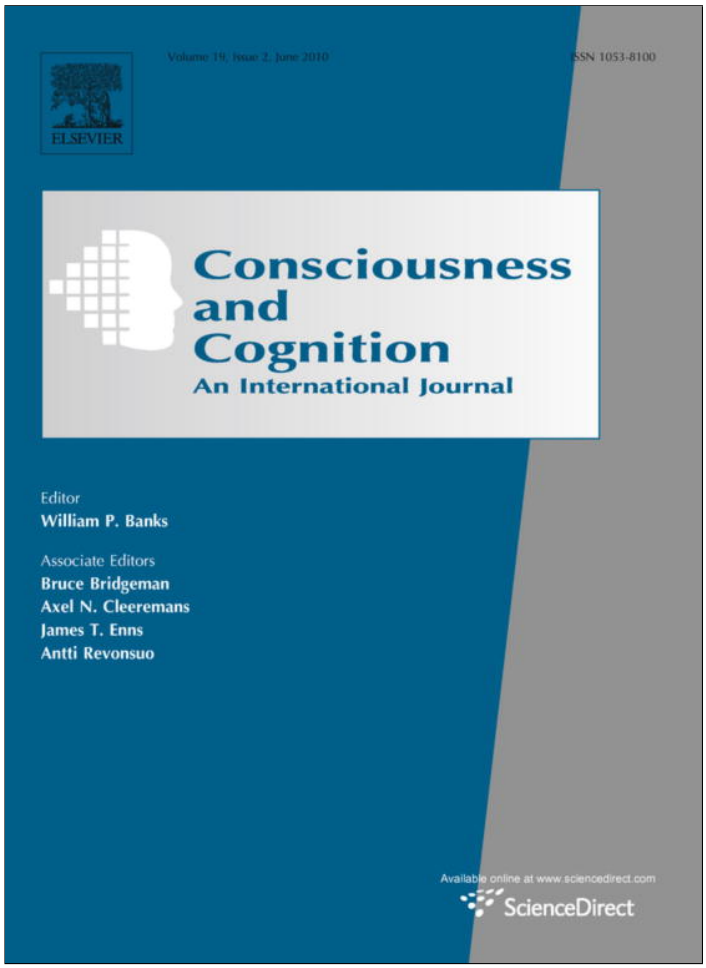
Provided for non-commercial research and education use.
Not for reproduction, distribution or commercial use.



This article appeared in a journal published by Elsevier. The attached copy is furnished to the author for internal non-commercial research and education use, including for instruction at the authors institution and sharing with colleagues.

Other uses, including reproduction and distribution, or selling or licensing copies, or posting to personal, institutional or third party websites are prohibited.

In most cases authors are permitted to post their version of the article (e.g. in Word or Tex form) to their personal website or institutional repository. Authors requiring further information regarding Elsevier's archiving and manuscript policies are encouraged to visit:

http://www.elsevier.com/copyright

Author's personal copy

Consciousness and Cognition 19 (2010) 685–686

Contents lists available at ScienceDirect

Consciousness and Cognition

journal homepage: www.elsevier.com/locate/concog

Reply

Subjective measures of implicit knowledge that go beyond confidence: Reply to Overgaard et al. ☆

Zoltán Dienes [a,c,*], Ryan B. Scott [a,c], Anil K. Seth [b,c]

[a] School of Psychology, University of Sussex, Sussex BN1 9QH, United Kingdom
[b] School of Informatics, University of Sussex, Sussex BN1 9QG, United Kingdom
[c] Sackler Centre for Consciousness Science, University of Sussex, Sussex BN1 9QG, United Kingdom

ARTICLE INFO

Article history:
Received 26 January 2010
Available online 25 February 2010

Keywords:
Subjective measures
Confidence
Implicit learning
Unconscious knowledge

ABSTRACT

Overgaard, Timmermans, Sandberg, and Cleeremans (2010) ask if the conscious experience of people in implicit learning experiments can be explored more fully than just confidence ratings allow. We show that confidence ratings play a vital role in such experiments, but are indeed incomplete in themselves: in addition, use of structural knowledge attributions and ratings of fringe feelings like familiarity are important in characterizing the phenomenology of the application of implicit knowledge.

