CHAPTER 12

Consciousness and the Limits of Language: You Can't Always Say What You Think or Think What You Say

Jonathan W. Schooler
Stephen M. Fiore
University of Pittsburgh

Language has a rather odd relation with consciousness. On the one hand, many aspects of conscious experience cannot be adequately conveyed in words: the smell of a flower, the appearance of a face, the taste of a fine wine. Despite such inherent limitations, language nevertheless represents the primary tool that we have for demarcating conscious experience. Indeed, verbal *reportability* is the standard criterion for determining whether an event/process was consciously experienced. The verbal report criterion is unquestionably of great value in investigations of consciousness; however, trouble may ensue when verbal reports and conscious awareness are treated as identities. This chapter reviews usage of the reportability criterion and then explores the possible clarifications and implications that follow when subjective awareness and content reportability are distinguished.

The tension between reportability and consciousness is exhibited in this volume's section on implicit learning. For example, Lewicki, Czyzewska, and Hill (chapter 9, this volume) recognize the possible discrepancy between reportability and consciousness, but then dismiss it, observing that "the inability to articulate . . . [implicitly learned] knowledge represents not merely a difficulty with verbalizing (i.e., 'putting into words') something that a person intuitively 'knows' or 'feels,' but rather a fundamental lack of access to the content (meaning) of the relevant rules and principles" (p. 161).

Reber (chapter 8, this volume) takes a slightly more tenuous position with respect to the relation between reportability, consciousness, and the implicit learning task. Reber acknowledges the limitations of the reportability crite-

J.C. Cohen and J.W. Schooler (Eds.) (1997) *Scientific Approaches to Consciousness* (pp.241-256). Hillsdale, NJ: Lawrence Erlbaum.

rion as a measure of consciousness, noting that individuals who are unable to report recently acquired knowledge when simply asked are able to report some aspects of this knowledge under more sophisticated questioning conditions. The slippery relation between verbalizability and consciousness leads Reber to suggest that "the verbalizability criterion is a red herring—a small odoriferous cousin to the sardine that when dragged across one's path, disturbs the scent and diverts one's attention away from the main issues" (p. 141). Although Reber recognizes the limitations of the verbalizability criterion, he nevertheless emphasizes its importance suggesting that the "proper approach is to use an individual's relative inability to provide verbal description of mental content as a kind of 'common sense' marker for increasing the likelihood that implicit processes are present" (p. 146).

Dulany (chapter 10, this volume) also recognizes the potential distinction between reportability and consciousness, however he deals with their potential discrepancy by suggesting that mental episodes may be reportable or nonreportable but, either way, should be viewed as being conscious. Dulany characterizes reportable memories as "deliberative mental episodes," which are made up of propositional contents—"a belief *that* ____" (p. 182)—consisting of more effortful operations such as decision and judgment. These deliberative episodes are contrasted with nonreportable memories that he describes as "evocative mental episodes," which are less effortful and are made up of contents that are "nonpropositional, nonpredicational—a sense *of* ____" (p. 185). Although these nonpropositional episodes may be difficult to articulate, Dulany nevertheless views them as corresponding to conscious experiences, arguing that tasks frequently described as nonconscious (e.g., implicit learning tasks) might be better thought of as relying on "the establishment and use of evocative relations among nonpropositional but fully conscious contents" (p. 189).

In short, the aforementioned authors all grapple with the potential discrepancy between reportability and consciousness, but in the end resolve these differences in rather different ways. Lewicki et al. acknowledge the possible distinction and then dismiss it, arguing that the type of knowledge they discuss is neither conscious nor reportable. Reber concedes that reportability is not a perfect criterion of consciousness but nevertheless argues that it provides a reasonable, albeit imperfect, marker of consciousness. Finally, Dulany uses the distinction between reportability and consciousness in order to discount studies that use reportability as a criterion for implicit knowledge, arguing that such knowledge, though not reportable, is still conscious.

THE AWARE$_1$/AWARE$_2$ DISTINCTION

One possible way to reconcile the potential discrepancies between reportability and consciousness is to draw on Dennett's (1969/1986) aware$_1$/aware$_2$

distinction. Dennett distinguished two different levels of awareness for a given proposition p at time t. "1) [An individual] A is aware$_1$ that p at time t if and only if p is the content of the input state to A's 'speech center' at time t; 2) A is aware$_2$ that p at time t if and only if p is the content of an internal event in A that is effective in directing current behavior" (Dennett, 1969/1986, pp. 118–119). In short, awareness$_1$ corresponds to internal events that can be reported, whereas awareness$_2$ corresponds to nonreportable internal events that nevertheless influence behavior. To flesh out this distinction, Dennett used the example of a driver traversing a familiar route while holding a conversation. In such a case, the driver would likely have an awareness$_1$ of the conversation as reflected in what was occupying his verbal reports or "speech center." However, he would have an awareness$_2$ of the curves of the road, in the sense that his driving behavior responded to the intricacies of the road and the traffic along the route. Yet, if asked what he could remember about the physical drive, he might respond "Nothing since the route was familiar and I was engrossed in my conversation" (Dennett, 1969/1986, p. 116).

