



BRIEF REPORT

THE EFFECT OF CHEWING GUM ON TOBACCO WITHDRAWAL

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Abstract — When smokers are in situations where smoking is prohibited, chewing gum is believed to reduce cravings to smoke. However, there is little scientific evidence to support this widely held assumption. The present study assessed craving for a cigarette and nicotine withdrawal in 20 dependent cigarette smokers under one of two conditions. All subjects smoked an initial cigarette upon arrival to the experimental session and were informed that they would not be allowed to smoke for the remainder of the session. The session consisted of each subject watching a movie, then waiting an additional 30 minutes. Half of the subjects were assigned to a Gum Condition where they were given free access to chewing gum throughout the experimental session; half were assigned to a No-Gum Control. Nicotine withdrawal was assessed immediately following the movie (Time 1) and again 30 minutes later (Time 2). Results from this study indicate that chewing gum reduces craving and helps with withdrawal when a nicotine-dependent person cannot smoke. © 1997 Elsevier Science Ltd

It is estimated that 32% of the American public smoke cigarettes each year (National Institute on Drug Abuse [NIDA], 1994). Chronic cigarette smoking is associated with a number of serious medical illnesses including cancer, coronary heart disease, and stroke. Given the high rate of cigarette consumption and the health problems related to continued use, it should come as no surprise that cigarette smoking is the number one preventable cause of death in our society. Many smokers, however, find it difficult to stop using cigarettes, and this is confirmed by the staggering rate that ex-smokers relapse. Of the 17 million smokers who try to quit each year, fewer than 1 out of 10 actually succeed (Kessler, 1994).

While smokers relapse for a variety of reasons, avoidance of withdrawal symptoms and the reinforcing value of nicotine itself are primary reasons for relapse. Thus, most smoking-cessation programs include ways of effectively altering smoking behavior by replacing it with some acceptable substitute. Few adequate substitutes for smoking behavior have been identified, however, in the scientific literature. Recently, behavioral economic theory has been applied to the problem of cigarette smoking (Bickel, DeGrandpre, Hughes, & Higgins, 1991; Bickel, Hughes, DeGrandpre, Higgins, & Rizzuto, 1992; Collins, Leftwich, Larson, & Trombley, 1994; Collins & Quevedo, 1993; Epstein, Bulik, Perkins, Caggiula, & Rodefer, 1991; Perkins, Epstein, Sexton, & Passtor, 1990) and provides a model for the evaluation of potential substitute reinforcers.

The present study was designed to examine the usefulness of chewing gum as a substitute reinforcer for cigarette smoking in dependent smokers when they are not allowed to smoke. It was anticipated that chewing gum would serve as a means of alleviating the signs of tobacco withdrawal, especially the "craving" for a cigarette. The first hypothesis closely examined the most common and reliable individual symptom of with-

drawal (i.e., craving), whereas the second hypothesis examined a more global measure of nicotine withdrawal, the total score obtained from the Withdrawal Symptom Checklist (Hughes & Hatsukami, 1986).

METHOD

Participants

Subjects for this study were cigarette smokers at least 18 years of age who reported smoking 16 or more cigarettes per day for at least 6 months. Potential participants were excluded if they had made a serious attempt to quit smoking within the last 6 months or reported heart dysfunction or disease. Subjects were recruited from undergraduate psychology courses offered at Oklahoma State University.

Materials

The Tobacco Withdrawal Symptom Checklist (WSC; Hughes & Hatsukami, 1986) is a 12-item self-report measure that assesses specific withdrawal symptoms and the severity of each symptom. Symptom severity is based on a 4-point Likert scale, where 0 indicates that the withdrawal symptom is not present to 3, indicating that the specific withdrawal symptom is severe.

Procedure

At the beginning of each session, all participants were asked to smoke a cigarette and then rate their current withdrawal symptoms by completing the WSC. Each subject was randomly assigned to one of two conditions: Gum vs. No Gum. Smoking was restricted for subjects in both conditions for the remainder of the experimental session. Chewing gum was given to subjects in the Gum Condition with general instructions to "chew." Subjects in the No-Gum condition were not given gum. All subjects then selected a movie of their choice from a library of more than 30 movies. Upon completion of the movie, subjects were again asked to complete the WSC and to remain in the lab for a short while. Thirty minutes later, each subject completed the WSC for a third time, was debriefed and excused.

