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Four empirical tests of Unconscious Thought Theory

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ABSTRACT

According to Unconscious Thought Theory, people make better decisions after unconscious than after conscious thought (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006a). Unconscious Thought Theory yields four specific predictions. First, an exact replication of Dijksterhuis et al. (2006a) study should indicate that unconscious decisions are superior to conscious decisions. Second, decisions should improve with duration of conscious thought. Third, unconscious decisions should be superior to conscious decisions, even if unconscious decisions are deliberated while having access to information. Fourth, unconscious decisions should be based on a weighting strategy. We report results of four studies, featuring 480 participants, that yield no evidence in favor of these predictions. Therefore our findings cast doubt on Unconscious Thought Theory and its advice to base decisions on unconscious thought. The results of our studies suggest that it is better to base decisions on conscious thought while having access to information.

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Introduction

It may seem self-evident that the best way for people to solve a complex decision problem is to carefully and *consciously* weigh the pros and cons of each choice alternative. However, this view has been challenged by an influential study on *unconscious* decision making (Dijksterhuis et al., 2006a). This study formed the empirical basis of Unconscious Thought Theory (Dijksterhuis & Nordgren, 2006) and prompted the advice that complex decision problems are best addressed not by conscious deliberation but by unconscious thought, that is, by sleeping on them. This counterintuitive claim received a lot of positive attention in the popular media,[1] yet also raised skeptical comments from within the scientific community (e.g., González-Vallejo, Lassiter, Bellezza, & Lindberg, 2008; Shanks, 2006). In this article, we first summarize Unconscious Thought Theory, we then derive four predictions from this theory and test these predictions in four studies featuring a total of 480 participants. Finally, we integrate our results with previous results and discuss implications for Unconscious Thought Theory.

Unconscious Thought Theory

The key assumption of Unconscious Thought Theory (UTT, Dijksterhuis & Nordgren, 2006) is that unconscious thought and conscious thought are characterized by different processes. That is, "unconscious thought" processes have a relatively large capacity – hence, they allow for an optimal decision strategy in which all attributes of choice alternatives are weighted according to their importance. These unconscious processes require time, therefore the quality of decisions increases with the duration of unconscious thought (Dijksterhuis & Nordgren, 2006, p. 99; see also Dijksterhuis, 2004). "Conscious thought" processes on the other hand, have a small capacity and therefore only allow for simplified decision making strategies. As summarized by Dijksterhuis and Nordgren (2006, p. 105): "When a decision strategy warrants the careful and strict application of one specific rule, as in a lexicographic strategy, use conscious thought. When matters become more complicated and weighting is called for, as in the weighting strategy, use unconscious thought".

Dijksterhuis et al. (2006a) tested one of the main predictions derived from UTT, namely that in complex situations, decisions should be better after unconscious than after conscious thought. A complex decision making situation was operationalized as a situation in which participants had to choose between four options (cars) defined by 12 attributes each (e.g. mileage, service, legroom). The attributes were presented verbally, one attribute at a time. Following an interval of 4 min, participants had to indicate which car they thought was best. In this 4 min interval, participants either deliberated their decisions (an operationalization of "conscious thought") or performed a secondary task in which they had to

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[1] A select subset of the many online references: http://news.bbc.co.uk/1/hi/health/4723216.stm, http://americanscientist.org/template/Newsletter?memberid=null&issueid=7262, http://www.washingtonpost.com/wpdyn/content/article/2006/02/19/AR2006021901108.html, http://www.newscientist.com/article.ns?id=dn8732, http://www.nytimes.com/2006/02/21/health/psychology/21deci.html?ei=5088&en=94fce15a93b5dd86&ex=129,81,78,000&adxnnl=1&partner=rssnyt&emc=rss&adxnnlx=1182113728-IcgxwPfeyZCsn9oZYxTrMA.

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solve anagrams and thus were not able to deliberate their decisions consciously (an operationalization of "unconscious thought"). The results showed that about 25% of the participants in the conscious condition chose the best car, whereas about 60% did so in the unconscious condition. This superiority of unconscious over conscious decisions was replicated by Strick, Dijksterhuis, and Van Baaren (2010). Moreover, Dijksterhuis (2004) reported a tendency, although not significant, towards superior unconscious performance (see also Lassiter, Lindberg, Gonzalez-Vallejo, Bellezza, & Phillips, 2009 for a similar tendency in one condition, the "form impression" condition).

Therefore, two studies provide evidence for UTT and two studies tend to do so. If a more extensive assessment of UTT would also support this theory, this would have profound implications, both for decision making theory as well as for real life decision making. In the next section we therefore review the possibilities for such a more extensive assessment of UTT, where we show that not all tests of UTT yield such favorable outcomes.

Four predictions from Unconscious Thought Theory

In this section, we show that a general assessment of Unconscious Thought Theory involves a test of four predictions derived from this theory. We review studies that tested these predictions, show that the evidence is still subject to debate, and indicate how additional evidence can be obtained.

