A Theory of Unconscious Thought

Ap Dijksterhuis and Loran F. Nordgren

Social Psychology Program, University of Amsterdam, Amsterdam, The Netherlands

ABSTRACT—*We present a theory about human thought named the unconscious-thought theory (UTT). The theory is applicable to decision making, impression formation, attitude formation and change, problem solving, and creativity. It distinguishes between two modes of thought: unconscious and conscious. Unconscious thought and conscious thought have different characteristics, and these different characteristics make each mode preferable under different circumstances. For instance, contrary to popular belief, decisions about simple issues can be better tackled by conscious thought, whereas decisions about complex matters can be better approached with unconscious thought. The relations between the theory and decision strategies, and between the theory and intuition, are discussed. We end by discussing caveats and future directions.*

One might almost believe that half of our thinking takes place unconsciously. . . . I have familiarized myself with the factual data of a theoretical and practical problem; I do not think about it again, yet often a few days later the answer to the problem will come into my mind entirely from its own accord; the operation which has produced it, however, remains as much a mystery to me as that of an adding-machine: what has occurred is, again, unconscious rumination. (Schopenhauer, 1851/1970, pp. 123–124)

Imagine you are looking for a new house. You have accepted a new job and are preparing to move to a new city. The local broker elaborately informs you about several available houses, and after an hour, you find yourself completely lost. The houses differ on so many different dimensions that it seems highly implausible that you would ever be able to make a sound choice. One house is bigger than the others, but also more expensive, and unfortunately your new job is that of a psychology professor and not of a CEO. Another house has a beautiful garden. Yet another

Address correspondence to Ap Dijksterhuis, Social Psychology Program, University of Amsterdam, Roetersstraat 15, 1018 WB, Amsterdam, The Netherlands, e-mail: a.j.dijksterhuis@uva.nl.

is on a very quiet and attractive street. And the rickety old mansion the broker mentioned at the very end has three bathrooms, one of them with marble from Tuscany.

What should you do, other than courageously confront the few unavoidable restless nights as you make your decision? One way to approach such a choice is by merely flipping a coin. All the houses are pretty nice anyway, and who cares about Tuscan marble? Most people would agree that this is a poor way to make such a choice. Instead, one should think. Some choices are better than others, and to increase the probability that you make a good choice, you should engage in thorough conscious thought. But does thorough conscious thought always pave the way to sound decisions? Yet another way to approach such a problem is to take your time and to "sleep on it." Rather than thinking much consciously, you can delegate the labor of thinking to the unconscious, and at some point you will intuitively "feel" what the best option is. Most people would agree that this strategy makes more sense than flipping a coin, but that it generally leads to poorer decisions than decisions made after thorough conscious thought. But is that true?

In recent research in our lab, we (e.g., Dijksterhuis, 2004b; Dijksterhuis, Bos, Nordgren, & van Baaren, 2006; Dijksterhuis & Meurs, 2006; Dijksterhuis & van Olden, in press; Nordgren & Dijksterhuis, 2006) compared the quality of choices between alternatives under different conditions. In the experiments, some people were not given the opportunity to think at all before choosing between alternatives. Others were able to consciously think for a while before choosing, and yet others were distracted for a while before choosing and thus could engage only in so-called unconscious thought. For example, in the first experiment (Dijksterhuis, 2004b, Experiment 1), participants were given information about four hypothetical apartments in their home city, Amsterdam. Each apartment was described by 12 different features (e.g., Apartment A is rather sizable, Apartment C is in a nice area, Apartment D has a very unfriendly landlord), for a total of 48 pieces of information, presented in random order. One of the four apartments was made more desirable than the others (it had predominantly positive features), whereas a second one was made undesirable (it had predominantly negative features). The two remaining apartments were more neutral. After par-

ticipants had read the rather daunting amount of information, they were asked to evaluate each apartment. They did this under one of three conditions. Some participants made their evaluations immediately after having read the information; others were given 3 min to consciously think about the information first; and still others were told they would be quizzed about the apartments later and in fact evaluated the apartments after being distracted for 3 min with a task that prevented conscious thought (a two-back task; see Jonides et al., 1997), thereby enabling only unconscious thought.

Under which conditions did participants best assess the actual desirability of the different apartments? Our dependent measure was the difference in evaluation between the most and the least desirable apartments. Ironically, the unconscious thinkers performed significantly better than the conscious thinkers and the immediate choosers. In fact, for participants who had to choose immediately or who engaged in conscious thought, the task was too difficult in the sense that they did not, on average, indicate greater liking of the desirable apartment than the undesirable apartment. They did not, in other words, know which apartment was better. Only the unconscious thinkers reported the appropriate preference for the desirable apartment.

Since this first experiment, we have continued to investigate unconscious and conscious thought. In the current article, we present a theory based on our own and other investigators' empirical work. The theory is about thought, or more precisely, about the strengths and weaknesses of unconscious and conscious thought. It is, in principle, a theory that is applicable to all psychological phenomena associated with thought, such as choice, decision making, attitude formation and attitude change, impression formation, diagnosticity, problem solving, and creativity. Moreover, our theory has transparent practical implications, in that it is easy to deduce from our theory whether unconscious thought or conscious thought will be more fruitful in many concrete situations.

In the remainder of this article, we provide an overview of the theory, named the unconscious-thought theory (UTT). UTT consists of six principles pertaining to unconscious and conscious thought. We first present these principles along with supporting empirical evidence. Next, we discuss a counterintuitive hypothesis (and its empirical support) about the relation between thought and decision making derived from UTT. We then discuss some general characteristics of UTT by comparing it with related models and theories. We also examine the relation between UTT and specific decision strategies and between UTT and intuition. We end with a discussion of caveats and future directions.

THE UNCONSCIOUS-THOUGHT THEORY

The Unconscious-Thought Principle
According to the *unconscious-thought principle*, there are two modes of thought: conscious and unconscious. The two modes of thought have different characteristics, making them differentially applicable or differentially appropriate to use under different circumstances.

We define conscious thought as object-relevant or task-relevant cognitive or affective thought processes that occur while the object or task is the focus of one's conscious attention. This rather complex definition simply describes what laypeople would call thought. For instance, if one consciously compares Florida and Tuscany as holiday destinations, at some point one might think, "Tuscany has fabulous food and wine." Unconscious thought refers to object-relevant or task-relevant cognitive or affective thought processes that occur while conscious attention is directed elsewhere. For instance, after not being able to choose between Florida or Tuscany, one might stop thinking about the choice consciously. Then, after 24 hr, the thought "It's going to be Tuscany!" might pop into consciousness. This thought itself is conscious, but the transition from indecision to a preference for Tuscany a day later is the result of unconscious thought (see also Dijksterhuis, 2004b).

In order to interpret the theory as we intend, it is very important to realize that *attention* is the key to distinguish between unconscious thought and conscious thought. Conscious thought is thought with attention; unconscious thought is thought without attention (or with attention directed elsewhere). However, this does not mean that conscious thought comprises only conscious processes. One could compare it to speech. Speech is conscious, but various unconscious processes (such as those responsible for choice of words or syntax) have to be active in order for one to speak. Likewise, conscious thought cannot take place without unconscious processes being active at the same time.

The Capacity Principle
According to the *capacity principle*, conscious thought is constrained by the low capacity of consciousness. Unconscious thought does not have this constraint because the unconscious has a much higher capacity. It follows that conscious thought by necessity often takes into account only a subset of the information it should take into account.

Try to think (consciously!) about where to spend your next summer holiday, about the next paper you want to write, and about what to eat tonight—all at exactly the same time, please. Of course, you cannot do this. Conscious capacity is limited, and generally consciousness cannot do more than one thing at a time. Furthermore, conscious capacity is limited in that it can temporarily "store" only about seven items (Miller, 1956). In the 1950s, various researchers tried to quantify the processing capacity of both consciousness itself and the human sensory system as a whole (i.e., for all unconscious processes and conscious processes combined). There is no need to discuss this literature thoroughly (for brief reviews, see Dijksterhuis, Aarts, & Smith, 2005; Nørretranders, 1998; Wilson, 2002), but the bottom line is important. Depending on the context, consciousness can process

between 10 and 60 bits per second. For example, if you read, you process about 45 bits per second, which corresponds to a fairly short sentence. The entire human system combined, however, can process about 11,200,000 bits per second. The visual system alone processes about 10 million bits per second. This interesting early research very clearly points out that conscious processing capacity is very low compared with the processing capacity of the entire human system.[1]

Decision theorists have long recognized that decision makers have to deal with limited capacity (e.g., Bettman, Luce, & Payne, 1998; Kahneman, 2003; H.A. Simon, 1955; Tversky & Kahneman, 1974). Wilson and Schooler (1991) explicitly argued that the low capacity of consciousness can lead to poor decisions or choices. In their experiments, participants evaluated objects, such as different college courses or jams. Under some conditions, participants were merely asked to evaluate the different objects without much thought or effort. In other conditions, participants were pressed to carefully analyze the reasons for their evaluations and to write down their thoughts and reasons. In other words, they engaged in thorough conscious thought. As it turned out, this did not help them. Compared with people who thought less, conscious thinkers made less accurate evaluations. Additional evidence in line with the capacity principle showed why conscious thought was maladaptive: Conscious thought led people to focus on a limited number of attributes at the expense of taking into account other relevant attributes.

