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Short communication

Chewing gum, occupational stress, work performance and wellbeing. An intervention study ☆

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ABSTRACT

An intervention study was carried out to examine the effects of chewing gum on occupational stress and related outcomes. 101 volunteers from Cardiff University completed the study. The results showed that chewing gum reduced stress (both at work and outside work), reduced fatigue, reduced anxiety and depression and led to a more positive mood. Chewing gum was also associated with perceptions of better performance (both at work and outside).

Introduction

Stress at work has become a major health and safety issue. The most up-to-date statistics available, as published on the HSE website (retrieved from http://www.hse.gov.uk/statistics/causdis/stress/index.htm) and taken from recognized sources such as the Labour Force Survey (LFS), the Psychosocial Working Conditions Survey (PWC) and the Health and Occupation Reporting network (THOR), summarise the current state of the situation in the UK as follows:

- 415,000 individuals believed they were experiencing work-related stress at a level that was making them ill (2008/09).
- 16.7% of working individuals thought their job was very or extremely stressful (2009).
- The annual incidence of work-related mental health problems was estimated at 5,126 new cases per year (2008) but most likely under-estimates the true incidence in the workforce.
- An estimated 230,000 people first became aware of work-related stress, depression or anxiety in 2008/09, giving an annual incidence rate of 760 cases per 100,000 workers.
- Self-reported work-related stress, depression or anxiety accounted for an estimated 11.4 million lost working days in 2008/09.

Aware of the growing problem, the Health and Safety Commission (2000) set 10-year targets that included a reduction in days lost to work-related ill health across the UK. The statistics above show that this has not yet been achieved and, therefore, remains a serious issue. Stress at work also increases the risk of accidents and injuries at work (Smith, 2000) and reduces productivity (Smith, Johal, Wadsworth, Davey-Smith, & Peters, 2000).

Multiple strategies need to be used to prevent and manage stress. Recent research has shown that what we eat (e.g. breakfast – Chaplin & Smith, 2011) and drink (e.g. caffeinated beverages – Smith, 2005) can have an impact on our health, safety and well-being at work.

The beneficial effect of chewing gum on stress has been suggested since the late 1930's. Hollingworth (1939) reported that chewing produced a 10% decrease in muscular tension observed as 'restlessness' and 'feelings of strain'. He suggested that chewing relieves stress through reducing excessive muscular tension and energy via masticatory movements. However, Freeman (1940) found that foot tapping produced the same relaxing effect as chewing gum, suggesting that the effects were due to repetitive motor activity and were not specific to chewing.

More recent experimental studies have provided mixed evidence for stress reduction due to chewing gum. Scholey et al.

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(2009) experimentally induced stress in 40 participants as they performed on a multi-platform task which increases feelings of stress by applying rising cognitive workload through a variety of tasks. Participants completed the tasks once while chewing, and again without chewing. It was found that scores on the state-trait anxiety inventory were lower in the chewing group than control group, along with subjective stress ratings. Salivary levels of the stress hormone cortisol were also lower in gum chewers than non-gum chewers, which provided objective and physiological evidence of the stress reducing effect of chewing gum. They also found that gum chewing was associated with better overall performance on cognitive tasks.

Other research has failed to replicate this effect (Johnson, Jenks, Miles, Albert, & Cox, 2011a). In addition, other methods of inducing stress have produced mixed results. Torney, Johnson, and Miles (2009) also induced stress experimentally by having participants try to complete insolvable anagram puzzles. The results showed no effect of chewing gum on reducing stress. Smith (2010) found that chewing gum had beneficial effects on mood and performance both when participants were stressed (exposed to noise) and not stressed. In terms of physiological response, this study showed that chewing gum was associated with an increased heart rate and cortisol levels. Possible reasons for the variability of findings from laboratory studies of chewing gum and acute stress are discussed by Allen and Smith (2011).

