiment appeared to have relied on allegedly undiagnostic experiences of ease or difficulty. Yet, as closer inspection reveals, this result is only seemingly in contrast to the current one, because the reported studies differ in the diagnosticity information offered to participants. In the current experiment, a strong diagnosticity cue was offered by telling participants that a salient feature (the background color) would influence verbal creativity. In Menon and Raghurir's experiment, a much weaker cue was offered by giving consensus information about how easy or difficult recall should be upon results from a nationwide survey. To the extent that the expenditure of processing resources depends on the interplay of the two principles *least*

effort and *sufficiency* as suggested within the heuristic systematic model (e.g., Chaiken, Liberman, & Eagly, 1989), low capacity participants should only cease to rely on accessibility experiences if there is good reason to doubt their diagnosticity. Arguably, such good reasons were present in the current experiment, but not in the one reported by Menon and Raghurir (2003), thus explaining the apparent difference in results.

General discussion

We started out from the observation that despite the prominence of the ease-of-retrieval heuristic, little empirical evidence is available regarding factors that moderate individuals' reliance on their retrieval experiences (for exceptions, Rothman & Schwarz, 1998; Dijksterhuis et al., 1999; Tormala et al., 2002; Ruder & Bless, 2003). In particular, we were not aware of any evidence on the potential role of processing capacity as a moderator of the use of accessibility experiences in judgment formation. Given the central role of processing capacity in social cognition research, the present research addressed this gap.

Three experiments revealed a clear pattern of results and supported the assumption that processing capacity moderates individuals' reliance on accessibility experiences. Specifically, participants *low* in processing capacity evaluated a surgery fee or their own self-assertiveness more positively after recalling few rather than many pieces of information. Presumably, this is because participants relied on the experience of ease or difficulty associated with recalling few as compared to many pieces of information (Tversky & Kahneman, 1973; Schwarz et al., 1991; for an overview, see Schwarz, 1998). Such a conclusion is in line with the conceptualization of cognitive subjective experiences as heuristics (Koriat & Levy-Sadot, 1999; for ease-of-retrieval, see Tversky & Kahneman, 1973), and with the notion that conditions of reduced processing capacity foster reliance on heuristics (e.g., Chen & Chaiken, 1999; Petty & Cacioppo, 1986). In contrast, participants *high* in processing capacity evaluated the surgery fee or their own self-assertiveness more positively after recalling many as opposed to few pieces of information. Presumably, this was due to participants evaluating and integrating the accessible content when forming the

respective judgments. Again, this result is in line with general models of attitude formation which hold that content-based judgments become more likely as processing capacity increases.

Findings of particular interest

At least six issues provide particular support for the hypotheses we have advanced. First, the interaction effect of amount of information and processing capacity was robust across two different judgmental domains. Both judgments about a surgery fee and more self-relevant judgments about personal self-assertiveness were affected by the experience of ease or difficulty in conditions of low processing capacity, which indicates the general nature of the reported effect.

Second, by assessing participants' mood states as well as recall accuracy, a number of alternative explanations such as differential efficaciousness of the capacity manipulation were ruled out.

Third, several results support the conclusion that the judgmental effects observed in the low capacity conditions were indeed due to individuals' reliance on their retrieval experiences. For instance, in Experiment 3, when the experimental setting reduced the perceived diagnosticity of the experienced ease-of-retrieval, recalling few rather than many instances no longer resulted in more positive evaluations. If we apply the logic proposed by prior research on misattribution paradigms (Schwarz et al., 1991; Schwarz & Clore, 1983), this finding suggests that low processing capacity participants did rely on the ease-of-retrieval heuristic to begin with. Further support for this conclusion stems from correlational analyses which revealed a substantial negative relationship between experienced ease and reported judgments in conditions of low, but not high processing capacity (Experiment 1, $r = -.23$, $p < .17$ and $r = -.08$, $p > .60$; Experiment 2, $r = -.23$, $p < .15$ and $r = .33$, $p < .05$).

