# On Making the Right Choice: The Deliberation-Without-Attention Effect

Ap Dijksterhuis, *et al.*

*Science* **311**, 1005 (2006);
DOI: 10.1126/science.1121629

13. E. J. Eide, H. Kang, S. Crapo, M. Gallego, D. M. Virshup, *Methods Enzymol.* **393**, 408 (2005).
14. S. Martinek, S. Inonog, A. S. Manoukian, M. W. Young, *Cell* **105**, 769 (2001).
15. M. Abe, E. D. Herzog, G. D. Block, *Neuroreport* **11**, 3261 (2000).
16. C. Iitaka, K. Miyazaki, T. Akaike, N. Ishida, *J. Biol. Chem.* **280**, 29397 (2005).
17. P. S. Klein, D. A. Melton, *Proc. Natl. Acad. Sci. U.S.A.* **93**, 8455 (1996).
18. G. Adelmant, A. Begue, D. Stehelin, V. Laudet, *Proc. Natl. Acad. Sci. U.S.A.* **93**, 3553 (1996).
19. B. W. Doble, J. R. Woodgett, *J. Cell Sci.* **116**, 1175 (2003).
20. A. Balsalobre, F. Damiola, U. Schibler, *Cell* **93**, 929 (1998).
21. F. Zhang, C. J. Phiel, L. Spece, N. Gurvich, P. S. Klein, *J. Biol. Chem.* **278**, 33067 (2003).
22. A. J. Gelenberg *et al.*, *J. Med.* **321**, 1489 (1989).
23. J. A. Ripperger, L. P. Shearman, S. M. Reppert, U. Schibler, *Genes Dev.* **14**, 679 (2000).
24. E. Iwahana *et al.*, *Eur. J. Neurosci.* **19**, 2281 (2004).
25. F. Benedetti *et al.*, *Neurosci. Lett.* **368**, 123 (2004).
26. R. H. Lenox, T. D. Gould, H. K. Manji, *Am. J. Med. Genet.* **114**, 391 (2002).
27. M. Gottlicher *et al.*, *EMBO J.* **20**, 6969 (2001).
28. C. J. Phiel *et al.*, *J. Biol. Chem.* **276**, 36734 (2001).
29. M. E. Dokucu, L. Yu, P. H. Taghert, *Neuropsychopharmacology* **30**, 2216 (2005).

30. We thank the University of Pennsylvania Diabetes and Endocrinology Research Center Vector Core (NIH DK 19525) and M. J. Birnbaum for GSK3β adenoviruses, and J. D. Alvarez and A. Sehgal for helpful discussions. Supported by NIH DK45586 (to M.A.L.) and NIH MH058324 (to P.S.K.).

**Supporting Online Material**
www.sciencemag.org/cgi/content/full/311/5763/1002/DC1
Materials and Methods
Figs. S1 to S7

20 October 2005; accepted 14 January 2006
10.1126/science.1121613

# On Making the Right Choice: The Deliberation-Without-Attention Effect

**Ap Dijksterhuis,* Maarten W. Bos, Loran F. Nordgren, Rick B. van Baaren**

**Contrary to conventional wisdom, it is not always advantageous to engage in thorough conscious deliberation before choosing. On the basis of recent insights into the characteristics of conscious and unconscious thought, we tested the hypothesis that simple choices (such as between different towels or different sets of oven mitts) indeed produce better results after conscious thought, but that choices in complex matters (such as between different houses or different cars) should be left to unconscious thought. Named the "deliberation-without-attention" hypothesis, it was confirmed in four studies on consumer choice, both in the laboratory as well as among actual shoppers, that purchases of complex products were viewed more favorably when decisions had been made in the absence of attentive deliberation.**

Common knowledge holds that thorough conscious thought leads to good decisions and satisfactory choices. Whether purchasing a new car, a desktop computer, or a pair of shoes, people generally believe that serious conscious deliberation increases the probability that they will make the "right" choice. This idea applies especially to choices between products that are complex, multifaceted, and expensive. Whereas most people are willing to buy a new set of towels without much thought, they are unlikely to buy a new car or outfit a new kitchen without deliberation.