The distinction between awareness$_1$ and awareness$_2$ can be applied to a variety of psychological phenomena that bear on the issue of consciousness. Bower (1990) borrowed Dennett's distinction to illustrate the relation between awareness$_1$ and awareness$_2$ with many different cognitive phenomena. For example, Bower suggested that subjects who are tachistoscopically presented the letter matrices used in the Sperling paradigm (1960) are "aware$_2$ immediately of nearly all of the letters in the display despite their inability to name all of them (in the sense of aware$_1$)" (Bower, 1990, p. 211). Other paradigms Bower saw as illustrating the awareness$_1$/awareness$_2$ distinction include: *subliminal perception* paradigms in which unreportable (no awareness$_1$) words nevertheless influence forced choice recognition behavior (awareness$_2$); *blind sight studies* in which patients with damage to the right occipital lobe report no awareness of the left visual field (awareness$_1$) yet are above chance on forced choice recognition at identifying pictures presented to that field (awareness$_2$); *hypnotically induced blindness studies* in which subjects instructed to behave as if they were functionally blind report no subjective experience of seeing flashed pictures (no awareness$_1$) yet perform below chance on recognition tests (indicating awareness$_2$); and, finally, *split-brain studies* in which commissurotomy patients can verbally identify objects presented to the right visual field indicating awareness$_1$ for the left hemisphere. However, in the latter case when objects are presented to the left visual field, patients are unable to report the object, but can still correctly point to the object, which indicates awareness$_2$ for the right hemisphere.

By explicitly distinguishing between reportable versus nonreportable forms of awareness the awareness$_1$/awareness$_2$ distinction begins to dis-ambiguate the murky relation between reportability and consciousness. However, this

distinction still lumps together situations that phenomenologically seem quite different. Specifically, the aware$_1$/aware$_2$ distinction fails to differentiate between behavioral influences that are conscious but not reportable and those that are neither conscious nor reportable. Bower (1990) acknowledged the potential subjective awareness associated with awareness$_2$: "A person may notice and be aware of a face or abstract painting and be able to subsequently select that face or abstract painting from a lineup. Yet he might be unable to describe accurately the face or painting in sufficient detail so that any other person could pick it out" (p. 212). This "minor indeterminacy with Dennett's distinction" notwithstanding, Bower nevertheless goes on to suggest that "by unconscious processes we refer to bodily and psychological events of which we are not aware$_1$" (p. 212).

In our view, the distinction between conscious experiences that cannot be reported versus entirely nonconscious experiences is not a minor glitch that can be acknowledged and then dismissed—rather it gets right to the core of some of the central issues surrounding consciousness. For example, our views of preverbal children seem fundamentally different depending on whether we consider their consciousness to correspond more closely to the awareness that we have for a face that we cannot describe or the awareness that a brain-damaged patient has for his blind field of view. Similarly, anyone who has seen a briefly presented visual array vanish before its contents could be reported knows that this phenomenological experience is quite different from that associated with a subliminally presented word. In short, although the awareness$_1$/awareness$_2$ distinction succeeds in demonstrating the value of using reportability to distinguish between different types of awareness, it fails to consider one critical dimension—individuals' phenomenological experience.

PUTTING CONSCIOUSNESS BACK INTO DEFINITIONS OF CONSCIOUSNESS

Although it might seem self-evident that individuals' perceptions about whether they were aware of an event would be part of our definition of conscious experience, such reports are often treated with skepticism. The major problem associated with including phenomenology in a definition of consciousness is that it assumes a shared agreement about what constitutes a conscious experience—a matter of some issue. Dennett (1991), for example, concluded that "controversy and contradiction bedevil the claims made under these conditions of polite mutual agreement" (p. 67). Ultimately, it must be conceded that the qualia of conscious experience eludes scientific scrutiny: We cannot ascertain the congruence between different individuals' experience of consciousness, anymore than we can tell the degree to which the color blue elicits the same subjective sensation across individuals. The intrinsic ambiguity

associated with individuals' subjective reports of their conscious experiences might seem to make such reports entirely uninformative. However, before dismissing subjective reports altogether, two issues should be considered: Do subjects phenomenological reports about their perceived awareness of an experience provide reliable indices that correspond to other measurable cognitive processes? And, if so, can subjects phenomenological reports of awareness be reliably distinguished from their verbal reports about the contents of an experience?

