Chewing Gum During Sample SAT Mathematics Questions as a Coping Technique to Reduce Stress

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Introduction

Stress

• According to previous research, it has been found that stress is related to an increase in heart rate in persons who experience stress-inducing tasks of mathematics problems (Hernandez, Larkin, & Whited, 2009).
• Stress could cause wear or tear on the body (Bennet, Klein, Granger, Ritter, & Whetzel, 2010).

Coping

• Coping strategies have been found to decrease anxiety when people encounter a stressor stimulus (Bauermeister, Caldwell, Hou, Hsieh, Wang, Xue, & Zimmerman, 2014).
• Chewing gum has been previously shown to affect anxiety in response to a stressor (Britt, Cohen, Cohen, & Collin, 2001).

Anxiety

• Test anxiety is a result of worry and emotionality; wearisomeness creates negative cognitive expectations while emotionally-charged arousal results in physiological changes in the body (Cohen, Ben-Zur, & Rosenfeld, 2008).
• Previous literature has stated that there is a link between mathematics anxiety and task performance (Lee, & Ng, 2010).

Current Study

• This study focused on comparing heart rate to the control of no gum and gum while answering mathematics problems.

Hypothesis

• It was hypothesized that chewing gum while mentally computing mathematics problems would decrease anxiety and increase accuracy in the number of correct answers given.

Results

• Mean values: Heart Rate before gum, M=86.66 (SD=7.22), Heart Rate after gum, M=85.10 (SD=8.01), Accuracy before gum, M=.26 (SD=.16), Accuracy after gum, M=.22 (SD=.17).
• A Spearman’s Rho correlation coefficient was calculated.
• No correlation was found between heart rate and gum chewing compared to the control of no gum present.
• After running a Mann Whitney test, there was no significance found between before gum and after gum in relation to heart rate.
• In relation to accuracy, there was also no significance found.

Discussion

Summary

• There was no significance in this study to support that gum affects heart rate when taking mathematics tests.

Limitations

• There was a small sample size of only N=10.
• Although gum was in the participants’ mouths, it does not mean they chewed it.
• There were only 5 mathematics questions used.
• Scrap paper and pencils were not given to participants.
• There were only 2 males compared to 8 females.
• Mathematics questions were difficult so some participants might have just guessed on answers.

Future Research

• Have at least 25 participants with equal male to female ratio.
• Have more simple mathematical questions with more of them.
• Compare different types of gum to one another; some might not like just one flavor resulting in them not wanting to chew it.

Method

Participants

• 10 students from Eastern Connecticut State University
  • 10 Total Students (N=10), 8 Female and 2 Male (n=8, n=2), 8 White and 2 Hispanic (n=8, n=2), 1 Freshmen, 5 Sophomores and 4 Juniors (n=1, n=5, n=4), and 3 18 year olds, 5 19 year olds and 2 20 year olds (n=3, n=5, n=2)

Materials

• Heart rate monitor to measure the rate of cardiac activity through an electrocardiogram
  • Each participant had an electrode placed on their upper arm
• Gum used as coping technique
  • Big Red gum was distributed to each participant during the second set of SAT Mathematics questions
• SAT Mathematics Questions
  • 2 sets of 5 SAT Mathematics Practice Questions
  • Multiple choice Response Pad (http://www.analyzemath.com/practice_tests/sat/sat_sample_1.html)

Procedure

• Participants were placed in a room with 1-2 other students, hooked up to a heart monitor.
• One SAT mathematics question viewed at a time (5 per trial, 2 trials total).
• Participants used a multiple choice response pad to record their answers.
• After trial 1 finished, researcher gave participant a piece of Big Red gum. Participant chewed the gum through trial 2 and completed 5 more SAT mathematics questions.
• Participant spit out gum after trial 2 finished.

References