A second pervasive idea is that the quality of a choice benefits from "sleeping on it." Rather than (or in addition to) thinking consciously, people usually feel that "unconscious thought" is useful for making sound decisions. Whereas conscious thought refers to thought or deliberation while conscious attention is directed at the problem at hand, unconscious thought can be defined as thought or deliberation in the absence of conscious attention directed at the problem (*1*). An example of unconscious thought is the following: One compares two holiday destinations (say the Costa Brava and Tuscany) and does not know what to decide. One puts the problem aside and after 48 hours of not thinking about it consciously, suddenly the thought "It's going to be Tuscany!" pops into consciousness. This thought itself is conscious, but the transition from indecision to a preference 2 days later is the result of unconscious thought, or of deliberation without attention.

The scientific literature has emphasized the benefits of conscious deliberation in decision making for hundreds of years (*2*, *3*). The idea that conscious deliberation is the ideal (if not always attainable) way to approach a decision forms the backbone of classic (*4*, *5*) as well as contemporary perspectives on decision making (*6*, *7*) and attitude formation (*8*, *9*). In contrast, the notion that unconscious thought is fruitful hardly developed beyond the status of "folk wisdom." It has been postulated or investigated by scientists infrequently [but see (*10*–*13*)]. The question addressed here is whether this view is justified. We hypothesize that it is not.

First, conscious thought does not always lead to sound choices. For example, participants who chose their favorite poster among a set of five after thorough contemplation showed less postchoice satisfaction than participants who only looked at them briefly (*14*, *15*). Furthermore, conscious deliberation can make multiple evaluations of the same object less consistent over time (*16*). Two reasons why conscious deliberation sometimes leads to poor judgments have been identified. First, consciousness has a low capacity (*17*, *18*), causing choosers to take into account only a subset of the relevant information when they decide (*13*, *19*). Second, conscious thought can lead to suboptimal weighting of the importance of attributes (*13*–*16*): We tend to inflate the importance of some attributes at the expense of others, leading to worse choices.

Conversely, unconscious thought, or thought without attention, can lead to good choices (*13*, *14*). In a recent experiment, participants read information about four apartments of different desirability (*20*). They were either asked to choose their favorite immediately, or given the opportunity to choose after a period of conscious thought, or distracted for some time

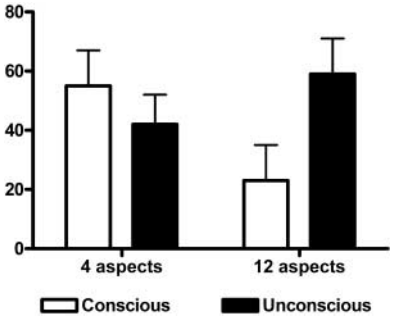


**Fig. 1.** Percentage of participants who chose the most desirable car as a function of complexity of decision and of mode of thought ($n$ = 18 to 22 in each condition). Error bars represent the standard error.

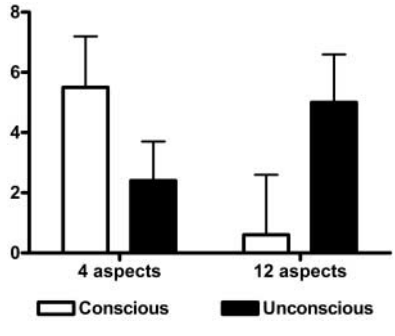


**Fig. 2.** Difference in attitude (on a scale of –25 to +25) toward the desirable and undesirable car as a function of complexity of decision and of mode of thought ($n$ = 12 to 14 in each condition). Error bars represent the standard error.

Department of Psychology, University of Amsterdam, Roetersstraat 15, 1018 WB, Amsterdam, the Netherlands.