It may be noted that our research on unconscious thought was motivated by the findings of Wilson and Schooler (1991), combined with the realization that the unconscious does not suffer from low capacity. One of our experiments (Dijksterhuis, 2004b, Experiment 2) provides further evidence for the capacity principle. Again, participants were presented with a considerable amount of information about four hypothetical apartments. This time, rather than rating each apartment, participants were asked to choose the best one. As before, they were given no time to think at all, a few minutes to think consciously, or a few minutes during which they were distracted and could think only unconsciously. We constructed the stimulus materials in such a way that one apartment was more desirable than the three others. As expected, unconscious thinkers chose the best apartment more often (59%) than conscious thinkers (47%) or immediate choosers (36%). In addition, participants were asked whether they had based their choice on one or two specific attributes or on a more holistic judgment. Forty-two percent of the immediate choosers said they made a holistic judgment. The

percentage of holistic judgments was higher for unconscious thinkers (56%) and, in line with the capacity principle, lower for conscious thinkers (27%). That is, the majority of the conscious thinkers indicated that they based their decisions on only one or two attributes. Correlations between whether people made a holistic choice and whether they made the right choice confirmed that a holistic judgment more often led to the selection of the most desirable apartment. In sum, this experiment supports the idea that consciousness by necessity uses only a subset of the available information, and that this restriction of capacity comes at the expense of the quality of a choice or decision.[2]

The Bottom-Up-Versus-Top-Down Principle

The unconscious works bottom-up, or aschematically, whereas consciousness works top-down, or schematically. We refer to this as the *bottom-up-versus-top-down principle*.

Bettman et al. (1998) used a nice metaphor to characterize the development of preferences: "Consumer preference formation may be more like architecture, building some defensible set of values, rather than like archaeology, uncovering values that are already there" (p. 188). Although this metaphor does not perfectly match our conception of top-down conscious thought and bottom-up unconscious thought, the gist is certainly the same. In these terms, conscious thought is more like an architect, whereas unconscious thought behaves more like an archaeologist. For this principle, we discuss conscious thought and unconscious thought separately.

Conscious Thought Is Guided by Expectancies and Schemas

In formulating the top-down-versus-bottom-up principle, we borrowed from Sloman (1996), who convincingly argued that strategic thought processes are inherently hierarchical, whereas automatic processes are not. In addition, social cognition research on stereotyping shows that people's use of stereotypes (or schemas in general) increases under circumstances of constrained processing capacity (e.g., Bodenhausen, 1988; Dijksterhuis & van Knippenberg, 1995; Fiske & Neuberg, 1990; Gilbert & Hixon, 1991; Macrae, Hewstone, & Griffiths, 1993). Whereas this work shows that limited processing capacity during encoding of information leads to more schema use, we propose that limited processing capacity after encoding also increases schema use. This reasoning led us to formulate and test the hypothesis that during impression formation, people stereotype more when they think consciously than when they

---

[1]We concede that it is a hazardous affair to quantify the processing capacity of consciousness and the entire human processing system. The numbers (e.g., 11,200,000 bits) should not be taken too literally, as it is impossible to measure human processing capacity with the same precision as, say, the distance between two cities. Still, even if the entire processing capacity of humans would turn out to be lower by a factor of 10, the discrepancy between conscious capacity and processing capacity of the entire system would remain enormous. The bottom line is that conscious processing capacity is only a fraction of the capacity of the entire human system.

[2]It is easy to defend the idea that it is generally better to take into account all relevant information rather than a subset of that information. However, this is not always the case. Gladwell (2004) used the example of emergency room doctors diagnosing chest pain. They do best when they take into account only four cues and ignore others. Of course, reliance on a subset of the information is beneficial only if one uses the appropriate subset. As we argue later (the weighting principle), this is usually not what consciousness does.

think unconsciously. After all, it is consciousness that suffers from limited capacity.[3]

Some readers may find this idea ironic. People generally associate stereotyping with automaticity and with the unconscious. However, the top-down-versus-bottom-up principle can easily be reconciled with this idea. Indeed, stereotypes are activated automatically (i.e., unconsciously), and people are usually not consciously aware of applying them (Bargh, 1994; Devine, 1989). In fact, when their goal is not to stereotype, people can often suppress stereotype application (e.g., Devine, Monteith, Zuwerink, & Elliot, 1991; Macrae, Bodenhausen, Milne, & Jetten, 1994; Monteith, Sherman, & Devine, 1998; see also Wegner, 1994; we discuss this further later). However, the top-down-versus-bottom-up principle entails the ironic idea that despite the fact that stereotypes are activated automatically, they are applied while one consciously thinks about a person or a group.

In several experiments, we tested the hypothesis that conscious thought leads to more stereotyping than unconscious thought does (Dijksterhuis & Bos, 2005). In most of these experiments, a person memory paradigm was used (see, e.g., Srull & Wyer, 1989; Stangor & McMillan, 1992). Participants were asked to form an impression of a target person. First, they were given a stereotypical expectation ("you are now going to read information about Mr. Hamoudi, a Moroccan man"), and then they read more detailed behavioral information. Some of this detailed information was congruent with the activated stereotype, and some was incongruent with the stereotype. Later on, we assessed participants' impression of the target person and memory for information about the target person. Some participants were requested to think consciously about their impression of the target person before engaging in the judgment and recall tasks, whereas others were distracted and engaged in unconscious thought. Our findings clearly demonstrated that conscious thinkers applied stereotypes more than unconscious thinkers did. They judged the target person in a more stereotypical manner, and their recall was biased in that they recalled more stereotype-congruent than stereotype-incongruent behavioral descriptions. Unconscious thinkers did not demonstrate stereotyping. Their judgments were more neutral, and they recalled more stereotype-incongruent than stereotype-congruent behavioral descriptions. This pattern was found in various experiments in which we also found that conscious thinkers recalled less information overall than unconscious thinkers. Additional experiments corroborated the idea that conscious thought works top-down: Conscious thought

leads people to concentrate on a stereotype and stereotype-congruent information, thereby making stereotype-incongruent information less accessible and harder to recall (see also Dijksterhuis & van Knippenberg, 1996).

The top-down-versus-bottom-up principle is also supported by work on *predecisional distortion* (see, e.g., Carlson & Russo, 2001; D. Simon, Pham, Le, & Holyoak, 2001), a phenomenologically subtle effect that can have profound (negative) consequences. When one consciously forms a judgment on the basis of a considerable amount of information, such as when one has to decide whether or not a defendant is guilty, the appropriate strategy is to wait to make a decision until all available information is processed and integrated. This is often not what happens, however. Instead, people often quickly form a prejudgment that works as an expectancy, biasing the interpretation of information processed later. This effect has been shown a number of times, and occurs even when people are warned not to make such a prejudgment (Carlson & Russo, 2001). Predecisional distortion is a very convincing example of the schematic way conscious thought works. In our own stereotyping work just discussed, participants were told that the target person was a member of a stereotyped group. In other words, participants were given a schema. Work on predecisional distortion shows that even when not explicitly given an expectancy, people quickly create their own to guide further conscious thought.

Carlson and Russo (2001) compared predecisional distortion among students in a hypothetical legal case with predecisional distortion among people who would soon be jurors in a real case. Interestingly, the biasing effects of predecisional distortion among future jurors were twice as large as the effects among students. Carlson and Russo explained these results by pointing out that the future jurors were older and thus may have held more stable prior beliefs, and also by suggesting that the students worked in a more analytic way that partially prevented distortion. We offer the admittedly speculative alternative that jurors, in anticipation of the real case, took the task more seriously and engaged in more conscious thought, which led to more distortion rather than less (for the relation between amount of deliberation and amount of predecisional bias, see Brownstein, 2003, and Davidson & Kiesler, 1964).

We conclude that it is hard to avoid "jumping to conclusions" when one thinks consciously. It may feel as if one is processing information with the goal of making a decision when what one really—unknowingly—is doing is processing information with the goal of confirming an expectancy. Research on positive-test strategy has convincingly demonstrated how powerful such biased information-processing strategies sometimes are (Klayman & Ha, 1987; Snyder & Swann, 1978).

Unconscious Thought Slowly Integrates Information to Form an Objective Summary Judgment
The available evidence thus far does not make it fully transparent what unconscious thought really is and how it works.

---

[3]One may think that this hypothesis is at odds with the finding that stereotyping increases when people are under cognitive load. However, the unconscious-thought conditions in our work are fundamentally different from the conditions of limited capacity used by the stereotyping researchers cited in this paragraph. In the stereotyping work, participants think consciously, but under impoverished circumstances (under load or time pressure, which reduces the low processing capacity of consciousness even more). In our work, participants do not think consciously, nor do they try to. Their consciousness is directed elsewhere. Hence, they do not experience low conscious capacity, as consciousness is not even employed for the task at hand.

