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PLACEBO EFFECT: IMPACT OF THE EXPECTATION OF CAFFEINE ON REACTION TIME AND MOOD

by

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THESIS APPROVAL PAGE

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ABSTRACT

Placebo Effect: Impact of the Expectation of Caffeine on Reaction Time and Mood

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The placebo effect is a physiological and/or psychological response to an inert substance that is believed to contain active ingredients. A body of placebo research has linked this phenomenon to the expectancy theory. The present study investigated the impact of expectations about the effects of caffeine on subjectivity (e.g., mood) and objectivity (e.g., reaction time). Subjects (n = 90) were asked to consume decaffeinated club soda and were either falsely informed that the drink contained caffeine equivalent to one cup or four cups of caffeinated coffee or were accurately told that the drink did not contain caffeine. Mood and reaction time were measured by a subjective mood scale and a lexical decision task, respectively. Results demonstrated no significant main effects or interaction effects. Although the hypotheses were not supported, the placebo effect is a highly researched occurrence and has been demonstrated in a variety of fields including pharmacology, psychology, and medicine.

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Introduction

The placebo effect is often associated with negative implications as it relates to construct validity and the experimental design as well as its varied history in medicine. According to Walach (2003), the term originated from a Latin psalm verse, "Placebo Domino in regione vivorum" ("I shall please the Lord in the land of the living") that was sung bedside during the Middle Ages to those nearing death. People were often paid to sing the lines, and the word placebo became synonymous with fraudulency. Furthermore, societies in the 18th century recognized the term as deceitful, as the medical community consciously provided patients with ineffective substances in order to satisfy them (Shapiro & Shapiro, 1997). With the intention of reforming physicians' reputation, modern medicine sought to demonstrate that remediation was a result of the active ingredients in the treatments and not due to hope or expectation. Nevertheless, the medical community has since accepted the concept that placebos contribute to varying degrees of therapeutic outcome and that psychological processes underlying the use of placebos can produce change (Wampold, Minami, Tierney, Baskin, & Bhati, 2005).

To avoid unfavorable associations, the placebo response phenomenon is also referred to as an *expectancy effect* and is broadly defined as a physiological or psychological state produced by the meaning of the intervention and the expectation associated with it (Moerman & Jones, 2002). Expectancy responses can produce positive outcomes (i.e., improvements in condition) or negative outcomes (i.e., adverse changes in condition) that are not attributed to the mechanisms of a pharmaceutical substance, the

latter referred to as a *nocebo effect* (Scott et al., 2008). These expectancy effects are reactions to an inert or inactive substance (placebo) that is believed to have beneficial or undesirable outcomes (Kirsch, 1985). In a meta-analysis of 19 clinical trials containing 2,318 participants that investigated changes in depressive symptoms, Kirsch and Sapirstein (1998) reported that 75% of patients' improvements in mood were due to a placebo response, while a literature review of nocebos cited a study that attributed 89% of self-reported adverse effects to a nocebo effect (Dunn, 2005).

Theoretical Explanations of the Placebo Effect

Learning theories have been used to explain the function of psychological processes on the placebo effect, and the two predominant learning theories are *response expectancy theory* and *conditioning theory*. According to the response expectancy theory, an individual can produce a physical or subjective change simply by holding a strong belief about an object (Stewart-Williams & Podd, 2004). Humphrey (2002) proposed a pattern of behavior that is descriptive of this theory: the patient must be aware of the treatment being received, hold a certain belief about the treatment that leads to an anticipated outcome, and allow that expectation to influence the patient's capacity to satisfy his or her conviction. This order of thinking ultimately produces a placebo effect by the act of confirming one's own anticipations (Kirsch, 2005).

The second theory used to explain the placebo effect is linked to Pavlov's (1927) classical conditioning theory, which states that repeatedly pairing a neutral stimulus with an unconditioned stimulus produces an unconditioned response (UCR). As a result, the neutral stimulus will transform into a conditioned stimulus (CS), which acquires the ability to elicit a conditioned response (CR) similar to the UCR. The CS may be

associated with placebo treatment, while the CR may be termed placebo response (Mikalsen, Bertelsen, & Flaten, 2001). Voudouris, Peck, and Coleman (1985) purported that this learning concept provides a theoretical framework for placebo responses, as the effect can be classically conditioned in humans. Conceptually, an individual would have experienced a positive effect from an intervention, which increases the probability of reacting similarly to future treatments. Likewise, a person holding negative opinions about an intervention due to past incidents would most likely respond with resistance to future therapies, as the placebo component contains adverse expectations.

