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RESEARCH CRITIQUE ABSTRACTS



EFFECTS OF EXAM STRESS ON DRUG USE AND SLEEP

A critique of the work of Zunhammer et al. (2014), "Sleep quality during exam stress: The role of alcohol..."
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PURPOSE

University students' sleep quality and drug use during an exam period are altered by stress. The purpose of the reviewed study was to show a possible relationship between legal drug consumption (caffeine, tobacco, and alcohol) and the quality of sleep due to stress produced by exams (Zunhammer, Eichhammer, & Busch, 2014).

METHODS

One hundred forty-two university students completed online questionnaires (Pittsburgh Sleep Quality Index or PSQI) about their quality of sleep before, during, and after an exam period. The students were also surveyed on their consumption of alcohol (in drinks/week), caffeine (in units/week), and nicotine (in cigarettes/week) at three points in time (see Table 1). Students then self-reported their perceived stress at these time points.

RESULTS & DISCUSSION

Sleep quality significantly decreased while insomnia symptoms significantly increased before and during an exam period. During the exam period, alcohol consumption decreased, while stress and caffeine consumption increased. There was no significant change in the consumption of nicotine (see Table 1). The decline in sleep quality during an exam period was mainly due to perceived stress, not the amount of legal drugs consumed.

Sleep Quality, Legal Drug Consumption, and Perceived Stress			
Variable	Pre-Baseline	Exam Period	Post-Baseline
Reported Sleep Time (h)	7.35 ± 1.01	7.10 ± 1.04	7.84 ± 1.21
Subjective Sleep Quality	0.43 ± 0.68	0.57 ± 0.96	0.37 ± 0.85
Caffeine (Cups)	4.76 ± 5.67	7.10 ± 9.51	4.56 ± 5.52
Nicotine (Cigarettes)	7.24 ± 25.54	7.19 ± 29.12	5.39 ± 20.75
Alcohol (Drinks)	5.94 ± 6.31	3.42 ± 4.42	6.29 ± 7.88
Perceived Stress Scale (PSQ-20)	33.68 ± 17.62	54.06 ± 19.34	29.62 ± 18.24

Table 1. Means ± standard deviations for each variable are given. The Pittsburgh Sleep Quality Index (PSQI) was used to measure the sleep quality of university students before, during, and after an exam period. Legal drug consumption of students was self-reported.

CRITIQUE

The sleep quality of students was mainly predicted by perceived stress. These results show that an exam period is a good time period for studying stress-related sleep problems. Because of the students' self-reporting, the present study may be prone to response bias. Further, the results may not be applicable to students in other countries. Future research should include participants from various countries, and data should be collected in a way, such as direct observation, that eliminates response bias.

REFERENCE

Zunhammer, M., Eichhammer, P., Busch, V. (2014). Sleep quality during exam stress: The role of alcohol, caffeine and nicotine. *PLoS ONE*, 9(10): e109490. doi:10.1371/journal.pone.0109490

USING YOGA TO MANAGE ANXIETY

A critique of the work of Stoller et al (2012), "Effects of sensory-enhanced yoga on symptoms of combat stress . . ." A. Castro – acas696@lasierra.edu – La Sierra University

PURPOSE

Yoga has many health benefits, both physical and psychological. The purpose of the reviewed study was to analyze a sensory-enhanced yoga program's effect on combat stress in deployed military personnel (Stoller, Greuel, Cimini, Fowler, & Koomar, 2012).

METHODS

Thirty-five individuals participated in a randomized control sensory-enhanced yoga intervention for three weeks, with daily 75-minute sessions to determine yoga's effects on state anxiety (situational), trait anxiety (personality-based), and disturbed sensory processing. Since the subjects were at a normal range for sensory processing prior to the study, this abstract solely analyzes the intervention's effects on the other two aforementioned scales of anxiety. Led by an instructor, they performed routines that offered both proprioceptive input and deep touch pressure. Both this group and an equivalent control group (n=35) were given the State-Trait Anxiety Inventory (STAI), a self-assessment, pre- and post- treatment to measure changes in anxiety. A two-independent sample t-test showed highly significant improvement in reduction of anxiety in the treatment group ($p < .001$) compared to the controls (see Table 1).

Anxiety Changes in Control and Treatment Groups					
	Sample Size	Mean Change	S Dev.	Difference	p-value
Trait Anxiety					
Control	34	1.21	7.18	8.06	<.001
Treatment	35	-6.86	6.99		
State Anxiety					
Control	34	1.38	8.52	9.61	<.001
Treatment	35	-8.23	8.55		

Table 1: Changes in perceived anxiety utilizing the State-Trait Anxiety Inventory. Responses to 40 statements ranked on a 4-point Likert scale.