Understanding the exact process by which unconscious thought forms a judgment will take time and additional experimenting (we return to this issue later). Nevertheless, some things have been discovered.

In our own experiments discussed thus far, we always compared a condition in which people consciously thought with a condition in which people were distracted, and we assumed this latter group engaged in unconscious thought. However, perhaps these people were merely distracted. Perhaps they did not engage in any thought at all. This alternative cannot explain why distracted people made better decisions than people who did not think at all (the immediate choosers), but maybe a little distraction helped to give people a "fresh look." Or maybe it simply helped to attenuate the biasing effects of primacy or recency effects. Demonstrating active unconscious thought entails showing that the mental representation of the presumed object of thought changes (Dijksterhuis, 2004b). After all, thinking about an object implies that the representation of that object in memory changes. If one for the first time thinks, "Hey, Tuscany also has great food and wine," it is a sign that one's representation of Tuscany has become more positive, which in turn increases the probability that Tuscany will be chosen as a holiday destination in preference to Florida.

In one of our experiments (Dijksterhuis, 2004a), we tested the straightforward hypothesis that if people indeed think unconsciously, then longer unconscious thought should lead to even better decisions than brief unconscious thought. In this experiment, participants were again presented with a complex choice problem. They read information about three hypothetical people in random order, having been instructed to determine whom they would like most to have as a roommate. Each person was described by 12 different characteristics (e.g., Person A has a great sense of humor, Person C is rather messy); one person was made desirable (i.e., had more positive than negative characteristics), whereas another was made undesirable (i.e., had more negative than positive characteristics). We replicated our previous finding that unconscious thinkers made better decisions than conscious thinkers or immediate choosers. In addition, participants who could think unconsciously for 7 min made even better decisions than participants who could think unconsciously for only 2 min.

Later, we conducted another choice experiment (Dijksterhuis, 2004b, Experiment 4) with a different dependent variable. Again, participants were confronted with the information about the three roommates. Afterward, rather than probing their preference, we gave participants a recognition task. Some participants did this task immediately; others thought consciously or had the opportunity to think unconsciously before performing the task. In the recognition task, participants were presented with the characteristics of the roommates, but this time without the specific roommate labels. Participants were asked to decide as quickly as possible to which roommate each characteristic belonged. The findings demonstrated that people's represen-

tations polarized under unconscious thought. The positive characteristics of the desirable roommate and the negative characteristics of the undesirable roommate were much more accessible (i.e., participants responded faster to them) than the negative characteristics of the desirable roommate and the positive characteristics of the undesirable roommate. This pattern was obtained only for unconscious thinkers, not for participants in the other conditions.

Using a different paradigm, we obtained additional evidence for changed mental representations after unconscious thought. This experiment (Dijksterhuis, 2004b, Experiment 5) showed that unconscious thought leads to a better organization of information in memory. Participants were asked to form an impression of a hypothetical man (named Jeroen) on the basis of 18 behavioral descriptions presented in random order. Six of the descriptions implied that Jeroen was intelligent, 6 others that Jeroen was idealistic, and 6 others that Jeroen was extraverted. Participants were not told that the behavioral descriptions represented three underlying trait constructs. Either immediately, after conscious thought, or after unconscious thought, participants were asked to recall as much information about Jeroen as possible. Of interest to us was whether participants' recall was clustered around the three implied traits. Did people recall the information in an organized order (e.g., first all the intelligent behaviors, then the idealistic ones, and finally the extraverted ones) or merely in random order? As it turned out, only the unconscious thinkers showed a certain degree of clustering. They organized their representation of Jeroen over time. Participants in the other two conditions did not.

Recently, we (Bos & Dijksterhuis, 2006) used the same paradigm to obtain evidence for the goal-directedness of unconscious thought. In all earlier experiments, unconscious thinkers had been told, before they engaged in the distraction task, that later they would be probed about the object (or objects) they just processed information about (apartments, roommates, Jeroen, etc.). What would happen if instead they were told that they would *not* answer questions about the object (or objects)? That is, is unconscious thought an active, goal-directed process, or merely a residual process of earlier conscious processing of information? Our experiment clearly supported the former idea. Only unconscious thinkers who knew they would be asked about Jeroen showed enhanced memory organization (and better recall). Those who were told that they would not be asked about Jeroen demonstrated no clustering at all.

To recapitulate, we know that as a result of unconscious thought, people's mental representation of a relevant object becomes more polarized and better organized. These changes help people to make better decisions.

The Weighting Principle

According to the *weighting principle*, the unconscious naturally weights the relative importance of various attributes. Conscious

thought often leads to suboptimal weighting because it disturbs this natural process.

Up to now, we have discussed our experiments in which the quality of a choice or decision was judged from a normative perspective. For example, a certain apartment had more positive than negative attributes, and hence it was desirable. However, people have idiosyncratic preferences, and perhaps the apartment that we labeled "the desirable one" was not the best one for each individual participant. Perhaps some people do not like Tuscany, because they do not care about food or wine. They want a beach. In essence, the quality of a decision is subjective. And perhaps conscious thought is better than unconscious thought at arriving at a subjectively optimal judgment. Some people have argued (after conference presentations about our work) that compared with unconscious thought, conscious thought may be better at weighting the subjective importance of various attributes. We argue that the opposite is true, that unconscious thought is better at weighting.

In one of our experiments (Dijksterhuis, 2004b, Experiment 3), we examined the relation between idiosyncrasies and conscious and unconscious thought. As in some experiments discussed previously, participants were presented with information about three potential roommates, each of whom was described by 12 features. The dimensions used for these features were the same for the three roommates (e.g., humor, neatness, friendliness), but the roommates differed in how they scored on these dimensions (e.g., one was very friendly, one was moderately friendly, one was rather unfriendly). Participants gave their attitudes toward each of the three roommates immediately after reading the information, after conscious thought, or after unconscious thought. However, about 45 min earlier, participants had rated how important the various dimensions in the stimulus materials were for them when choosing a new roommate (e.g., "How important is it for you for your roommate to be neat?"). By correlating attitudes with idiosyncratic preferences, we determined how well participants evaluated the three roommates according to their own individual standards or preferences. Differences between conditions were not statistically significant, but if anything, conscious thinkers did not do better than the others. In fact, they did the worst, whereas unconscious thinkers did the best.

Wilson and his colleagues (e.g., Wilson et al., 1993; Wilson & Schooler, 1991; see also Levine, Halberstadt, & Goldstone, 1996) have argued that conscious contemplation disturbs natural weighting schemes. In one experiment, Wilson et al. (1993) compared the postchoice satisfaction of people who chose from five different art posters. Some participants were merely asked to choose, whereas others were asked to carefully scrutinize the reasons for their preference. When their satisfaction was assessed a few weeks later, the expectations of the experimenters were confirmed. The people who engaged in thorough conscious thought were less happy with their choice. Wilson et al. attributed this to suboptimal weighting: "Introspection . . . can change

an optimal weighting scheme into a suboptimal one. When people analyze reasons, they might focus on those attributes of the attitude object that seem like plausible causes of the evaluations but were not weighted heavily before" (p. 332). It should be noted that participants in this experiment did not just think consciously, but actually had to list their thoughts. However, we argue that suboptimal weighting generally occurs with normal conscious thought. Conscious thought leads people to put disproportionate weight on attributes that are accessible, plausible, and easy to verbalize (see also Schooler, Ohlsson, & Brooks, 1993), and therefore too little weight on other attributes.

Recently, we (Dijksterhuis & van Olden, in press) replicated and extended the experiment by Wilson et al. (1993). Participants chose a poster (out of five) to take home under one of three different conditions. They either chose after looking at the posters briefly, after looking at them and then thinking about them for 9 min, or after a 9-min distraction task following a brief look. That is, people either chose immediately, after conscious thought, or after unconscious thought. Participants took their chosen poster home and were called a few weeks later to find out how they felt about their choice. As expected, participants who thought unconsciously were happier with their poster than participants in the other two conditions. In addition, when asked for what amount of money they would be willing to sell their poster, unconscious thinkers indicated a sum twice as high as conscious thinkers did.

An interesting question is whether conscious thinkers choose poorly because they are indecisive, or because they have a strong preference for the wrong alternative. Right after we asked participants to choose, they were also asked to give their attitude toward each individual poster. By subtracting the average attitude toward the four nonchosen posters from the attitude toward the chosen one, we calculated the strength of their preference. As it turned out, conscious thinkers had the strongest preference, whereas unconscious thinkers were relatively indecisive. However, correlations between the attitude toward the chosen poster and later satisfaction revealed that for immediate choosers and for unconscious thinkers, attitudes predicted later satisfaction. For conscious thinkers, they did not. In other words, conscious thinkers had a preference that was both relatively strong and wrong.

There is also research on how consistently people weight attributes. Levine et al. (1996) had participants evaluate a large number of faces that varied along six dimensions (such as the shape of the nose). Participants either merely evaluated these faces or had to think about the reasons for their evaluations before doing so. Of interest to the experimenters was the way people used and weighted the six dimensions to evaluate the faces. The data clearly demonstrated that conscious thought made weighting more varied and inconsistent.