Although reflecting a non-significant tendency only, these correlations suggest that participants in conditions of low processing capacity relied on the experienced ease to form the respective judgments.

Fourth, the conclusion about experienced-based (low capacity group) versus content-based (high capacity group) judgments was corroborated by *processing latencies* assessed during judgment formation. Given that evidence with respect to processing latencies is surprisingly scarce in the ease-of-retrieval literature, these findings are particularly noteworthy. Specifically, for the *low* capacity group, a similar pattern of processing latencies was observed regardless of the amount of information recalled, suggesting that participants in these conditions relied on single cues of information such as the experience of ease or difficulty. Importantly, the observed similarity of processing latencies not only supports the outlined hypothesis of heuristic processing, but also rules out any content-based alternative explanations for the reported attitudinal pattern (e.g. differential quality of retrieved content). *High* capacity participants, in contrast, took more time to form their judgments after recalling many as opposed to few pieces of information. This difference is in line with the hypothesis that participants in this condition used the content retrieved from memory and therefore took more time to evaluate and integrate many rather than few pieces of information. Again, alternative explanations for the reported judgmental pattern are ruled out. For example, if high capacity participants relied on some sort of numerosity heuristic instead of on the content itself, processing latencies should have been similar, which was not the case.

Fifth, while the present findings provide the first empirical evidence that processing capacity moderates the reliance on *cognitive* subjective experiences in the form of the experienced ease-of-retrieval, a parallel finding has been documented in the domain of *affective* subjective experiences. In particular, Siemer and Reisenzein (1998) reported that reliance on the mood-as-information-heuristic (Schwarz & Clore, 1983; Schwarz & Clore, 1996) is most likely to occur in situations of low processing capacity. In combination with the current research, these results suggest that processing capacity moderates individuals' reliance on subjective experiences across several domains of cognitive and affective feelings, underscoring the robustness of the hypothesized effect.

As a final speculation, one may relate the present findings to an intriguing set of studies recently reported by Gawronski and Bodenhausen (2005). The authors presented

evidence suggesting that ease-of-retrieval experiences not only impact explicit, but also implicit measures, yet only if these were based on mechanisms of response compatibility processes (e.g., Implicit Association Test, Greenwald, McGhee, & Schwartz, 1998; for a structural analysis of implicit measures, see De Houwer, 2003). In contrast, implicit measures based on mechanisms of stimulus compatibility (e.g., semantic priming, Neely, 1977) were more likely to be influenced by direct knowledge activation in associative memory. If one argues that conditions of low processing capacity foster the impact of mechanisms of response compatibility (here: response tendencies elicited by cognitive subjective experiences), whereas conditions of high processing capacity foster the impact of mechanisms of stimulus compatibility (here: spreading activation of activated content information), the findings reported by Gawronski and Bodenhausen (2005) further support the conclusions drawn in the present set of experiments. Noticeably, however, to substantiate such a comparison, further research would be needed.

Theoretical implications

Going beyond the reported empirical evidence it is instructing to note that the present findings mirror the majority of results with respect to the moderating impact of processing motivation on the reliance on ease-of-retrieval experiences (Rothman & Schwarz, 1998; Aarts & Dijksterhuis, 1999; Grayson & Schwarz, 1999; Florack & Zoabi, 2003; Haddock, 2002). Although this correspondence in findings is conceptually sound due to the functional similarities of processing motivation and processing capacity (e.g., Chen & Chaiken, 1999; Petty & Cacioppo, 1986; Fiske & Neuberg, 1990; Fazio & Towles-Schwen, 1999), one may reasonably ask how the present findings relate to other prior research endeavors that showed the reverse effect: Reliance on accessibility experiences in conditions of *high* but not low processing motivation (Wänke & Bless, 2000; Tormala et al., 2002). We think that both a methodological and conceptual explanation may account for this (seeming) inconsistency. From a *methodological* perspective, many investigations of the moderating impact of processing motivation were harboring a methodological confound as processing motivation