THE VALIDITY OF SUBJECTIVE REPORTS AS A CRITERION FOR CONSCIOUSNESS

Although it may be impossible to know with certainty the true correspondence between different individuals' experience of what they are willing to categorize as "conscious," it is nevertheless possible that such categorization may still be informative. By analogy, even though we cannot know the degree to which two individuals share the same phenomenological experience (qualia) when viewing the color blue, we can still learn a great deal by asking them to report what color they see. And, although there may be some differences in their reports (particularly for nonfocal colors), we nevertheless will find that their reports systematically covary with other variables in a consistent manner (e.g., the responses elicited when pigments labeled blue are mixed with pigments that reflect other wavelengths of light). In a similar manner, we may find that although not privy to individual subjects' qualia of consciousness, we nevertheless observe that subjects' self-reports of consciousness are both reliable and correspond in meaningful ways to other variables. Indeed, although paradigms that rely on subjects' phenomenological reports of awareness are relatively rare, we consider two such paradigms that systematically produce meaningful results consistent with what one would expect if, in fact, subjective reports were measuring conscious experience.

The Know/Remember Distinction

Tulving's (1985) know versus remember paradigm is a cogent example of the effectiveness of using subjective reports as the criterion for judging awareness. In this paradigm, explored by Rajaram and Roediger (chapter 11, this volume; see also Jacoby, Yonelinas, & Jennings, chapter 2, this volume), subjects study a list of words under various conditions, and then are later given a test in which they first decide whether a given word is "old" or "new." If the word is judged "old," they then make a further subjective judgment about whether or not they became "consciously aware again of some aspect or aspects of what happened or what was experienced at the time the word was pre-

sented" (Rajaram & Roediger, chapter 11, this volume, p. 216). Under these conditions they are instructed to provide a remember response when they are aware of the context in which the item was learned, and a know response when they "cannot consciously recollect anything about its actual occurrence or what happened or what was experienced at the time of its occurrence."

Although know/remember judgments rely entirely on subjective assessments of conscious states, they nevertheless provide a generally consistent and stable pattern of findings that interact in predictable ways with various cognitive and individual difference variables. For example, Rajaram and Roediger observed that know judgments interact with manipulations typically associated with implicit (unconscious) memory effects. They found that performance on know judgments can be characterized in terms of the influence of perceptual fluency—a construct typically used to account for performance on implicit memory tasks such as word-fragment completion. In contrast, they find that performance on remember judgments can be characterized in terms of the influence of distinctiveness—a construct primarily associated with conscious memory tasks such as recall. Similarly, Jacoby et al. (chapter 2, this volume) observed that know/remember judgments can lead to estimates of conscious and unconscious processes that closely correspond to estimates garnered from more objective procedures, such as comparing fragment completion performance when subjects are given inclusion instructions (use previously seen words) versus exclusion instructions (do not use previously seen words). Thus, although know/remember judgments rely entirely on subjective judgments of awareness, they nevertheless converge with other measures, suggesting that they provide a useful metric for assessing conscious states.

Subjective Perceptual Thresholds

The value of subjective reports of conscious awareness has also been illustrated with research investigating the impact of very briefly presented and then masked visual stimuli—what is commonly, although somewhat controversially, referred to as subliminal perception. For example, Merikle and Cheesman (1986) distinguished between "the subjective threshold, [which is] the level of discriminative responding at which observers claim not to be able to detect perceptual information at better than a chance level of performance, and the objective threshold, [which is] the level of discriminative responding corresponding to chance level performance" (p. 42). Merikle and Cheesman readily conceded that the subjective threshold, in effect, "transfers responsibility of defining awareness to an observer" (p. 42), thereby producing the clear need for providing converging evidence that such a transfer of responsibility is appropriate. And they find such evidence. For example, using a Stroop priming task, Cheesman and Merikle (1986) observed that, when primes are presented below the subjective threshold of awareness, there is evidence of automatic processing of the prime but no evidence of strategic processing. In contrast, when primes are presented above the subjective threshold, subjects performance is qualitatively different, leading to an actual reversal of the standard Stroop effect. This would be expected if subjects are taking advantage of strategies that could be derived from an awareness of the frequency of different types of primes. More recently, Merikle and Joordens (chapter 6, this volume) report that a very similar pattern of results is observed when threshold durations are determined using Jacoby's method of opposition (cf. Jacoby, Yonelinas, & Jennings, chapter 2, this volume) in which subjects performance is compared when they are instructed to complete word fragments, often corresponding to the briefly presented words, under either inclusion ("use the target") or exclusion ("do not use the target") instructions.

In short, both know/remember and subjective perceptual threshold judgments interact with independent variables in a manner that would be expected if they did, in fact, correspond to a criterion for consciousness, and they both provide estimates of unconscious processes that resemble those garnered through other techniques. This converging evidence for the validity of subjective reports of consciousness suggests that the construct of reported awareness is a reasonable one. This is not to say that reported subjective awareness is a flawless measure of consciousness. Indeed, as is discussed later, it is likely that there may be some grey area around precisely where individuals draw the line. It is also likely that there may be alternative ways of assessing subjective awareness (such as Jacoby's method of opposition) that may be more precise than self-reports. Our point here is simply that subjective awareness, as measured by self-reports or superior techniques if available, is a meaningful and measurable construct. It is therefore appropriate to ask whether subjective awareness corresponds to the variable most often used as the metric for consciousness: the ability to report the contents of the cognitive event in question.

