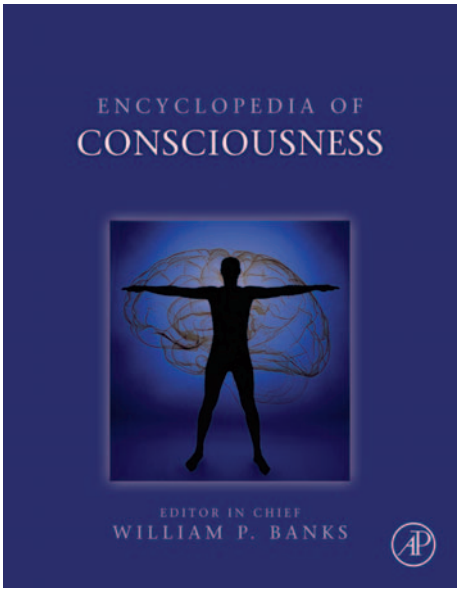

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Meta-Awareness

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Glossary

Automaticity – The cognitive processing associated with highly practiced activities.
Flow – A mental state marked by full immersion in a task, such as the feeling of being 'in the zone.'
Meta-awareness – The process of directing attention toward the contents of consciousness, thereby gaining an appraisal of the contents of consciousness.
Metacognition – Knowledge about one's knowledge.
Metaconsciousness – Another term for meta-awareness.
Mindfulness – A state that is enhanced by a practice of meditation, in which one engages in watchful attention and is very present in the moment.
Mind wandering – The experience of having thoughts that are unrelated and often counterproductive to the task and hand.
Recovered memories – Memories, corresponding to what would seem to be highly memorable experiences such as trauma or sexual abuse, that are perceived to have been forgotten and subsequently recalled.
Temporal dissociation – A temporary disconnect between consciousness and meta-awareness in which one goes for some period of time without noticing the contents of their thought.
Translation dissociation – A disconnect between consciousness and meta-awareness, in which meta-awareness, in reappraising consciousness has misrepresented the original experience.
Tuning out – Mind wandering that an individual is aware of engaging in.
Verbal overshadowing – The phenomenon of verbal report interfering with a related task. For instance, describing a face and subsequently having poorer recognition for that face.
Zoning out – Mind wandering without awareness.

Introduction

'Meta-awareness,' a term often used interchangeably with metaconsciousness, is the state of deliberatively attending to the contents of conscious experience. Frequently when researchers speak of consciousness, they distinguish between two general states: unconscious, in which if information is processed at all, it is processed without any concomitant experience, and conscious, in which individuals experience what ever is occupying their minds. In this context, meta-awareness can be thought of as third level of consciousness in which consciousness is turned upon itself in order to re-represent the contents of experience. In other words, meta-awareness is one's explicit appraisal of the current contents of consciousness.

The distinction between unconscious, conscious, and metaconscious processes can be illustrated with the example of mind wandering while reading. Consider the all too familiar case of reading along and then suddenly realizing that despite your best intentions, although your eyes have continued to move across the page, your mind was fundamentally elsewhere. In this example, the pattern recognition procedures that allowed you decode the individual words correspond to an unconscious processes. Conscious experience would primarily correspond to specific contents of mind wandering musings, although

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presumably some superficially processed aspects of the reading (e.g., the sounds of some of the words) would also enter consciousness. Initially in this example, meta-awareness would be absent until you notice that you are mind wandering. This abrupt realization (almost like waking up) represents the dawning of metaconsciousness, in which you take stock of what you are thinking about and realize that it has nothing to do with what you are reading. Once meta-awareness of mind wandering is achieved, then you are able to redirect your attention to the narrative and can search for the last sentence you remember actually attending to, and try again.