*To whom correspondence should be addressed. E-mail: a.j.dijksterhuis@uva.nl

before they chose. In the third of these conditions, participants could only engage in unconscious deliberation: They knew they would have to choose later, but the distraction task prevented them from devoting conscious attention to the choice. Interestingly, unconscious thinkers made better decisions than conscious thinkers or than immediate choosers (*13*, *14*).

Recently, we formulated the Unconscious Thought Theory (UTT) (*21*) about the strengths and weaknesses of conscious thought and unconscious thought, that is, of deliberation with and without attention. Two characteristics of conscious and unconscious thought are important in the current context. First, conscious thought is rule-based and very precise (*22*, *23*). Unconscious thought can conform to rules in that it detects recurring patterns, as the literature on implicit learning shows (*24*). However, in order to actively follow strict rules, conscious attention is necessary. For example, one cannot do arithmetic without conscious attention. This capacity to follow rules makes conscious thought more precise in decision making, because it can strictly follow self-generated rules such as not exceeding a maximum price. Second, as alluded to earlier, conscious thought suffers from the low capacity of consciousness, making it less suitable for very complex issues. Unconscious thought does not suffer from low capacity. Indeed, it has been shown that during unconscious thought, large amounts of information can be integrated into an evaluative summary judgment (*13*).

These characteristics of conscious and unconscious thought led us to postulate the "deliberation-without-attention" hypothesis, on the relation between mode of thought or deliberation (conscious versus unconscious) and the complexity and quality of choice. Complexity is defined as the amount of information a choice involves. A choice between objects for which one or two attributes are important (such as oven mitts or toothpaste) is simple, whereas a choice between objects for which many attributes are important (cars or houses) is complex. Conscious thought is hypothesized, due to its precision, to lead to good choices in simple matters. However, because of its low capacity, conscious thought leads to progressively worse choices with more complex issues. Unconscious thought (i.e., deliberation without attention) is expected, because of its relative lack of precision, to lead to choices of lower quality. However, the quality of choice does not deteriorate with increased complexity, allowing unconscious thought to lead to better choices than conscious thought under complex circumstances, this latter idea being the kernel of the deliberation-without-attention hypothesis. Quality of choice was operationalized both normatively (studies 1 and 2) as well as subjectively (as postchoice satisfaction, in studies 3 and 4).

Study 1. Participants were subjected to a 2 (mode of thought: conscious versus unconscious) × 2 (complexity of choice problem: simple versus complex) factorial design (*25*). All participants read information about four hypothetical cars. Depending on the condition, each car was characterized by 4 attributes (simple) or by 12 attributes (complex). The attributes were either positive or negative. One car was characterized by 75% positive attributes, two by 50% positive attributes, and one by 25% positive attributes (supporting online text). After reading the information about the four cars, participants were assigned either to a conscious thought condition or to an unconscious thought condition. In the conscious thought condition, participants were asked to think about the cars for 4 min before they chose their favorite car. In the unconscious thought condition, participants were distracted for 4 min (they solved anagrams) and were told that after the period of distraction they would be asked to choose the best car.

The percentages of participants who chose the best car are shown in Fig. 1. The crucial two-way interaction supporting the deliberation-without-attention hypothesis was significant [$F(1,76) = 4.85$, $P < 0.04$]. Unconscious thinkers fared relatively well and showed no differences between conditions ($F < 1$, not significant). Conscious thinkers generally made the proper choice under simple conditions, but performed poorly under complex circumstances [$F(1,40) = 4.95$, $P < 0.04$].

Study 2. For the second study we made one change (*25*). Rather than asking for a choice, we asked participants about their attitudes toward each of the four cars. As the dependent variable, we used the difference in attitude toward the best car and the worst car. Again, conscious thinkers were better able to differentiate the quality of the cars under simple conditions, whereas unconscious thinkers were better able to differentiate the quality of the cars under complex conditions [$F(1,47) = 5.63$, $P < 0.03$]. The means are shown in Fig. 2.