CONTENT REPORTABILITY VERSUS SUBJECTIVE AWARENESS

We propose that discussions of consciousness may be facilitated if a distinction is made between two types of reports that can be made about a cognitive event:[1] *Subjective awareness* corresponding to subjects' phenomenological

[1]Discussions of consciousness are complicated by the fact that there are various types of information of which an individual might be conscious, including external events, mental processes, mental states, acquired knowledge, and so on. Dennett (1969/1986) and Bower (1990) approached this ambiguity by considering them all subsumed by the notion of "propositions." However, the concept of propositions is laden with implications as well, as demonstrated by Dulany's suggestion (chapter 10, this volume) that evocative remembering is nonpropositional. We there-

judgment of whether or not they believe the cognitive event occurred, and *content reportability*, corresponding to subjects' ability to report the contents of the cognitive event. Our claim is that these two criteria are not simply different levels along a single dimension. Rather, we suggest that subjective awareness and content reportability correspond to fundamentally different psychological dimensions. We base this claim on the observation that these two dimensions are fully dissociable; that is, although there are many cases in which both subjective awareness and content reportability are commensurate, there are also cases in which the two diverge. For example, it is possible to have subjective awareness but lack the ability to report the contents of that awareness. It is even possible to report an absence of subjective awareness and yet, when encouraged, accurately describe the contents of a subjectively nonexistent cognitive event. In other words, the distinction between subjective awareness and content reportability suggests that we should be able to create a 2 × 2 (subjectively aware/not aware × content reportable/content nonreportable) matrix and find instances of situations that apply to each hypothetical cell. Figure 12.1 presents such a grid along with potential candidates for each cell.

Although there is considerable debate regarding precisely what belongs in the two commensurate cells, that is, subjectively aware/reportable versus subjectively unaware/nonreportable (for examples of such debates see the contrasting views offered by Dulany [chapter 10, this volume] vs. Lewicki, Czyzewska, & Hill [chapter 9, this volume] and Reber [chapter 8, this volume]; Ericsson & Simon, 1994, vs. Nisbett & Wilson, 1977; Fowler, 1986, vs. Holender, 1986), the existence of these two cells is relatively noncontroversial, and therefore requires no more discussion here. However, because our distinction relies fundamentally on the existence of situations corresponding to the incommensurate cases—that is, subjectively aware without content reportability and content reportability without subjective awareness—we focus on these cases.

Subjectively Aware/Content Nonreportable

As noted at the outset of our discussion, there are many subjectively conscious experiences that we are nevertheless unable to translate into words. For most of us, it is virtually impossible to convey anything but the bare rudiments of many complex sensory experiences (such as the appearance of a face, the taste of a fine wine, or the sound of a piece of music). Despite our inability to convey the contents of such experiences, we nevertheless are quite likely to

fore use the term *cognitive event* to correspond to the class of mental activities of which an individual might in principle be conscious (e.g., the perception of a stimulus, the formation or appli- [illegible] the recollection of an event, associations, etc.). The contents of cognitions are

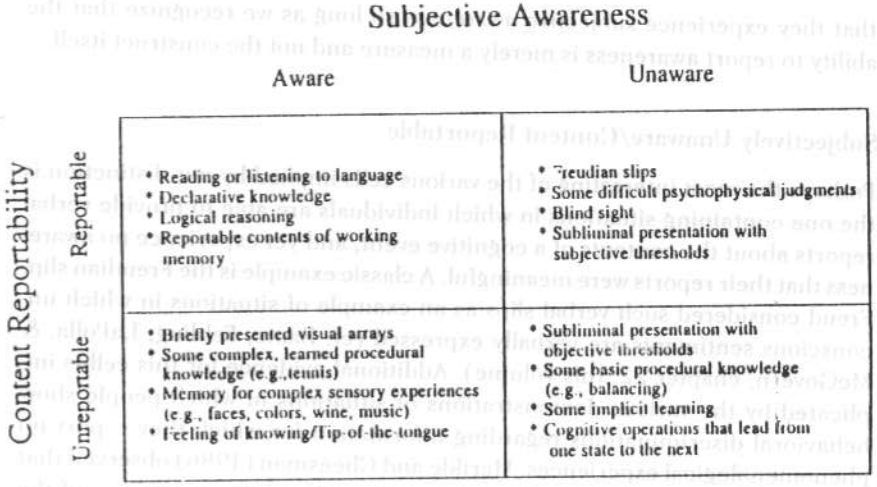

FIG 12.1. Matrix distinguishing subjective awareness and content reportability.