RESULTS & DISCUSSION

Both trait and state anxiety were reduced as an effect of the program, with a reduction of 6.86 in the scores for trait anxiety, and a decrease of 8.23 in the scores for state anxiety. This is tangible evidence in support of yoga's relieving effects on the various manifestations of anxiety, possibly through the suppression of the autonomic nervous system.

CRITIQUE

A sensory enhanced yoga program helped relieve anxiety from combat stress in deployed military personnel. The study opened the door to research on how this reputable and safe intervention can help those with combat stress. However, the subjective nature of the self-assessments used to measure data may have been biased. Perhaps the addition of impartial physiological tests will offer more legitimate results.

REFERENCE

Stoller, C. C., Greuel, J. H., Cimini, L. S., Fowler, M. S., & Koomar, J. A. (2012). Effects of sensory-enhanced yoga on symptoms of combat stress in deployed military personnel. *Amer J of Occupational Therapy*, 66, 59-68.

REPRESENTATIONS OF FEMALE ATHLETES

A critique of the work of Fink et al. (2014), “The Freedom to Choose: Elite Female Athletes’ Preferred...”
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PURPOSE

Female athletes are rarely offered endorsements by corporations; however when they are depicted in advertising, their sex appeal is frequently highlighted as opposed to their athletic competence. The purpose of the reviewed study was to find out how elite female athletes preferred to be portrayed if their salary and the amount of commercial exposure was the same. (Fink et al.,2014)

METHODS

Semi-structured interviews were conducted with thirty-six collegiate female athletes from two universities in the Midwest and Northeast. The athletes each competed in either individual (swimming, tennis, track) or team (basketball, ice hockey, softball) sports. After viewing pictures depicting female athletes in the context of athletic competence, femininity, and being sexually provocative, among the questions presented to the interviewees was how they would prefer to be portrayed in product endorsements. Authors independently examined all transcripts and emerging themes were the focus of the analysis.

RESULTS & DISCUSSION

Thirty-four of the thirty-six participants (94.4%) interviewed chose to be portrayed in an athletic or combined athletic-feminine context (see Table 1). Those who participated in a team sport were more likely to prefer portrayal of both their athletic abilities and their feminine characteristics.

Portrayal Preference		
	%	N
Athletic Competence Exclusively	66.77%	24
Athletic & Feminine Portrayal	27.78%	10

Table 1. Elite Athletes’ endorsement portrayal choice

CRITIQUE

Positive attributes include (a) having worked from transcripts and subsequently checking inter-rater consistency, (b) use of semi-structured interviews allowed for probes to elicit more detailed responses and explanations, and (c) inclusion of athletes from several sports. Limitations include (a) a small sample size, (b) examining inter-rater consistency overall rather than by variable, and (c) the possible influence of the specific images on interviewee’s responses to questions.

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Flink, J.,Kane, M., & LaVoi, N. (2014). The Freedom to Choose: Elite Female Athletes' Preferred Representations Within Endorsement Opportunities. *Journal of Sports Management*, 28(2). 207-219.

LITERATURE REVIEW ABSTRACTS



TYPE II DIABETES REVERSAL: SURGERY VS. LIFESTYLE

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ISSUE

Type II diabetes has increased worldwide and is regarded as progressive, with irreversible beta cell failure (Lim, Hollingsworth, Aribisala, Chen, Mathers & Taylor, 2011). However, recent research has shown that abnormalities associated with Type II diabetes can be reversed by surgical weight loss (Steven, Carey, Small & Taylor, 2015; Inge, et al., 2009) or intensive lifestyle changes to reduce weight (Savoie, et al., 2014).

OVERVIEW

Weight control is effective in treating Type II diabetes (Steven et al., 2015; Savoie et al., 2014). The issue is which method of treatment is best: bariatric surgery or lifestyle change (Table1). For bariatric surgery, normoglycaemia was only achieved when patients lost more than 25 kg. (Steven et al., 2015). In contrast, lifestyle changes improved glucose tolerance and reduced cardiovascular risk factors (Savoie et al., 2014) without surgical risks.

Lifestyle Change Versus Bariatric Surgery in Reversing Type II Diabetes

Intervention	Pros	Cons
Lifestyle Change	<ul style="list-style-type: none">* Has long lasting positive effects* Improves overall well-being* No serious side-effects	<ul style="list-style-type: none">* Requires commitment* Major change comes about more slowly* Compliance may be difficult
Bariatric Surgery	<ul style="list-style-type: none">* Results take shorter time* Some insurances cover the cost of surgery	<ul style="list-style-type: none">* Cost of surgery is expensive* Potential side-effects* To maintain, still have to change diet/exercise

Table 1. Pros and cons of methods for reversing Type II diabetes.