Study 3. In a pilot study, undergraduate students were asked how many aspects of a product they would take into account in the purchase of 40 different products. In this way, we obtained an average "complexity score" for 40 different products (supporting online text).

For the actual study, other students were presented with this list of 40 products. From the list, they were asked to choose a product that they had recently purchased and were asked the following questions: Which product did you purchase? Did you know the product before you went on the shopping trip? How much did you think about the product between seeing it for the first time and buying it? How satisfied are you with the product?

To test our hypothesis, we distinguished participants who thought (either consciously or unconsciously) about their purchase from impulse buyers who did not think much at all. Hence, participants who indicated that they bought a product they had never come across before the shopping trip were not included, leaving only participants who knew the product beforehand ($n = 49$).

It is impossible to know whether people are engaged in unconscious thought by asking them, so strictly speaking, we can only test the relationship between conscious thought,



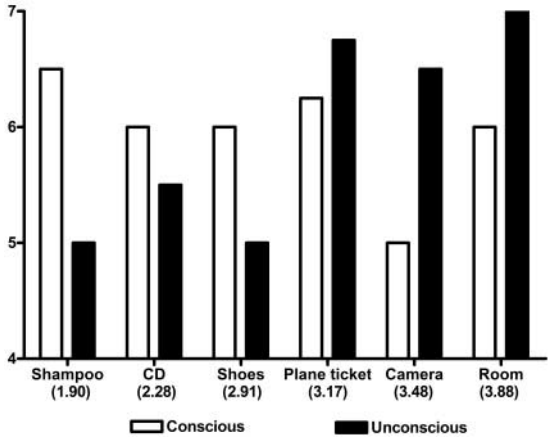


**Fig. 3.** The relation between mode of thought and postchoice satisfaction (on a scale of 1 to 7) for the six products most frequently chosen in study 3. Higher bars indicate more satisfaction. The more complex the product (on a scale of 1 to 5), the further to the right it is shown. The complexity score is given in parentheses. Participants were divided into conscious and unconscious thinkers on the basis of a median-split for each product individually. Each bar represents between two and five participants.

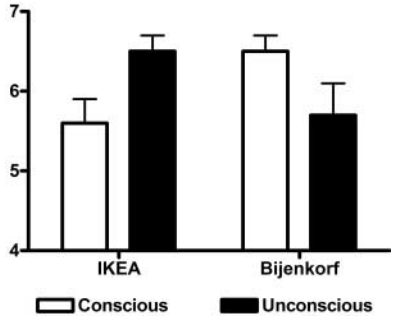


**Fig. 4.** Postchoice satisfaction of IKEA ($n = 27$) and Bijenkorf ($n = 27$) shoppers as a function of mode of thought. Error bars represent the standard error.

complexity, and quality. However, it follows from our definition of conscious and unconscious thought (according to which attention to the problem at hand is the crucial distinguishing factor) that they are at least partly dependent. At any one point in time, attention is either directed at the decision under consideration, or it is not; that is, at any particular point in time, either you are attending to buying a car, or you are not. The more you think about a decision consciously (that is, with attention), the less time remains to think about the same decision unconsciously (that is, without attention).

We regressed the amount of thought and the average number of aspects on postchoice satisfaction. As expected, thinking does not make people more satisfied, nor does complexity ($t$'s < 1). However, the interaction of the two parameters significantly predicted postchoice satisfaction [$t(48) = 2.13$, $P < 0.04$]. Correlations were calculated between amount of thought and postchoice satisfaction for three categories of products: complex, medium, and simple. For products of medium complexity, no correlation was found [$r(18) = -0.03$]; for simple products, a positive correlation was found [$r(15) = 0.57$, $P < 0.03$]; and for complex products, a negative correlation was found [$r(16) = -0.56$, $P < 0.03$]. As expected, the more people thought consciously about simple products, the more satisfied they were with their purchase. Conversely, the more people thought consciously about complex products, the less satisfied they were with their purchase. Figure 3 depicts satisfaction as a function of mode of thought for the six most frequently chosen products (*26*).

