How necessary is the unconscious as a predictive, explanatory, or prescriptive construct?

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Abstract: We elucidate the epistemological futility of using concepts such as unconscious thinking in research. Focusing on Newell & Shanks' (N&S's) use of the lens model as a framework, we clarify issues with regard to unconscious-thought theory (UTT) and self-insight studies. We examine these key points: Brunswikian psychology is absent in UTT; research on self-insight did not emerge to explore the unconscious; the accuracy of judgments does not necessitate the unconscious; and the prescriptive claim of UTT is unfounded.

Daryl Bem (1972) foresaw a slippery slope in resorting to unconscious processes as explanatory variables. The point was not to deny that mental activity could occur outside of awareness, but to warn researchers about abandoning sound epistemological practices when explaining phenomena. We add to this a concern about deriving prescriptions from theories that have not been extensively tested; from studies that have not been widely replicated; and from the usage of terms, such as *unconscious*, that have not been consistently defined. In this light, we commend Newell & Shanks (N&S) for their critical review of unconscious influences on decision making and agree with their conclusions. However, we identify areas needing clarification following their use of the lens model (Brunswik 1952; Hammond & Stewart 2001) as an interpretive framework.

Greenwald (1992, p. 775) concluded that unconscious cognition occurs rapidly and is "severely limited in its analytic capability." In contrast, unconscious-thought theory (UTT; Dijksterhuis & Nordgren 2006) assumes a deliberative and temporally extended unconscious that can sift through vast amounts of information to arrive at optimal decisions. UTT experiments, as described by N&S, use a unique multi-attribute evaluation task that presents participants with cue values, sequentially and randomly. We agree with N&S that the evidence supporting the benefits of unconscious thinking is weak. The application of the lens model to research based on UTT, however, is not self-evident. First, N&S identify points within the lens model where *lack of awareness* could take place; however, lack of awareness and UTT's *unconscious processing* do not equate. Second, it is worth adding that UTT is not Brunswikian in spirit. Representative design is absent; most UTT studies use a small set of objects with attributes and their values selected by the experimenters. The cue values are presented in random order across cases in UTT studies, whereas in most judgment situations the unit of information acquisition is organized first by case/object. And in terms of accuracy, UTT uses agreement between judgments and the experimentally defined "best option" rather than by correspondence of judgments with agreed-upon environmental criteria. N&S note that within the lens model, a source of lack of awareness may occur at the weighting of cues stage. We add that this relates to UTT's Principle 4, which claims that unconscious weights the relative importance of attributes in an efficient manner; but the evidence supporting this principle is missing (see González-Vallejo et al. 2008).

From a historical perspective, we note that multiple-cue judgment research did not directly attempt to study unconscious processes, even when considering the topic of self-insight. Hammond (1955) advocated for the use of a quantitative technique to make the judgment process explicit, in the sense of revealing which cues were most influential. The impetus behind this was not rooted in discovering unconscious processes, but simply in the realization that judgments had not been systematically studied and were impacting lives in important domains (e.g., clinical judgments). Because most psychological and physical processes are not easy to verbalize, modern psychological research shifted from relying on verbal reports to using psychometric techniques, and this ensued in judgment research as well. The focus on self-insight evolved from contrasting statistically estimated cue weights with the verbal descriptions of what was important. As N&S show, that agreement is variable, but the goal of the approach was not about understanding unconscious processes but rather about employing statistics to help individuals communicate the basis for their judgments (Hammond & Adelman 1976). More generally, mathematical models of cognition are ubiquitous and use many function forms. The view that individuals may be able to verbalize model parameters, thus showing self-insight, is an interesting but not very useful proposition. Indeed, even if we think mathematical models are about the unconscious, a notion like self-awareness would be unnecessary. We do agree with N&S that the validities of measures of self-insight are questionable, but we add the caveat that both subjective assessments and statistical estimates of parameters depend on a model, so neither has priority over the process they are measuring.