In addition to the response expectancy and classical conditioning theories, researchers have conducted experimental studies demonstrating the influence of expectancies on placebo responses. Placebo analgesia was enhanced after classically conditioning individuals to experience low levels of pain in response to a pain stimulus. Reducing the intensity of a pain stimulus, without the participants' awareness, whenever the placebo anesthetic was triggered produced these effects (Voudouris et al., 1985; Colloca & Benedetti, 2005). Furthermore, the presence of suggestion in placebo studies has produced significant increases in expectancy effects in several pain investigations (Colloca & Benedetti, 2005).

The most common method of assessing the placebo effect is by designing double-blind, randomized placebo-controlled studies with two groups. One group consists of participants who are given an active treatment, while the second group includes participants who receive the placebo. Some clinical trials include a no treatment group as opposed to a placebo control group. In order to infer that the placebo exists, the results must demonstrate that the inert substance influences clinical improvement (Colloca &

Benedetti, 2005). Most clinical trials that demonstrate large or moderate placebo effects examine disorders that are amenable to placebo. Papakostas and Daras (2001) asserted that conditions such as anxiety and pain are more responsive to placebos compared to hereditary and chronic diseases that exhibit resistance to faux treatments.

Applications of the Placebo Effect

Investigations of antidepressants versus placebos in the treatment of depression are prominent in literature, as depressive symptoms have been shown to improve due to the presence of inactive drugs. Randomized controlled trials (RCTs) have attributed approximately 75% of observed responses to inactive pills, suggesting that the expectancy effect of taking an antidepressant is larger than an actual pharmacological effect (Waring, 2008). Studies conducted by Kirsch and Sapirstein (1998) reported comparable findings; their 1998 analysis of four non-antidepressant medications (amylobarbitone, lithium, liothyronine, and adinazolam) demonstrated effects similar to selective serotonin reuptake inhibitors (SSRIs) and tricyclics. Responses to active antidepressants may be due to a placebo response as indicated by these effects. A later study assessing the six most prescribed antidepressant medications between 1987 and 1999 demonstrated that approximately 92% of reported effects were accountable by the placebo response (Kirsch et al., 2002). The long standing comparison trials of placebos and antidepressants reflect the potential therapeutic benefits of placebos without the adverse side effects of active drugs (Waring, 2008).

According to Colloca and Benedetti (2005), placebo effects are also apparent in pain studies that focus on expectation pathways in the brain. The authors reported that proglumide, a drug originally used to treat ulcers, produced pain analgesic effects only

when paired with placebos, emulating classical conditioning. Although proglumide is not a painkiller and therefore does not interfere with pain processes in the body, it has been established that its presence reduces pain by activating opioid mechanisms. Wager, Scott, and Zubieta (2007) supported hypotheses concerning pain analgesia and opioid activity by finding that placebo treatment of pain was correlated with endogenous (naturally occurring) opioid systems.

Pain expectancies also contribute to a considerable amount of experienced pain. Administration of an inactive treatment combined with the suggestion that it reduces unwanted symptoms can lead to a decrease in perceived pain (Colloca & Benedetti, 2005; Scott et al., 2008). An effect is most evident when removing psychosocial factors, such as therapist-patient interaction, from treatment and examining pharmacological effects of a drug by including a hidden intervention (Levine & Gordon, 1984). For example, patients in postoperative pain who received 6-8 milligrams of morphine without their knowledge rated equal pain to those who observed a nurse inject a saline solution (placebo). An analgesic response was stronger than the placebo only when morphine was surreptitiously increased to 12 milligrams (Levine & Gordon, 1984). In a separate analysis of postoperative pain, Amanzio, Pollo, Maggi, and Benedetti (2001) also demonstrated that an observed injection of a sham painkiller is equally effective at reducing pain compared to a hidden administration of a true analgesic. These findings reinforce the efficacy of the psychological and social components of an individual, such that there is similar activation of the brain when influenced by true and placebo treatments (Amanzio et al., 2001). Results described in these studies are also consistent with placebo research conducted beyond the field of pain.

