

Why there is No False Memory Trait and Why Everyone is Susceptible to Memory Distortions:

The Dual Encoding Interference Hypothesis

(Commentary on Bernstein, Scoboria, Desjarlais, & Soucie, in press)

Lawrence Patihis

University of Southern Mississippi

### **Abstract**

Until recently, it was unclear whether there is an identifiable “trait” that represents a person’s vulnerability to developing false memories. Two articles in the current issue (Patihis, Frenda, & Loftus, this issue; Bernstein, Scoboria, Desjarlais, & Soucie, this issue) find scant evidence that performance on any one false memory task could reliably predict performance on another. Individual difference measures also were poor predictors of false memories, consistent with past research. I argue that these findings, and other converging evidence, suggest there is no false memory trait, that all people are susceptible to false memories, and that memory distortions likely arise from brain structures and mechanisms common to all people. Accepting the idea that all people are susceptible to false memories, and not just the 25 percent or so who typically report a false memory in any single study, has important implications for preventing memory distortions in psychotherapy and other settings. In this article, I also propose the Dual Encoding Interference hypothesis that explains why trait-like individual difference measures typically correlate negligibly with false memory tasks.

*Keywords:* memory distortion, false memory, susceptibility, prone, trait, autobiographical memory

## Why there is No False Memory Trait and Why Everyone is Susceptible to Memory

### Distortions: The Dual Encoding Interference Hypothesis

Given that the narrative that some people are especially susceptible to false memories originated from bold speculation more than a century ago (e.g. Bernheim, 1900/1884; Freud 1928/2001), and it appears to be difficult to shake the idea, let me be so bold to question whether a false memory “trait” exists. We might ask whether there is a trait—a “false memory proneness” if you will—that predicts consistently higher rates of false memories over time and across tasks. Put another way, is it the case that the reason we find that about a quarter of participants succumb to false memories in studies of memory distortion means that these participants are false memory prone, and that three-quarters of the population are not susceptible to false memories? In this commentary, I argue that there is no false memory trait, that 100% of individuals are prone to false memories, and that predicting who will have a false memory based on a trait is therefore difficult, if not impossible. I will also introduce the Dual Encoding Interference hypothesis to explain why trait-like individual differences do not predict false memories very well in the misinformation research.

More than a century ago Hippolyte Bernheim (1900/1884) was one of a group of hypnotists and physicians who speculated that false memory production might be related to an internal tendency in an individual. He wrote:

We have observed that certain subjects capable of being hypnotized are susceptible to illusions or varying hallucinations by simple affirmation in the waking condition without the necessity of re-hypnotizing them. They are also susceptible to retroactive hallucinations (p. 166).

Bernheim goes on to suggest that this susceptibility to false memory may be measurable,

commenting that one “can measure the suggestibility of a doubtful witness by a process of clever questioning” (p. 178). I call this assumption into question, given current research, because it assumes that by measuring suggestibility in one setting, it will be possible to predict false recollection in another setting or circumstance. Sigmund Freud, influenced by the hypnotist schools in France, continued to advance the general idea that people with certain tendencies produce false memories by writing: “there is reason to distrust the autobiographical statements of neurotics. Experience shows that their memories introduce falsifications” (Freud 2001; originally written 1928; p. 2717).

This framing of false memories as an inherent characteristic of a minority of people has persisted to the present day. For example, Brewin and Andrews (2017) reviewed the literature and concluded that, when using stringent definitions, an average of only about 15% of participants in memory distortion studies experience what they categorized as a genuine false memory. Though this percentage is a measure of occurrence at a particular point in time in relation to a particular task, they make the error of relating this finding to a more encompassing *susceptibility* to false memories, implying that only a minority of individuals are vulnerable to false memories. They write that “susceptibility to false memories of childhood events appears more limited than has been suggested” (p. 2). Brewin and Andrews continue the conflation of occurrence of a false memory and more general vulnerability to false memories later by stating that “susceptibility to false memories appears to be lower than has often previously been suggested” (p. 20). They repeat this framing by stating that “it cannot be concluded” that “the majority of individuals are susceptible” to false memories (p. 20). Here, I point out that even if only an average of 15% of people exhibit a false memory in a given study, it does not mean 85% of people are not *susceptible* to false memories on other

occasions or under other circumstances. In other words, the 15% statistic gauges occurrence on one particular point in time, not a propensity to false memories more generally, so one might more circumspectly state that 85% of people did not evidence a memory error *on this particular occasion of assessment*. Brain structures, mechanisms, and cognitive processes pertinent to the creation of false memories will still engender vulnerability in the future to memory distortions, consonant with the reconstructive nature of memory. I argue that the complex interaction and interferences of attention and memory during numerous events results in false memory production that is not possible to robustly predict in relation to a trait or individual difference.