Recently, we (Nordgren & Dijksterhuis, 2006) extended these effects. In our experiments, we used a variety of judgments, including judgments of the attractiveness of Chinese ideograms

and the extraversion of people on the basis of their faces. In all the experiments, participants judged the same stimuli twice, sometimes after a 45-min delay and in other cases after weeks. Some participants were asked to judge quickly, whereas others were asked to engage in thorough conscious thought. People who engaged in thorough conscious thought always showed more inconsistency. Quick "gut" judgments were clearly more consistent over time than judgments that were made after conscious reasoning. In addition, conscious reasoning did not lead to better judgments. In one experiment, participants repeatedly judged the quality of various pieces of art. We included both what is considered good art (from MOMA, the Museum of Modern Art in New York) and what is considered bad art (from MOBA, the Museum of Bad Art in Boston). Compared with unconscious thinkers, conscious thinkers were again less consistent over time, but not more accurate.

In sum, studies have demonstrated poor weighting by consciousness (e.g., Dijksterhuis & van Olden, in press; Wilson et al., 1993). The work by Levine et al. (1996) and by Nordgren and Dijksterhuis (2006) goes a step further, demonstrating that people weight inconsistently over time. That is, people display what one may call "decisional noise." Through poor and inconsistent weighting, conscious thought introduces noise that causes evaluations, judgments, or choices to become inconsistent over time. It is likely (but not tested yet) that such decisional noise increases as a function of the complexity of the task.

Before we move on, we should note that our assumption that unconscious weighting is better than conscious weighting does not hold in very extreme cases, as we discuss in the next section. Imagine a choice in which one attribute by necessity has to overshadow all the others (e.g., the beautiful apartment is way above budget). One could argue that correct choice in this case is a matter of appropriate weighting, in that cost should get maximum weight, thereby clearly pushing the decision ("I can't take this apartment"). However, we feel such a decision problem is better characterized as based on a rule concerning the maximum sum of money. In such cases, as we propose next, the rule principle dictates that conscious thought is better.

The Rule Principle

The *rule principle* states that conscious thought can follow strict rules and is precise, whereas unconscious thought gives rough estimates.

What is 13×14? Providing you refrain from using a calculator, you can answer this question only after a brief period of conscious thought. It cannot be answered by unconscious thought. You could be asked "what is 13×14?" and then distract yourself for 2 weeks (we recommend going to Tuscany for a holiday), and you would still not know the answer unless you have spent some conscious effort on the problem.

The key to understanding why the unconscious cannot do arithmetic is that it cannot follow rules. In his book on consciousness, the unconscious, and creativity, Claxton (1997) made the argument that the distinction between rule-based and associative thinking largely maps onto the distinction between consciousness and the unconscious. During conscious thought, one can deal with logical problems that require being precise and following rules strictly, whereas during unconscious thought, one cannot.

Note that this does not mean that unconscious thought does not conform to rules. Sloman (1996) distinguished between following rules and merely conforming to them, and this distinction is very important here. For example, an apple conforms to gravity by falling down rather than up, but it does not actively follow a rule in doing so. The literature on implicit learning (e.g., Lewicki, Hill, & Czyzewska, 1992) shows that the unconscious is very good in detecting recurring patterns, even if these are highly complicated. However, implicit learning involves conforming to rules, rather than following (or using) rules actively, such as in arithmetic.

Research by Betsch, Plessner, Schwieren, and Gütig (2001) demonstrates that unconscious thought can give rough (but accurate) estimates on the basis of numbers, but does not engage in real arithmetic. That is, the unconscious can deal with numbers to some extent, but not by doing arithmetic. Participants in these experiments were asked to look carefully at various ads shown on a computer screen. At the same time, the numerical increases and decreases in the value of five hypothetical shares of stock were shown. Participants were presented with 75 units of information about the shares, with each unit being presented only briefly on the computer screen. Afterward, participants were asked specific questions about each of the shares, such as what the average money returns were. Not surprisingly, participants were not even remotely able to answer such specific questions. However, when they were asked merely to give their attitudes, they somehow knew what the best and worst shares were. They had developed a rough, gut feeling toward the shares, which indicated that they had unconsciously integrated the numerical information. If participants had failed to take into account even a small portion of the 75 units of information, this would have been impossible. However, if participants had engaged in arithmetic, they would have been able to answer the specific questions (e.g., about average return) with more accuracy.

Deutsch, Gawronski, and Strack (in press) reported another study showing the inability of the unconscious to follow rules. They consciously and unconsciously primed participants with affectively laden terms (e.g., "bad") and with corresponding negations with similar meanings (e.g., "not good"). As it turned out, negations could not be processed correctly unconsciously. For example, the unconscious prime "not good" was interpreted as "good." This does not mean, however, that unconscious thought cannot deal with negations once they are properly encoded. In many of our experiments (e.g., Dijksterhuis, 2004b), we used negations such as "Apartment A is not very expensive," and unconscious thought dealt well with such statements.

However, people need to be consciously aware while they encode a negation for the first time. If they are not aware during encoding, they cannot correctly process negation, or, in other words, they cannot follow what we may call the "negation rule."

The implications of the rule principle obviously go beyond arithmetic and negation. From the perspective of someone who has to form an impression or who has to choose between three apartments, the fact that conscious thought can follow rules is important, as it can also follow rules that are self-generated in the context of a decision process. One can be confronted with a house or apartment with many fabulous attributes, but if its cost exceeds a self-generated rule about the budget, consciousness will quickly decide against it (see also Dijksterhuis, 2004b). Similarly, consciousness can follow a rule regarding an absolutely crucial characteristic, such as when one evaluates apartments and insists on a balcony, or judges job candidates who must be fluent in both English and German. Finally, the rule principle also applies to purchases of mundane things for which some "rules" are rather obvious. One does not want a shirt with a hole in it or with very sloppy stitching on the hems. Selecting a shirt with the desired quality requires a certain degree of detailed precision and therefore conscious thought.

To conclude, the ability to follow rules allows for precision in the context of a decision. As we have argued, if one wants to use a very strict rule or criterion on a single dimension, one needs conscious thought. For unconscious thought, an apartment that costs €595 a month is virtually the same as an apartment that costs €605. Conscious thought judges these two apartments entirely differently if one has set a rule that an apartment may not cost more than €600.

The Convergence-Versus-Divergence Principle

According to the *convergence-versus-divergence principle*, conscious thought, and memory search during conscious thought, is focused and convergent. Unconscious thought is more divergent.

The convergence-versus-divergence principle is more relevant for creativity than for choices or decisions. Creativity has long been associated with the notion of incubation—that unconscious activity continues if conscious attention is directed elsewhere. Nobel laureates and famous artists, when asked to introspect on the process leading to their discoveries or creations, often emphasize the important role of incubation (Ghiselin, 1952). Some necessary conscious activity notwithstanding, it is, in most people's view, the unconscious that produces truly creative or unique thoughts. It seems that creative insight results from a process in which some initial conscious thought is followed by a period during which the problem is put to rest, consciously at least. After this period without conscious thought, a solution or idea presents itself.

Although the anecdotal evidence for incubation is abundant, not much is known about the process. At first, effects of incubation were hard to find in the psychological laboratory (Olton, 1979). Later, some evidence of incubation was obtained (e.g.,

Schooler & Melcher, 1995; S.M. Smith & Blankenship, 1989), but the effects were generally not explained as involving true unconscious thought. In studies on incubation, participants were usually given insight problems to solve. Some participants were then distracted for a while (starting the incubation process), and they were more likely to solve the problems than were participants who were not distracted. However, such effects were explained by *set shifting*. Rather than assuming that the unconscious really thinks, researchers assumed that distraction led to a change in mental set, perhaps because of forgetting. For example, sometimes chess players cannot solve a chess problem because they are stuck thinking in the wrong direction. A period of distraction might lead them to forget the wrong direction, and they might later solve the problem because of having a fresh look.

Although set shifting can clearly contribute to creative thoughts or to problem solving, it is a little dissatisfying as a complete explanation. Surely Newton did not discover the explanation for gravity because of continuous set shifting. People are not born with an inherent understanding of gravity, such that the person who can best distract him- or herself is the one who uncovers this deeply hidden explanation. Instead, the crucial thought itself must at some point be constructed, and for this to occur, one needs thought, not merely distraction. And in our view, it is more likely that this crucial thought is constructed during unconscious thought than during conscious thought. As we state in the convergence-versus-divergence principle, consciousness generates thoughts or ideas in a very focused and convergent way, whereas the unconscious is more divergent, which increases the probability of generating creative and unusual ideas. When one generates thoughts, "conscious thought stays firmly under the searchlight, [whereas] unconscious thought ventures out to the dark and dusty nooks and crannies of the mind" (Dijksterhuis & Meurs, 2006, p. 138).