© 2010 Elsevier Inc. All rights reserved.

Ramsøy and Overgaard (2004) introduced a scale of perceptual experience which has the goal of asking people about the clarity of contents of their visual experience, e.g. no experience, a glimpse, almost clear, clear. Sandberg, Timmermans, Overgaard, and Cleeremans (in press) and Overgaard et al. (2010) contrast this Perceptual Awareness Scale (PAS) with confidence ratings because, they argue, a person could in principle be aware of the clarity of visual contents independently of the person's assessment of the relevance of the contents for a discrimination at hand. For example, one could clearly or vaguely consciously see something but think it is of no relevance to making a required discrimination, and so have no confidence in the discriminative response. In such a case the PAS scale would indicate some conscious visual experience of the stimulus even as confidence ratings indicated no confidence. Thus, Overgaard et al. argue that PAS is superior to confidence ratings for determining subliminal perception. They ask how the methodology in implicit learning could correspondingly be improved beyond confidence ratings to take into account the principles behind PAS.

Dienes and Seth (in press) argue that in fact confidence ratings determine the conscious status of the visual contents relevant to a discrimination better than PAS does: Having some conscious content does not entail having relevant conscious contents. In the present comment, we recall that a methodology already exists in the implicit learning literature that determines conscious contents independently of a participant's assessment of the relevance of those contents to a discrimination. We further argue that this method needs to be combined with confidence ratings for a more complete assessment of the conscious status of relevant mental states.

Scott and Dienes (2008) used artificial grammar learning to explore the phenomenology of the application of knowledge resulting from implicit learning. In their Experiment 3, after classifying a test string, people reported their confidence in the classification, rated how familiar the string felt, and indicated what strategy they used to make the classification. The options for strategy use were: random response, intuition, familiarity, rules, or recollection. Importantly, people could respond with

☆ Reply to Commentary by Overgaard, M., Timmermans, B., Sandberg, K., & Cleeremans, A. (2010). Optimizing subjective measures of consciousness. *Consciousness & Cognition, 19*, 682–684.

* Corresponding author. Address: School of Psychology, University of Sussex, Sussex BN1 9QG, United Kingdom.
E-mail address: dienes@sussex.ac.uk (Z. Dienes).

1053-8100/$ - see front matter © 2010 Elsevier Inc. All rights reserved.
doi:10.1016/j.concog.2010.01.010

Author's personal copy

no confidence and choose a strategy other than random responding; for example, if they were aware of using rules to make a judgment but had no confidence in those rules for determining grammaticality. Similarly, people could say they were responding randomly and still indicate what degree of familiarity the test string had, thereby reporting conscious experiences that may in fact be relevant, even if the person themselves had no idea about their relevance.

As Sandberg et al. (in press) reported in the visual case, Scott and Dienes (2008) found dissociations between confidence in a decision and conscious experiences concerning the target of the decision. People could be aware of using rules, recollections or feelings of familiarity in classifying a string while having no confidence in that classification. In addition, like Sandberg et al., when people said they had no relevant conscious experience at all – no experience of the stimulus (in the visual case) or no experience of their decision having any basis whatsoever (in the implicit learning case) – people still classified above chance. Further, through the use of different scales, i.e. reports of different conscious contents, Scott and Dienes were able to reveal subtleties not apparent when only one scale is used. They showed, for example, that people could believe they were responding randomly while they were actually using the information contained in their feelings of familiarity (Scott & Dienes, 2008). They also showed that, in more complex situations, when people believed they were responding randomly, even the information contained in feelings of familiarity did not account for classification accuracy (Scott & Dienes, 2010; Wan, Dienes, & Fu, 2008). Importantly, the incorporation of confidence ratings also allows us to go beyond the PAS scale alone, to distinguish conscious states that it cannot, as Dienes and Seth (in press) argued for the visual case.

