



## False memories and individual variations: The role of Field Dependence–Independence

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### ABSTRACT

Susceptibility to false memory is influenced by exogenous factors (e.g. depth of processing), endogenous factors (e.g. age, emotion) and by some individual difference measures. The aim of this research was to assess an individual difference variable, Field Dependence–Independence, in the Deese–Roediger–McDermott (DRM) false memory paradigm. The DRM paradigm consists in displaying to participants lists of words that are associated with a non-presented critical lure and false memory is demonstrated when participants report the non-presented lure as having being presented earlier. We find here that Field-Dependent participants falsely recalled and recognized more critical lures than did Field-Independent participants, findings discussed here as due to the distinction between item-specific and relational processing strategies.

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### 1. Introduction

In the last decade, there has been a rapid and sudden increase in research into the subject of false memories. What is intriguing is that there are large individual differences in susceptibility to producing false memories: certain individuals seem to be somewhat immune whereas others are extremely prone to misremembering. It is still unclear which cognitive and personality characteristics predispose to the creation of or reduction in false memories. One aim of this study is to examine one individual difference variable in one of the most popular techniques for studying false memories in the laboratory, namely the Deese–Roediger–McDermott (DRM) paradigm. The DRM paradigm involves showing participants lists of words for recall and/or recognition. The words on a list are all highly associated with a given word (as determined by free association procedures); however, this word is not presented for study (Roediger & McDermott, 1995). Typically, after a list has been presented to participants, participants tend to misremember the lure as one of the presented words, at a recall probability similar to that found for items that had been presented in the middle of the list (Roediger, Watson, McDermott, & Gallo, 2001). However, as with the other false memories paradigms that are used, there are robust individual differences in the likelihood that participants will misremember the non-presented lure.

Two theories are generally cited to account for the creation of false memories. Proponents of the Fuzzy-Trace Theory posit that

experienced events are stored in both a verbatim and a gist form, with the two forms of representation encoded in parallel. By this account, false memories are due to the arousal of gist memories that are erroneously put down to experience. Accordingly, the recall of the lure items results from the difficulty in identifying specific characteristics of the words on the list and on the other hand, from the encoding of their shared features. The second and most prevalent theory, the activation-monitoring theory, is based on encoding-based (activation) and retrieval-based (monitoring) factors. Generally speaking, the activation-monitoring theory proposes that the critical lure is consciously or unconsciously activated by related associates. If critical lures consciously come to mind, false memories occur because of a reality monitoring failure, i.e. the participants have difficulties in discriminating between the words presented and the critical lures at retrieval. If the non-presented words are unconsciously primed during encoding because of the spreading activation in the semantic network, this unconscious priming could be sufficient to produce subsequent false recalls or recognitions (Gallo & Seamon, 2004).

Whatever the theory, i.e. activation-monitoring or fuzzy-trace, encoding conditions that prompt distinctive processing help focus the participant's attention on individual item information, that is to the processing of differences relating to a context or a background. Consequently, false memory would be greater when people do not process item-specific information and would be less, as greater item distinctive information is processed. Any factor which contributes to promoting the processing of item distinctivity should have an impact on diminishing the likelihood of producing false memories. We argue here that an endogenous individual

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difference, Field Dependence–Independence is related to the degree one uses item-specific processing and hence should predispose to the creation of and/or reduction in false memories.

## 2. Why Field Dependence–Independence?

Initially devised for assessing the perceptive attitude to make a component out of context, the Field Dependence–Independence (FDI) also makes it possible to distinguish individuals depending on whether they adopt a global or analytic strategy in their cognitive activities. The Group Embedded Figures Test (GEFT; Oltman, Raskin, & Witkin, 1971) is one of the favoured tools for assessing FDI. The task consists in locating a simple figure within a complex one, i.e. once the participant identifies the figure, he then draws the outlines of the simple figure as precisely and as quickly as possible. The variations in performance are determined by means of either a global or analytic strategy. The global strategy leads the participants to considering material as a whole and to analyzing the situation on the basis of holistic impressions. Consequently, those individuals who have difficulties in distinguishing simple figures within the GEFT complex patterns tend to fail in problems that require an isolation of a component from the context in which it appears. On the other hand, the analytic strategy results in the participants breaking down the whole material and in picking out each part more easily. Hence, this cognitive style corresponds to the characteristic way an individual selects and processes information. The Field-Independent individuals consider the parts as dissociated from the organized background and “have no difficulty in separating the most essential information from its context” (Emmett, Clifford, & Gwyer, 2003, p. 1496). Field-Dependent participants tend to assign considerable weight to the general organization of the field, the various components appearing as fused together and indistinct; in other words, the participants are more prone to a halo effect.