We tested our ideas in a number of experiments (Dijksterhuis & Meurs, 2006). In all these experiments, we asked participants to generate a list (e.g., new names for pasta, place names starting with an *A*) either immediately upon request, after thinking consciously about the task, or after being distracted for a number of minutes. Although we generally obtained no differences between conditions in the number of items people generated, the nature of these items differed. For instance, when we asked people to generate new names for pasta, we gave five examples, all ending with an *i*. Whereas conscious thinkers used this cue and listed almost only names ending with an *i*, unconscious thinkers listed more names with other endings. When we asked people to generate Dutch place names (i.e., cities and villages) starting with an *A*, conscious thinkers listed highly accessible and obvious items (e.g., big cities such as Amsterdam), whereas unconscious thinkers listed more small villages. Finally, when we asked people to "generate things one can do with a brick," as expected, unconscious thinkers came up with ideas that were more unusual and creative.

THE DELIBERATION-WITHOUT-ATTENTION EFFECT

One can derive various concrete hypotheses from the six principles of UTT. We formulated and tested one such hypothesis ourselves in a recent series of studies (Dijksterhuis et al., 2006). It is a counterintuitive hypothesis about the relation between mode of thought (conscious vs. unconscious), complexity of the decision problem, and the quality of a decision. We named it the *deliberation-without-attention* hypothesis.

The capacity principle dictates that conscious thought does not make good decisions under very complex circumstances. Some work we discussed earlier (Dijksterhuis, 2004b) indeed showed this. When choosing between four apartments, each described by 12 features, conscious thought broke down, and the unconscious made much better decisions. However, the rule principle states that consciousness is precise and that it may well be good at choosing as long as its capacity is not strained. That is, conscious thought, because of its precision, may lead to better choices than unconscious thought when there is a minimal amount of information involved. In effect, the deliberation-without-attention hypothesis states that conscious thought is good when things are simple, and becomes worse as the complexity of the decision problem increases.

In contrast, during unconscious thought, as dictated by the top-down-versus-bottom-up principle and the weighting principle, people slowly integrate huge amounts of information into relatively sound summary judgments, giving the pieces of information (more or less) appropriate weights depending on their relative importance. In principle, this means that the quality of decisions made after unconscious thought is independent from the complexity of the problems. That is, the deliberation-without-attention hypothesis predicts that the quality of unconscious decisions is always fairly good.

Figure 1 depicts the deliberation-without-attention hypothesis about the relation between quality of a decision, complexity of a decision problem, and mode of thought (conscious thought and unconscious thought). It should be noted that in this hypothesis, complexity is defined in terms of the amount of information involved.
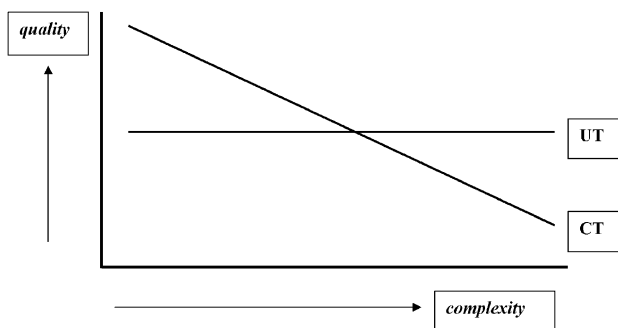

Fig. 1. The relation between the quality and complexity of a decision, as predicted by unconscious-thought theory. For conscious thought (CT), quality varies as a function of complexity, whereas for unconscious thought (UT), it does not.

In the first experiment testing the deliberation-without-attention hypothesis, participants read information about four hypothetical Japanese cars and were told to choose the best one. One of the cars had more positive features than the others. The amount of information the choice was based on varied across conditions. The problem was either relatively simple (each car was described by 4 features, for a total of 16 pieces of information) or very difficult (12 features per car). Participants indicated their choice either after a few minutes of conscious thought or after a few minutes of unconscious thought. The results fully supported the deliberation-without-attention hypothesis. Conscious thinkers performed very well under simple conditions, but very poorly under more demanding circumstances. Unconscious thinkers showed a different pattern in that their performance did not vary with condition; they often chose the right car in both conditions.

In another study, we tested the deliberation-without-attention hypothesis in the context of actual consumer choices. First, to assess the relative complexity of various products, we asked undergraduate participants how many characteristics they would take into account if they bought certain products. We asked for estimates regarding 40 different products, making sure we covered a wide range from highly complex to very simple (e.g., car, computer, couch, bed, shoes, dress, shirt, CD, vase, towel, umbrella, oven mitts). In a separate study, we gave other participants the same list of products and asked them to think about a recent occasion when they bought one of these items. We asked them what they specifically bought and how expensive it was. Subsequently, we asked whether they had seen the specific product before they went shopping. This question allowed us to differentiate between people who engaged in conscious or unconscious thought before their purchase and people who merely bought the product impulsively (or at least with very little thought). The data from this latter group were not analyzed further. We then asked the people who had seen the product beforehand whether or not they had engaged in much thought; these responses served as a measure of the amount of conscious versus unconscious thought in which the participants had engaged prior to their purchase. Finally, we asked them how satisfied they were with what they bought.

In a regression analysis, neither the amount of thought nor the number of characteristics alone predicted satisfaction. However, the interaction of these two variables did significantly predict satisfaction. To explore this interaction, we distinguished among complex products (i.e., products with many characteristics, such as a car, computer, camera, or couch), products of medium complexity (e.g., shirt, watch, skirt), and simple products (e.g., pot, alarm clock, vase, toothpaste). The more people thought consciously in the period between seeing a simple product for the first time and buying it, the more happy they were with it. Conversely, the more people thought consciously in the period between seeing a complex product for the first time and buying it, the less happy they were with it.

In a final study, we interviewed people outside two shops in Amsterdam, one where people predominantly buy complex products (IKEA, where people buy furniture) and one where people predominantly buy simple products (the Bijenkorf, where people buy clothes or small accessories). Shoppers were asked what they bought, whether they had seen it before, and whether they had thought about it much before buying it. A few weeks later, we called them to ask how satisfied they were with their purchase. As expected, IKEA shoppers were generally more happy the less they had consciously thought about what to buy, whereas Bijenkorf shoppers were more happy the more they had consciously thought. Again, the deliberation-without-attention hypothesis was confirmed.

In the study in which we asked undergraduate students about a recent purchase, we also found that the correlation between the amount of conscious thought and the number of product characteristics was .54 (note that both of these variables also correlated positively with price). The more complex a problem is (and the more expensive a purchase is), the more people consciously think before they act (see also Dijksterhuis, Smith, van Baaren, & Wigboldus, 2005). This is intuitively logical, but the deliberation-without-attention hypothesis shows that people should do the reverse. As decision makers, people are bad managers of their own minds. They behave like a conference organizer who asks the janitor to deliver the keynote address and the highly accomplished professor to fold up the chairs.

SOME CHARACTERISTICS OF THE THEORY

It seems appropriate to discuss UTT against the background of other, related, models and theories. Doing this enables us to articulate some key characteristics of UTT. Furthermore, it makes it easier to appreciate what is new about UTT.

In the 1980s and early 1990s, social psychologists formulated a number of dual-process models (Brewer, 1988; Chaiken, 1980; Fazio, 1990; Petty & Cacioppo, 1986; for a continuum model rather than a dual-process model, see Fiske & Neuberg, 1990). In these models, the central assumption is that there are two different routes one can take to arrive at an attitude or an impression of a person. What is particularly appealing about these models is that they permit a certain degree of individual choice. One route is decidedly more effortful than the other, but a person who has the motivation and the capacity to engage in the effortful route can generally do so. UTT reflects this relative freedom of choice. A starting point for our model is also that people can generally choose between conscious thought, unconscious thought, or no thought at all.

However, UTT differs from other models in other respects. In most social psychological models, the effortful route generally leads to more desirable outcomes (e.g., more stable attitudes, less stereotypical impressions) than the relatively effortless route. In addition, it is generally believed that schemas are primarily applied in the effortless route. UTT, in contrast, can be

said to contain three routes: an effortless route that involves no thought at all, an unconscious route that takes time but is relatively effortless, and a conscious route that is effortful. UTT deviates from the general "effort is good" idea in that it does not predict conscious efforts will generally lead to better outcomes than unconscious efforts and in that it does not maintain that effort is the way around using schemas.

Some recent models involve different systems rather than processing routes (Epstein, 1994; Kahneman, 2003; Sloman, 1996; E.R. Smith & DeCoster, 1999; Strack & Deutsch's, 2004, reflective-impulsive model involves both systems and processing routes, to some extent). Such models are especially informative as to the processes or even modules underlying decisions (or human behavior in general). Our approach differs in that we do not assume separate systems. UTT describes the characteristics of two processes, rather than two systems or modules. Most of the system models just cited differentiate between a rule-based system and a more associative system, and although this distinction is highly relevant for UTT, there is no perfect match. That is, unconscious thought is not simply the working of the associative system, and conscious thought is not simply the working of the rule-based system. First, most system models assume that the two systems use different input (e.g., Sloman, 1996), whereas UTT regards both unconscious and conscious thought as able to work on most input. Furthermore, whereas most system models assume that schemas or heuristics are employed by the associative system, UTT holds that they are used primarily during conscious thought. Finally, some system models hold that the associate system is passive and merely reproductive (E.R. Smith & DeCoster, 1999), whereas UTT sees unconscious thought as an active, generative, and creative mode of thought.