Another model of assessing placebo analgesia includes Parkinson's disease (PD) patients. Fregni and colleagues (2006) postulated that a causal link exists between expectation and pain perception. In support of this hypothesis, verbally induced expectations of a placebo pill altered the rating of pain just as frequently as the active treatment (levodopa) that is prescribed for PD. Individuals inflicted with PD also showed subjective motor improvement to placebo (Fregni et al., 2006). According to research conducted by de la Fuente-Fernández et al. (2001), the expectation of clinical benefit activated endogenous dopamine in the striatum of the brain, which is involved with executive functioning and movement. Participants who anticipated a therapeutic reward were more likely to generate higher levels of dopamine than those who received levodopa, suggesting a "dose dependent relation between the release of endogenous dopamine and the magnitude of the placebo effect" (p. 1164). The function of dopamine release in response to expectation may be a common phenomenon across many conditions (de la Fuente-Fernández et al., 2001).

Caffeine and the Placebo Effect

Placebo effects have also been identified in caffeine research, utilizing decaffeinated beverages as placebos. This experimental model has been shown to be beneficial because the effects can be examined in healthy participants, and participants may believe that a variety of bodily reactions can be produced by the effects of caffeine. The method of consuming decaffeinated coffee that is believed to contain caffeine has repeatedly yielded indicators of placebo responses in physiological (e.g., heart rate), behavioral (e.g., reaction time), and subjective (e.g., mood) measures (Schneider et al., 2006). Improvement in these areas were also associated with quicker response times to

caffeine (approximately 10 minutes), although the stimulant can take 30 to 40 minutes to become effective, and remained for at least one hour. (Anderson & Horne, 2008).

The expectancy and classical conditioning theories were contrasted in several caffeine placebo studies with attempts to attribute the placebo effects to either explanation. On the one hand, participants performed better on motor tasks, with heightened states of alertness, when falsely informed that they were consuming caffeine (Mikalsen et al., 2001). On the other hand, observed effects can also rely on conditioning features. Individuals who ingested decaffeinated coffee without knowledge that the beverage lacked caffeine experienced increased levels of behavioral functioning after smelling or tasting the beverage (Ader, 2000).

Although literature supports the power of the "caffeine placebo paradigm" (Schneider et al., 2006, p. 331), opposing research has suggested otherwise. Flaten, Blumenthal, and Aasli (2003) and Schneider et al. (2006) reported nonsignificant results from studies that assessed the placebo response. Flaten and colleagues (2003) surveyed individuals' perception about how much their arousal, alertness, calmness, and stress will increase after ingesting one and two cups of caffeinated or decaffeinated coffee, and each were subsequently presented with the substances. The researchers predicted positive correlations between the expectation of caffeine effects and the actual effects. Contrary to their hypothesis, participants who expressed relatively strong expectations about the effects of caffeinated coffee on increased subjective arousal and stress and decreased calmness did not exhibit responses that correlated with the expectancies.

Schneider et al. (2006) also examined the impact of caffeine expectations on arousal as well as on reaction time and well-being across three groups: true information,

false information, and control. Reaction time was assessed by a test module that was developed to measure alertness, while well-being and arousal were rated using a multidimensional questionnaire. The two treatment groups were administered decaffeinated coffee, with one falsely informed that the beverage contained potent caffeine and one truly informed that the substance was decaffeinated. The control group was not provided with a beverage. Results failed to show an effect for the differences between the three groups for each dependent measure (arousal, reaction time, and well-being), although participants in the falsely informed group expected to feel the effects of their assigned beverage. Despite nonsignificant findings, participants in both experimental groups who expected to experience the effects of caffeine displayed equal or higher subjective alertness, as measured by self-report, compared to those in the control group. Such findings indicate that the placebo effect is primarily demonstrated through self-reported introspection; however, a broad array of objective and subjective instruments should be utilized to gain a more coherent perspective on this phenomenon (Schneider et al., 2006).

Purpose of the Present Study

The emphasis of objective and subjective measurements that monitor psychological and physiological changes regarding placebo response studies has remained considerably small. The prevailing literature exhibits inconsistent findings for both dimensions when studied together, as psychological observations often have been portrayed as having a larger effect than physiological changes. For instance, in a systematic review of clinical placebo trails comparing placebo with no treatment, Hróbjartsson and Gøtzsche (2001) reported finding limited evidence in support of the

power of placebos. Subjective findings that were rated as continuous variables demonstrated significant differences between placebo and no treatment trials as well as in self-reported evaluations of pain treatments; however, objective and subjective outcomes produced nonsignificant results. Fregni and colleagues (2006) asserted that placebos possess the ability to alter overall expectations but that they might not accurately reflect objective functioning. For example, Fregni et al. demonstrated that Parkinson's patients in the experimental group experienced reduced levels of perceived pain but did not show improvements in motor tasks, such as walking.

