stance that the "historical truth" (e.g., Freud 1937/1964) of recovered memories cannot (nor should) be ascertained by the therapist. The originators and perpetuators of the memory recovery movement (e.g., Bass & Davis 1994) were not psychoanalysts – often not psychologists. Their program, which fundamentally violated psychoanalytic technique, would have been rejected by Freud, who, early on, underscored the "growing recognition of the untrustworthiness of statements made by witnesses," even when testifying about themselves (Freud 1906b/1959, pp. 103–113). Although Freud had originally proposed his "infantile seduction" theory of hysteria from the problematical recollections of some of his early patients, for which he has been much criticized (e.g., Crews 1995), Freud retracted his erroneous proposal within a decade (e.g., Freud 1906a/1953). Thereafter, Freud emphasized the role of fantasy in such recollections: "If hysterical patients trace back their symptoms to traumas that are fictitious, then the new fact that emerges is precisely that they create such scenes in *phantasy*" (Freud 1914b/1958, p. 17). Such recollections tend to be, even if they are not invariably, "imaginary memories" (Freud 1906a/1953, p. 274). Ironically, if Freudian tenets had not been so muffled in modern psychology, much of the miscarriage of concept and practice might have been averted and the corrective programs by experimental psychologists, such as Beth Loftus, rendered less necessary.

6. Conclusion

Psychology has become pervasively constructivist (as neuroscience and psychoanalysis have always been). It is by now the standard view that memory is not strictly veridical and is subject to wide-ranging and ongoing distortions. The source of these distortions – omissions, elaborations – varies from situation to situation, and one type of distortion need not be incompatible with another: Sometimes the distortions come from intrusions from other lists; other times, from implicit suggestions in the querying process; other times, from long-established internal structures, which sometimes are intellectual in character (Bartlett) and other times emotional (Freud). All these distortions can be exacerbated by the subject himself who, in the process of thinking about and retrieving information, may inhibit memories or amplify errors of previous constructions in a process akin to succumbing to one's own propaganda and the creation of myth.

As scientists, we should resist such trends in our own work and should not ignore the historical facts. Progress by euphemistic relabelling or tendentious silences, though ubiquitous in the real world, is not scientific progress. It does not matter from a scientific standpoint if we labelled the process "repression," "suppression," "retrieval inhibition," "dissociation," "cognitive avoidance" – or "Mary" – though such untrammelled synonymy, without the anchor of viable theory, drifts, over time, into dissociated baronies of discourse and brings upon us a self-inflicted curse of Babel: We do not understand each other; we misunderstand each other; we impose distinctions where none are justified; we fail to make distinctions that are obligatory; we argue about the wrong issues and fail to deal with the real issues; we dissociate ideas that belong together; we suffer amnesia and consign ourselves endlessly to rediscover what we already have mastered.

The laboratory and the clinic have converged on a simple but fundamental insight: Cognition, from perception to memory, is pervasively constructive. We structure our fragmentary reality by omitting from and elaborating on our meager scraps of information. We inhibit and augment our reality by different techniques and for different reasons. We try to make sense of our reality, intellectually as well as emotionally.

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NOTES

1. Anna Freud might have agreed. In a telling conversation with Joseph Sandler (Sandler & A. Freud 1985), published posthumously, she anticipates one of Daniel Holender's (1986) criticisms of experimental psychology's efforts to demonstrate nonconscious priming: The prime might have been fleetingly conscious but forgotten by the time the experimenter tests for it. Here is how Anna Freud treats the conundrum in an interchange on the defense mechanism of reaction formation:

> *Anna Freud*: Heinz Hartmann would say that it can become automatic.
>
> *Joseph Sandler*: . . . I still think that there must be an awareness of the impulse to evoke the response.
>
> *Anna Freud*: Hartmann and I discussed it at the time, in 1936 and 1937. There must be a momentary awareness. (Sandler & Freud 1985, pp. 22–23)

Charles Eriksen, the great critic of subliminal perception, later proposed also the idea of "automatization" of highly practiced behaviors (Eriksen & Pierce 1968), now a common notion in cognitive psychology.

2. A foreshadowing of the present twofold organization of repression can be found in Freud's *The Interpretation of Dreams* (1900/1953): "There can be no doubt that the censoring agency, whose influence we have so far recognized in limitations and omissions in the dream-content, is also responsible for interpolations and additions to it" (Freud 1900/1953, p. 489).