CONSIDERATIONS

Both bariatric surgery and lifestyle interventions hold merit, but it is shown that a change in lifestyle is preferable since it comes without the complications and cost often seen with surgery. The biggest challenges in implementing dietary and physical activity change are commitment and compliance. This option is preferable to the risk associated with surgery.

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EXERCISE AND GPA AMONG COLLEGE STUDENTS

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The growing obesity epidemic has placed great interest on the benefits of physical activity (PA). Regular PA is advantageous to health and may be associated with higher academic achievement. However, the examination of this link within the college population is limited (Bellar, D., Judge, Petersen, Bellar, A., & Bryan, 2014; Franz & Feresu 2013; Keating, Castelli, & Ayers, 2013). The specific considerations for PA were aerobic activity and strength training/weight-lifting. The factors determining adequate PA included duration, frequency, and intensity.

OVERVIEW

Students who participated in higher levels of aerobic activity were associated with higher grade point averages (GPA) (Bellar et al., 2014). A non-significant trend was observed with higher weight-lifting activity being associated with lower GPA (Bellar et al., 2014). However, the negative trend related to weight-lifting (Bellar et al., 2014) was at variance with an earlier study (Keating et al., 2013). Students in the normal body mass index (BMI) category had significantly higher GPA than those in the overweight category (see Table 1; Franz & Feresu 2013). Higher frequency of weekly PA were more likely to result in a higher GPA (Bellar et al., 2014; Keating et al. 2013). Variances in GPA were related with the year in college and socio-demographic characteristics of participants (Franz & Feresu 2013; Bellar et al., 2014; Keating et al., 2013).

Distribution of BMI and GPA

Variable	GPA			
	<i>n</i>	Mean	SD	<i>p</i> -value
BMI (kg/m ²)				
≥18.5 - <25 (Normal)	47	3.64	0.29	<0.01
≥25 - <30 (Overweight)	23	3.40	0.36	n.a.
≥ 30 (Obese)	7	3.52	0.33	n.a.

Table 1. Comparison between BMI and GPA in college students.

CONSIDERATIONS

The positive association between PA and GPA encourages further examination of potential causal relationships. The present investigation expands findings among elementary, middle, high schools, and college students in regard to the association of PA and GPA (Bellar et al., 2014). It can be suggested that colleges and universities promote opportunities of high frequency PA for students. Caution was taken when interpreting PA and GPA values of cross-sectional data due to subjectivity in self-reporting (Franz & Feresu 2013; Bellar et al., 2014; Keating et al., 2013).

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THE EFFECTS OF PROCESSED MEAT ON MORTALITY

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Red meat is assumed to cause adverse effects on health, such as increased blood cholesterol, risk of heart disease, and development of certain cancers. However, the type of meat consumed may be the critical factor (See Table 1, Kappeler, Eichholzer, & Rohrmann, 2013). This research discusses the possibility that it is primarily processed meats that are the culprit when it comes to the association between meat eating and increased risk of cancer and heart disease mortality.

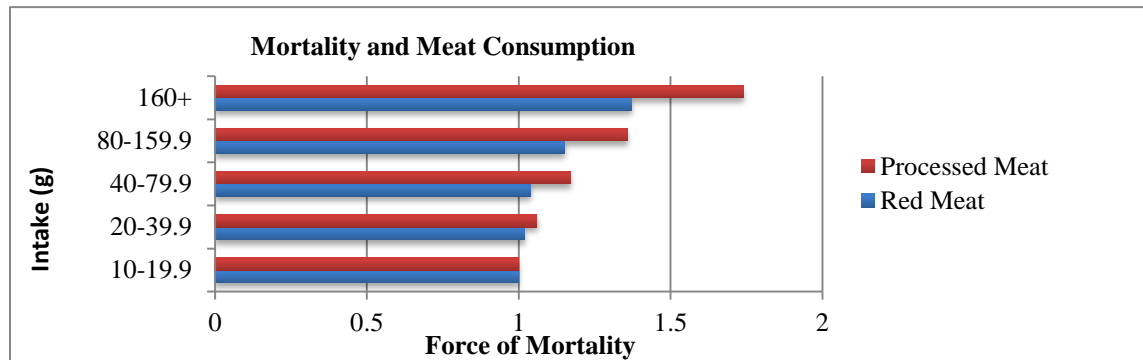


Table 1. Statistical differences of processed vs. red meat may explain mortality.