Although UTT differs from existing models in various respects, the most valuable addition of this theory, we hope, is the idea of unconscious thought. Previous models included the idea that one can choose between making a decision in an effortful way and making a decision in a relatively effortless way (i.e., that people can either think about things or not). UTT adds the idea that people think unconsciously.

UTT AND DECISION STRATEGIES

Decision theorists have long recognized that people use different decision strategies under different circumstances. For example, under some circumstances, people aim merely to satisfice (H.A. Simon, 1955). If you need a new bathroom towel, rather than searching at length to find the perfect towel, you may well simply look and purchase the first towel you can find that seems satisfactory. On other occasions, people want to choose the best possible alternative, and they engage in a lengthy and very careful weighting process in which they weight attributes of different options until they feel they have selected the absolutely perfect alternative (some specific people in the process of

buying shoes come to mind). Quite a number of different decision strategies have been identified, and it is interesting to try to map these different strategies onto unconscious and conscious thought. Do the characteristics of conscious and unconscious thought make them differentially able to apply different strategies? Let us give a few examples.

The weighted adding strategy (WADD) is a complex strategy in which a chooser first assesses the importance of different attributes (e.g., "culture is important for a holiday destination"), then assigns a choice alternative a value on each attribute (e.g., "Tuscany is excellent for culture"), and then multiplies each value for that alternative by the importance of the attribute dimension. The resulting scores for all attributes are summed to obtain a score for the attractiveness of the choice alternative, and the process is repeated for the other alternatives. This strategy is very sophisticated, but it is highly unrealistic to assume that people often engage in WADD.

In our view, conscious thought is not able to engage in WADD. First, this strategy is most useful for complex problems, and, as the capacity principle states, conscious thought cannot deal well with complex problems. In addition, WADD requires that people more or less accurately weight the importance of attributes, and consciousness is not very good at weighting (as stated in the weighting principle).

But what about unconscious thought? On the one hand, the rules of WADD are highly complex, and strictly following these rules is impossible during unconscious thought (the rule principle). On the other hand, the way unconscious thought deals with complex problems is probably rather similar to WADD: It slowly makes summary judgments based on appropriate weighting schemes. This means that although, strictly speaking, unconscious thought cannot do WADD, the results of unconscious thought processes are closer to what WADD would prescribe than the results obtained by conscious thought. In other words, if one faces a complex choice problem and really wants to apply WADD, unconscious thought is preferable over conscious thought.

The lexicographic strategy (LEX) is simple in comparison. In this strategy, the choice alternative with the best value on the most important dimension is selected. If the size of your new house matters a great deal more to you than all other features, choose the largest house. This strategy follows one strict rule, making conscious thought rather than unconscious thought the preferred mode of thinking. There is one catch in that consciousness has to be able to correctly identify the most important dimension. But when that requirement is met, conscious thought is more suitable than unconscious thought for LEX.

During satisficing (SAT), alternatives are considered sequentially. Attributes of a choice alternative are compared with a predetermined standard, and if the standard is not met, the alternative is not considered further. If a choice alternative meets the standards for all attributes, that alternative is chosen. This strategy is not easy to map onto conscious and unconscious thought. First, SAT requires that one option is considered at a time. This rule is highly strict and can be obeyed only by conscious thought. Thus, conscious thought can meet the first requirement of SAT (one thing at a time), whereas unconscious thought cannot. Second, SAT entails accuracy in judging whether something meets a predetermined standard. Conscious thought should be better at this than unconscious thought, but there is again a catch. Successful SAT depends on setting the right standard. Consciousness can do this, provided the standard is rather easy to determine and indeed easy to verbalize. It is very easy, for instance, to determine whether a purchase meets the standard "it should cost less than €100."

Conscious thought is more appropriate than unconscious thought for some decision strategies, whereas the reverse is true for other strategies. Generally, the relative applicability of both modes of thought is mostly a function of three of UTT's principles (the capacity principle, the weighting principle, and the rule principle). When a decision strategy warrants the careful and strict application of one specific rule (as in LEX), use conscious thought. When matters become more complicated and weighting is called for (as in WADD), use unconscious thought. In addition, when the amount of relevant information increases and strictly following a single rule ceases to be feasible (such as when buying a house), use unconscious thought.

UTT AND INTUITION

Intuition is defined differently by different researchers; however, we choose to define intuition as a gut feeling based on unconscious past experience. Intuition, in other words, involves feeling that something is right or wrong, or that A is better than B, while being largely unaware where that feeling came from, or what it is based on. In this section, we briefly discuss the implications of UTT for understanding and appreciating this phenomenologically familiar feeling, conceding in advance that this discussion is speculative.

As Lieberman (2000, p. 109) observed, Western culture is replete with cognitive maxims like "look before you leap" and "think before you act." Intuitions are distrusted and often seen as flawed by definition. In general, people attach much more weight to thorough conscious thought than to intuition, perhaps in part because they want decisions to be based on verbalizable reasons rather than on feelings. How would you react if you came home one day and discovered your partner had bought a $32,000 car? No doubt, your reaction would depend in part on the explanation. If your partner said he or she had thought about the car for quite a while, that the price was really low given all the assets, that the car's mileage was very good, and that this car was the safest one in its price bracket, you would accept the decision more easily than if your partner merely said that he or she had seen the car a number of times recently and "felt" he or she really wanted it. The latter explanation might well lead to temporary turmoil in your relationship.

The question is whether such turmoil would be justified. In our view (see also Bruner, 1960; Lieberman, 2000), to judge the quality of an intuition or of a decision based on intuition, one needs to look at what took place before the intuition manifested itself. What, in other words, are the gut feelings based on? A major reason that people distrust intuition is the belief, which is often implicitly held, that intuitions are snap judgments that arrive in consciousness with little or no prior information processing. However, such a belief may not be justified. In many cases, intuitions may well be the result of extensive unconscious thought. Intuitions are the summary judgments the unconscious provides when it is ready to decide. To go back to the car example, if your partner had repeatedly seen the car, perhaps read some information about it here and there, and heard other people talk about it occasionally, your partner's feeling of really wanting the car would be the summary judgment of his or her unconscious after having "crunched" the information for a while.

In cases in which intuition is based on extensive unconscious thought, it should not be distrusted. Let us return briefly to the decision strategies discussed in the previous section. If you want to buy a car according to one or two important criteria (e.g., mileage and safety), LEX would be an appropriate strategy, and it would indeed be best to use consciousness. As we argued before, unconscious thought cannot make a decision based on a specific rule. Alternatively, if you want to decide on the basis of a more holistic judgment in which many criteria are taken into account, such as in WADD, it would be best to use unconscious thought. At some point, a gut feeling or intuition would arrive, and this would be your unconscious telling you what you should do. You should not distrust this feeling. Rather, you should welcome it as the best device to base your decision on.

To clarify, we do not argue that intuitions are always right. Whether they are good depends on various moderators. First, as we just argued, they should be based on extensive unconscious thought. Second, it is important that the unconscious had access to all important information. An intuition telling you to buy a certain car without knowing the price, the mileage, and the safety rating is not a very useful intuition. But the bottom line is that the feeling itself should not be distrusted. Recent research on the somatic marker hypothesis (Bechara, Damasio, Tranel, & Damasio, 1997) indicates that one can develop accurate gut feelings before one is able to verbalize the basis of this intuition. Gladwell (2004), in his recent book *Blink*, discussed the example of some art experts who intuitively sensed that a *kouros* (a statue) bought by the Getty Museum was a fake. The first few tests indicated that nothing was wrong and that the statue was genuine. The experts could not verbalize what was wrong, but somehow the statue led to aversive feelings. They had that wonderful intuition telling them the statue was fake. Later testing proved them right.

To conclude, in our view, intuition is often the result of unconscious thought and is often highly useful. How useful intuition is,

however, depends on the extent of the unconscious thought it is based on, and on whether the unconscious had access to the most important information. If you have a strong intuition telling you to date a certain person, or that car A is better than car B, you may ask yourself a few questions. The first is, "Did I give myself enough time to engage in unconscious thought?" The answer probably depends not only on time, but also on experience. As Gladwell's (2004) example shows, an expert can achieve much more with relatively brief unconscious thought than a novice can. If you conclude that you have thought enough unconsciously, ask the second question: "Did I have all the important information, or are there additional things I really need to know first?" If you think you have all the information you need, go with your intuition. It likely is the best advice you will get.[4]

CAVEATS AND FUTURE DIRECTIONS

Before closing, we would like to discuss three important limitations of the theory as it currently stands. These issues warrant discussion and provide interesting avenues for future research.

A first important issue is the role of encoding, or acquisition of information. On the basis of UTT, one may draw the conclusion that conscious thought is often inferior to unconscious thought and that therefore people should refrain from too much conscious activity when they face important decisions. However, UTT pertains to thought processes that, as is always the case with thought, follow an initial phase of information acquisition. We do indeed argue that in many ways unconscious thought is superior to conscious thought, but this superiority of unconscious processes does not pertain to the earlier stage of information acquisition. At that stage, conscious processes are superior.

