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Revelation Effect

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Without Abstract

Synonyms

Appearance effect; Familarity change; Premonition effect

Definition

The Revelation Effect (RE) occurs when a person is *more* likely to rate an item (e.g., a word or a number) as being more familiar after "revealing" the solution to an anagram or problem.

Theoretical Background

Unsurprisingly, people are more likely to say that they previously saw an item (e.g., a word, number, face, etc.) if they actually had seen it, as compared to if they had not. But under certain conditions, people can be made to believe that they have seen items previously even when they have not. One such condition is when an item is initially distorted and then "revealed" in some way. This is called the "Revelation Effect" (Watkins and Peynircioğlu *1990*).

The Revelation Effect (RE) refers to the tendency to falsely recognize an item after the item is revealed from a distorted state. In a standard revelation experiment, participants view a list of words one at a time. Next, participants see a second list of words, some of which were on the original list (old items), some of which were not (new items). Half of the old items and half of the new items appear as anagrams which the participant must solve (e.g., *dpornair* for *raindrop*). Anagrams occur only in the second list, where participants must report whether each word on this list is old or new. The typical finding is that words that must be solved are "recognized" more often (Hicks and Marsh *1998*).

The RE is a robust phenomenon, occurring for many sorts of distortion. These include words with missing letters (where letters "unfold" one at a time until the whole word is apparent), anagrams, words with rotated letters, words that are themselves rotated, Arabic numbers disguised as Roman numerals (e.g., "3" disguised as "iii," or "4" disguised as "iv"), numbers implied by equations, and even faces (Hicks and Marsh *1998*; Watkins and Peynircioğlu *1990*).

The name "Revelation Effect" implies that the effect occurs when an item is being revealed. This is misleading for two reasons. First, it suggests that the effect occurs *solely* when an item is revealed. However, other work shows that procedures other than revealing an item can inflate the item's apparent familiarity. Such procedures include generating synonyms for the item or keeping sequentially presented letters in working memory (Westerman and Greene *1996*). Thus, an item need not be revealed in order for the RE to occur. Second, the label "Revelation Effect" is misleading because it suggests that the distorted item and the revealed item are really the same item in different arrangements. Yet the RE can occur even when the distorted item is *different* from the subsequent test item. For example, when people solve a math problem

(e.g., with a solution of 6) and then immediately judge whether they have just seen a *different* target number (e.g., 5) in a list, this leads them to believe that they have seen the target number previously (Niewiadomski and Hockley *2001*). Furthermore, this can also occur when the target is an entirely different *type* of item; for example, when the distortion is a math problem and the subsequent item is a *word* (rather than a number); that is, people are more likely to believe that they had previously seen the word that is preceded by a math problem as compared to when it is not.

Curiously, the RE enhances people's chance of correctly guessing an old item to be old (seen on a previous list), as well as their tendency to guess *incorrectly* that a new item is old. In terms of signal-detection theory, this can mean either that (a) people are less sensitive to the distinction between old and new words, or (b) that there is a shift in bias or one's decision criterion for making the decision. Regarding (b) specifically, the criterion is loosened such that any item, whether new or old, is more likely to be perceived as old. Surprisingly, the RE is typically stronger for new items – ones that were not seen previously (Hicks and Marsh *1998*). For example, suppose that someone sees a list of words that includes the word *screamed*. Later s/he views a new list of words that are presented (sequentially) and includes some of the old words from the previous list – such as *screamed*, as well as some new words, such as *barbeque*. However, immediately before seeing half of the words, s/he solves an anagram. That person is more likely to guess that both old (*screamed*) and new (*barbeque*) anagram-preceded words were on the original list. Yet this increased likelihood is even more pronounced for *barbeque* and other new words.

Accuracy and Criterion Shift as Two Complementary Types of RE

The RE is often thought to have at least two independent aspects, depending on the conditions under which the phenomenon occurs (Verde and Rotello *2004*). The two proposed types of the RE are accuracy (called "sensitivity" in the literature) and *criterion shift*. "Accuracy" refers to the ability to correctly distinguish old words (previously seen) from new words (not previously seen). "Criterion-shift" refers to changing one's bias, meaning that people become more or less lenient in their judgments of whether or not a given item is old.

When the distorted item is the same as the subsequent clear item, lower accuracy and increased bias both underlie the RE. However, when the distorted item differs from the subsequent clear item, increased bias alone underlies the RE. Intuitive reasoning for the latter is that you would not expect one type of item, like a math problem, to activate neural pathways connected to a different sort of item, like verbal information; therefore math should not increase the accuracy of a test word. Yet you would be more lenient in your decision-making (Niewiadomski and Hockley *2001*). In terms of performance, lower sensitivity means reduced ability to distinguish old from new; more bias means a greater tendency to say old.

Important Scientific Research and Open Questions

The RE is commonly believed to apply only to episodic memory tasks in which a person is asked to make a judgment that relies on recognition of a specific event, for example, seeing the word "screamed" on a list presented earlier (see Watkins and Peynircioğlu *1990*). One argument is that RE does not extend to non-episodic memory tasks such as rating how typical or frequent a word is in everyday usage, or whether a string of letters is a real word or a nonsense word (called "lexical decision tasks"). These sorts of ratings are non-episodic judgments because they do not rely on memories of particular prior experiences.

However, there is evidence that the RE occurs for cognition unrelated to episodic memory, as in items without study lists, such as childhood autobiographical memories and trivia statements (Bernstein et al. *2002*). For example, when people read a phrase about a childhood event (e.g., "broke a *dwniwo* playing ball") embedded with an anagram that they must solve, they are more likely to believe that such an event occurred in their own childhood. Similarly, when people read a trivia statement (e.g., "fastest animal") they are more likely to believe that a given answer is true – whether or not it actually is – when the answer is presented as an anagram that the person must solve (e.g., *elpraod*, "leopard"). As in the context of study lists, the RE also occurs even when the anagram is of an *unrelated* word. For example, compared with reading "fastest animal: leopard," solving the unrelated anagram *rteeanxl* ("external") immediately before reading "leopard" renders a person more likely

to falsely believe that the leopard is the fastest animal. The important point here is that REs for childhood autobiographical memories and trivia statements are instances of non-episodic memory judgments where the RE occurs in the absence of a study list. Thus, any theory of the RE must account for its occurrence in non-episodic memory judgments.

Little research has been done on the direct impact of the RE on learning. However, meta-analysis by Hicks and Marsh (*1998*) showed that overall the effect is greater for new words than old words; that is, the difference between distorted and intact is greater for new than old items. The net result is therefore inaccurate memory, which is detrimental to learning. Therefore, one would expect the RE to have a negative effect on learning. Solving any puzzle, such as a math problem or a game of Sudoku, just prior to viewing misinformation (e.g., the leopard is the fastest animal) should render the misinformation more believable immediately (Bernstein et al. *2002*), and later at re-test. It appears that nobody has tested the long-term learning consequences of the RE, but this is a fruitful avenue for future research.

Cross-References

Autoassociative Memory and Learning

Confidence Judgments in Learning

Intuition Pumps and the Augmentation of Learning

Signal-Detection Models

Similarity Learning

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