Study 4. On the basis of the pilot study to study 3, two shops were selected: one where people generally buy complex products (IKEA, which sells mainly furniture) and one where people generally buy simple products (Bijenkorf, a department store like Macy's that sells clothes, clothing accessories, and kitchen accessories). At the exit, shoppers were asked the following questions: What did you buy? How expensive was it? Did you know the product before you went on the shopping trip? and How much did you think about the product between seeing it for the first time and buying it? A few weeks later, the shoppers were asked (over the phone) how satisfied they were with their purchases. As in study 3, participants who indicated that they bought a product they had never come across before the shopping trip were not included.

We divided participants ("thinkers") on the basis of a median-split procedure into those who engaged in much conscious thought (conscious thinkers) and those who engaged in little conscious thought (unconscious thinkers). As expected, conscious thinkers reported more postchoice satisfaction than unconscious thinkers for Bijenkorf products (simple products) [$F(1,25) = 6.52$, $P < 0.02$]. The opposite was true for the IKEA customers (complex products), in which case unconscious thinkers showed more postchoice satisfaction than conscious thinkers [$F(1,25) = 6.12$, $P < 0.02$] (Fig. 4).

In sum, in four studies we demonstrated the deliberation-without-attention effect. Conscious thinkers were better able to make the best choice among simple products, whereas unconscious thinkers were better able to make the best choice among complex products. Among people who knew the product they purchased before they went on a shopping trip, the amount of conscious thought was positively related to postchoice satisfaction for simple products and negatively related to postchoice satisfaction for complex products.

Our aim was to test the "deliberation-without-attention" hypothesis both in the laboratory and among shoppers. In that sense, it is important to view our set of studies as a whole rather than as a series of individual studies. Study 4 has unavoidable disadvantages such as that the IKEA and Bijenkorf samples may have differed (after all, different shops attract a different clientele), which naturally opens the potential for alternative explanations. Therefore, study 3 was done in order to "bridge" the laboratory studies with study 4. It has many of the assets of study 4 (real choices between real products with satisfaction as the dependent variable), except that all participants were students.

Although we investigated choices among consumer products in our studies, there is no a priori reason to assume that the deliberation-without-attention effect does not generalize to other types of choices—political, managerial, or otherwise. In such cases, it should benefit the individual to think consciously about simple matters and to delegate thinking about more complex matters to the unconscious.

