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Implicit Knowledge as Automatic, Latent Knowledge

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Abstract

Implicit knowledge is perhaps better understood as latent knowledge so that it is readily apparent that it contrasts with explicit knowledge in terms of the *form* of the knowledge representation, rather than by definition in terms of consciousness or awareness. We argue that as a practical matter any definition of the distinction between implicit and explicit knowledge further involves the notion of control.

One advantage of the natural language meaning of the implicit-explicit distinction as applied to knowledge representations is that it provides a principled explanation for why the implicit is so quiet: it contrasts with the explicit by being in a *form* that cannot be expressed. Thus, rather than "unconsciousness" being a defining (and then yet to be explained) characteristic of implicit knowledge—as in "implicit knowledge is just like explicit knowledge, except it's quiet"—the "unconsciousness" associated with the implicit is a consequence of this indirect representation (see O'Brien & Opie, in press, and their similar distinction between "vehicle" and "process" theories of consciousness). But perhaps a better term than implicit knowledge to capture this meaning of indirect representation would be *latent* knowledge, in the natural language sense of hidden and unappreciated. Such knowledge is not merely *implied* (and, thereby, completely without effect until made predicate explicit) by other *explicit* representations, as in Dienes and Perner's bachelor and King of France examples, but rather is indirectly represented because it is distributed over the network of semantic and other (e.g., instance or episodic) data-bases. Implicit knowledge as latent knowledge accurately describes the representation resulting from Dienes and Perner's preferred mechanism of first-order neural networks for the acquisition, retention, and use of implicit knowledge (cf. O'Brien & Opie, in press); it also accords well with the remarkable demonstrations of such knowledge in the large-scale, autoassociative networks of the Latent Semantic Analysis (LSA) models of Landauer and his colleagues (e.g., Landauer & Dumais, 1997; Laham, 1997).

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Implicit knowledge as latent knowledge also accounts for the attraction of instance (or exemplar or episodic) models as explanations for implicit learning, as in Brooks' (1978) early memory-for-instances account of Reber's (1967, 1969, 1976) original claims for implicit abstraction of structure in artificial grammar learning. Because the categorical structure is latent in the distribution of instances, learners will behave in a structured manner even though they are responding only to the memory for individual instances. As with Dienes and Perner's theory, the knowledge of structure is implicit in instance accounts of implicit learning because it is not directly represented (see also Vokey & Brooks, 1992; Whittlesea & Dorken, 1993).

Dienes and Perner's approach emphasises both implicit and explicit knowledge in the positive sense, but in many of the example domains they discuss, especially artificial grammar learning and context-specific item recognition, an important role for latent knowledge may be to support coming to know in the negative sense (i.e., that something is *not*, for example, a member of a category or a previously studied training list): recognising, for example, *only* at a test of face recognition that a test face from a particular minority group (e.g., moustache wearers) could not be a target item because there were no members of that group in the study set, or detecting correctly *only* at test that a test letter string is nongrammatical because it begins with an "X" and none of the grammatical training items did. Because of the possibly infinite number of dimensions of difference between set and non-set members, it would be absurd to suppose that all such dimensions were precomputed and directly or explicitly represented prior to the test. We believe that this test-cued *detection of novelty* plays a major, but unappreciated role in many implicit learning tasks that have focussed principally on hits, rather than on the control of false-alarms (see Brooks, Vokey, & Higham, 1997; Higham & Brooks, 1997; Higham, Vokey, & Pritchard, in press; Vokey & Brooks, 1994; Vokey & Read, 1995; Wright & Burton, 1995).

Dienes and Perner acknowledge that direct or explicit representation in their theory (i.e., predication explicitness) *by itself* does not *neccessitate* conscious access to or awareness of the knowledge so represented (i.e., what they refer to as "attitude explicitness"). As noted, it is also the case in their theory that unconsciousness is a consequence and not a defining characteristic of implicit (latent) knowledge. Thus, as they note in their conclusion (section 5), the conscious–unconscious distinction is *at best* only imperfectly correlated with the implicit–explicit distinction. It is surprising, then, that they are willing to put so much weight on such evidence as accuracy–confidence correlations, and the "guessing criterion" as diagnostic, especially of implicit knowledge. At best, such evidence implies that the learner has some attitude explicit knowledge. Such correlations do *not*, however, imply that the knowledge responsible for the residual behaviour is necessarily implicit, anymore than they imply that the explicit knowledge is necessarily responsible for the behaviour with which it is correlated; *inter alia* such correlated explicit knowledge could often occur as a consequence of the operation of implicit knowledge, as in our examples of coming to know what something is not, or may be present but not the functional source as in, for example, Allen and Brooks (1991) in which participants given a simple, explicit rule for categorisation still responded to the specific similarity of the exemplars.

The key concern is that demonstrations such as accuracy-confidence correlations or the "guessing criterion" rely on some form of dissociation logic. As the last 30 years of research on implicit learning has indicated, critics of implicit learning rarely find such demonstrations convincing. For these reasons we have argued recently (Higham et al., in press; Higham & Vokey, 1999) that a more useful definition of the distinction between implicit and explicit knowledge involves the notion of *control*, and a research paradigm that relies on opposition logic based on control (e.g.,

Jacoby, 1991), rather than on dissociation logic based on some measure of explicitness (e.g., verbal report). That is, to be useful, the implicit–explicit distinction must track the automatic–controlled distinction, simply as a practical matter for investigation, if not on logical grounds.

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