Tobacco withdrawal was measured three times for each subject. The Baseline measure, taken after each subject smoked a standard cigarette, was taken prior to the movie and was used to determine the subject's baseline level of withdrawal. The second measure (Time 1) was taken at the end of the movie, and the third measure (Time 2) was taken 30 minutes later.

The present study used a mixed design with two factors, Condition (Gum vs. No Gum) and Time (Time 1 vs. Time 2). Condition was a between-subjects factor; Time was the repeated-measures factor. Data were analyzed using a 2×2 repeated measures analysis of variance (ANOVA).

RESULTS

The means for the "craving" item on the WSC at Time 1 and Time 2 are presented in Figure 1. As hypothesized, a significant Condition \times Time interaction was observed ($F(1, 18) = 13.36, p < .01$). To analyze the observed Condition \times Time interaction further, simple effects tests were used. A significant difference was observed at Time 2 ($F(1, 18) = 38.04, p < .01$), but not at Time 1 ($F(1, 18) = 0.21, p > .05$).

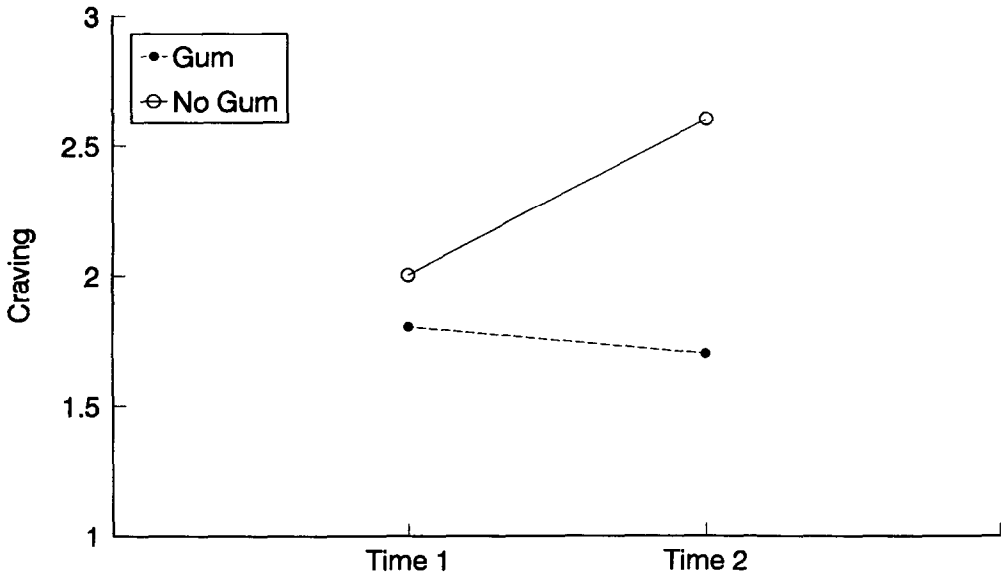


Fig. 1. Mean craving score for Gum and No-Gum Conditions at Time 1 and Time 2.

The means for total withdrawal at Time 1 and Time 2 are presented in Figure 2. The total score from the WSC was obtained by taking the sum of all the items listed on the WSC except the craving item. Again, as hypothesized a significant Condition \times Time interaction was observed ($F(1, 18) = 6.08, p < .05$). To analyze this observed Condi-

