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# Emotional memories: the relationship between age of memory and the corresponding psychophysiological responses

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## Abstract

The recollection of emotional memories has been used as a method of emotion induction for much of the research concerning the psychophysiological sequelae of emotions. The instructions used in most of these investigations have simply required the participants to recollect or imagine an emotional memory, with no constraint being placed on the age of the memory. Research has indicated that the specific instructions for inducing emotions can have a profound effect on the resulting patterns of psychophysiological arousal. The present investigation concerned whether the age of the emotional memory has an influence on the resulting psychophysiological arousal. Heart rate and skin conductance was recorded from 10 female graduate students while they recollected emotional memories concerning mirth and anger. The results indicated a significant positive correlation between skin conductance and age of both the angry (0.6395) and the mirthful (0.8460) memories. The results are discussed and explained within the framework of the somatic marker hypothesis and the spreading activation model of memories. © 2001 Elsevier Science B.V. All rights reserved.

*Keywords:* Emotional memories; Age of memory; Spreading activation model; Somatic marker

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## 1. Introduction

Several different types of emotion induction procedures have been used in research investigations seeking to induce emotional arousal (Gerards-Hesse et al., 1994; Westermann et al., 1996; Foster et al., 1999). For many of these investigations, the use of emotional memories has been frequently employed as a method of emotion induction (Schwartz et al., 1981; Roberts and Weerts, 1982; Ekman et al., 1983; Cook et al., 1988; Stemmler, 1989; Rime et al., 1990; Sidorova et al., 1992; de Jong-Meyer et al., 1993; George et al., 1995; Partiot et al., 1995; Foster et al., 1997, 1999; Lane et al., 1997; Reiman et al., 1997). Research utilizing emotional memories to investigate the psychophysiological sequelae of emotional arousal has indicated that the use of this emotion induction method has consistently produced significant changes in psychophysiological response (Schwartz et al., 1981; Roberts and Weerts, 1982; Ekman et al., 1983; Cook et al., 1988; Stemmler, 1989; de Jong-Meyer et al., 1993; Foster et al., 1997, 1999).

Although memories have been used extensively as an emotion induction method, the specific effects of different ages of emotional memories on the resulting changes in psychophysiological arousal have not been determined. Indeed, a thorough review of the literature failed to locate any studies that sought to investigate whether a relationship exists between the age of the emotional memories recollected and the corresponding changes in psychophysiological arousal. The possibility of such a relationship existing carries serious implications for research concerning the psychophysiological sequelae of emotions, especially when considering the fact that most investigations using emotional memories have typically placed no constraints on the age of the memory to be recalled (Schwartz et al., 1981; Roberts and Weerts, 1982; Ekman et al., 1983; Cook et al., 1988; Stemmler, 1989; de Jong-Meyer et al., 1993). Clearly, determining whether a relationship exists between the age of emotional memories and the corresponding changes in psychophysiological arousal is an important task to be undertaken. The purpose of the present investigation was to

determine whether such an influential relationship exists. Based on the assumption that more recent memories would be recalled with greater detail and more vividly, it was hypothesized that a negative relationship would be found between the age of the recalled memories and increases in both heart rate and skin conductance. Specifically, it was expected that more recent memories would be associated with greater increases in heart rate and skin conductance than older emotional memories.

## 2. Method

### 2.1. Participants

A total of 10 female graduate students with a mean age of approximately 25 years (S.D. = 2.41) volunteered to participate in this investigation. The ages of the participants ranged from 24 to 32 years. The participants were all graduate students in the Department of Psychology at Virginia Polytechnic Institute and State University.

### 2.2. Apparatus

A Grass model 7P1 low-level DC preamplifier polygraph (Grass Instruments, Quincy, Mass.) and model F-EGSR silver/silver chloride finger electrodes filled with EC-2 electrode cream were used to record skin conductance. Additionally, a Grass model 7P4 EKG preamplifier (Grass Instruments, Quincy, Mass.) with a model PTTLF photoelectric pulse sensor was used to record heart rate.

### 2.3. Procedure

The participants were greeted by the principle investigator and subsequently entered the psychophysiological laboratory. The participants were then informed that the experiment involved being connected to a polygraph, which would record their psychophysiological responses to various emotional memories. All participants received the same set of instructions. At this time they were given an opportunity to ask questions relevant to the requirements of the experiment and their

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