From another perspective, lens model research has yielded a rich body of work (Karelaia & Hogarth 2008). The main results are (a) linear models capture similar and relatively high proportions of variance in environmental outcomes and in human judgments, and (b) judges reach high levels of accuracy when predicting criteria in many domains. Factors that affect accuracy can be safely classified as task/environmental characteristics (see also Stewart et al. 1997). Therefore, on logical grounds, there is little need to resort to unconscious thinking as an explanatory variable of judgments, or as a mechanism for improving accuracy.

Because of Hammond's central role in lens model research, we feel his views on intuition must be mentioned. Cognitive continuum theory (CCT; Hammond 1986; 1996; Hammond et al. 1997) states that both tasks and cognitive processes are located on an intuitive-to-analytic continuum. According to Hammond, most judgment is "quasi-rational," involving a combination of intuition and analysis (Hammond 1996), thus contrasting with dual-process conceptions (Epstein 1994; 2003; Kahneman 2011) and with UTT's first principle of two modes of thought. (We refer the reader to our analysis of this principle in González-Vallejo et al. 2008.) In short, Hammond's notion of quasi-rationality is similar to modern conceptions of cognition. In particular, with the emergence of parallel processing models (e.g., Rumelhart et al. 1986) and more generally connectionist models (Phaf & Wolters 1997), psychologists favor the view that responses reflect a mixture of unconscious and conscious contributions.

We end by revisiting the prescription that complex decisions should be left to unconscious thinking. Many years of research converge on the conclusion that selecting important predictors is best done by experts, but the combination of cues is best left to a statistical tool (Bishop & Trout 2005; Dawes 1979). Imagine a psychiatrist judging the likelihood that a patient will commit suicide; the prescription that she or he should let the unconscious decide is not only wrong, it is also unethical.

Do implicit evaluations reflect unconscious attitudes?

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Abstract: We extend Newell & Shanks' (N&S's) arguments to the question of whether implicit evaluations reflect unconscious attitudes. We argue that correspondence to explicit evaluations fails to meet the criteria of relevance and sensitivity. When awareness is measured adequately and in line with N&S's criteria, there is compelling evidence that people are consciously aware of their implicit evaluations.

Newell & Shanks (N&S) call for a more rigorous study of awareness using reliable, relevant, and sensitive measures that are administered when the relevant mental operation is taking place. In the current commentary, we extend N&S's arguments to implicit evaluations, which can be conceptualized as evaluative responses captured by performance-based measures, such as the Implicit Association Test (Greenwald et al. 1998), evaluative priming (Fazio et al. 1995), and various response interference tasks (for a review, see Gawronski et al. 2011). Implicit evaluations are widely assumed to reflect *unconscious attitudes* that are held outside of awareness (for a review, see Gawronski et al. 2006). Drawing on N&S's conceptual framework, we argue that lack of awareness in the domain of implicit evaluations is inferred from incomplete evidence that does not warrant the conclusion of unawareness.

Characterizations of implicit evaluations as reflecting unconscious attitudes are based on the finding that implicit evaluations typically show rather low correspondence to self-reported explicit evaluations of the same target object (for meta-analyses, see Cameron et al. 2012; Hofmann et al. 2005). However, the conclusion that dissociations between implicit and explicit evaluations indicate unawareness of the former violates N&S's criteria of relevance and sensitivity.

Research and theorizing suggest that encountering an attitude object spontaneously activates evaluative associations in memory (De Houwer 2009; Ferguson & Zayas 2009). Performance-based measures are assumed to capture these associations regardless of whether the person considers them valid. When a person is asked to report an explicit evaluation, activated associations are assessed for their (subjective) validity by propositional processes (Gawronski & Bodenhausen 2006; 2011). To the extent that the evaluation implied by activated associations is consistent with other salient propositions, it is typically regarded as valid and reported on measures of explicit evaluations. However, if the evaluation implied by activated associations is inconsistent with other salient propositions, consistency has to be restored before an explicit evaluation can be reported (Festinger 1957). In such cases, implicit and explicit evaluations often diverge, such that implicit evaluations reflect activated associations regardless of their perceived validity, whereas explicit evaluations reflect activated associations that are regarded as valid (e.g., Gawronski & LeBel 2008; Gawronski & Strack 2004; Gawronski et al. 2008). From this perspective, an explicit evaluation is not a measure of a person's awareness of his or her implicit evaluation. Instead, it reflects the role of propositional processes in assessing the subjective validity of activated associations.

