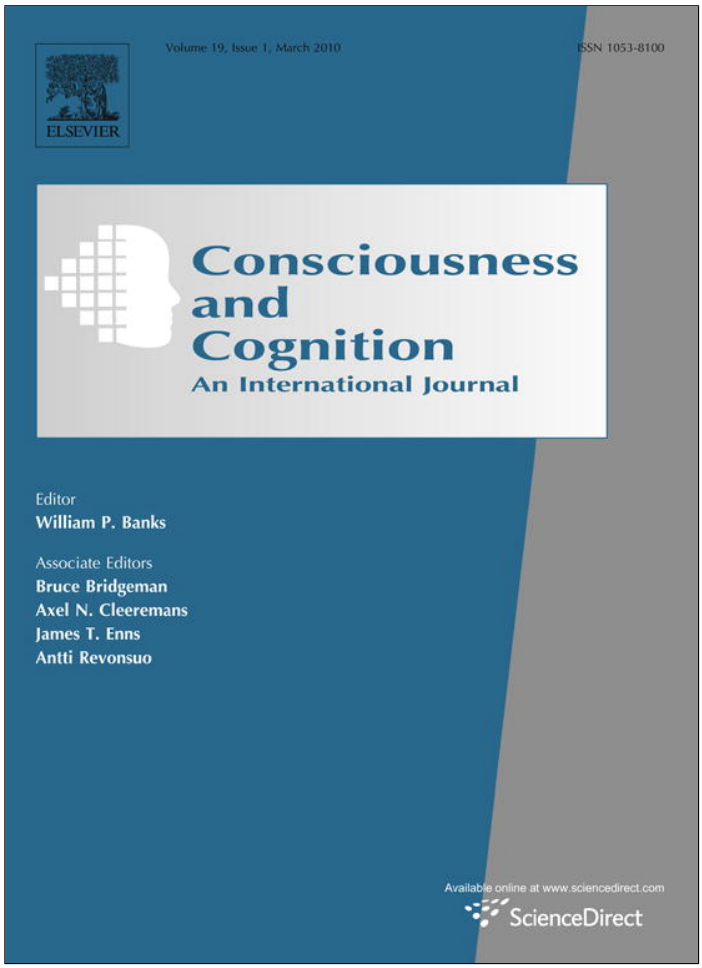

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Reply

# The distinction between intuition and guessing in the SRT task generation: A reply to Norman and Price ☆

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ABSTRACT

We (Fu, Dienes, & Fu, 2010) investigated the extent to which people could generate sequences of responses based on knowledge acquired from the Serial Reaction Time task, depending on whether it felt subjectively like the response was based on pure guessing, intuition, conscious rules or memories. Norman and Price (2010) argued that in the context of our task, intuition responses were the same as guessing responses. In reply, we argue that not only do subjects apparently claim to be experiencing different phenomenologies when saying intuition versus guess, but also intuition and guess responses are associated with different behaviors. We found that people could control the knowledge when generating responses felt to be based on intuition but not those felt to be pure guessing. We present further evidence here that triplets associated with intuition but not guessing were also processed fluently.



Dienes and Scott (2005) pointed out that the knowledge of a structure (structural knowledge) can be distinguished from the knowledge of whether a particular test item has that structure (judgment knowledge). In principle, people can acquire conscious or unconscious structural knowledge, and if the structural knowledge is unconscious the associated judgment knowledge can be either conscious or unconscious. The conscious status of both can be measured, more or less imperfectly, by asking subjects whether their response was based on pure guessing, intuition, rules, or memories. In the context of the Artificial Grammar Learning (AGL) paradigm, Dienes and Scott (2005) found that the intuition and guessing attributions (corresponding to unconscious structural knowledge) behaved similarly and different from the memory and rules attributions (corresponding to conscious structural knowledge). Thus, Dienes (2008) suggested that the most interesting theoretical distinction in implicit learning research may be between conscious and unconscious structural knowledge. However, when adopting the attribution tests in the Serial Reaction Time (SRT) task, we (Fu et al., 2010) found that participants trained on 15 blocks could control the expression of their knowledge during an exclusion task when responses were attributed to rules, memory and intuition but not to guessing. The results provided new evidence for the distinction between conscious and unconscious judgment knowledge in the context of implicit learning (showing that the SRT task behaves somewhat differently from AGL, e.g. Dienes, Altmann, Kwan, & Goode, 1995; Scott & Dienes, 2008; Wan, Dienes, & Fu, 2008).