Several important features of meta-awareness emerge from the mind wandering while reading example. First, as conscious and unconscious processes are presumed to carry on relatively continuously throughout waking life, metaconsciousness is intermittent. Only periodically does one take stock of the contents of thought, which is how it is possible for one to mind wander during reading despite knowing that it is impossible to comprehend text while simultaneously thinking about something entirely unrelated to what one is reading. Second, when one notices that they are mind wandering while reading, there is often an abrupt experience of 'coming to.' It is almost as if one has just awoken even though one was not previously asleep. The abruptness of metaconscious understanding illustrates the qualitative difference between a mental state that is associated with metaconsciousness and one for which metaconsciousness is lacking. Finally, it is important to emphasize that when one notices that the mind has wandered, this fact temporarily becomes the dominant element in consciousness, as one thinks to themselves "shoot I just spaced out again, let's see: where was I?" Thus, although metaconsciousness represents a distinct category of thought, it may be nothing more than a particular kind of subject matter of consciousness, namely when the subject of consciousness becomes an acknowledgment of whatever it is that consciousness had just been focusing on. In short, metaconsciousness need not represent a unique mental state, nor need it entail specific dedicated brain regions. It may simply be a topic area (albeit a very important one) of consciousness.

History

Meta-awareness can be thought of as a subtype of a larger category of mental phenomenon known as 'metacognition.' Metacognition corresponds to our knowledge about what we know. The term was introduced by John Flavell in the context of studying children's capacities for monitoring their cognitions. Flavell distinguished two general classes of metacognition. The first was metacognitive knowledge, or in other words understanding how thought operates in the world. Belief that rehearsal improves memory falls under this category of metacognitive knowledge. The second class was metacognitive experiences, which was more focused on the feelings associated with metacognition. The feeling that a sought for word is on the 'tip of one's tongue' falls under this heading.

A key moment in the development of the construct of meta-awareness came with Thomas Nelson and Louis Narens' introduction of a basic model of the control and regulation of cognition in a paper published in 1990. This early model proposed two levels of cognition, the object-level and the meta-level. The object-level deals with cognitions about external objects, while the meta-level deals with cognitions about object-level cognitions. Moreover, information was said to flow between these two levels. Monitoring occurs when the object-level is informed by information from the meta-level. Control, on the other hand, occurs when information from the meta-level modifies the object-level. These applications of metacognitive knowledge provided a shift from work focusing on an understanding of conscious thought, toward work on meta-awareness as a specific representation of consciousness. The distinction between monitoring and control remains prevalent in current work on meta-awareness.

Meta-Awareness and Monitoring

Many aspects of daily life require routine monitoring and adjustment. When one speaks, one needs to adjust their volume to the ambient noise in the room. When one reads, one needs to adjust the rate at which they move their eyes in accordance with comprehension. In many cases, this

type of monitoring and adjustment can carry on behind the scenes without any explicit awareness. However, the tacit monitoring system is limited in the types of things it can monitor. It can, for example, help one to keep one's volume appropriate under normal circumstances, but if one is wearing headphones one has to explicitly attend to one's volume when speaking, otherwise one will be shouting. Similarly, tacit monitoring processes can control eye movements sufficient to recognize the word, but recognizing that one is not attending to what the words are saying requires a more sophisticated monitoring process. Meta-awareness provides this more sophisticated form of monitoring. Comparisons can be drawn between the meta-aware monitoring system and the pilot of an airplane. The autopilot system (tacit monitoring) can efficiently pilot a plane under most circumstances, making minor adjustments to keep the plane on track under most conditions. However, if something major occurs, the pilot (meta-awareness) is needed to make major corrections and decisions. The meta-aware monitoring system has a lot more resources available as it draws from several different systems, but is also more resource-taxing and can potentially interfere with carrying out concurrent tasks. Thus, while it is necessary to invoke meta-awareness periodically to make sure that things are on track, the common absence of meta-awareness is adaptive because it frees up resources that can be applied to the task at hand.