was usually manipulated or present *prior* to the manipulation of retrieval ease. As discussed in the introduction to Experiment 1, this order of manipulations is problematic given that similar inputs between experimental groups are a necessary precondition for strong conclusions about the *use* of experienced ease in the paradigm introduced by Schwarz and colleagues (1991). Indeed, when processing motivation is manipulated prior to ease-of-retrieval, high- versus low-motivated participants are likely to differ in the recalled content information and the associated experiences, hence violating the outlined precondition of similar inputs. From this perspective, the described inconsistency in findings may have been due to the specific order of manipulations usually chosen. The present experiments circumvented this problem by manipulating processing capacity only *after* differences in ease-of-retrieval were instigated.

From a *conceptual* perspective, it appears possible that the previous inconsistency in findings was only a seeming one, as the moderating impact of processing motivation or processing capacity might itself be moderated by a third variable. The following is to illustrate this argument in the context of the present experiments. Specifically, while we believe to have investigated the default, it is possible to conceive of boundary conditions in which experienced ease-of-retrieval may influence judgments even in conditions of *high* processing capacity. For example, Eagly and Chaiken (1993) posited that systematic processing strategies are complemented by heuristic processing styles if the accessible content is ambiguous in nature. Thus, for conditions of ambiguous accessible content, reliance on subjective experiences seems possible even if processing capacity is high. Similarly, for conditions in which the experienced ease is attributed to factors that are influential only under systematic processing, it is possible that experiences matter even in conditions of high processing capacity, despite a generally low probability for this to be the case. Hence, in selective boundary conditions, reliance on accessibility experiences may be likely even in conditions of high processing capacity. Intriguingly, this argument suggests that what appeared to be an inconsistency in findings with respect to the moderating impact of processing motivation (Rothman & Schwarz, 1998; Grayson & Schwarz, 1999; Aarts &

Dijksterhuis, 1999; Florack & Zoabi, 2003; Haddock, 2002; vs. Wänke & Bless, 2000; Tormala et al., 2002) might have been systematic variation upon different attributional mechanisms. This post-hoc hypothesis remains to be tested.

Conclusion

Our central assumption holds that low processing capacity increases individuals' reliance on their cognitive subjective experiences. Given that daily life is replete with situations of low processing capacity, one may speculate that many or even most every-day decisions and judgments are strongly influenced by cognitive subjective experiences – in other words, what governs everyday decision making are accessibility experiences rather than the accessible content (even if judgments can easily be rationalized afterwards). Taking into account that participants in Experiment 3 were still responsive to current situational constraints, an experience-wise default is not only probable, fast, and frugal, but also rather adaptive.

In sum, we propose that subjective experiences in general, and experienced ease-of-retrieval, in particular, play a highly important role in human judgment and decision-making. Given this importance, we are convinced that research needs to address the long-neglected question of when individuals do or do not rely on their subjective experiences. By addressing the role of processing capacity, a central determinant of human information processing, the present research provides some first important answers.