The inference that implicit evaluations reflect unconscious attitudes because they show low correspondence to explicit evaluations thus violates N&S's criteria of relevance and sensitivity. Low correspondence between implicit and explicit evaluations is not relevant for awareness of implicit evaluations, because explicit evaluations may differ from implicit evaluations for reasons other than lack of awareness. Moreover, low correspondence is not sensitive, because measures of explicit evaluation do not ask participants to merely report their evaluative associations, but to report the evaluative associations that they regard as valid.

To overcome these limitations, we have recently started a research project in which we asked participants to predict their implicit evaluations of multiple target groups before completing corresponding measures of implicit evaluation (Hahn et al., in press). We argue that predictions of implicit evaluations are both more relevant and more sensitive for inferences about awareness than correspondence to explicit evaluations. Predictions are more relevant, because they rule out cognitive inconsistency as a potential cause of diverging explicit evaluations. Moreover, predictions are more sensitive, because they directly capture participants' ability to report their implicit evaluations (e.g., "If we ran a computerized test, what would it show?") rather than evaluations that they perceive as valid (e.g., "How much do you agree with the statement that group X is likeable?"). Our studies consistently showed that participants were highly successful in predicting their implicit evaluations, even in cases where they reported distinct explicit evaluations. In line with previous findings (e.g., Blair 2001; Hofmann et al. 2005; Nosek 2005), implicit and explicit evaluations revealed correlations around 0.20. In contrast, participants' predictions showed mean correlations with implicit evaluations higher than 0.50 and median correlations of around 0.65.

Our research also led to some additional discoveries that highlight the benefits of studying awareness more rigorously. For example, high levels of accuracy in predicting implicit evaluations were found primarily when accuracy was determined within subjects (i.e., rank order of evaluations of different target groups for each participant). However, when accuracy was determined between subjects (i.e., rank order of evaluations of the same target group across participants), prediction accuracy was lower. In other words, although participants were able to predict their implicit evaluation of a given target group vis-à-vis other target groups (within-subjects analysis), their predictions were less accurate for identifying their implicit evaluations of a given target group vis-à-vis other participants (between-subjects analysis). Interestingly, participants also predicted lower levels of implicit evaluative bias against outgroups for themselves than for other participants. These findings suggest that, although people are aware of the evaluative quality of their implicit evaluations, they may not be aware of how their implicit evaluations compare to those of other people. That is, people seem to be aware of some aspects of their implicit evaluations (e.g., the fact that they hold more biased implicit evaluations against some groups than others) but not others (e.g., whether these biases are stronger than those of other people), and studying these two "kinds" of awareness requires different methods (i.e., within-subjects analysis vs. between-subjects analysis). Thus, rather than treating awareness as an all-or-none issue, our findings highlight the importance of more fine-grained analyses when studying conscious awareness.

In sum, we agree with N&S's concern that unawareness of psychological processes is often inferred from insufficient evidence. We argue that inferences of unawareness from dissociations between implicit and explicit evaluations violate the criteria of relevance and sensitivity. Research using more adequate measures indicates that implicit evaluations can be predicted with accuracy, suggesting that implicit evaluations do not reflect unconscious attitudes.

But what if the default is defaulting?

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Abstract: We critically consider the default view of consciousness and decision making, and we explore the implications of this view to the authors' argument. We therefore call for rigorous collection of data regarding the role of consciousness in decisions. We also propose that