Dissociations between Meta-Awareness and Consciousness

Because meta-awareness is re-representation of the contents of consciousness and not consciousness itself, it is possible that meta-awareness can in some cases be an imperfect or poorly timed translation of conscious experience. In other words, people may fail to take stock of their conscious thoughts, or may do so inaccurately. These dissociations between meta-awareness and consciousness can have important and far-reaching consequences. In 2002, Schooler elaborated on the concept of meta-consciousness by proposing two specific types of dissociations between experiential consciousness and metaconsciousness: *temporal dissociations*, which are discovered experiences that once had eluded meta-awareness, and *translation dissociations*, which encompass occasions when meta-awareness does not accurately reappraise conscious experience. Both types of dissociations are explained in greater detail in the following sections.

Temporal Dissociations

Conscious experience can often occur in the absence of meta-awareness. When triggered, meta-awareness can lead to a reappraisal of elements of conscious thought that once eluded meta-awareness. This experience of discovering an experience that one was previously not meta-aware of is known as a temporal dissociation.

Mind Wandering

Mind wandering without noticing it is a quintessential example of a temporal dissociation meta-awareness. The pervasive phenomenon of mind wandering occurs when attention is decoupled from the task an individual intended it be directed toward. In many situations, mind wandering may be quite adaptive or at least, harmless. For example, when one is walking to work, it may be helpful to think about what one needs to do that day, rather then devoting all attention to the nondemanding task of walking down the sidewalk. However, in other situations, for example, when one is driving in difficult traffic or reading an important paper, mind wandering is counterproductive. The fact that individuals mind wander even when engaged in tasks that they recognize as being undermined by mind wandering illustrates how easy it is to temporarily lose track of what is going on in one's mind, that is, to have a temporal dissociation of meta-awareness.

In recent years, a number of laboratory studies have investigated the process and impact of mind wandering without meta-awareness. Under laboratory conditions, two different approaches have been used to sample mind wandering. The first approach, the probe-caught method, samples the experience of the individual at varying time intervals as they perform a cognitive task. The second

approach, the self-caught method, requires the individual to respond with a button push whenever they catch their own mind wandering. Probe- and self-caught measures of mind wandering yield different information on the occurrence and awareness of mind wandering because they systematically sample the different aspects involved in off-task experiences. The probe-caught technique provides evidence of how readily the mind turns inward, and can be used to study the onset of decoupling, or the speed of drift within attention. On the other hand, the self-caught method requires the individual to recognize that his or her mind is wandering, and so illustrates the engagement of meta-awareness of their own mind wandering. Evidence of the value of distinguishing between probe-caught and self-caught mind wandering comes from the findings that the two measures are differentially associated with task performance. Interestingly, it is the probe-caught mind-wandering episodes that tend to be maximally associated with detriments in performance, including both reading comprehension and memory. The more modest consequences of self-caught mind-wandering episodes suggest that when individuals are meta-aware of mind wandering, they are more effective in circumventing its costs either by more effectively dividing attention or by more efficiently recovering information that was missed during the lapse.

A second way in which meta-awareness during mind wandering has been assessed is simply to ask people following a probe whether or not they had previously been aware of the fact that they were mind wandering. Strikingly this simple procedure reveals consistent differences (in keeping with the self-caught probe-caught distinction introduced above). For example, mind wandering episodes that are characterized as having occurred without meta-awareness (termed 'zone-outs') are typically correlated with performance detriments, whereas mind wandering episodes that occur with meta-awareness (termed 'tune-outs') tend to be less problematic. Neurocognitive measures have revealed a similar story. For example, errors on a simple vigilance task were found to be correlated with zone-outs but not with tune-outs. Similarly, in a functional magnetic resonance imaging (fMRI) study of mind wandering, it was found that the difference in brain activation between on-task and off-task performance was markedly greater when individuals reported being off-task and unaware, relative to off-task and aware.

Automaticity

During mind wandering, it can often seem like the task at hand (e.g., reading, in some cases) has been put on autopilot. There are some tasks, however, that can more easily be put on automatic, and these tasks are also understood better under the umbrella of meta-awareness. Automatic behaviors are often considered to be unconscious, a designation that can prove problematic. For instance, driving an automobile can become automatic, especially if one is attempting to do something like hold a conversation while doing so. The person will then often find that he has arrived at his destination with little memory of the actual drive. The driving, however, was not unconscious as the driver was certainly experiencing the road at some level. Meta-awareness allows psychologists to posit that the driver was conscious of the driving, but not meta-aware of these behaviors.

