

Brief Communication

Chewing gum can produce context-dependent effects upon memory

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Received 17 May 2004; accepted 11 June 2004

Abstract

Two experiments examined whether chewing spearmint gum can affect the initial learning or subsequent recall of a word list. Comparing those participants in Experiment 1 who chewed gum at the learning or the recall phases showed that chewing gum at initial learning was associated with superior recall. In addition, chewing gum led to context-dependent effects as a switch between gum and no gum (or no gum and gum) between learning and recall led to poorer performance. Experiment 2 provided evidence that sucking gum was sufficient to induce some of the same effects as chewing.

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Keywords: Chewing gum; Context-dependent effects; Memory

Introduction

There is a general belief that chewing gum can aid concentration and, thereby, influence cognition. This belief remained essentially untested until [Wilkinson, Scholey, and Wesnes \(2002\)](#) recently showed that chewing gum could lead to improved performance on tests of immediate and delayed recall of words. In addition, chewing gum appeared to improve both spatial and numeric working memory ([Wilkinson et al.](#)). This information may be of considerable practical relevance given that chewing gum is used worldwide, with the US having the highest consumption. An indication of the prevalence of gum chewing in the US comes from a survey of 584 university students, of which 87% reported that they chewed gum at least occasionally ([Britt, Collins, & Cohen, 1999](#)).

It is not yet known why chewing gum might enhance performance on some memory tasks. As [Wilkinson et al. \(2002\)](#) found no direct support for the view that chewing gum aids concentration they suggested other possible mechanisms, including an indirect effect of insulin release

or changes in brain blood flow brought about by mastication. Another means by which chewing gum could affect memory is if it is sufficient to induce context-dependent effects. These effects were not examined by [Wilkinson et al.](#) as all participants chewed gum throughout the battery of memory tasks, i.e. at encoding and retrieval. It has long been known that an item can be more readily recalled if the environment at recall is similar to the environment while learning ([Godden & Baddeley, 1975](#); [Tulving & Thompson, 1973](#)). While the term environment can refer to physiological states ('state dependent learning'), it can also refer to other forms of context. Given that smells are sufficient to induce context-dependent effects ([Aggleton & Waskett, 1999](#); [Chu & Downes, 2000](#); [Schab, 1990](#)) it is quite plausible that tastes are able to do the same. If chewing gum can invoke context-dependent effects it is predicted that chewing gum at both learning and recall will produce superior performance to chewing gum only at learning or only at recall (Experiment 1). This experiment also provided the opportunity to test the reliability of the reported enhancement in word recall ([Wilkinson et al.](#)). A second experiment investigated whether the taste of the gum, without the associated chewing, is sufficient to produce any effects upon memory (Experiment 2).

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