report that we were vividly aware of them. In addition to sensory experiences, there are a variety of other cognitive events that would fit into this category. For example, as discussed earlier, there is the Sperling paradigm (1960) in which, even though subjects can only report a fraction of the total items seen in a briefly presented array, they nevertheless reveal a brief awareness of all of the items, as indicated by their near-perfect performance when queried about a randomly selected subportion of the array. Some procedural knowledge, particularly for visual motor skills, may also fit in this cell. In complex learned procedures such as tennis, individuals may be aware of, and use, rather sophisticated knowledge that they are nevertheless unable to articulate—except perhaps by watching themselves engage in the activity. Other examples of situations in which individuals have an awareness of knowledge they eannot fully articulate include "tip-of-the-tongue" experiences (e.g., Brown & McNeill, 1966), intuitive hunches (Bowers, Regehr, Balthazard, & Parker, 1990), affective judgments (e.g., Nisbett & Wilson, 1977; Wilson, chapter 15, this volume), and grammatical judgments (Reber, chapter 8, this volume).

We might also speculate that the cognitive processes of preverbal children and, at least, some animals fit in this category. Such a claim requires a bit of extrapolation because preverbal children and animals cannot report that they are conscious of experiences they are unable to put into words. Indeed, even if they have a phenomenological experience that corresponds to our experience of subjective awareness, they likely lack not just the words for it, but also the self-reflection processes necessary to possess a concept of subjective awareness (cf. Hobson, chapter 19; Johnson & Reeder, chapter 13; Kihlstrom, chapter 24; this volume). Nevertheless, this need not rule out the possibility

that they experience subjective awareness so long as we recognize that the ability to report awareness is merely a measure and not the construct itself.

Subjectively Unaware/Content Reportable

Perhaps the most interesting of the various cells implied by our distinction is the one containing situations in which individuals are able to provide verbal reports about the contents of a cognitive event, and yet experience no awareness that their reports were meaningful. A classic example is the Freudian slip. Freud considered such verbal slips as an example of situations in which unconscious sentiments are verbally expressed (cf. Baars, Fehling, LaPolla, & McGovern, chapter 22, this volume). Additional evidence for this cell is implicated by the various demonstrations of situations in which people show behavioral discriminations regarding information for which they report no phenomenological experiences. Merikle and Cheesman (1986) observed that "in difficult detection tasks subjects often claim that they are unaware of the perceptual information, even though their objective detection performance may indicate a considerable ability to respond discriminatively to the stimuli" (p. 42). Many of Bower's (1990) examples of awareness$_2$ without awareness$_1$ (e.g., subliminal priming, blind sight, hypnotic forgetting, and the performance of commissurotomy patients) fit this category. As applied to the awareness$_1$ (verbal reportability) versus awareness$_2$ (behaviorally evidenced) distinction, the fact that these instances correspond to situations in which knowledge is manifested behaviorally, but not reported verbaliy, is a critical point. However, in our view, the fact that individuals did not report their responses verbally is of little consequence. Indeed, in standard cognitive procedures, behavioral responses such as pressing yes or no on a response key is typically considered a proxy for an actual verbal report. Thus, we view the behavioral responses elicited in subliminal priming and blind sight, as evidence of content reportability without subjective awareness.

Even if one specifically requires verbal reportability as the criterion, evidence can be found to support this category. For example, using a psychophysical judgment paradigm in combination with confidence estimates, Adams (1957) observed that subjects showed better than chance discriminations on judgments rated as guesses. As Fowler (1986) observed, interpreting Adams' finding using the verbalizability criterion for consciousness leads to a rather problematic situation: "Because the psychophysical judgments were made verbally the experimental outcome must be classified as showing discrimination with awareness even though the classification is in conflict with the subject's own (also verbal) assessment" (p. 34).

There is also evidence that individuals who are unaware of seeing a stimulus, can provide more than simple verbal yes/no reports—they can actually identify the stimulus! For example, Sidis (1898) showed subjects printed digits or letters at a distance at which the subjects reported seeing at most a dim black spot. Many even reported that "they might as well shut their eyes and guess" (Sidis, 1898, p. 17). Nevertheless, these subjects were well above chance at verbally guessing the characters.

Individuals' ability to verbally report stimuli that they are unaware of having perceived extends beyond the ability to simply name visual symbols. In a recent demonstration study, we found that individuals are capable of naming briefly flashed words that they were unaware of having seen. Subjects viewed words and nonwords for 32 ms followed by a mask of ampersands. After each presentation, subjects indicated whether or not they believed that a word was presented. Regardless of their previous answer, we then asked them to "Name any word that might have been presented."