Unwanted Thoughts

As noted earlier, sometimes the mind can wander even when the individual is explicitly told to reign it in. But, could individuals experience this same gap in meta-awareness when the cost is revisiting a terrible thought or memory? Psychologists, such as Daniel Wegner, have often wondered about why it is so difficult to suppress unwanted thoughts. Meta-awareness shines new light on this troubling issue. Some unwanted thought theorists have hypothesized that these unwanted thoughts lie in the unconscious (or preconscious) mind. An unconscious monitoring system is said to patrol these thoughts and purposefully avoid them, but when this system gets tired or overwhelmed, these thoughts can surface. Research supporting this theory finds that unwanted thoughts are more likely when a person is under a high cognitive load, thus occupying the monitoring system.

Meta-awareness provides another level at which to understand the prevalence of unwanted thoughts. This account suggests unwanted thoughts may simply lie in conscious thoughts, ones that

occupy people's minds but may not penetrate meta-awareness all the time. The monitor, in this account, would then be patrolling conscious thoughts looking for evidence of the unwanted. This formulation of unwanted thoughts can potentially tell researchers more about how unwanted thoughts are banished and where they go.

Recovered Memories

In a similar vein to this research on unwanted thoughts, meta-awareness also provides a useful framework for accounting for recovered memories of sexual abuse. These memories that individuals were previously unaware of, but come streaming back as if from nowhere, are difficult to understand through many traditional psychological theories. Further, there is a good deal of controversy over the truthfulness of some of these memories, an important issue given the often traumatic and sexual nature of some of these memories. Although there are good reasons to believe that recovered memories can be fictitious (particularly when they are recovered in therapy), many of these memories (at least those occurring outside of therapy) can be corroborated and thus treated as memories of actual events. Scrutiny of these corroborated recovered memories demonstrates that they are often consistent with the current conceptualization of meta-awareness.

One way in which the notion of meta-awareness can help us understand recovered memories is with respect to people's estimations that prior to the recovery, the memory had been unrecalled. The characterization of a memory as having been previously forgotten is itself a metacognitive judgment. One is making an appraisal of what one thinks one previously knew. However, if individuals often lack meta-awareness of the contents of their minds, then it is in principle possible that individuals who report recovered memories could in fact have known and thought about the experiences before, but simply failed to note this fact. Several lines of evidence are consistent with this interpretation of at least some recovered memories. First, a number of documented cases of recovered memories have involved individuals who are known to have talked about their experience during the period in which they believed themselves to have been amnesic. Second, individuals with memories that are recovered out of therapy have been found to be particularly susceptible to failures in metacognitive judgments regarding previous episodes of recollection. In other words, they tend to be poor at determining what information they have previously recalled. Third, individuals with recovered memories of sexual abuse tend to be poor at noticing when they are having unwanted thoughts.

Together these findings suggest that reports of recovered memories of abuse may at least sometimes be the consequence of a deficit in meta-awareness, in which individuals lived for a period of time occasionally recalling their abuse, but failed to explicitly notice that they had done so.

Meta-Awareness and Affect

Temporal dissociations need not only deal with lapses of meta-awareness of thoughts, but also of feelings. For example, as the old children's song goes, "If you're happy and you know it, clap your hands." This line certainly implies that it is possible to be happy, but to not have realized it yet. And indeed, the current understanding of meta-awareness suggests it is indeed possible to experience an affective state without having realized it yet.