References

- Aarts, H., & Dijksterhuis, A. (1999). How often did I do it? Experienced ease of retrieval and frequency estimates of past behavior. *Acta Psychologica*, 103(1), 77-89.
- Bless, H., & Forgas, J. P. (2000). *The message within: The role of subjective experience in social cognition and behavior*. Philadelphia, PA: Psychology Press.
- Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 212-252). New York, NY: Guilford Press.
- Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 73-96). New York, NY: Guilford Press.
- Clore, G. L. (1992). Cognitive phenomenology: Feelings and the construction of judgment. In L. L. Martin & A. Tesser (Eds.), *The construction of social judgments* (pp. 133-163). Hillsdale, N.J.: Erlbaum.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159.
- De Houwer, J. (2003). A structural analysis of indirect measures of attitudes. In J. Musch & K. C. Klauer (Eds.), *The psychology of evaluation: Affective processes in cognition and emotion* (pp. 219-244). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.
- Dijksterhuis, A., Macrae, C. N., & Haddock, G. (1999). When recollective experiences matter: Subjective ease of retrieval and stereotyping. *Personality and Social Psychology Bulletin*, 25(6), 760-768.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth: Harcourt Brace Jovanovich.
- Fazio, R. H., & Towles-Schwen, T. (1999). The MODE model of attitude-behavior processes. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 97-116). New York, NY: Guilford Press.
- Fiske, S. T., & Neuberg, S. L. (1990). A continuum of impression formation from category-based to individuating processing: Influences of information and motivation on attention and interpretation. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 23, pp. 1-74). Orlando, FL: Academic Press.
- Florack, A., & Zoabi, H. (2003). Risikoverhalten bei Aktiengeschäften: Wenn Anleger nachdenklich werden. (Risk behavior in share transactions: When investors think about reasons). *Zeitschrift für Sozialpsychologie*, 34(2), 65-78.
- Gawronski, B., & Bodenhausen, G. V. (2005). Accessibility effects on implicit social cognition: The role of knowledge activation and retrieval experiences. *Journal of Personality and Social Psychology*, 89(5), 672-685.
- Gilbert, D. T., & Osborne, R. E. (1989). Thinking backward: Some curable and incurable consequences of cognitive busyness. *Journal of Personality and Social Psychology*, 57(6), 940-949.

- Grayson, C. E., & Schwarz, N. (1999). Beliefs influence information processing strategies: Declarative and experiential information in risk assessment. *Social Cognition, 17*(1), 1-18.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74*(6), 1464-1480.
- Haddock, G. (2000). Subjective ease of retrieval and attitude-relevant judgments. In H. Bless & J. P. Forgas (Eds.), *The message within: The role of subjective experience in social cognition and behavior* (pp. 125-142). Philadelphia, PA: Psychology Press.
- Haddock, G. (2002). It's easy to like or dislike Tony Blair: Accessibility experiences and the favourability of attitude judgments. *British Journal of Psychology, 93*(2), 257-267.
- Haddock, G., Rothman, A. J., Reber, R., & Schwarz, N. (1999). Forming judgments of attitude certainty, intensity, and importance: The role of subjective experiences. *Personality and Social Psychology Bulletin, 25*(7), 771-782.
- Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 133-168). New York, NY: Guilford Press.
- Koriat, A., & Levy-Sadot, R. (1999). Processes underlying metacognitive judgments: Information-based and experience-based monitoring of one's own knowledge. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology*. (pp. 483-502). New York, NY: Guilford Press.
- Menon, G., & Raghurir, P. (2003). Ease-of-retrieval as an automatic input in judgments: A mere-accessibility framework? *Journal of Consumer Research, 30*(2), 230-243.
- Neely, J. H. (1977). Semantic priming and retrieval from lexical memory: Roles of inhibitionless spreading activation and limited-capacity attention. *Journal of Experimental Psychology: General, 106*(3), 226-254.
- Petty, R. E., & Cacioppo, J. T. (1984). The effects of involvement on responses to argument quality: Central and peripheral routes to persuasion. *Journal of Personality and Social Psychology, 46*, 68-81.
- Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York, NY: Springer.
- Raghurir, P., & Menon, G. (1998). AIDS and me, never the twain shall meet: The effects of information accessibility on judgments of risk and advertising effectiveness. *Journal of Consumer Research, 25*(1), 52-63.
- Rothman, A. J., & Hardin, C. D. (1997). Differential use of the availability heuristic in social judgment. *Personality and Social Psychology Bulletin, 23*(2), 123-138.
- Rothman, A. J., & Schwarz, N. (1998). Constructing perceptions of vulnerability: Personal relevance and the use of experiential information in health judgments. *Personality and Social Psychology Bulletin, 24*(10), 1053-1064.
- Ruder, M., & Bless, H. (2003). Mood and the reliance on the ease of retrieval heuristic. *Journal of Personality and Social Psychology, 85*(1), 20-32.