In the experiments UTT was based on, participants were always presented with information they encoded consciously. Generally speaking, decisions are of course likely to be best when they are based on information that is encoded thoroughly and consciously. A decision based on incomplete information or on information that is acquired hastily and sloppily will not be as good. It is possible that in such cases, decisions will be poor irrespective of whether the later thought process is conscious or unconscious. However, it is also possible that unconscious thought suffers more from poor encoding than conscious thought

---

[4]In *Blink*, Gladwell (2004) seemed to conclude that intuitions are often very good. However, he did not make the distinction between intuitions that are the result of thorough unconscious thought and intuitions that are made very quickly. In our view, this distinction is crucial for predicting whether intuitions are good. As we have argued, intuitions based on thorough unconscious thought are usually good. Whether immediate decisions are often good is not clear, however. Anecdotal evidence (see Gladwell, 2004) suggests two important moderators that may be tested in future research. First, immediate intuitions that were good were made by experts (perhaps they have so much knowledge that they can think unconsciously very quickly). Second, the quick judgments were always simple and indeed binary ("good" vs. "bad," "real" vs. "fake"). It is unlikely that immediate intuitions are very good when the judgments involved are more complex ("which of these four apartments is best for my grandmother?").

does, so that unconscious thought would lose its superiority under such conditions. This is an issue that warrants further study.

The superiority of conscious encoding leads us to what we call the "best of both worlds" hypothesis: Complex decisions are best when the information is encoded thoroughly and consciously, and the later thought process is delegated to the unconscious. In concrete terms, when one wants to buy a new house, one should consciously acquire as much information as possible. One may consciously engage in listing the information, so that it is processed very thoroughly. However, the next step, the weighting and integration of the information to arrive at a judgment, should then be left to the unconscious. In short, consciousness should be used to gather information, and the unconscious should be used to work on it.

Zajonc (1980) provided anecdotal evidence emphasizing this division of labor, describing a colleague who was in the process of deciding between two jobs. She made a list of various attributes and assigned both choice options pluses and minuses on these attributes. During this process, she suddenly realized that there were too many pluses appearing on the "wrong side." According to UTT, what happened is that her unconscious had already made an intuitive decision. The decision conscious thought was about to reach, however, was the opposite. We argue that one should give more weight to the unconscious intuitive feeling than to the conscious pluses and minuses. According to UTT, lists with pluses and minuses may be used to get a better grasp of the relevant information. However, once all the information is encoded and one needs to work toward a preference, lists can be maladaptive because they obviously invite conscious rather than unconscious thought (interestingly, though, this example shows that assigning pluses and minuses may help one figure out whether the unconscious has already reached a decision). Instead, one should look at the list, stop conscious thought for a while, and then wait for the unconscious to deliver the decision in the form of an intuitive feeling.

A second important issue is the role of intentions or goals. Conscious thought is goal directed, and we have argued that unconscious thought is, too (although more evidence for that would be welcome). In the experiments discussed, people were always intending to make a good decision. This is an important goal, but also a very general one. It is not yet clear what happens when goals are more specific or directional. What if you have to decide on the best apartment, not for you, but for your grandparents? In this case, attributes different from the ones you are used to, such as the absence of stairs, become important. It is not clear whether unconscious thought is good at making such decisions. Relatively specific goals often imply strict rules, and as we have argued, conscious thought is better at following rules.

Findings in the domain of stereotyping illustrate this point. Our own experiments (Dijksterhuis & Bos, 2005) demonstrated that conscious thought can lead to more stereotypical impressions than unconscious thought. However, many researchers have shown that when people are given the specific goal not to stereotype, they generally fare quite well (e.g., Devine et al., 1991; Monteith et al., 1998; although there are pitfalls—see Macrae et al., 1994). In this work, the participants engaged in conscious thought, and it is not yet clear whether the unconscious would be at all sensitive to such goals. People do not have to be consciously aware of the goal not to stereotype in order for that goal to have an effect (e.g., Moskowitz, Gollwitzer, Wasel, & Schaal, 1999), but whether the intended effect of not using the stereotype can be achieved by unconscious thought rather than by conscious thought remains to be tested.

Finally, it is necessary to shed more light on how unconscious thought works and when and how the unconscious transfers its information to consciousness. Up to now, we have discovered that unconscious thought leads to polarization and that people are better able to organize information in memory with unconscious than with conscious thought. This knowledge, however, represents no more than the tip of the iceberg, and there is much more about the processes involved that remains to be discovered. For now, it is perhaps best to conceive of unconscious thought as a computational process, as slowly calculating what is best. Is it useful to conceive of unconscious thought in connectionist terms, as slowly working to a state of equilibrium? And what is the role of affect? Is unconscious thought good at weighting the relative importance of information because it somehow uses the affective tone of the information better than conscious thought does? Such highly intriguing questions are impossible to answer yet.

And when does the unconscious deliver its solutions? In our experiments, the amount of time given to participants was fixed. Under such circumstances, the use of unconscious thought is suboptimal; the end product of unconscious thought should be better under more natural circumstances in which the unconscious chooses when to deliver its solution. But when does it do that? Jaynes (1976) jokingly referred to a British physicist who talked about the three Bs: bed, bath, and bus. Quite a number of major scientific discoveries have been made in these unusual places. At times, the unconscious indeed chooses odd moments to present its findings.

Have you ever had the following experience? You are planning to start writing your next article, and although you have some ideas about what to write in the introduction, things are still a bit fuzzy. You still have to make decisions ("Shall I first present the weighting principle, or shall I first talk about the rule principle?"). And then, at some point, you suddenly know exactly what to do. First this, then that, then X, then Y, and so on. Sometimes such bursts of inspiration come at awkward moments, such as when you are grocery shopping. You are not able to write things down while your unconscious is strongly pushing you to do so. All you can do is hurry home (forgetting the lettuce), desperately hoping you do not lose these "great" thoughts before you can write them down. And then, at home, you sit down and write, and in a few minutes, you have basically shaped your introduction. You still have to do the actual writing of course, but you

know exactly how it will unfold. Such moments of inspiration are wonderful, and they are demonstrations of unconscious thought processes telling you they achieved a solution. But why did they deliver their creative solutions when they did? At this time, we understand such processes very poorly. The determinants of when the unconscious presents its ideas remain in the dark.

CONCLUSIONS

We have presented a theory about human thought, the core of which is the idea that people have two modes of thought, unconscious and conscious. Unconscious thought and conscious thought have different characteristics, making these modes more or less useful under different circumstances. UTT suggests that people often apply the two modes inappropriately. For instance, people tend to engage in a great deal of conscious thought when they deal with complex problems, whereas they should engage more in unconscious thought.

Rational choice theory, the perspective that has dominated decision and consumer research for quite some time, proposes that "the consumer has ability or skill in computation that enables the calculation of which option will maximize his or her received value and selects accordingly" (Bettman et al., 1998, p. 187). This theory emphasizes that people can weight the relative importance of information and generally decide quite well. There is no denying that this approach has been highly successful in accounting for people's consumer choices (e.g., Bettman et al., 1998; Simonson, 2005). The irony, however, is that although the name of the approach includes the term "rational," its success may in part be due to the fact that consumers generally do not think much consciously before they decide. Perhaps the relative success of rational choice theory is due to the fact that people think more often unconsciously than researchers currently appreciate. And perhaps if consumers would start to think more consciously, rational choice theory would lose rather than gain predictive power. After all, the unconscious is often much more "rational" than consciousness.

REFERENCES

Bargh, J.A. (1994). The four horsemen of automaticity: Awareness, intention, efficiency, and control in social cognition. In R.S. Wyer, Jr., & T.K. Srull (Eds.), *The handbook of social cognition: Vol. 2. Basic processes* (pp. 1–40). Hillsdale, NJ: Erlbaum.

Bechara, A., Damasio, H., Tranel, D., & Damasio, A.R. (1997). Deciding advantageously before knowing advantageous strategy. *Science*, *275*, 1293–1295.

Betsch, T., Plessner, H., Schwieren, C., & Gütig, R. (2001). I like it but I don't know why: A value-account approach to implicit attitude formation. *Personality and Social Psychology Bulletin*, *27*, 242–253.

Bettman, J.R., Luce, M.F., & Payne, J.W. (1998). Constructive consumer choice processes. *Journal of Consumer Research*, *25*, 187–217.

Bodenhausen, G.V. (1988). Stereotypic biases in social decision making and memory: Testing process models of stereotype use. *Journal of Personality and Social Psychology*, *55*, 726–737.

Bos, M.W., & Dijksterhuis, A. (2006). *On the goal-directedness of unconscious thought*. Unpublished manuscript, University of Amsterdam, Amsterdam, The Netherlands.

Brewer, M.B. (1988). A dual process model of impression formation. In R.S. Wyer, Jr., & T.K. Srull (Eds.), *Advances in social cognition* (Vol. 1, pp. 1–36). Hillsdale, NJ: Erlbaum.