Open Peer Commentary

Encouraging the nascent cognitive neuroscience of repression

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Abstract: Repression has remained controversial for nearly a century on account of the lack of well-controlled evidence validating it. Here we argue that the conceptual and methodological tools now exist for a rigorous scientific examination of repression, and that a nascent cognitive neuroscience of repression is emerging. We review progress in this area and highlight important questions for this field to address.

To mainstream experimental psychologists, repression has always had the scent of an untestable theory, too exotic to be true, based too much on clinical anecdote. Given the importance of this construct in the realm of clinical observation for more than a century, however, one is compelled to ask why more empirical progress has not been made. In his target article, Erdelyi hints at two conceptual errors that have marginalized repression and limited scientific progress. First, the characterization of repression as a specialized psychological defense mechanism hindered investigators from distinguishing between the cognitive mechanisms that might underlie repression (e.g., inhibition) and the use to which those mechanisms are put (e.g., defense). Second, the historically enforced distinction between suppression and repression insists that repression is unconscious, rendering it difficult to study scientifically. Erdelyi's target article persuasively argues, however, that Freud never intended repression to be exclusively unconscious, and that it is entirely reasonable to study mechanisms separate from the reasons for engaging them. If so, the necessary tools to understand repression are readily available in the armamentarium of cognitive psychology and cognitive neuroscience. The conclusion couldn't be more different from what mainstream experimentalists have supposed: Repression is, in fact, a scientifically tractable problem.

We strongly agree (Anderson 2006; Anderson & Green 2001; Anderson & Levy 2002). We disagree, however, with Erdelyi's conclusion that if suppression = repression, then much of the controversy surrounding repression "dissolves." This seems premature. One can accept that suppression (repression) exists without believing that this process could be responsible for cases of memory recovery of the sort addressed in the recovered memory debate, around which much controversy revolves. Although the extension of work on inhibition to recovered memories is plausible, it is not yet proven. In fact, we would like to suggest that the scientific study of repression is in a place not unlike where false memory research was in the early 1990s (e.g., Loftus 1993; Loftus & Ketcham 1994).

Loftus and colleagues had successfully demonstrated that misleading post-event suggestions can alter what subjects believe they remember (e.g., Loftus et al. 1978). Whereas these demonstrations generated useful evidence regarding the fallibility of eyewitnesses, they concerned fairly trivial details of an experience (e.g., whether a car had passed a stop sign or a yield sign) that should never be regarded as evidence for "memory implantation." Indeed, early claims that misinformation effects could potentially generate entirely false memories of traumatic experiences were appropriately criticized (e.g., Harvey & Herman 1994; Olio 1994; Pezdek et al. 1997). However, programmatic research on false memory has gradually extended suggestibility findings in ways that render this claim more plausible (Loftus & Pickrell 1995; Mazzoni & Loftus 1998; Mazzoni et al. 2001). Many investigators now consider it possible that some instances of memory recovery result from suggestion. These important results were not accomplished without patiently building an evidence base with progressively greater ecological validity.

As in the early 1990s, cognitive psychology now has several model paradigms through which to study memory control, including the think/no-think paradigm (Anderson & Green 2001), directed forgetting (e.g., Bjork & Bjork 2003), and retrieval-induced forgetting (Anderson 2001; Anderson et al. 1994; Bjork et al. 1998; for reviews, see Anderson 2003; Levy & Anderson 2002). Consider the think/no-think paradigm. Subjects view reminders to previously encoded memories and, while focusing on each reminder, do one of two tasks: either retrieve the memory associated to the reminder (respond trials), or exclude the memory from consciousness (suppression trials). As Figure 1 illustrates, whereas retrieving the associated memory improves later retention, excluding traces from consciousness impairs memory relative to baseline items. Thus, when people are inclined to be reminded, reminders enhance memory as nearly everyone might guess; but when people desire not to be reminded, the reminders not only fail to enhance memory, they set the occasion for processes that impair memory. This reversal of the normal positive influence of reminders is a product of executive control mechanisms mediated by