Our logic was that a response of "nonword" indicated that the subject did not have a phenomenological experience of seeing a word. Of course, they may have been aware that something was presented, but a judgment of nonword clearly indicates they were subjectively unaware that a word had appeared. In fact, this was probably a conservative measure of phenomenological awareness in that, even when subjects are not subjectively aware, they still would be expected to perform above chance on discriminating words from nonwords (e.g., Cheesman & Merikle, 1986). We expected that subjects who indicated they were not aware that a word was presented would still, at least sometimes, be able to report it accurately. Consequently, our main interest centered on the trials where subjects were presented with a word they believed to be a nonword. Consistent with our predictions, on trials in which subjects indicated that they did not see a word, they nevertheless demonstrated a mean accuracy rate of 18% on their word identification, with individual performance ranging as high as 50%! From our perspective, this finding is just another example of the many previously mentioned situations in which individuals behaviorally reveal knowledge of information of which they are not subjectively aware. The only difference is that, in this case, the behavior is a verbal report. In short, the ability to verbally report the contents of a cognitive event does not mean that event was consciously experienced.

REFINING THE DISTINCTION

The aforementioned discussion suggests that content reportability and subjective awareness, although often co-occurring, do not necessarily go hand in hand. The fact that, across tasks, we can find double dissociations between the two constructs (i.e., situations in which subjective awareness exceeds the ability to report the contents of that awareness, and situations in which content reportability occurs in the absence of subjective awareness) indicates that they are not simply two different points on some single dimension. Rather,

content reportability and subjective awareness appear to be distinct constructs, which although frequently overlapping, must be considered separately.

Thus far we have only provided a bare-bones existence proof for the value of the content reportability/subjective awareness distinction, and in so doing have glossed over a number of issues. Given the complexity and marked divergence of opinions on the topic, it seems unlikely that we will be able to alleviate all of the potential concerns that our distinction may raise. Nevertheless, brief consideration of three particularly salient issues, while complicating the picture a bit, helps to further illustrate the distinction's value and indicates some of its other research implications.

Process Versus End Product

Although we have tried to identify some prototypical tasks to illustrate our 2 × 2 classification scheme, we do not mean to suggest that all psychological tasks neatly fit into one cell or another. Most tasks involve multiple components that may be differentially classified. For example, in characterizing what individuals can report about their task performance, it is often important to distinguish between the end product (i.e., the final conclusion, judgment, or solution) versus the process (i.e., the manner in which that end product was reached). Often an individual may be able to report the end product, and yet be unable to provide much information regarding the steps that led to its formulation (cf. Nisbett & Wilson, 1977). Consider, for example, insight problem solving in which the solution to a problem suddenly pops to mind. Correct insight solutions are readily reportable, yet individuals are often unable to report anything about the steps leading up to successful insights (e.g., Schooler & Melcher, 1995). In contrast, for logical problem solving, individuals are able to report both the specific steps used to solve the problem and the problem solution (Schooler & Melcher, 1995).

The know/remember paradigm corresponds to another situation in which the process versus end product distinction applies. In this paradigm, the end product (whether the word is categorized as "old" or "new") is both conscious and reportable. However, the process (how that conclusion is reached) can vary in both reportability and awareness. For remember responses, individuals are able to report, and are presumably aware of, at least something about the basis for their recognition decisions (i.e., they recall the context, etc.). However, in the case of know judgments, subjects are unable to report any specifics regarding the basis for their decisions, yet they do report an indescribable feeling of familiarity, suggesting that at least a component of the recognition decision process may be conscious, even though it is not reportable.

Implicit learning tasks also reveal this differential reportability of process versus end product, although discussions of implicit learning sometimes overlook this distinction. For example, Shanks and St. John (in press) suggested

that subjects' ability in a sequence learning task to predict the next location of an event indicates some awareness of the manner in which the prediction was made. However, the ability to formulate predictions does not require an awareness of the processes that led to those predictions. As Reber (chapter 8, this volume) notes, "Knowing explicitly where a stimulus will occur is certainly not the same thing as explicitly knowing the underlying rule that determines its location" (p. 143).

Continuous Dimensions

A second refinement to our 2 × 2 matrix is that, although we have depicted consciousness and reportability as discrete categories, in fact, both are probably better characterized as continuous dimensions. The notion that consciousness lies on a continuum is well embedded in the phenomenological terms that we use to describe conscious experiences. For example, we describe some events as being in the "center of attention" whereas we may be only "dimly aware" of other events. Similarly, we can refer to some ideas as "foremost in my thoughts," whereas others may linger in "the back of my mind." James (1890) referred to those aspects of consciousness of which we are only dimly aware as the "fringe" and included in this category such experiences as feelings of familiarity, feeling of knowing, the tip-of-the-tongue phenomena, intentions to speak, expectancies, and feelings of being on the right track. (See Farah, O'Reilly, & Vecera, chapter 17, this volume; Galin, 1995; Jackendoff, 1987; Johnson & Reeder, chapter 13, this volume; Kinsbourne, chapter 16, this volume; Mangan, 1991; Reber, chapter 8, this volume, for additional discussions of the continuous nature of consciousness.)