Brownstein, A.L. (2003). Biased predecision processing. *Psychological Bulletin*, *129*, 545–568.

Bruner, J. (1960). *The process of education*. Cambridge, MA: Harvard University Press.

Carlson, K.A., & Russo, J.E. (2001). Biased interpretation of evidence by mock jurors. *Journal of Experimental Psychology: Applied*, *7*, 91–103.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, *39*, 752–766.

Claxton, G. (1997). *Hare brain, tortoise mind: How intelligence increases when you think less*. New York: HarperCollins.

Davidson, J.R., & Kiesler, S.B. (1964). Cognitive behavior before and after decisions. In L. Festinger (Ed.), *Conflict, decision, and dissonance* (pp. 10–19). Stanford, CA: Stanford University Press.

Deutsch, R., Gawronski, B., & Strack, F. (in press). "Not good" may feel quite positive: Affective and behavioral consequences of processing negated information. *Journal of Personality and Social Psychology*.

Devine, P.G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, *56*, 5–18.

Devine, P.G., Monteith, M.J., Zuwerink, J.R., & Elliot, A.J. (1991). Prejudice with and without compunction. *Journal of Personality and Social Psychology*, *60*, 817–830.

Dijksterhuis, A. (2004a). [Decision quality after different amounts of unconscious thought]. Unpublished raw data.

Dijksterhuis, A. (2004b). Think different: The merits of unconscious thought in preference development and decision making. *Journal of Personality and Social Psychology*, *87*, 586–598.

Dijksterhuis, A., Aarts, H., & Smith, P.K. (2005). The power of the subliminal: Perception and possible applications. In R. Hassin, J. Uleman, & J.A. Bargh (Eds.), *The new unconscious* (pp. 77–106). New York: Oxford University Press.

Dijksterhuis, A., & Bos, M.W. (2005). *I am thinking about you . . . when I shouldn't: The dangers of conscious thought during impression formation*. Manuscript submitted for publication.

Dijksterhuis, A., Bos, M.W., Nordgren, L.F., & van Baaren, R.B. (2006). On making the right choice: The deliberation-without-attention effect. *Science*, *311*, 1005–1007.

Dijksterhuis, A., & Meurs, T. (2006). Where creativity resides: The generative power of unconscious thought. *Consciousness and Cognition*, *15*, 135–146.

Dijksterhuis, A., Smith, P.K., van Baaren, R.B., & Wigboldus, D.H.J. (2005). The unconscious consumer: Effects of environment on consumer choice. *Journal of Consumer Psychology*, *15*, 193–202.

Dijksterhuis, A., & van Knippenberg, A. (1995). Memory for stereo-type-consistent and stereotype-inconsistent information as a function of processing pace. *European Journal of Social Psychology*, *25*, 689–694.

Dijksterhuis, A., & van Knippenberg, A. (1996). The knife that cuts both ways: Facilitated and inhibited access to traits as a result of stereotype activation. *Journal of Experimental Social Psychology*, *32*, 271–288.

Dijksterhuis, A., & van Olden, Z. (in press). On the benefits of thinking unconsciously: Unconscious thought can increase post-choice satisfaction. *Journal of Experimental Social Psychology*.

Epstein, S. (1994). Integration of the cognitive and psychodynamic unconscious. *American Psychologist*, *49*, 709–724.

Fazio, R.H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 75–109). San Diego, CA: Academic Press.

Fiske, S.T., & Neuberg, S.L. (1990). A continuum model of impression formation from category-based to individuating processes: Influences of information and motivation on attention and interpretation. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 1–74). San Diego, CA: Academic Press.

Ghiselin, B. (1952). *The creative process*. New York: New American Library.

Gilbert, D.T., & Hixon, J.G. (1991). The trouble of thinking: Activation and application of stereotypic beliefs. *Journal of Personality and Social Psychology*, *60*, 509–517.

Gladwell, M. (2004). *Blink: The power of thinking without thinking*. New York: Little, Brown.

Jaynes, J. (1976). *The origin of consciousness in the breakdown of the bicameral mind*. Boston: Houghton Mifflin.

Jonides, J., Schumacher, E.H., Smith, E.E., Lauber, E.J., Awh, E., Minoshima, S., & Koeppe, R.A. (1997). Verbal working memory load affects regional brain activation as measured by PET. *Journal of Cognitive Neuroscience*, *9*, 462–475.

Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. *American Psychologist*, *58*, 697–720.

Klayman, J., & Ha, Y. (1987). Confirmation, disconfirmation, and information in hypothesis testing. *Psychological Review*, *94*, 211–228.

Levine, G.M., Halberstadt, J.B., & Goldstone, R.L. (1996). Reasoning and the weighting of attributes in attitude judgments. *Journal of Personality and Social Psychology*, *70*, 230–240.

Lewicki, P., Hill, T., & Czyzewska, M. (1992). Nonconscious acquisition of information. *American Psychologist*, *47*, 796–801.

Lieberman, M.D. (2000). Intuition: A social cognitive neuroscience approach. *Psychological Bulletin*, *126*, 109–137.

Macrae, C.N., Bodenhausen, G.V., Milne, A.B., & Jetten, J. (1994). Out of mind but back in sight: Stereotypes on the rebound. *Journal of Personality and Social Psychology*, *67*, 808–817.

Macrae, C.N., Hewstone, M., & Griffiths, R.J. (1993). Processing load and memory for stereotype-based information. *European Journal of Social Psychology*, *23*, 77–87.

Miller, G.A. (1956). Information Theory. *Scientific American*, *195*, 42–46.

Monteith, M.J., Sherman, J.W., & Devine, P.G. (1998). Suppression as a stereotype control strategy. *Personality and Social Psychology Review*, *2*, 63–82.

Moskowitz, G.B., Gollwitzer, P.M., Wasel, W., & Schaal, B. (1999). Preconscious control of stereotype activation through chronic egalitarian goals. *Journal of Personality and Social Psychology*, *77*, 167–184.

Nordgren, L.F., & Dijksterhuis, A. (2006). *Conscious thought and decisional noise*. Unpublished manuscript, University of Amsterdam, Amsterdam, The Netherlands.

Nørretranders, T. (1998). *The user illusion: Cutting consciousness down to size*. New York: Viking.

Olton, R. (1979). Experimental studies of incubation: Searching for the elusive. *Journal of Creative Behavior*, *13*, 9–22.

Petty, R.E., & Cacioppo, J.T. (1986). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 123–205). New York: Academic Press.

Schooler, J.W., & Melcher, J. (1995). The ineffability of insight. In S.M. Smith, T.B. Ward, & R.A. Finke (Eds.), *The creative cognition approach* (pp. 97–134). Cambridge, MA: MIT Press.

Schooler, J.W., Ohlsson, S., & Brooks, K. (1993). Thoughts beyond words: When language overshadows insight. *Journal of Experimental Psychology: General*, *122*, 166–183.

Schopenhauer, A. (1970). *Essays and aphorisms* (R.J. Hollingdale, Trans.). London: Penguin. (Original work published 1851)

Simon, D., Pham, L.B., Le, Q.A., & Holyoak, K.J. (2001). The emergence of coherence over the course of decision making. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *27*, 1250–1260.

Simon, H.A. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics*, *69*, 99–118.

Simonson, I. (2005). In defense of consciousness: The role of conscious and unconscious inputs in consumer choice. *Journal of Consumer Psychology*, *15*, 211–217.

Sloman, S.A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin*, *119*, 3–22.

Smith, E.R., & DeCoster, J. (1999). Associative and rule-based processing: A connectionist interpretation of dual-process models. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 323–336). New York: Guilford.

Smith, S.M., & Blankenship, S.E. (1989). Incubation effects. *Bulletin of the Psychonomic Society*, *27*, 311–314.

Snyder, M., & Swann, W.B. (1978). Hypothesis testing in social interaction. *Journal of Personality and Social Psychology*, *36*, 1202–1212.

Srull, T.K., & Wyer, R.S., Jr. (1989). Person memory and judgment. *Psychological Review*, *96*, 58–83.

Stangor, C., & McMillan, D. (1992). Memory for expectancy-congruent and expectancy-incongruent information: A review of the social and social developmental literatures. *Psychological Bulletin*, *111*, 42–61.

Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, *8*, 220–247.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*, 1124–1131.

Wegner, D.M. (1994). Ironic processes of mental control. *Psychological Review*, *101*, 34–42.

Wilson, T.D. (2002). *Strangers to ourselves: Discovering the adaptive unconscious*. Cambridge, MA: Harvard University Press.

Wilson, T.D., Lisle, D., Schooler, J.W., Hodges, S.D., Klaaren, K.J., & LaFleur, S.J. (1993). Introspecting about reasons can reduce post-choice satisfaction. *Personality and Social Psychology Bulletin*, *19*, 331–339.

Wilson, T.D., & Schooler, J.W. (1991). Thinking too much: Introspection can reduce the quality of preferences and decisions. *Journal of Personality and Social Psychology*, *60*, 181–192.

Zajonc, R.B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist*, *35*, 151–175.