Results from surveys have yielded a consistent pattern of results. Zibell and Madansky (2009) carried out two online survey studies which assessed the effect of chewing in frequent chewers and non-frequent chewers. The results showed that both groups reported increased stress levels while abstaining from chewing and decreased stress levels after chewing. The effect of chewing gum for non-habitual chewers clearly suggests that were not due solely to an association between chewing gum and feelings of calm and relaxedness. Chewing gum had no effect on reducing stress associated with severe natural stressors. However, chewing gum may reduce less severe life stress. For example, Smith and Woods (2012) carried out a 14 day intervention to examine effects of chewing gum on student's stress and productivity. Chewing gum was associated with reduced stress in a dose-response fashion, and chewing gum was also associated with getting more work done.

Cross-sectional surveys have also been carried out to examine associations between chewing gum, occupational stress and health outcomes. Smith (2009a) carried out a cross-sectional study of an occupational sample of 2,248 full time workers. Participants reported their levels of perceived stress and their exposure to stressful events. The Hospital Anxiety and Depression Scale (HADS) was administered and the frequency of chewing gum was recorded. It was found that non-chewers were around twice as stressed at work, and nearly one and a half times more stressed at home than those participants who chewed gum. Chewers reported visiting their GP less frequently and to suffer less from high blood pressure than non-chewers. Higher levels of depression were more common in non-chewers than chewers. The effects of chewing gum remained significant after logistic regression controlled for demographics, personality and negative work characteristics. However, it is difficult to assign causality from such cross-sectional data, as the association between stress and chewing gum may be bidirectional.

Smith (submitted) replicated this effect of chewing gum in another occupational sample. In addition, he found a linear dose-response relationship between frequency of chewing gum and reduced stress. Dose-response relationships do provide initial evidence of causal effects. However, stronger evidence comes from intervention studies and the present study used this approach. One occupational group that reports high stress levels are university staff (Mark & Smith, 2012). The aim, therefore, was to conduct an intervention study to determine whether chewing gum reduces stress and improves mental health and performance efficiency in the staff of a university.

A number of studies (see Allen & Smith, 2011, for a review) have shown that chewing gum increases alertness. This has usually involved examining ratings of alertness while chewing gum (e.g. Smith, 2010) or shortly after chewing (e.g. Smith, 2009b). However, if this effect is maintained with repeated chewing one might expect ratings of fatigue to be lower when gum is chewed. This was examined here and the study also investigated whether chewing gum had more general effects on positive and negative mood. In addition, productivity at work and frequency of cognitive failures (errors of attention, memory or action) were also recorded. There is some evidence that chewing gum can acutely improve cognition, although such effects are not as robust as effects of chewing gum on subjective alertness and stress (see Allen & Smith, 2011). Reduction of stress and increases in alertness are also likely to benefit work performance and the present study examined whether chewing gum influenced all of these aspects of behaviour.

Method

This study was carried out with ethical approval from the ethics committee, School of Psychology, Cardiff University, and with the informed consent of the participants.

Design

A cross-over design was used with each participant being in both the gum and no gum conditions. Half of the participants carried out the conditions in the order gum/no gum and the others in the order no gum/gum.

Sample size

In a cross-over design, with power set at 0.8, 65 participants are required to detect an effect of half a standard deviation (an effect size of practical significance). The present study recruited more than this number.

Participants

Volunteers were recruited from an existing staff participant panel and by advertising the study on the University bulletin board. Recruitment stopped when 105 eligible participants volunteered. Volunteers were excluded if: they were unable or unwilling to chew gum; they had existing medical conditions or were taking medication.

Final sample

101 volunteers completed the study (mean age = 32 years, range 16–58 years; 38 males, 63 females).

Procedure

Participants came to the research centre to check that they understand what was involved in the study and to collect their gum. They were provided with an information sheet at this time and written consent was obtained. Participants were de-briefed at the end of the study and paid £100 for completing the study.

In the "no gum" condition volunteers were required to abstain from chewing gum. In the "gum" condition they were required to chew at least two pieces of gum a day for 20 min and also to try to