The reportability of experiences also can be characterized as a continuum. The continuous quality of the reportability dimension is particularly apparent when we consider experiences that we have classified in the conscious/nonreportable cell. Strictly speaking, most of these experiences are not entirely nonreportable. For example, we can usually describe some aspects of a memory for a face, or a taste even though we cannot entirely capture it in words. Sometimes we can do a better job of describing such experiences than others, depending on our relative verbal versus perceptual proficiency. As a result, the discrepancy between the reportability and awareness dimensions may vary as a function of individuals' relative expertise. For example, in the domain of face recognition, there is a marked discrepancy between individuals' ability to consciously remember a face (as measured by recognition) versus verbally describe it (as revealed by whether judges can use the description alone to identify the face). Nevertheless, the magnitude of this discrepancy is greater for same race faces than other race faces, presumably because the greater perceptual expertise associated with same race faces is not associated with a commensurately greater verbal expertise (Fallshore & Schooler, 1995). The

distinction between the relative degrees of an individuals' ability to remember versus describe a sensory experience highlights the fact that, although both consciousness and reportability are continuous, they nevertheless correspond to different continua.

Reportable Versus Reported: The Effects of Verbalization

The potential discrepancies between the continuums associated with reportability versus awareness lead to yet another clarification of our 2 × 2 table: the distinction between the degree to which a cognitive event is potentially *reportable* versus whether it was actually *reported*. Although the reportability of a cognitive event may lie on a continuum, whether or not it has been reported corresponds to discrete states (reported vs. unreported). Moreover, the act of verbal report can fundamentally influence subjects' awareness of the cognitive event—crystallizing what was articulated and overshadowing the more hazy components that were not (cf. Koestler, 1964).

Evidence for the "crystallizing" effects of reporting comes from a number of studies examining the effects of verbalization on ambiguous stimuli. For example, Brandimonte and Gerbino (1993) observed that verbalizing the appearance of ambiguous forms (e.g., reversible images) interferes with the ability to discover a form's alternative interpretation. Similarly, we have found that insight problem solving, which requires the discovery of a nonobvious alternative approach, is hampered by thinking out loud—in contrast, noninsight or logical problem solving is unaffected by verbalization (Schooler, Ohlsson, & Brooks, 1993).

Evidence that reporting a cognitive event can overshadow its nonreported aspects comes from a number of studies examining the impact of verbalization on tasks involving difficult-to-report knowledge (including many of those included in the subjectively aware/content nonreportable cell of Figure 12.1). For example, describing a previously seen face can interfere with an individuals' ability to distinguish that face from verbally similar distractors (Schooler & Engstler-Schooler, 1990). Comparable verbal overshadowing effects have now been observed in quite a few domains that rely on nonreportable knowledge or processes (for a recent review, see Schooler, Ryan, Fallshore, & Melcher, in press).

The reportability/reported distinction is also nicely illustrated when we consider it in the context of the continuous nature of the awareness and reportability dimensions. Specifically, the extent to which an individual's performance is disrupted by verbal report depends on the magnitude of the discrepancies between the awareness versus reportability dimensions. For example, as mentioned earlier, memory for same race faces is associated with a greater discrepancy between awareness and reportability than other race faces. And, consistent with the present considerations, same race face recognition is more impaired by verbalization than is other race recognition (Fallshore & Schooler, 1995). Similarly, Melcher and Schooler (1996) found that verbalization impaired the wine recognition of nonprofessional drinkers (who had drinking experience but relatively little verbal wine knowledge). However, verbalization had little effect on either nondrinkers (individuals with relatively little perceptual or verbal expertise) or wine professionals (individuals with marked perceptual and verbal expertise). These findings suggest that when the discrepancy between awareness and reportability is great, as when individuals have perceptual expertise without commensurate verbal expertise, then the disruptive effects of verbalization can be substantial. However, when the discrepancy between these two dimensions is less (i.e., when either verbal expertise is high or perceptual expertise is low), there is little consequence of committing an experience to words.

CONCLUSIONS

Language has a powerful hold on consciousness. There seems little doubt of the profound debt that our sense of consciousness has to language. Many of the defining qualities of our conscious experience (e.g., reflection—Johnson & Reeder, chapter 13, this volume; self-concept—Kihlstrom, chapter 24, this volume; symbolic reasoning—Dulany, chapter 10, this volume) may be closely wed to language. Given languages' centrality to consciousness, it is understandable that individuals may mistakenly confuse what they are able to report with what they are conscious of, thereby leading them to ignore that which was not adequately described. It is also understandable, although perhaps a bit less so, that researchers have considered what subjects are able to report about an experience as the primary index for assessing what is conscious. However, as researchers, we must be ever vigilant not to confuse the construct with the measure. Language may provide a critical window to consciousness, nevertheless, what one reports and what one is conscious of are not the same thing.