The experience of flow illustrates the dissociation between experience and meta-awareness of pleasure. One of the most effective ways of assessing the occurrence of pleasure in everyday life is the experience sampling technique in which participants are equipped with a pocket computer that intermittently probes them regarding what they are doing and how much they are enjoying it. Using this methodology, research has found that many of most pleasurable moments occur when individuals are in a state of flow. The flow state occurs when one is deeply absorbed in a task that is both highly challenging yet also accomplishable. What is so striking about research on the flow states is the fact that it indicates that individuals' most positive experiences occur when they are not thinking about themselves, but are rather deeply absorbed in the activity itself. Indeed the flow state is so absorbing that individuals do not have the attentional resources to explicitly notice that they are happy at the time.

As it seems that experience and meta-awareness of positive and negative affect can often become dissociated, then it stands that inducing meta-awareness of affect can change the entire experience of an feeling-laden event. Recent research has shown that the induction of meta-awareness does alter the nature of such events. In one such study, subjects were instructed to continually rate their level of happiness while listening to hedonically ambiguous music. Researchers found that subjects who did rate their happiness throughout the study reported less postmusic happiness than subjects who did not continually rate their happiness throughout the study. Results from this study indicate that inducing meta-awareness of emotion can inextricably change the experience itself. Further, research from flow literature also strongly suggests that introducing meta-awareness during a flow state would interrupt the state and any positive feelings that go along with it.

Translation Dissociations

When reappraising the contents of consciousness, there is a chance that the reappraisal might not be perfectly veridical to the actual experience. These experiences are classified as translation dissociations because there has been a break down of the translation of the experience to meta-awareness. The likelihood of a translation dissociation is particularly great under three sets of circumstances. First, if the experience is essentially nonverbal and a person attempts to verbally reflect on it; then there is an increased chance that he or she will get it wrong. Second, a person could be especially motivated to misrepresent an experience. And third, a lay theory about how an experience should be could lead to a reinterpretation that is unfaithful to the actual experience.

Attempting to verbalize a nonverbal experience can lead to a misrepresentation of that experience, an effect that is often labeled as 'verbal overshadowing.' The hallmark in finding the verbal overshadowing literature deals with the verbalization of faces. Faces are known to be represented holistically in the mind, a quality that makes them difficult to verbalize completely. Numerous studies have shown that subjects instructed to verbally describe a face are poorer at recognizing that face later, as opposed to subjects who simply viewed the face without instructions to verbalize it. Verbal overshadowing is likely due to the recoding of the visual image into words, a modality that lacks the intricacies and nuances to properly describe the complex, holistic nature of a face. In this situation, the meta-aware reappraisal of an experience interferes with the task at hand. The verbal overshadowing effect is not specific to faces, and generalizes to other areas of perceptual memory.

Several studies have shown that many visual stimuli that defy words are vulnerable to verbal overshadowing effects. The detrimental effects of verbalization include stimuli such as color and shapes. Beyond visual memories, verbalization can also interfere with other perceptual modalities, such as audition and taste. One such study demonstrated that untrained wine enthusiasts had poorer memory for the wine they tasted if they attempted to describe wine-tasting experience. These wine drinkers were ostensibly well accustomed to tasting wine, thus possessing the ability to detect various nuances present in the wine. They did not, however, have the vocabulary or expertise to properly describe the wine, leading to a reappraisal that did not do a good job of describing their perceptual experience. On the other hand, trained wine writers showed an improvement of memory when verbally describing the wines, likely due to their ability to accurately and fully verbalize their wine-tasting experience. A meta-awareness of an experience can both aid and obstruct a task depending on one's ability to take stock of and reanalyze that experience.

Constructing a meta-awareness of a nonverbal experience applies not only to the domain of perceptual memory, but to other areas of nonverbal cognition. In the domain of judgment and decision making, verbally describing or rating the qualities of the available choices to be made can lead to substandard outcomes. This detrimental effect of verbalization has been reliably demonstrated in contexts where the choices to be made are affect laden, such as taste and visual appeal. For instance, researchers performed a study veiled as an inquiry into consumer judgments of strawberry jams. They asked some participants (verbalizers) to taste the jams and then list their reasons for liking or not liking the jams, as well as analyzing their reasons.