OVERVIEW

Increased consumption of processed meat was found to increase the frequency of cardiovascular disease and cancer. White meat and unprocessed red meat showed no significant increase in the disease developments or mortality. The amount of processed meat consumed related directly to the hazard rate (Otto et al., 2012; Rohrmann et al., 2013).

CONSIDERATIONS

Participants' ethnicity, background, education level, age, smoking and drinking habits, physical activity, and demographics were examined in each study. A pre-study self-assessment questionnaire was analyzed to ascertain nutritional and physical lifestyle habits (Kappeler et al., 2013; Otto et al., 2012; Rohrmann et al., 2013). Multivariable-adjustments were conducted to account for participants' diversity accurately. Further study is needed to ascertain whether one can decrease risk of cancer and heart disease by simply eliminating processed meats rather than all red meat from the diet

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BENEFITS OF PHYSICAL ACTIVITY FOR CHILDREN WITH CEREBRAL PALSY

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Cerebral palsy (CP) is the most common childhood neurodevelopmental disease linked with lifelong motor impairment (Verschuren, Darrah, Novak, Ketelaar, & Wiart, 2013). A few therapies focusing on physical activity interventions include hippotherapy (Zadnikar & Kastrin, 2011), aquatherapy (Lai, Liu, Yang, Chen, Wu, Chan, 2014), and interventions that decrease sedentary behavior (Verschuren, et al., 2013) (See Table 1).

Active Approaches to Treating Childhood Cerebral Palsy

Physical Therapy Approach	Benefits	Limitations
Hippotherapy (Zadnikar & Kastrin, 2011)	Works major muscles	Only improves muscles
Aqua therapy (Fragala-Piham, et al., 2014)	Increase in functional strength and aerobic capacity	Inappropriate for children with aquaphobia
Decreasing sedentary behavior (Verschuren, et al., 2013)	Improvement in daily activities	Time consuming

Table 1. The benefits and limitations of different physical therapy approaches to cerebral palsy.

OVERVIEW

In 21 of 39 children with CP, those who continued their regular physiotherapy and occupational therapy during the hippotherapy study period demonstrated improved coordination, increased head and trunk control, and improved gait (Zadnikar & Kastrin, 2011). In another study, children who participated in aqua therapy showed greater gross motor function measures than those receiving conventional therapy only showed (Fragala-Piham et al., 2014). Even incorporating light-intensity activities with 30 minutes of vigorous activity has been shown to be beneficial to children with CP (Verschuren et al., 2013).

CONSIDERATIONS

The evidence presented above demonstrated that the implementation of physical activity programs in children with CP can be beneficial. Since the sample sizes were small, not too much should be read into the outcomes. More extensive studies, such as the long term effects of certain physical therapy approaches, are needed to verify the above research findings.

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THE EFFECTS OF HYPERBARIC OXYGEN THERAPY ON PEOPLE WITH AUTISM

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ISSUE

Autism is a developmental disorder that decreases social communication skills, causes repetitious actions, and stunts behavioral advancements. Physiologically, autism is characterized by cerebral hypofusion, tissue inflammation, and oxidative stress. Hyperbaric oxygen therapy (HBOT) is when patients stay in a pressurized chamber of 100% oxygen for varying lengths of time. Doctors are now using HBOT to treat people with autism. The considerations for HBOT and autism that will be covered in this review include 1) physical characteristic effects, 2) behavioral characteristics effects, and 3) third-party perceptions on improvement.

OVERVIEW

Many physical characteristics were affected by HBOT treatment. El-baz, Elhossiny, Azeem, and Girgis (2014) performed an HBOT study on people with autism in a 100% oxygen chamber at 1.5 atmospheric absolutes (APA) for a minimum of 20 sessions. El-baz et al. used Magnetic Resonance Imaging (MRI) to measure regional cerebral blood flow (RCBF) before and after HBOT treatments. After HBOT, researchers reported significant increases in white matter RCBF in right and left prefrontal regions and in right and left superficial temporal regions. Additionally, El-baz et al. observed no significant color differences (corresponding to changes) in MRI scans before and after HBOT in either the right or left deep temporal regions. Rossignol, Rossignol, James, Melnyk, and Mumper (2007) performed another study with a 100% oxygen chamber at 1.5 APA and a 24% oxygen chamber at 1.3 APA, both for 40 HBOT sessions. After HBOT, Rossignol et al. reported that the 18 children tested had an averaged 88.4% decrease in their C-Reactive Protein (CRP) levels from their 4.3 ± 8.7 mg/L to 0.5 ± 0.7 mg/L mean starting values. This decrease in CRP levels indicated a decrease in both neuroinflammation and gastrointestinal inflammation. Furthermore, Rossignol et al. found that oxidized glutathione levels, which is a marker of oxidative stress, remained similar before and after HBOT (0.26 vs. 0.27 μ mol/L in 1.3 atm and 0.20 vs. 0.22 μ mol/L in 1.5 atm).