- Schwarz, N. (1998). Accessible content and accessibility experiences: The interplay of declarative and experiential information in judgment. *Personality and Social Psychology Review*, 2(2), 87-99.
- Schwarz, N. (2004). Metacognitive experiences in consumer judgment and decision making. *Journal of Consumer Psychology*, 14(4), 332-348.
- Schwarz, N., Bless, H., Strack, F., Klumpp, G., Rittenauer-Schatka, H., & Simons, A. (1991). Ease of retrieval as information: Another look at the availability heuristic. *Journal of Personality and Social Psychology*, 61(2), 195-202.
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgment of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, 45(3), 513-523.
- Schwarz, N., & Clore, G. L. (1996). Feelings and phenomenal experiences. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 433-465). New York, NY: Guilford Press.
- Siemer, M., & Reisenzein, R. (1998). Effects of mood on evaluative judgements: Influence of reduced processing capacity and mood salience. *Cognition and Emotion*, 12(6), 783-805.
- Tormala, Z. L., Petty, R. E., & Briñol, P. (2002). Ease of retrieval effects in persuasion: A self-validation analysis. *Personality and Social Psychology Bulletin*, 28(12), 1700-1712.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5(2), 207-232.
- Wänke, M., & Bless, H. (2000). The effects of subjective ease of retrieval on attitudinal judgments: The moderating role of processing motivation. In H. Bless & J. P. Forgas (Eds.), *The message within: The role of subjective experience in social cognition and behavior* (pp. 143-161). Philadelphia, PA: Psychology Press.
- Wänke, M., Bless, H., & Biller, B. (1996). Subjective experience versus content of information in the construction of attitude judgments. *Personality and Social Psychology Bulletin*, 22(11), 1105-1113.
- Wänke, M., Bohner, G., & Jurkowitsch, A. (1997). There are many reasons to drive a BMW: Does imagined ease of argument generation influence attitudes? *Journal of Consumer Research*, 24(2), 170-177.
- Wänke, M., Schwarz, N., & Bless, H. (1995). The availability heuristic revisited: Experienced ease of retrieval in mundane frequency estimates. *Acta Psychologica*, 89(1), 83-90.
- Wyer, R. S. J., & Srull, T. K. (1989). *Memory and cognition in its social context*. Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Footnotes

- ¹ Additionally, participants' mood was assessed by means of three 9-point Likert-scaled items, reading, for example, 'How are you feeling right now? (quite well – quite bad).' These items were included to assess whether the selected ease-of-retrieval manipulation differentially influenced participants' mood states. The items were combined to form a single index (Cronbach's $\alpha = .92$), which was submitted to a 2 (few vs. many arguments) x 2 (high vs. low processing capacity) factorial ANOVA, yielding no effect of significance (all $F < 1$). Thus, the ease-of-retrieval manipulation did not selectively influence participants' mood, and hence it seems unlikely that the attitudinal judgments were mediated by differences in participants' mood states. Similar results were obtained in Experiments 2 and 3 and will therefore not be further reported.
- ² Across Experiments 1 to 3, recall accuracy was considerably low (around 40% correct responses, compared to 100% in prior research, e.g. Gilbert & Osborne, 1989). Most likely these low accuracy rates were due to the experimental set-up: Whereas participants in Gilbert and Osborne's studies had 25 seconds to rehearse the 8-digit number, participants in the current set of experiments had only 5 seconds (i.e. 80% less). From this perspective, it appears unlikely that the low levels of recall accuracy reported in the present experiments are indicative of reduced adherence to the secondary task or diminished experienced load. Rather, if anything, participants in the present experiments might have experienced higher load, because keep a shallowly rather than well-rehearsed number in memory appears to be more taxing.
- Despite this methodological reason, it seemed desirable to investigate whether recall accuracy had an impact on the reported judgmental effects. For that reason, recall accuracy was added as a dummy-coded independent variable (correct vs. wrong) to the reported ANOVAs of participants' judgments. Noticeably, across Experiments 1 to 3, none of the effects associated with recall accuracy was significant (for all main and interaction effects, $p > .13$), while the significance level of the reported interactions between ease-of-retrieval and capacity (or diagnosticity) remained unchanged.