In a commentary on our article (Fu et al., 2010), Norman and Price (2010) questioned whether the attribution tests originally used in AGL task could be straightforwardly applied to SRT task and in particular whether intuition attributions really occurred in our SRT study. This concern is based on a key difference between the AGL task and the SRT task. Typically, in the AGL task, participants are asked to classify strings that may be up to nine letters long, which therefore entail many relation-

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ships between elements that might be relevant to defining what is grammatical. In our version of the generation test of the SRT task, subjects were asked to predict the next one based on the responses to the first two locations, which were thus the only source to predict the next location. According to Norman and Price, as our procedure involved only a two-element sequence where items varied only in position, if a person had any confidence in their decision it is clear what it was based on (i.e. the last two locations): In this situation, one cannot be confident and have no idea of its basis. Thus, they argued intuition is more likely to mean guess than what we defined it to mean to subjects: Having some confidence in one's response, but having no idea why.

First of all we will consider whether it makes sense to take subjects as meaning what they say: Can they mean by intuition that they had some confidence but no idea why their answer was right? Second, given that it is meaningful to contrast guess and intuition phenomenologies, are there objective reasons for believing these stated phenomenologies corresponded to something psychologically real?

It seems entirely possible in the context of our generation test to have the following experience: To be drawn to a particular location as a response, for it to feel right, but to have not consciously based that decision on anything at all. No rule or memory was consciously used to produce the answer. The only thing the person knows about the basis was what he was told and he can still have no idea WHAT about the last two positions determined the next (In this sense, as Reber, Allen, and Regan (1985) argue, a test situation can explicate or appear to explicate knowledge that was implicit.). That would be a different phenomenology from having a conscious rule or memory upon which one derived the right answer; and different again from purely guessing, when one has no confidence whatsoever. Thus, the phenomenology of intuition is possible in our situation. But is there any evidence that stated intuition and guess phenomenologies were behaviorally different otherwise, especially in theoretically expected ways?

The difference between feelings of intuition rather than of guessing is whether judgment knowledge is conscious or unconscious. Theoretically, conscious judgment knowledge allows more control over the use of that knowledge than is allowed by unconscious judgment knowledge (even if the relation is not absolute in some paradigms: e.g. Wan et al., 2008). And indeed, when subjects said they were guessing they had no control over the knowledge, whereas they did have control when they said they used intuition (the degree of control is different between those two attributions: $t(13) = 2.02$, $p < .05$, one-tailed). This conclusion is reinforced by the "pure guessing (50% confidence rate)" responses being associated with no control in Experiment 1.

Norman and Price suggested that the lack of control for guessing in SRT was partly due to a suppressed inclusion performance. This was the case: Only for guessing was inclusion performance at chance ($p = .20$); for the other attributions, it was significantly above chance ($ps < .001$). But, why is there the distinction between intuition and guessing in the SRT task?

We propose that fluency may be absent for guess responses and present for intuition responses. While fluency plays no role in accuracy in AGL (Scott & Dienes, in press), procedural knowledge as revealed by RT benefits, i.e. fluency, plays a crucial role in the SRT task (e.g. Bischoff-Grethe, Goedert, Willingham, & Grafton, 2004; Willingham, Wells, Farrell, & Stemwedel, 2000). In our SRT task, participants were trained on the SOC sequence, during which each training triplet repeated 105 times but each transfer triplet 15 times, resulting in an RT benefit ($M = 28$ ms) for training compared with transfer triplets. For those triplets which were given "guess" attributions on both inclusion and exclusion tests, the RT benefit was $-17$ ms ($n = 8$) and was less than the average ($t(7) = 1.98$, $p < .05$, one-tailed) but not different from zero ($t(7) = -.74$, $p = .48$); for those triplets given "intuition" attributions on both tests the RT benefit was 26 ms ($n = 19$) and was not detectably different from the average ($t(18) = .17$, $p = .87$) but significantly above zero ($t(18) = 1.92$, $p < .05$, one-tailed). Therefore, it is plausible that when subjects said "intuition" they meant what they said – fluency produced some confidence, though not based on any conscious inference.

Finally, we thank Norman and Price for their stimulating comments and we agree that the way Norman, Price, Duff, and Mentzoni (2007) used multi-dimensional stimuli in both training and testing would be a very useful way of exploring the phenomenology of intuition in future studies, beyond the confines of the simple situation we placed our subjects in.

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