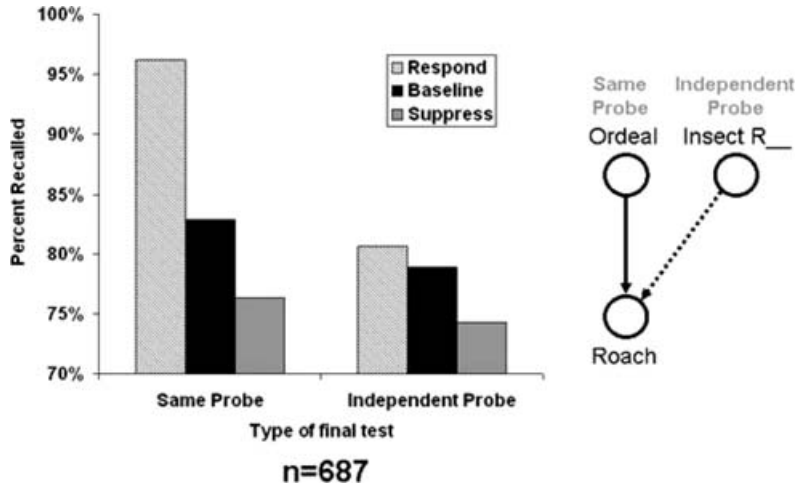

Figure 1 (Anderson & Levy). Final recall in the TNT procedure from a meta-analysis of 687 subjects. The graph shows recall on the final test as a function of whether subjects recalled the item (Respond), suppressed the item (Suppress), or had no reminders to the item (Baseline) during the think/no-think phase. The left side shows recall to the originally trained cue (i.e., the Same Probe); the right side shows recall to a novel, extra-list category cue (i.e., the Independent Probe). The large difference between the respond and suppression conditions reflects the total *memory control effect*, of which *positive control* (facilitation of respond items above baseline due to subject-initiated retrieval) and *negative control* (inhibition of suppression items below baseline due to subject terminated retrieval) are components. Note that even if below-baseline inhibition did not occur, tendentiously avoiding retrieval when reminders are present clearly deprives a memory of reactivations (due to intentional retrieval or to spontaneous reminding) that otherwise would preserve and enhance more desirable traces, as Erdelyi discusses.

dorsolateral prefrontal cortex modulating activation in the hippocampus (Anderson et al. 2004). Anderson and colleagues have argued that these findings provide an existence proof of mechanisms that could underlie repression (Anderson 2006; Anderson & Green 2001; Anderson et al. 2004). Freud (1915a/1963) defined repression as "simply the function of rejecting and keeping something out of consciousness" (p. 147), which is precisely what we asked our subjects to do. Thus, it simply is no longer reasonable to say that there is *no way* that repression could occur.

However, to conclude, based on these findings, that inhibitory control underlies traumatic memory repression, though plausible to some (certainly to us and perhaps Erdelyi), is as warranted as concluding that false memories of abuse can be implanted based on misremembering a yield sign. Several issues remain to be addressed to build more ecologically valid support for this hypothesis. First, can inhibition suppress *complex multi-modal memories for emotionally arousing events* thought to be central to repression? Second, can inhibition endure for an extended time, or does it need to be continually reinstated? Third, what triggers recovery, and what are a memory's characteristics, once recovered? Fourth, might suppressed memories exert unconscious influence on behavior, through priming or conditioning? Finally, might inhibition progress from being intentional to being unintentional? The development of habitual diversionary thoughts through many experiences with avoiding a memory may render exclusion so routine that the original purpose of the diversions may be forgotten. Might the resulting retrieval-induced forgetting recurrently reinstate inhibition (Anderson 2001; Anderson & Green 2001) without people's awareness?