- ³ Arguably, the main effect of processing capacity on the measured processing latencies is due to the capacity manipulation restricting the allotted time in the low but not in the high capacity condition. However, given that participants in the high capacity condition still took less time than the maximum time allotted in the low capacity condition (7 seconds), the likelihood that the reported main effect is an artefact is low.
- ⁴ In this respect, the latency findings obtained in Experiment 2 suggest that the applied experimental setting reduced processing capacity, but that the imposed constraints were not too severe. Specifically, participants in the low capacity conditions needed on average 3.98 seconds for their judgments – thus requiring less time than allowed by the experimental setting (7 seconds). In combination with the fact that high capacity participants required on average 5.28 seconds, these data suggest that given sufficient processing motivation, low capacity participants would have sufficient time to switch to alternative strategies apart from heuristic processing.

Author's note

We are grateful to Judith Lupatsch for her valuable help with this research project. This research was supported by a grant from the Deutsche Forschungsgemeinschaft within the SFB 504 of the University of Mannheim, Germany, and by a grant from the German Federal Ministry of Education and Research (BMBF) within the framework of the German-Israeli Project Cooperation (DIP).

Figure Caption

Figure 1. Mean ratings about the surgery fee with standard errors in Experiment 1 as a function of amount of information (few vs. many arguments) and processing capacity (high vs. low). Summary index ranged from 1 to 9, with higher values indicating a more positive evaluation of the surgery fee.

Figure 2. Mean self-assertiveness ratings (left chart) and mean processing latencies (right chart) with standard errors in Experiment 2 as a function of amount of information (few vs. many instances) and processing capacity (high vs. low). Mean self-assertiveness ratings ranged from 1 to 9, with higher values indicating more positive self-assertiveness judgments. Processing latencies are indicated in seconds.

Figure 3. Mean ratings about the surgery fee with standard errors in Experiment 3 as a function of amount of information (few vs. many arguments) and diagnosticity (experiences diagnostic vs. undiagnostic). Summary index ranged from 1 to 9, with higher values indicating a more positive evaluation of the surgery fee.