On the face of it, it can be suggested that Field-Independent participants will, being more inclined to dissociate the words in the lists from the context they activate and so to favour distinctive processing, produce fewer false recalls and recognitions than the Field-Dependent participants. However, certain results may give grounds for the opposite hypothesis. Spiro and Tirre (1980) showed that Field-Independent participants were more capable than Field-Dependent participants of using their background knowledge i.e. a larger context than that of the situation, entailing the implementation of a more global processing. If the Field-Independent participants are more likely to activate a larger context in memory, as in the case of positive mood, they might simultaneously produce more false recalls and recognitions than the Field-Dependent participants with a DRM task (Corson, 2002, 2006). For this reason, despite the fact that FDI seemingly might account for the role of individual differences in the generation of false memories, there is still the question of the direction of the effects.

## 3. Experiment

### 3.1. Method

#### 3.1.1. Participants

Ninety-one University of Nantes (France) undergraduates (50 females; mean age: 21) volunteered to take part in the experiment. All the participants were native French speakers.

#### 3.1.2. Materials

The ten DRM lists in this experiment were extracted from a corpus established at the University of Nantes and have been previ-

ously used (Corson & Verrier, 2007). Each list consisted of the 15 strongest associates of the critical lures, which were presented to subjects in order from strongest to weakest associative strength. Two random orders of the 10 lists were constructed.

Recognition tests consisted of 60 words randomly listed in two columns on the last two pages of the DRM booklet. The 60 words consisted of the first, eighth and tenth items from each of the 10 lists (a total of 30 words), the 10 critical lures and 20 additional words selected so as to be unrelated to the 150 words of the 10 lists. Each word in the recognition test was proposed with a 4-point Likert scale with 4 for *sure that the item was studied*, 3 for *probably studied*, 2 for *probably new* and 1 for *sure it was new*.

#### 3.1.3. Procedure

Participants were run in groups of up to 8 persons. They were successively given two booklets, the first one allotted to the GEFT and the second booklet to the DRM experiment. Both tasks were always proposed in the same order. However there is only a remote possibility that performance on the GEFT task, consisting in abstract geometrical figures, influenced the DRM experiment made up of verbal materials. In addition, given that the order was the same for all the participants, a hypothetical effect would be identical for each of the experimental conditions.

The GEFT booklet comprised two examples and three parts. The first part, made up of seven items, was used as practice. The other two parts, each of nine items, comprised the test itself. The participants' scores were subsequently calculated by only taking into account the last eighteen items.

After completing the GEFT phase, the participants were given the second booklet comprising 14 pages. The first page allowed the participant to write down his name, age and sex. The second page provided the recall instructions. The next 10 were blank pages to be used for the recall of the 10 lists and the list number was printed at the top of each page. The last two pages were devoted to the recognition test. The participants were told that the experiment was meant to test their memories for lists of words and that they had to recall as many of the words as they could after being presented with each list. The lists were read aloud at the approximate rate of one word every 2 s and participants were given 1 min to recall each list immediately after it has been read. The participants then had to write down the words in the order that came to mind and without guessing them. After the last list had been recalled, the recognition instructions were explained and participants had the remaining time to fill in the recognition test pages. The whole experiment lasted 45 min at most.

## 3.2. Results

### 3.2.1. GEFT

The scores on the GEFT follow a normal distribution (Kolmogorov-Smirnoff  $d = .14$ , n.s.). Therefore, it is possible to distinguish Field-Dependent and Field-Independent participants on the basis of limits defined by the mean score more or less one standard deviation (mean = 12.84,  $sd = 3.92$ ). Thus, those participants whose score was higher than 16 are considered Field-Independent ( $n = 24$ ) and those whose score was lower than 10 ( $n = 23$ ) are considered Field-Dependent. This partition seems quite relevant insofar as the scores (in this case 10 and 16) correspond exactly to the marks that specify the upper and lower boundaries of the first and fourth quartiles of the GEFT norms.

### 3.2.2. Recall

The proportions of recalled items (studied, unrelated items, and critical lures) as a function of Field Dependence–Independence are shown in Table 1.

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