Fortunately, significant progress has already been made. For instance, memory inhibition in the think/no-think paradigm can be obtained with emotionally negative stimuli (Anderson & Kuhl 2004; Joorman et al. 2005), even when those stimuli are aversive photographs (e.g., car accidents; Depue et al. 2006). Interestingly, both retrieval-induced forgetting (Barnier et al. 2004; Wessel & Hauer 2006) and directed forgetting have now been observed with autobiographical memories (Barnier et al., in press), even when the memories are recorded over multiple weeks in a diary and contain emotionally significant events (Joslyn & Oakes 2005). Others have demonstrated that inhibition in the think/no-think paradigm affects explicit, but not implicit, memory (Kawaguchi et al. 2006), showing persisting influence of inhibited information outside of awareness (see also, Bjork & Bjork 2003). Although some reports indicate that retrieval-induced forgetting dissipates after 24 hours (MacLeod & Macrae 2001; Saunders & MacLeod 2002), others have now observed these effects, undiminished, after a week (Storm et al., in press; see also Migueles & Garcia-Bajos, submitted). Importantly, we have found that people with more extensive history of trauma (of any sort) show enhanced memory inhibition (Anderson & Kuhl 2004), establishing a clear connection between these processes and those likely to be used to control unwanted remindings in daily life. These findings validate the point, stressed by Erdelyi, that individual differences will turn out to be crucial. All that it takes for inhibition to be a reasonable model of repression is for there to be *some* individuals who can wield it effectively. Indeed, although the overall size of the inhibition effect in the think/no-think procedure is modest (7–10%), some individuals show effects as large as 60%, even though the total time spent suppressing is only a little over one minute. Why? Understanding this variation is a vital goal in the coming years.

Although the science of repression is in its early stages, the burgeoning knowledge about the cognitive and neural basis of executive control, long-term memory, attention, and affect regulation will surely provide a powerful theoretical basis through which to understand how the human mind exerts control over unwanted memories or feelings. At this early stage, what is required most of all to transform the nascent cognitive neuroscience of repression is patience, a long-view of progress, and a skeptical stance regarding the overly damning and tendentious critiques of the most strident skeptics of repression. With any luck, Erdelyi's target article will entice a generation of talented researchers to understand how humans adapt memory in the aftermath of trauma, and experimental psychology will no longer sweep repression under the rug.

Can repression become a conscious process?

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Abstract: A major weakness in Erdelyi's account concerns the claim that repression can become conscious. A relational account of cognition demonstrates that if repression is successful, then the repressive act cannot become known. Additionally, "resistance" further distinguishes "repression" from "suppression." Rather than blurring the distinction between these processes, it is possible to recognise a series of defences. Suggestions are provided for alternative research avenues.

Erdelyi's target article provides an important contribution to understanding repression within modern psychological thinking. However, a major theoretical weakness in his account, involving the claim of a "false" distinction between repression and suppression, concerns whether repression can become conscious. Such an assertion necessitates a discussion of what is meant by "conscious" and "unconscious," but Erdelyi's reference to an "unconscious–conscious" continuum (comparing the issue to the arbitrary "child–adult" distinction), is uninformative since it is without reference to "knowing" (an issue similarly neglected by others within this debate – e.g., Cramer 2000). Subsequently, the conceptual coherency of Erdelyi's position remains unclear. A helpful direction to address this is a *relational* account of consciousness, where cognition (understood here in terms of acts of *knowing*, such as believing and remembering) is viewed as a *relation* between a cognising subject (a knower) and an independent object term (a situation, or state of affairs) that is known (Anderson 1927/1962; Maze 1983; Michell 1988).[1] To be "known" is a relation entered into, rather than a quality of property of situations known, so for a mental act p (where p may be a desire or belief that p), to be conscious is simply for p to be *currently known* (such that subject S currently knows p), and to be unconscious means simply that p is not currently known. The act of knowing is, itself, not automatically known but requires attending to for it to become conscious. That is, when S knows (or wishes, etc.) of some situation p, the relation of knowing (or wishing, etc.) (call this relation SR_p) is itself unconscious and does not become conscious unless it becomes the object of a *second mental act*, such that S knows SR_p. For example, at a specific time S becomes aware of p, and then at a later time S is prompted to pay attention to the fact of becoming aware of p (S knows that S knows p). This awareness of p can now be called conscious, whereas previously it had been an unconscious mental act, or *descriptively unconscious* (Freud 1923/1961, p. 13). Furthermore, any process will remain unconscious if the causal antecedents necessary for its becoming conscious fail to occur. Thus Freud correctly recognised that "every psychical act begins as an unconscious one, and it may either remain so or go on developing into consciousness" (Freud 1912/1958, p. 264).

Repression, itself, can be conceptualised as the act of turning away from, and inhibiting, wishes and desires that are believed to engender threat (Freud 1915a/1957; 1926a/1959). On the foregoing analysis, for repression to become conscious would mean that it is capable of becoming the object of a second mental act. That is, when S represses the wish for p to be the case (again, a relation, SR_p), that repressive act can be known