Varied behavioral characteristic results have been observed after HBOT treatments in people with autism. Jepson et al. (2010) used a 24% oxygen chamber at 1.3 APA for 40 HBOT sessions over 56 days, and reported no persistent trends in any adaptive, stereotypy, or aberrant behaviors. The only variations listed by Jepson et al. were that one participant's adaptive score mildly decreased from 1.5 to 0.9, and another participant's stereotypy score mildly increased from 1.9 to 2.5. However, Jepson et al. indicated that the other participants did not reproduce these results. Another study by Bent, Bertoglio, Ashwood, Nemeth, and Hendren (2011) used a 100% oxygen chamber at 1.5 APA for 80 HBOT treatments spread throughout 20 weeks. Bent et al. reported that all 10 children scored a two (corresponding too much improvement) at 80 days of treatment using a Clinical Global Impression-Improvement (CGI) scale. Bent et al. indicated that the change from baseline measurements after the study was $p=0.004$. Additionally, Bent et al. observed the most prevalent behavioral changes in eye contact, language, and imitation. Significant improvements were indicated by standard deviation (SD) changes in irritability (13.9 baseline SD to 9.7 SD at 80th day treatment), lethargy (13.7 baseline SD to 7.1 at 80th day treatment), and hyperactivity (21.9 baseline SD to 5.7 at 80th day treatment).

Rossignol et al. (2009) performed a study with a treatment group that had 40 HBOT sessions at either 1.3 APA with 24% oxygen or at 1.03 APA with 21% oxygen. Also, a control group was maintained. Rossignol et al. recorded that physician CGI ratings significantly improved in the HBOT treatment group by 1.13 points compared to 0.83 points in the control group (4.0 points = no improvement). Similarly, parental CGI ratings improved by 1.30 points in the treatment group and only 0.83 points in the control group. Rossignol et al. also said the physician CGI scores improved for 80% of children in the treatment group and 38% in the control group ($p=0.0024$). In addition, Rossignol et al. reported that both physician and parental CGI scores rated no children as minimally worse in the HBOT treatment groups, whereas one child in the control group was rated minimally worse.

CONSIDERATIONS

Previous investigations by El-baz et al. (2014) and Rossignol et al. (2007) both utilized a 100% oxygen chamber at 1.5 APA for 40 sessions in their studies. This was a strength because the results for RCBF, CRP levels, and oxidized glutathione levels were compatible between the studies. The findings for behavioral characteristics presented by Jepson et al. (2010) and Bent et al. (2011) could not be compared due to different HBOT testing conditions. The participants' improvements in irritability, lethargy, and hyperactivity noted by Bent et al. might be due to the 1.5 APA testing condition and 80 sessions of treatment. Conversely, the lack of adaptive, stereotypy, and aberrant improvements noted by Jepson et al. might be due to the 24% oxygen chamber for only 40 sessions. Explanations for what each behavioral category entails were noted in Table 1. Future research should include a multifaceted study that tests the effects of HBOT at 100% oxygen and 1.5 APA for 80 sessions on multiple physical and behavioral characteristics in children with autism. Examples of these characteristics to test for include changes in RCBF, eye contact, aberrant behaviors, and language.

Differences in Behavior Categories
• Adaptive: vocal and physical initiations and responses
• Stereotypy: vocal and physical repetitions
• Aberrant: aggression, tantrums, and disruptions
• Hyperactivity: excessive vocal and physical responses and actions

Table 1. Behavioral definitions are listed above.

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DENTAL CHALLENGES RELATED TO BULIMIA

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ISSUE

Gastric acid is the strongest acid found in the human body with an average pH of 2.0. With frequent vomiting, the acid damages not only the esophageal lining, but also intraoral components such as the phalanx, gums, and teeth. Patients with *bulimia nervosa* have a tendency of frequent vomiting, and often have noticeable damage to these components (see Table 1; Bretz, 2002; Uhlen, Tveit, Refsholt-Stenhagen, Mulic, 2014).

Potential Intraoral Damage from Gastric Acid

Region	Components	Symptoms
Soft tissue	Gums, salivary glands, tongue, palate, etc.	Swellings, ulcers, semi-permanent scars.
Hard tissue	Enamel layer and dentin of teeth.	Corrosion to enamel and dentin. Increased risk of dental caries due to increased number of <i>S.sobrinus</i> on enamel.