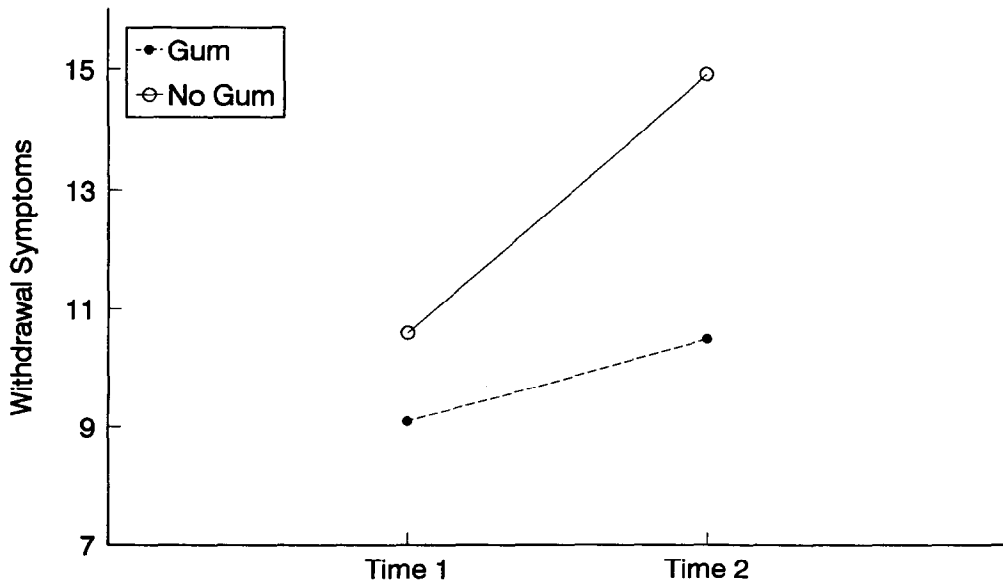


Fig. 2. Mean total withdrawal score for Gum and No-Gum Conditions at Time 1 and Time 2.

tion \times Time interaction further, simple effects tests were also used. Significant differences were observed at both Time 1 ($F(1, 18) = 7.90, p < .05$) and Time 2 ($F(1, 18) = 37.25, p < .01$).

DISCUSSION

The results of this study suggest that chewing gum reduces craving and helps with withdrawal when a nicotine-dependent person cannot smoke. The results do not suggest, however, that chewing gum will allow a person to avoid withdrawal completely. Withdrawal was clearly seen in all the subjects who participated in this study, yet it was observed that those subjects who were asked to chew gum experienced significantly less withdrawal than did their no-gum counterparts. Interestingly, the "craving" for cigarettes that smokers often report appeared to decrease if they were given access to chewing gum during the time in which they were asked to refrain from smoking. This decrease in craving, however, is small and not significant.

It was predicted that dependent smokers who had access to chewing gum would not only experience less craving for a cigarette but would also experience less withdrawal on the whole. In this study, a "real-world" situation was simulated to test these hypotheses. In the "real world" when a person goes to a movie theater, he or she is usually banned from smoking inside the theater. Typically after viewing a movie, a dependent smoker will leave the theater and smoke a cigarette. In the present study, this response was prevented by having the smoker remain in the lab for 30 minutes after the movie had concluded. As expected, the results were in accord with both hypotheses. Subjects in the Gum Condition had significantly lower craving scores as well as lower total scores from the WSC than did individuals in the No-Gum Condition.

Several clinical implications arise based on the findings of this study. Craving is one of the most common and reliable signs of tobacco abstinence (Hughes & Hatsukami, 1986), and it has been shown to be a predictor in relapse (Covey, Glassman, & Stetner, 1990). Thus, it seems only fitting that smoking-cessation programs target this symptom. This study suggests that smokers who chew gum when access to cigarettes is restricted report significantly less craving than do smokers who do not chew gum. In fact, over time, craving for those individuals in the Gum Condition lessened, whereas those in the No-Gum Condition reported an increase in craving.

Although the present study suggests that chewing gum seems to lessen craving and helps with nicotine withdrawal when a person cannot smoke, it tells us little about whether gum can reduce smoking when cigarettes are available to a smoker. To determine whether chewing gum is a true substitute for cigarettes, one must examine the influence of chewing gum in a situation wherein the smoker has access to both gum and cigarettes, but is motivated not to smoke. If chewing gum is indeed a substitute for cigarettes, those smokers who are given access to gum should be more successful in abstaining than the smokers who do not have access to gum.

Another limitation of the present study is that the smokers who participated in this study were not trying to quit smoking; rather, they were asked only to refrain from smoking for approximately 3 hours. It is possible that the observed results apply only to smokers who find themselves in situations where they are unable to smoke and do not apply to smokers who wish to permanently quit smoking. Future research must address this question to examine possible differences between those who are abstaining from those who wish to quit smoking for good.

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