In the visual case, a person can clearly consciously see an object as having property *x* without at all consciously seeing it has property *y*, even if the person did indeed (unconsciously) see the object had property *y*. One cannot just say "the seeing is conscious": The mental state that was conscious must be fixed by specifying its contents, because different contents imply different mental states. What contents are relevant to implicit learning? Dienes and Scott (2005) distinguished knowledge contents concerning the structure of grammatical strings in general (structural knowledge) and the knowledge content that a particular string is (or is not) grammatical (judgment knowledge). Other relevant contents are the string being familiar to some degree. One could be aware of believing the string is grammatical but not of believing that grammatical strings can only start with M or T; similarly one can be aware of a feeling of familiarity but not of believing the string is grammatical. When a person gives a confidence rating in a classification of a string being grammatical, such a response measures specifically whether the person is aware of believing the string is grammatical, i.e. the conscious status of judgment knowledge. Structural knowledge may or may not be conscious; and feelings of familiarity may or may not be conscious. Thus, one can fail to be aware that one believes the string is grammatical even as one is aware of a degree of familiarity with the string. Understanding such fine gradations in phenomenology is only possible with multiple subjective measures.

Similarly in the visual case, interesting distinctions can occur in conscious phenomenology which can only be revealed by multiple subjective measures, including confidence. As Weiskrantz (1997) found, a person can have conscious judgement knowledge as revealed by having some confidence even in the absence of any visual experience as such (type I vs. type II blindsight). Overgaard, Fehl, Mouridsen, Bergholt, and Cleeremans (2008) provide evidence in favor of such a conclusion, assuming the subject "performed the task exactly as instructed": A blindsight patient who was prone to say she had not consciously seen a stimulus under certain conditions, would say she was aware of a stimulus being there but had no idea what it was.

In summary, the use of confidence ratings, structural knowledge attributions, and ratings of other fringe feelings like familiarity can provide a detailed assessment of the conscious phenomenology of participants in implicit learning experiments, in a similar way as the combination of PAS and confidence ratings can in perception experiments.

References

Dienes, Z., & Seth, A. K. (in press). Measuring any conscious content versus measuring the relevant conscious content: Comment on Sandberg et al. *Consciousness & Cognition*.

Dienes, Z., & Scott, R. B. (2005). Measuring unconscious knowledge: Distinguishing structural knowledge and judgment knowledge. *Psychological Research, 69*(5–6), 338–351.

Overgaard, M., Timmermans, B., Sandberg, K., & Cleeremans, A. (2010). Optimizing subjective measures of consciousness. *Consciousness & Cognition, 19*, 682–684.

Overgaard, M., Fehl, K., Mouridsen, K., Bergholt, B., & Cleeremans, A. (2008). Seeing without seeing? Degraded conscious vision in a blindsight patient. *PLoS ONE, 3*(8), e3028.

Ramsøy, T. Z., & Overgaard, M. (2004). Introspection and subliminal perception. *Phenomenology and the Cognitive Sciences, 3*, 1–23.

Sandberg, K., Timmermans, B., Overgaard, M., & Cleeremans, C. (in press). Measuring consciousness: Is one measure better than the other? *Consciousness & Cognition*.

Scott, R. B., & Dienes, Z. (2010). Knowledge applied to new domains: The unconscious succeeds where the conscious fails. *Consciousness & Cognition, 19*, 391–398.

Scott, R. B., & Dienes, Z. (2008). The conscious, the unconscious, and familiarity. *Journal of Experimental Psychology – Learning Memory and Cognition, 34*(5), 1264–1288.

Wan, L. L., Dienes, Z., & Fu, X. L. (2008). Intentional control based on familiarity in artificial grammar learning. *Consciousness and Cognition, 17*, 1209–1218.

Weiskrantz, L. (1997). *Consciousness lost and found*. Oxford University Press.