Table 1. Potential symptoms observed from oral components of bulimic patients.

OVERVIEW

Patients who vomit frequently were likely to have various identifying marks (Bretz, 2002; Uhlen et al., 2014), including noticeable acid-caused scars on the soft skinned region inside the mouth (Bretz, 2002), erosion on dental enamel (Bretz, 2002; Hermont, Oliveira, Martins, Paiva, Pordeus, Auad, 2014; Uhlen et al., 2014), and a high number of *Streptococcus Sobrinus*, an intraoral bacteria which favors a low pH and sugar-abundant environment, on dental enamel (Bretz, 2002). Those three marks could be used as evidence for bulimic behavior.

CONSIDERATION

Vomiting associated with bulimic behavior was likely to cause tooth erosion (Bretz, 2002; Hermont et al., 2014; Uhlen et al., 2014) in about 70% of the bulimic patients (Uhlen et al., 2014). It was recommended that they should avoid brushing teeth right after purging, washing mouth cavity with clean water thoroughly to remove acidic residue, and using fluoride toothpaste to minimize the damage (Bretz, 2002). The data regarding the relationship between tooth erosion and bulimia is limited; for example, in majority of the studies the gender of subjects were female (Hermont et al., 2014). Also, most studies were only focused on relationship between the length of bulimic behavior and the degree of tooth erosion. More studies of this relationship including physical or psychological factors of patients are needed.

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ORIGINAL RESEARCH ABSTRACTS



DOES CAFFEINE INTAKE SIGNIFICANTLY AFFECT THE PREDICTION OF VO2MAX AND OTHER PERFORMANCE VARIABLES OF ELITE CROSS COUNTRY RUNNERS?

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PURPOSE

The purpose of this study was to determine if caffeine intake enhanced aerobic performance during a 10-15 minute time trial. The performance measurements taken were the following: VO2max, heart rate, blood pressure, and perceive rate of exertion.

METHODS

The populations sampled were cross country runners from small northwest college. Both male and female (2 males and 2 females) cross country runners were included in this study. The ages ranged from 18 to 25 for participants. The cross country runners were tested during their off season, in the spring semester. The participants were able to do more work, as well as hold the threshold longer during trial with caffeine (See Table 1). The participants reached their threshold at a later time in trial (See Table 2).

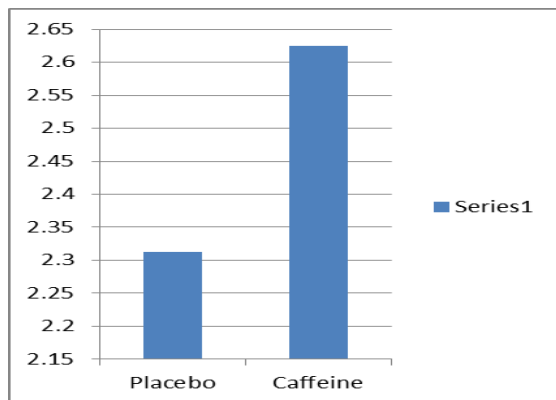


Table 1 Duration of Threshold

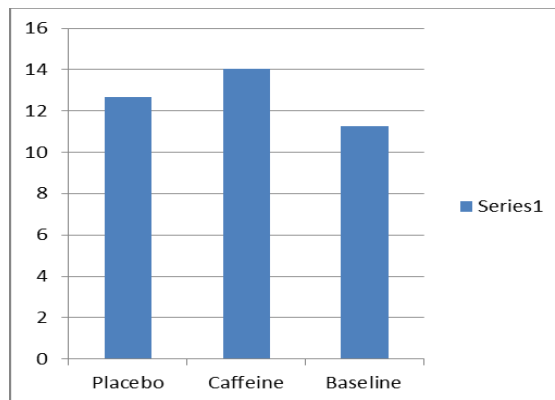


Table 2 Time of Threshold

RESULTS & DISCUSSION

T-test assuming equal variance was used to determine the duration of threshold between caffeine and placebo trial. The result was not significant (p-value 0.40252). An ANOVA was performed to determine the duration of threshold among placebo, caffeine, and baseline trial. The value was not significant (p-value 0.79827).

CRITIQUE

Caffeine did have a positive effect on aerobic performance. Results of testing indicated that with the use of caffeine the participants were able to reach their threshold and hold their threshold longer, thus allowing them to work harder for a longer period of time. Results of the treatment affect of caffeine aided the participants in reaching their threshold at a later time in their trial and were able to perform longer after reaching their threshold. The result from our research is not significant but we still believe that is meaningful. If we had a larger population group in our study we feel the result would be significant.