Figure 1

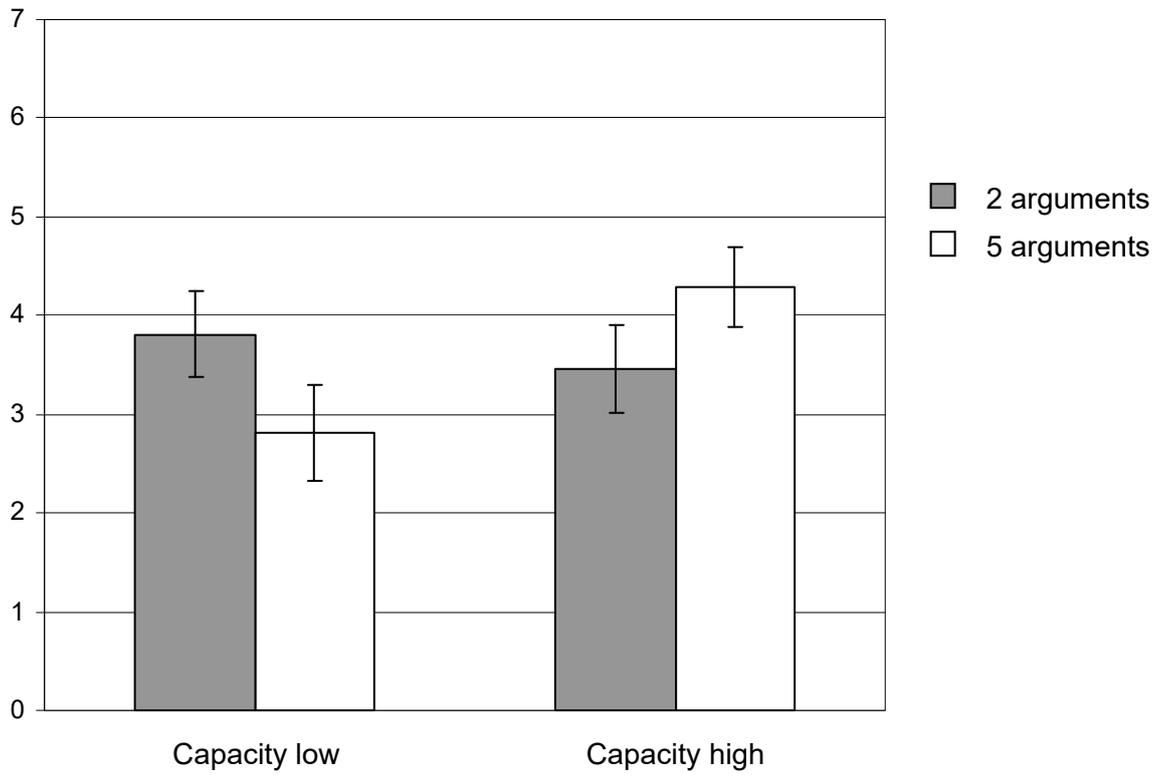


Figure 2

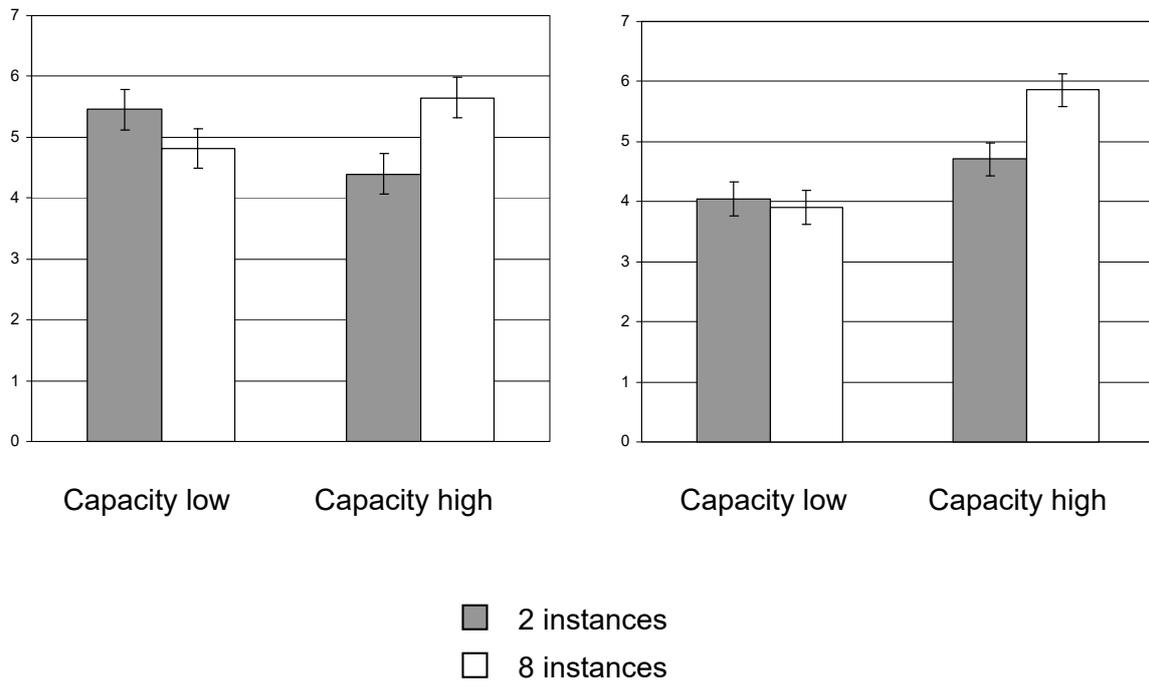


Figure 3