Control participants tasted the jams, but did not list or analyze their thoughts about the jams. These researchers found that participants who did not list and analyze their reasons made judgments that were more similar to that of expert jam raters (from consumer report magazines) as compared with verbalizers. Other research has shown that analyzing reasons can also promote choices that yield decreased postchoice satisfaction.

The verbal overshadowing effect and other evidence of the sometimes problematic nature of meta-awareness have been shown to be reliable phenomena in the psychological literature. Still, it is important to note that verbal reflection is often helpful. This is so when the experience is easily translated into words. Research has shown that logical problem-solving is aided by verbalization, as are situations when the verbalizer has the expertise or training to create accurate verbalizations. Recall that wine drinkers trained to accurately describe wine show a better memory for wines they verbalize. Regardless, the influence of verbal reflection on memory, judgment, and decision making illustrates the importance of a full, rich, and most importantly, accurate meta-awareness of an experience.

While sometimes an experience is difficult to describe, other times individuals may simply be motivated to misrepresent the experience to themselves. It has been shown that homophobic individuals may not want to recognize when they are aroused in response to depictions of homosexual acts. In other words, they may consciously experience arousal, but not be meta-aware of these feelings due to a strong motivation to suppress such information.

Even if the motivation to develop an accurate meta-awareness exists and verbal reflection is not a problem, other barriers exist to cause translation dissociations. One such barrier is a faulty theory about what a meta-awareness should contain. That is, people may have a faulty theory about what they should be feeling or thinking in a particular situation, which in turn colors their appraisal of their actual experience. A compelling example of this comes from people's reports of their experience of catching a ball. Most people believe that as they watch a ball, their eyes first rise and then go down following the trajectory of the ball. Indeed, this is the case when one watches someone else catch a ball. However, when people catch a ball themselves, they actually maintain the ball at precisely the same visual angle. Nevertheless, when people who just caught a ball are asked what they experienced, they rely on their theory of experience rather than on what they actually did.

The Double-Edged Nature of Meta-Awareness

The various dissociations between meta-awareness and experiential consciousness serve to show that meta-awareness can have both beneficial and detrimental effects. Meta-awareness allows humans the ability to monitor and control their thoughts, which in turn make goal-driven behavior possible. To illustrate, imagine a pilot attempting to land a plane: Without the ability to take stock of his thoughts he would be unable to stave off, or even recognize a potentially disastrous bout of mind wandering during this important process. Phenomena such as verbal overshadowing, however, show that meta-awareness can be incongruent with success at certain tasks. These times when it is perhaps better to not be meta-aware are summed up well by the old children's story of the centipede and his beautiful dance. As the story goes, there was a centipede who, using all his 100 legs, did a wonderful dance that all of the other creatures were jealous of, none more so than the tortoise. The tortoise devised a devious plan to derail the centipede, by sending him a letter asking how the dance was performed. Did he move his 28th leg before the 39th? And was that followed by the 12th and 72nd at the same time? The centipede began to think about what exactly he did and was never able to dance again. This classic story illustrates well the danger of paralysis through analysis, or in other words, the danger of becoming meta-aware (i.e., dissecting the dance) of a conscious experience (i.e., the dance itself). Still, the field of mindfulness may shed light on how to achieve analysis without the accompanying paralysis.

Research on mindfulness meditation training demonstrates a process that may focus on the benefits of meta-awareness, while avoiding its pitfalls. Like other forms of meditation, mindfulness

mediation deals with becoming aware of consciousness. Unlike other types of mediation, it does not involve focusing on a stimulus, but instead strives for a broad observation of several facets of experience. Mindfulness-based interventions have been shown to help decrease stress, anxiety, and lead to several positive outcomes. These results indicate that there may be different sorts of meta-awarenesses to be experienced, and one that involves being broadly mindful may avoid some of the pitfalls of other varieties.