I advance this assertion because there exists converging evidence against the idea that false memory proneness (or susceptibility, if you will) is a moderate or large factor in the prediction of memory distortions. Patihis, Frenda, and Loftus (2017) and Bernstein, Scoboria, Desjarlais, and Soucie (2017) both found negligible-to-low relationships between different types of false memories (e.g., misinformation and DRM words lists:  $r = .05$  meta-analytic average in Bernstein et al., Table 4) and between individual difference measures and memory distortions (e.g., fantasy proneness and misinformation:  $r = .08$ , in Bernstein et al.). These authors also reviewed past research that converges on a similar conclusion. Given past and current research, exceptions to these negligible-to-low effects should be replicated to mitigate false positive reporting in this domain (cf. Simmons, Nelson, & Simonsohn, 2011).

The research presented and reviewed in this issue is also reinforced by our increasing understanding of how false memories form, in terms of cognitive mechanisms related to specific brain structures (e.g., Okado, & Stark, 2005; McDermott, Gilmore, Nelson, Watson, & Ojemann, 2017), and that memory malleability springs from evolutionary adaptive

cognitive processes (Schacter, Guerin, & Jacques, 2011). If it were adaptive in evolutionary history for memory to be malleable, then it could well be a universal property of human minds, as I argue here. If that were the case, then we would expect to find susceptibility to memory distortions even in individuals with superior memory, and we do (Patihis et al., 2013). The argument is that we all use these mechanisms or cognitive processes, and we all have similar neural nets and brain structures that arise in part from our genetic code. If we all use these mechanisms in forming memories, then all people should be susceptible, and that conclusion fits with the evidence in this issue, alongside previous research.

The above argument addresses why all people are likely to be susceptible to false memories. Another related finding in the current issue and in past research is that individual differences measures do not correlate very strongly with false memory occurrence in research involving post-event misinformation. This seems to be true even of trait-like measures of characteristics that theoretically should enhance encoding (for example absorption). To explain this, I put forward the Dual Encoding Interference (DEI) hypothesis (see Figure 1). The DEI explanation builds on the fact that there are two encoding events in the misinformation effect, and this has a flattening effect on the relationship between false memories and trait-measures and other individual differences. The DEI explanation goes as follows:

(1) The misinformation effect involves two encoding stages (the original event and misinformation stage; hence the term *dual encoding*).

(2) Traits that could enhance encoding will strengthen *both* the memory of the original event *and* misinformation. Conversely, those who possess low levels of the trait will exhibit weak encoding of both the original event and the misinformation presented.

(3) For individuals who score high on a trait that enhances encoding, a strongly encoded event is matched with strong retroactive *interference* from the misinformation stage memory. When both the event and misinformation are encoded with similar strength, there is a potential for source monitoring errors at the time of retrieval. This interference between the original event and misinformation yields a middling probability of false memory formation, despite better than average encoding of events (c.f., Patihis et al., 2013; Merckelbach, 2004). Conversely, individuals who possess low levels of the trait will encode misinformation weakly that interferes with a weak event memory. This state of affairs results in two equally weak memory traces that could produce interference and cause source monitoring errors, thus yielding roughly similar probabilities of false memory formation compared with individuals who score high on the trait.

--INSERT FIGURE 1 ABOUT HERE--

To illustrate this further, Figure 1 uses absorption as an example of a trait that is theoretically and empirically likely to strengthen encoding (see Patihis, 2016; Tellegen & Atkinson, 1974). This figure and DEI explanation also apply to other variables that could potentially produce differences in encoding strength (e.g., fantasy proneness: see Merckelbach, 2004, dissociation, working memory, attention). Shown to the right of Figure 1, individuals who become highly absorbed in new experiences are likely to encode the event and the misinformation strongly, which leads to the misinformation interfering strongly with the event memory. This produces an average or middling probability of false memories. To the left of Figure 1, those who tend to not become absorbed in new experiences encode both the event and misinformation weakly, leading to similar source monitoring problems at test, and leading to similar rates of false memories compared with those who score high on absorption.

Conversely, the DEI hypothesis also predicts that the likelihood of false memories will increase if the event is encoded weakly but the misinformation is encoded strongly.

Nevertheless, this combination is unlikely to be consistently related to a stable trait or tendency. This mismatched combination is likely to happen independent of personal traits and will result in false memory production that is difficult to predict and which appears pseudo-random.

The argument in this commentary has important implications for how we view memory in the courtroom and in psychotherapy. More specifically, the misguided idea that some people are not susceptible to false memories could lead to a disregard of the impact of memory contamination in both arenas and to the acceptance or legitimization of techniques that distort memory among individuals who are believed to be less susceptible to memory distortion. This argument also plays a role in the debate between the trauma-model of dissociation and the fantasy model of dissociation (Dalenberg et al., 2012; Lynn et al., 2014). If false memories do not consistently correlate with individual differences, such as dissociation and fantasy proneness, then the strongest alternative argument against the trauma model of dissociation has to shift from the idea that dissociation and fantasy proneness are major predictors of false memories to an argument that everyone is susceptible to false memories. Readers will notice that both the trauma and fantasy model involve linking some kind of pathology or unusual characteristic to those who have purportedly repressed memories (i.e., the pathology associated with severe repressed trauma in the trauma model) or to those who experience false memories (i.e., the pathology or unusual characteristics of people with high levels of fantasy proneness or dissociation in the fantasy model). I suggest that we move away from a pathological view of false memory production. Indeed, it may be the case that



those who report purported repressed memories or who experience false memories in therapy are less damaged or “different” than previously thought. Such people then become less of an out-group curiosity and more of an uncomfortable reminder of how we are all vulnerable to the same processes that produce false memories.