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AN EVALUATION OF DISTRACTION CONTROL IN EXPERIENCED CYCLISTS

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PURPOSE

The purposes of this study are to 1) determine the effect of a distracter (i.e., non-preferred, varied tempi music, and no music) on experienced road cyclists' performance (i.e., power, heart rate, perceived exertion) during a 20-minute continuous cycle session, and 2) to determine whether participants' hardiness (low vs. high) minimizes or extinguishes the distracter's effect on performance.

METHODS

Participants: A sample of 21 experienced cyclists volunteered for participation in this study ($n_{\text{male}}=10$, $n_{\text{female}}=11$). All participants were defined as physically active (e.g. rides a bicycle 100+ miles per week and with a Par-Q and You questionnaire). Participants were currently riding with music and have time trial experience. **Equipment:** Cycling power accuracy was measured by using a Power Tap wheel. The bicycle was mounted into magnetic resistance Cycle Ops trainer and Cycle Ops leveling block. The Garmin Forerunner 310xt and chest strap was used to measure power from the Power Tap, and actual heart rate. The chest strap was secured by the volunteer, fitting snugly across the breast plate. Perceived rate of exertion was defined through Borg's Rate of Perceived Exertion (RPE) scale. LG personal music player and Skull Candy headphones were used to administer the Non-Preferred music measure. A demographic questionnaire was utilized to collect cycling experience(s). The Psychological Performance Inventory (PPI) was used to measure mental toughness. The Brunel Music Rating Inventory-C was used to measure motivational qualities of administer music. **Procedures:** Prior to testing, all participants completed the Research Participant Information and Consent Form, and the Par-Q and You questionnaire. Successful completion of the forms, the participants completed the demographic and the Psychological Performance Inventory through Qualtrics Survey Software. Volunteers had their rear wheel removed from their personal bicycle and a Power Tap wheel was affixed. The bicycle was held in place with the Cycle Ops trainer, with the Cycle Ops leveling block held the front wheel in place. Volunteers had a familiarization period, along with their warm-up at a self-regulated pace on their bicycle. Administration of Preferred (P), Non-Preferred (NP), and No Music (NM) were randomized. Volunteers cycled at a continuous effort for 20-minutes, while listening to P, NP or with NM. Heart rate (HR) and cycling power (CP) was recorded through the Garmin Forerunner 310xt and Power Tap. At the end of the session, volunteers gauged their effort by using the RPE scale. Volunteers cooled down at a self-regulated pace. Finally, each volunteer completed the Brunel Music Rating Inventory-C after listening to the P and NP playlist, rating each song that was heard (ensuring that music considered P, is considered desirable by the volunteer and that administered music NP is considered undesirable). Each volunteer supplied their own P music playlist. Music considered

NP was provided, as determined by each volunteer's current selections. **Statistics:** Using a test-retest methodology (randomized testing for 3 trials: using P, NP, and NM trials), participants will complete Brunel's Music Rating Inventory-C and the Physiological Performance Inventory to confirm preferred music playlist and determine level of hardiness prior to the experimental trials. Performance outcomes assessed during the experimental trials will be Borg's RPE, power (i.e., Power Tap and Garmin Forerunner 310xt devices) and exercise heart rate. Inferential analyses will include 2 x 2 MANOVA (hardiness x music type) per each outcome measure and dependent sample *t*-test to confirm significant interactions.

RESULTS

Data collection still in the process. Results to be determined.

DISCUSSION

By introducing NP and NM to the experienced cyclists, and then examining their responses to the PPI, it is hypothesized that those with mental skills training will experience similar results in HR, RPE, and cycling power. Those cyclists who have minimal or no exposure in mental skills training may experience an increase in HR, RPE, and a decrease in cycling power, when administered to the NP and NP controls. Cyclists who ride while listening to preferred music may change the physiological component of their training session by suppressing fatigue, enhancing the overall riding experience, lower heart rate, and reducing perceived exertion levels; however, music can also be a distracter (Lim, Atkinson, Karageorghis, Eubank, 2009). Distractions can be positively or negatively interpreted, and, if the athlete is able to manage the negative distractions, positive results are likely to be achieved (Jackson & Csikszentmihalyi, 1999), demonstrating that a stimulus can be controlled. Training with music as a positive distracter is a method commonly employed by many athletes, as music can alter perceptions of time, effort and motivation (Beltman, 2005).