Conclusion

Meta-awareness is likely unique to humans. It represents the ability to step outside one's own thoughts and reflect upon them. This function of meta-awareness endows a high degree of flexibility, such as the ability to monitor and control cognition. While meta-awareness confers incredibly flexibility, it does not always work as one might wish. For one, meta-awareness is limited and costly to sustain. Such can be seen in temporal dissociations such as mind wandering. Attention drifts during these lapses in meta-awareness allow individuals to get off track, and perhaps more importantly fail to notice they are off track. A lack of meta-awareness may even be confused with the feeling of having never known, such as with the problem of recovered memories of sexual abuse.

Meta-awareness is also, by nature, imperfect. When consciousness is reanalyzed and reappraised, mistakes can be made – seldom is the time when the copy is as robust as the original. Translation dissociations such as verbal overshadowing illustrate this pitfall of meta-awareness. In such cases a verbal recoding of a perceptual experience, like the image of a face or the bouquet of a wine, are not as good as the original. This mismatch between experience and reappraisal can cause problems with memory as well as judgments and decisions. Translation dissociations can also occur if the motivation to accurately reflect on a memory is not present, or if theories about how an experience should be are faulty.

Although the two-edged nature of meta-awareness may never be completely avoidable, some forms of meta-awareness may be more beneficial than others. For example, explicit analytic reflection may be more disruptive than the more intuitive mindful awareness that develops through contemplative practices such as meditation. As research continues on the nature of these different flavors of meta-awareness, students and researchers can expect a deeper knowledge of how to harness this fundamentally human ability.

See also: The Control of Mnemonic Awareness; Philosophical Accounts of Self-Awareness and Introspection; Self: The Unity of Self, Self-Consistency.

Suggested Readings

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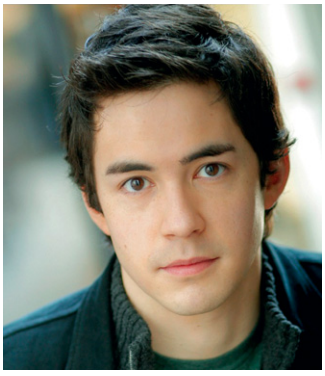
Biographical Sketch

Jonathan W. Schooler is a professor of psychology in the University of California at Santa Barbara. He pursues research on consciousness, memory, the relationship between language and thought, problem-solving, and decision-making. A *cum laude* graduate of New York's Hamilton College, Dr Schooler earned his PhD in psychology at the University of Washington in 1987. He joined the faculty of the University of Pittsburgh as an assistant professor, and in 2004 he accepted and held the position of a full professor and the Canada Research Chair in Social Cognitive Science until 2007 when he accepted his current position. A fellow of the Association for Psychological Science, Dr Schooler has been the recipient of three Akumal Scholar Awards from the Positive Psychology Network, an Osher Fellowship given by the Exploratorium Science Museum, and a Lilly Foundation Teaching Fellowship. His work has been supported, among others, by the National Institute of Mental Health, the Office of Educational Research, and Canada's Social Sciences and Humanities Research Council. He currently is on the editorial boards of *Consciousness and Cognition* and *Social Cognitive and Affective Neuroscience*. Dr Schooler is the author or coauthor of more than 100 papers published in scientific journals and the editor (with J.C. Cohen) of *Scientific Approaches to Consciousness*.



Jason M. Chin is a PhD student at the University of British Columbia studying social psychology. He completed his undergraduate work at the University of Virginia, where he majored in economics and psychology, graduating *cum laude*. At the University of Virginia, Mr Chin researched the psychological underpinnings of aversion to risk, suggesting that it stems from a tendency to overweight future negative emotional reactions. He earned his MA in psychology in 2005 from his present university for his work on verbal overshadowing, and he currently studies motivational and informational models explaining prosocial behavior. Mr. Chin's research has been supported by the University of British Columbia and the Izaak Killam Memorial Trust. A member of the Society for Personality and Social Psychology, he has presented his research at several conferences and is a coauthor of two scholarly publications. Mr. Chin has also served as a reviewer for several psychological publications.