The first prediction derived from UTT is that in complex situations, decisions after unconscious thought should outperform decisions after conscious thought. Several studies provide support for this prediction (Dijksterhuis et al., 2006a; Strick et al., 2010; and a tendency in Dijksterhuis, 2004 and in Lassiter et al., 2009), but other studies do not (Lassiter et al., 2009, "memorize" condition; Acker, 2008; Calvillo & Penaloza, 2009; González-Vallejo, Lassiter, Bellezza, & Lindberg, 2008; Mamede et al., 2010; Newell, Wong, Cheung, & Rakow, 2009; Payne, Samper, Bettman, & Luce, 2008; Rey, Goldstein, & Perruchet, 2009; Thornsteinson & Withrow, 2009; Waroquier, Marchiori, Klein, & Cleeremans, 2009). However, it might be argued that the latter studies (i.e., those that failed to replicate Dijksterhuis et al., 2006a) did not reveal superiority of unconscious thought because they were not designed to provide an *exact* replication of the experimental conditions in Dijksterhuis et al. (2006a). Specifically, the Dijksterhuis et al. (2006a) study differed from the others in four aspects. First, the Dijksterhuis et al. (2006a) study concerned choice whereas other studies concerned judgment (Acker, 2008; Calvillo & Penaloza, 2009; Lassiter et al., 2009, study 2; Thornsteinson & Withrow, 2009, study 1; Waroquier et al., 2009, studies 1–3). These two situations, choice vs. judgment, may trigger different decision strategies (Billings & Scherer, 1988). Second, in the Dijksterhuis et al. (2006a) study participants did not receive a decision instruction prior to the presentation of attributes, whereas this instruction was provided in some other studies (Acker, 2008; Newell et al., 2009, study 3; Payne et al., 2008). Third, not all studies incorporated the original stimulus material (Calvillo & Penaloza, 2009, studies 1 and 2; González-Vallejo, Lassiter, Bellezza, & Lindberg, 2008; Mamede et al., 2010; Newell et al., 2009, studies 1 and 4; Payne et al., 2008; Thornsteinson & Withrow, 2009, studies 1 and 2; Waroquier et al., 2009, studies 1 and 3). Finally, not all studies operationalized conscious thought as Dijksterhuis et al. did (Rey et al., 2009). For these reasons we performed a study in which we tried to replicate the Dijksterhuis et al. (2006a) study as closely as possible. That is, our replication study concerned choice, participants did not receive a decision goal before viewing stimulus materials, we used the same stimulus materials and incorporated the same operationalization of conscious thought, we even sampled from the same Dutch subpopulation as Dijksterhuis et al. did. According to UTT, this exact replication should show that unconscious decisions are superior to conscious decisions.

The second prediction derived from UTT is that the quality of unconscious decisions should increase with the duration of unconscious thought. This also means that unconscious decisions should be superior to immediate decisions. However, several studies comparing unconscious to immediate decisions did not find evidence in favor of this prediction: instead, unconscious and immediate decisions were shown to be equivalent (Acker, 2008; Dijksterhuis, 2004; Newell et al., 2009, study 3). Newell et al. explained this result by arguing that participants who are instructed to perform a judgment already form this judgment online, that is, during attribute presentation. This online judgment is then used to arrive at a decision immediately after attributes have been presented (Hastie & Park, 1986), where the decision is not changed by either conscious nor unconscious thought (cf. Lassiter, Lindberg, Gonzalez-Vallejo, Bellezza, & Phillips, 2009 for a similar interpretation). However, Strick et al. (2010) recently showed that decisions after unconscious thought are superior to online decisions. Therefore, the evidence for the second UTT prediction is inconclusive. In order to study this second prediction further, we compared immediate, conscious and unconscious decisions, where the duration of unconscious thought was varied. UTT predicts that unconscious decisions outperform immediate decisions, and that the quality of unconscious decisions increases with the duration of unconscious thought.

The third prediction derived from UTT is that the superiority of unconscious over conscious thought is a general phenomenon that is not related to a particular operationalization of (un)conscious thought (Dijksterhuis, Bos, Nordgren, & Van Baaren, 2006b; Dijksterhuis & van Olden, 2006; Dijksterhuis et al., 2006a). Dijksterhuis et al. (2006a) operationalized conscious thought in a way that is arguably not very representative of realistic decision making situations (González-Vallejo et al., 2008; Shanks, 2006; Thornsteinson & Withrow, 2009). That is, in the Dijksterhuis study there was no opportunity for participants to inspect information during deliberation; whereas in real life people often do have access to this information. In order to test this third UTT prediction, we designed a study in which unconscious thought was compared to more realistic operationalizations of conscious thought which offer participants access to information while they deliberate their decisions. UTT predicts that even in this situation unconscious thought should be superior to conscious thought.

The fourth prediction derived from UTT is that unconscious thought is associated with an optimal decision strategy, the weighting strategy, whereas conscious thought is associated with suboptimal strategies, such as the lexicographic strategy. In the weighting strategy, people derive for each choice alternative an importance-weighted sum of attributes and subsequently prefer the alternative with the highest weighted sum (see Brandstätter, Gigerenzer, & Hertwig, 2006, for a review). In the lexicographic strategy (Luce, 1978), people prefer the alternative with the highest score on the most important attribute. When two or more alternatives are tied, people compare the tied alternatives on the next most important attribute. This procedure continues until all ties are broken and only a single alternative is left. Note that there exist other suboptimal strategies, such as Dawes strategy (e.g. Brandstätter et al., 2006; Bröder & Schiffer, 2003). People using the Dawes strategy choose the alternative with the highest number of positive attributes (Bröder & Schiffer, 2003; Dawes & Corrigan, 1974, see also Payne et al., 2008). The weighting and Dawes strategy are prime examples of a compensatory strategy: negative values on some attributes can be compensated by positive values on other attributes. In contrast, the lexicographic strategy is a non-compensatory strategy: if one choice option scores suboptimal on the most important attribute, this cannot be compensated by other positive attributes.

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