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RELATIONSHIP OF TASTER STATUS & FOOD ENVIRONMENT ON BMI

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PURPOSE

Obesity is a big problem in the western hemisphere and as more countries become developed and begin introducing western customs of fast food intake, there is a spike in the amount of people who become obese. A fact that highlights the high-fat diet and low-exercise community is that more than 1/3 of U.S adults and 17 percent of children ages 2-19 are obese. (CDC, 2014) Our interest in this topic is to help add to the literature about how taster status awareness & food environment identification may affect BMI levels. Taste has many influences such as genetic traits inherited from parents, environmental factors such as race and culture, and accessibility to healthy or unhealthy food. (Burd, et al, 2013, p.787) The null hypothesis of the study is that if people understand their taste status and food environment, it will have no affect on their BMI levels.

METHODS

Participants: A sample of 35 to 45 Riverside County Citizens was requested to participate in the study. Participants were in the age range of 18-27. We had 22 males and 19 women in the study to have a balanced sample size and look at potential differences. **Equipment:** BMI was measured using a portable scale and measuring tape. PROP (6-n-propylthiouracil) test slips were used to properly analyze taster status: supertaster, non-taster, or in between. **Procedures:** First, they will complete a small questionnaire by Freedman titled “Perceptions of Food Environment Scale,” to determine food environment status. The questionnaire makes eight statements about perceived environmental exposure to food by having them rate on a likert scale their exposure to the statement’s subject. Next, they used the PROP-test, which has been used in multiple studies to assess oral-taste responsiveness. (Ofstedal & Tepper, 2013, p.104) This test involves licking a PROP-test slip and addressing if the bitterness was strong, in-between, or not detectable.

Statistics: Our dependent variable in the research study was BMI because this is where we got our measureable results. The independent variables were food environment and taster status. Food environment had two categories, which were unhealthy or healthy, by using the questionnaire specified above. Taster status will have three categories, which will be a PROP taster (supertaster), taster, or non-taster. We used IBM’s SPSS predictive analysis software (Version 22) to help input and interpret data, to develop our results. Our design was static group comparisons because we analyzed the relationship of taster status and food environment on BMI.

RESULTS

A 2 x 3 factorial ANOVA was used to determine if taster status, environment status, or their interaction were related to BMI. No main effect was seen for environment status ($F(1,39) = 0.01$, $p = .91$), for taster status ($F(2,38) = 1.71$, $p = .20$), or for the interaction between them ($F(2,38) = 0.09$, $p = .92$) When we look at taster status relation with BMI there is a strong possibility that because our sample size was underpowered, we potentially could have acquired a statistically significant result of the relationship with more participants. Table 1 demonstrates the amount of participants that took part in this study.

Between-Subjects Factors

		Value Label	N
Taste Status	1.00	Non-Taster	12
	2.00	Taster	19
	3.00	Supertaster	10
Environment Status	1	Healthy	22
	2	Unhealthy	19

Table 1: Descriptive Quantitative Data of the Participants

DISCUSSION

In conclusion, the study revealed that there was no significant difference in BMI values for taster status and environment. Taster status is important because in a study where researchers analyzed similar data, they found that supertasters tended to avoid bitter foods such as black coffee, grapefruit, and certain vegetables (Burd, et al, 2013, p.788). Any type of vegetable reduction in diets is unacceptable when desire to maximize health is high; because the nutrients they provide to the body are essential. Burd’s group also found that there was a strong link of non-tasters preferring to eat very fat-rich food. This is why we felt that non-tasters would have significantly higher BMI values. In our study we had 29% non-tasters, 24% tasters, and 47% regular tasters. We also looked into the importance of the food environment the participants perceived in their lives with a survey. Factors that play a role in food preference include early exposure to a variety of foods, health beliefs, classically conditioned negative and positive associations, observational learning and cognitive interpretations of sensory experiences with various flavors. (Cantanzaro, et al, 2013, pp. 126-127) 54% of the participants perceived their food environment to be healthy and the remaining 46% perceived their food environment as unhealthy. BMI was used to numerically validate the fatness of participants accurately, which is ideal according to the Center for Disease Control and Prevention (CDC, 2015). We recommend researchers interested in the area to consider using bioelectrical impedance or bod pod to get better results of body composition. The participants varied in their data when looking at the comparison of BMI to taster status, which explains our results. For example, there were very heavy people who had a non-taster status and healthy environment, which indicated that there are more factors involved in the analysis of healthy weight maintenance. It is definitely a multifaceted area that requires an in-depth analysis of more variables than the three indicated above. Our priority was to look specifically at taste although because it is an area that does not necessarily come to mind when analyzing the factors that help promote a healthy body.

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