After early theorists—such as Bernheim and Freud—were so bold as to infect us with the century-long narrative that a group of people are especially false memory prone, let me be so bold as to correct the narrative and state simply that there is no such thing as a false memory trait. I was motivated to find it, as others were, we searched proverbially high and low for it, yet we could not find compelling evidence for it. Part of the delay in establishing a consensus on this matter is that we may have been undervaluing research that does not have p-values under .05, a file-drawer problem, and difficulties in publishing research articles such as the two in this issue. To some in the field, the universality of the cognitive mechanisms that facilitate memory distortions, and thus the universality of susceptibility to false memories, is merely stating the obvious—something they appreciated long ago. To others they may view the idea of universal susceptibility as wrong or as speculation that can only be tested with attempts to falsify it. I hope they try.

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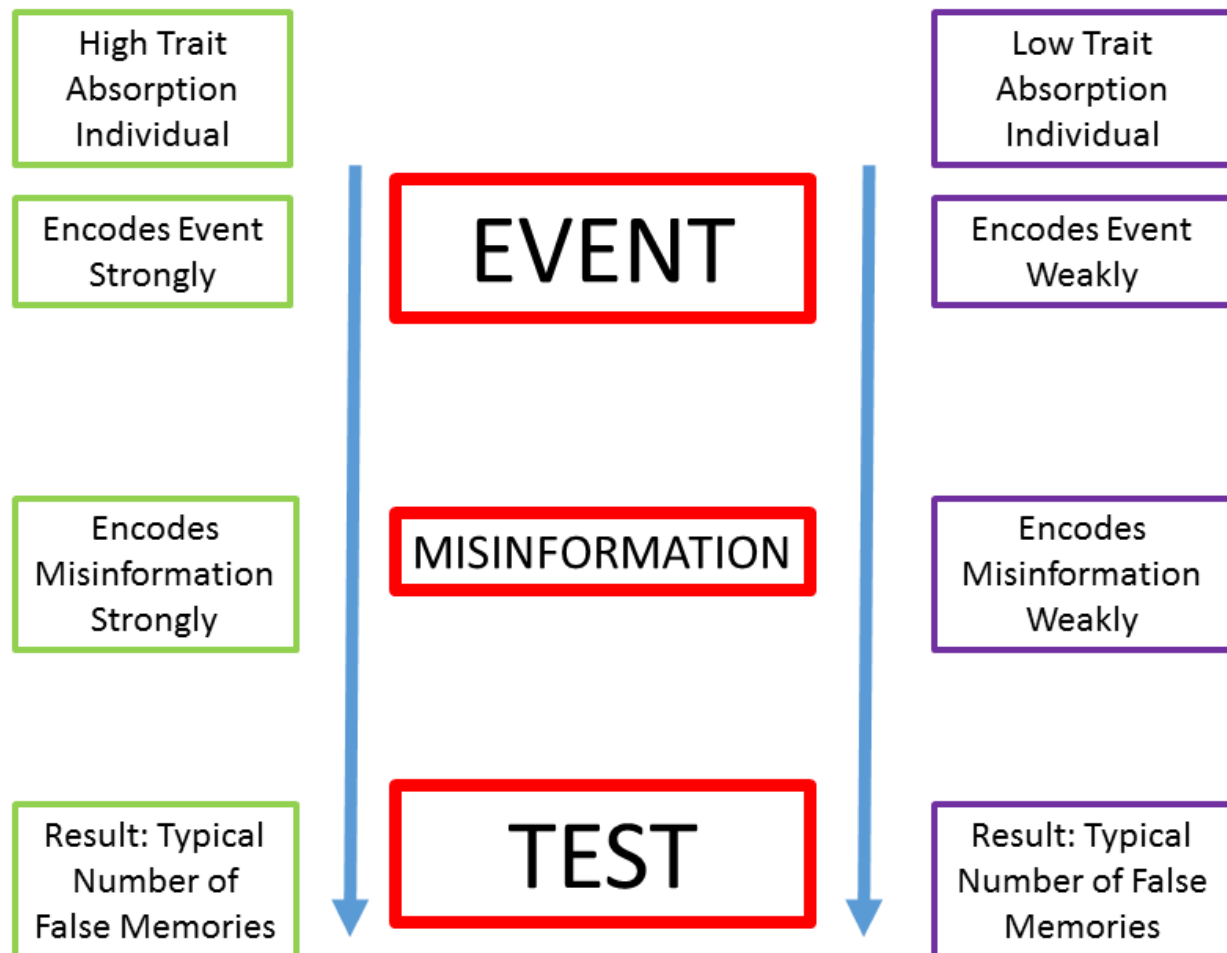
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*Figure 1.* The Dual Encoding Interference explanation of low trait to misinformation associations. An illustration of how trait-like individual differences, like absorption, often reveal low associations with false memories in misinformation research.