Distinguishing consciousness from reportability might seem to make scientific investigations of consciousness all the more elusive, as the measure with the seemingly greatest face validity is shown to be inadequate. However, as we have tried to illustrate, self-reported subjective awareness can help to fill the void created by abandoning content reportability as the sole measure of what is conscious. Moreover, distinguishing subjective awareness and content reportability enables us to refine our understanding of conscious experience, differentiating between situations that might otherwise be inappropriately lumped together. Most importantly, this distinction leads us to ask questions that we might have otherwise overlooked. Is it possible to report a cognitive event and yet not be conscious of it? Are there costs to reporting cog-

nitive events that are not entirely reportable? The answers to questions such as these elucidate the tenuous relation between language and thought. Appreciating the limits of language may help us avoid the confusion (both in measurement and in cognition) that can ensue when language is used as a proxy for consciousness.

ACKNOWLEDGMENTS

The writing of this chapter was supported by an NIMH grant to the first author.

REFERENCES

Adams, J. K. (1957). Laboratory studies of behavior without awareness. *Psychological Bulletin, 54,* 383–405.

Bower, G. H. (1990). Awareness, the unconscious, and repression: An experimental psychologist's perspective. In J. L. Singer (Ed.), *Repression and dissociation* (pp. 209–231). Chicago: University of Chicago Press.

Bowers, K. S., Regehr, G., Balthazard, C., & Parker, K. (1990). Intuition in the context of discovery. *Cognitive Psychology, 22,* 72–110.

Brandimonte, M. A., & Gerbino, W. (1993). Mental image reversal and verbal recoding: When ducks become rabbits. *Memory and Cognition, 21,* 23–33.

Brown, R., & McNeill, D. (1966). The "tip of the tongue" phenomenon. *Journal of Verbal Learning and Verbal Behavior, 5,* 325–337.

Cheesman, J., & Merikle, P. M. (1986). Distinguishing conscious from unconscious perceptual processes. *Canadian Journal of Psychology, 40,* 343–367.

Dennett, D. (1986). *Content and consciousness.* London: Routledge & Kegan Paul. (Original work published 1969)

Dennett, D. (1991). *Consciousness explained.* Boston: Little, Brown.

Ericsson, K. A., & Simon, H. A. (1994). *Protocol analysis: Verbal reports as data.* Cambridge, MA: MIT Press.

Fallshore, M., & Schooler, J. W. (1995). Verbal vulnerability of perceptual expertise. *Journal of Experimental Psychology: Learning, Memory and Cognition. 21,* 1608–1623.

Fowler, C. A. (1986). An operational definition of conscious awareness must be responsible to subjective experience. *Behavioral and Brain Sciences, 9,* 33–35.

Galin, D. (1995). *The structure of awareness: Contemporary applications of William James' forgotten concept of "the fringe."* Unpublished manuscript, University of California.

Holender, D. (1986). Semantic activation without conscious identification in dichotic listening, peripheral vision, and visual masking: A survey and appraisal. *Behavioral and Brain Sciences, 9,* 1–66.

Jackendoff, R. (1987). *Consciousness and the computational mind.* Cambridge, MA: MIT Press.

James, W. (1890). *The principles of psychology.* New York: Dover.

Koestler, A. (1964). *Act of creation.* London: Hutchinson.

Mangan, B. (1991). *Meaning and the structure of consciousness: An essay in psycho-aesthetics.* Unpublished doctoral dissertation, University of California.

Melcher, J. M., & Schooler, J. W. (1996). The misremembrance of wines past: Verbal and perceptual expertise differentially mediate verbal overshadowing of taste memory. *The Journal of Memory and Language, 35,* 231–245.

Merikle, P. M., & Cheesman, J. (1986). Consciousness is a "subjective" state. *Behavioral and Brain Sciences, 9,* 42–43.

Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84,* 231–259.

Schooler, J. W., & Engstler-Schooler, T. Y. (1990). Verbal overshadowing of visual memories: Some things are better left unsaid. *Cognitive Psychology, 22,* 36–71.

Schooler, J. W., & Melcher, J. M. (1995). The ineffability of insight. In S. Smith, T. B. Ward, and R. A. Finke (Eds.), *The creative cognition approach* (pp. 97–133). Cambridge, MA: MIT Press.

Schooler, J. W., Ohlsson, S., & Brooks, K. (1993). Thoughts beyond words: When language overshadows insight. *Journal of Experimental Psychology: General, 122*(2), 166–183.

Schooler, J. W., Ryan, R. D., Fallshore, M., & Melcher, J. M. (in press). Knowing more than you can tell: The relationship between language and expertise. In R. E. Nisbett & J. Caverni (Eds.), *The psychology of expertise.* Amsterdam: Elsevier.

Shanks, D. R., & St. John, M. F. (in press). Characteristics of dissociable human learning systems. *Behavioral and Brain Sciences.*

Sidis, B. (1898). *The psychology of suggestion.* New York: Appleton.

Sperling, G. (1960). The information available in brief visual presentations. *Psychological Monographs, 74,* 1–29.

Tulving, E. (1985). Memory and consciousness. *Canadian Psychologist, 26,* 1–12.