### References and Notes


1. It is important to note that attention to the problem at hand is the crucial distinction in our definitions of conscious and unconscious thought. Thinking about buying a new car while attention is directed at possible new cars is conscious thought. Thinking about buying a new car while attention is temporarily directed elsewhere is unconscious thought. This distinction does not mean that conscious thought only comprises conscious processes. One can compare it to speech. Speech is a conscious process (i.e., attention is directed at it while one speaks), but it is in part dependent on accompanying unconscious processes (such as processes responsible for syntax or word choice).
2. R. Descartes, *The Philosophical Writings of Descartes* (Cambridge Univ. Press, Cambridge, 1984).
3. J. Locke, *An Essay Concerning Human Understanding* (Penguin, London, 1689/1997).
4. I. L. Janis, L. Mann, *Decision Making: A Psychological Analysis of Conflict, Choice, and Commitment* (Free Press, New York, 1977).
5. H. A. Simon, *Q. J. Econ.* **69**, 99 (1955).
6. J. R. Bettman, M. F. Luce, J. W. Payne, *J. Consum. Res.* **25**, 187 (1998).
7. D. Kahneman, *Am. Psychol.* **58**, 697 (2003).
8. S. Chaiken, *J. Pers. Soc. Psychol.* **39**, 752 (1980).
9. R. E. Petty, J. T. Cacioppo, in *Advances in Experimental Social Psychology*, L. Berkowitz, Ed. (Academic Press, New York, 1986), vol. 19, pp. 123–205.
10. As far as we know, the possibility of unconscious thought (as well as the term "unconscious thought") was explicitly used for the first time by Schopenhauer, who remarked that "One might almost believe that half of our thinking takes place unconsciously" (*27*).
11. G. Claxton, *Hare Brain, Tortoise Mind: How Intelligence Increases When You Think Less* (Harper Collins, New York, 1997).
12. The idea of unconscious thought was also studied by various researchers interested in incubation processes in creativity. An example is K. S. Bowers *et al*. (*28*).
13. A. Dijksterhuis, *J. Pers. Soc. Psychol.* **87**, 586 (2004).
14. A. Dijksterhuis, Z. van Olden, *J. Exp. Soc. Psychol.*, in press.
15. T. D. Wilson *et al.*, *Pers. Soc. Psychol. Bull.* **19**, 331 (1993).
16. G. M. Levine, J. B. Halberstadt, R. L. Goldstone, *J. Pers. Soc. Psychol.* **70**, 230 (1996).
17. G. A. Miller, *Psych. Rev.* **63**, 81 (1956).
18. T. Nørretranders, *The User Illusion: Cutting Consciousness Down to Size* (Viking, New York, 1998).
19. T. D. Wilson, J. W. Schooler, *J. Pers. Soc. Psychol.* **60**, 181 (1991).
20. Quality of decision was operationalized from a normative perspective. One of the choice options was made more desirable than the others because it had been assigned more positive aspects than the other apartments.
21. A. Dijksterhuis, L. F. Nordgren, *Persp. Psychol. Sci.*, in press.
22. The important distinction between following rules and merely conforming to them (and the need for conscious attention in the former) was made by S. A. Sloman (*29*).
23. E. R. Smith, J. DeCoster, *Dual-Process Theories in Social Psychology*, S. Chaiken, Y. Trope, Eds. (Guilford, New York, 1999), pp. 323–336.
24. Unconscious thought is reminiscent of implicit learning, but there is an important difference. Implicit learning refers to aspects of a task that are learned while working on the task (and that are inaccessible to consciousness). Unconscious thought refers to thought processes that take place after the encoding of relevant information. A good example of this definition of unconscious thought is the groundbreaking work by Stickgold and colleagues on learning during sleep. See, e.g., (*30*, *31*).
25. Materials and methods are available as supporting material on *Science* Online.
26. We found a correlation between number of aspects and amount of thought ($r = 0.54$, $P < 0.001$): The more complex a product is, the more people think consciously when deciding to purchase it. Understandable as this may be, our analysis suggests that people should do the opposite, i.e., think unconsciously when deciding to purchase a complex product. The correlation between number of aspects and price was also significant ($r = 0.45$, $P < 0.001$): Expensive products were more complex than inexpensive ones.
27. A. Schopenhauer, in *Essays and Aphorisms* (Penguin, London, 1851/1970), p. 123.
28. K. S. Bowers, G. Regehr, C. Balthazard, K. Parker, *Cogn. Psychol.* **22**, 72 (1990).
29. S. A. Sloman, *Psychol. Bull.* **119**, 3 (1996).
30. R. Stickgold, M. Walker, *Trends Cogn. Sci.* **8**, 191 (2004).
31. R. Stickgold *et al.*, *Science* **294**, 1052 (2001).


32. We thank E. Neimeijer, L. Schreers, and R. Wassenberg for help with conducting study 4. This research was supported by a grant from Nederlandse Organisatie voor Wetenschappelijk Onderzoek (016.025.030).


### Supporting Online Material

www.sciencemag.org/cgi/content/full/311/5763/1005/DC1
Materials and Methods

20 October 2005; accepted 9 January 2006
10.1126/science.1121629