Contrary to these findings, Anderson and Horne (2008) determined that objective measures produce results comparable to subjective tests, as they found shorter reaction times following placebo in individuals who were sleep deprived. These investigators highlighted the importance of providing explicit expectations about the effects of caffeine (i.e., improved vigilance) with regard to placebo conditions. Furthermore, when incorporating varying doses of caffeine in coffee comparable to one and two cups, Flaten et al. (2003) found positive correlations between expectations about the effects of caffeinated coffee and the actual responses to decaffeinated coffee for alertness and discontentedness.

The present study was designed to investigate the impact of expectations associated with caffeine consumption on the placebo response across both objective and subjective dimensions. Reaction time and mood variables will be monitored among three groups (low-dose placebo, high-dose placebo, and control) that consume decaffeinated club soda. Participants in the experimental groups will be told that the beverage is

equivalent to one (low dose) or four (high dose) cups of caffeinated coffee and the control group will receive accurate information about its contents (i.e., no caffeine).

It is hypothesized that participants in the low-dose placebo group will experience improved psychological well-being, as indicated by higher mood ratings on the Positive Affect and Negative Affect Schedule (PANAS; Watson et al., 1988), and enhanced behavioral functioning, characterized by faster reaction times on the lexical decision task (LDT), compared to participants in the high-dose placebo group. Individuals in the low-dose placebo group are also expected to report increased mood ratings on the PANAS and achieve quicker reaction times on the LDT compared to individuals in the control group. Lastly, it is hypothesized that participants in the high-dose placebo group will exhibit slower reaction times on the LDT and decreased mood ratings on the PANAS compared to participants in the control group. Participants in the high-dose placebo group are expected to perform slower on the LDT, because they are expected to experience adverse effects of excessive caffeine consumption (e.g., difficulty with concentration, nervousness, irritability).

Method

Participants

A total of 90 subjects (73 females and 17 males, mean age 20.29, age range 18-59 years) participated in the study. Participants were undergraduates at Towson University and recruited through the university's Psychology Research Pool. At the end of the experiment, all subjects were asked to report their average intake of caffeine on the demographics questionnaire (see Appendix A). Out of all participants, typical caffeine consumption ranged from no caffeine to moderate caffeine use (consuming caffeine two

to four times per day). Immediately after providing written consent to participate, all subjects provided a self-report about their perceived effects of caffeine on psychological well-being and behavior on the Expectation Questionnaire[1] (see Appendix B). Of the sample, 44.0% expected to feel energized after consuming a *low-dose* of caffeine (equivalent to one cup of a caffeinated beverage) and, out of 89 respondents, 49.4% expected to feel awake after consuming a low-dose, caffeinated drink. Following consumption of a *high-dose*, caffeinated beverage (equivalent to four cups of a caffeinated drink), 39.3% of 89 total participants expected to feel anxious and 40.0% of all 90 subjects expected to feel jittery. Missing data was due to voluntary omissions from participants. Results of the questionnaires are displayed in Table 1. The project was approved by the Institutional Review Board at Towson University. All students provided written consent, received course credit for their participation, and fully debriefed at the conclusion of the study.

Materials

Demographic information was collected using a questionnaire assessing age, gender, ethnicity, year in school, etc. In addition, participants were asked to identify habitual caffeine or stimulant use (e.g., smoking cigarettes, drinking coffee). If applicable, participants were also prompted to indicate reasons for caffeine or stimulant consumption as well as the frequency and amount of use. This questionnaire also contained the manipulation check, which was used to determine whether participants actually believed that they were consuming specific quantities of caffeine (no caffeine, caffeine equivalent to one cup of coffee, caffeine equivalent to four cups of coffee).

[1] Responses to the Expectation Questionnaire were collected anonymously and could not be matched with the experimental data for statistical analysis.

Participants were asked to indicate on a scale of zero (*equated to zero cups of coffee or 20 oz. bottle of soda*) to six (*equated to six cups of coffee or 20 oz. bottle of soda*) how much caffeine they believed to have consumed during the study.

The Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988; see Appendix C) was used to measure present psychological well-being. The measurement includes two 10-item mood scales that represent Positive Affect (PA) and Negative Affect (NA). High PA scores indicate elevated energy, concentration and activity, whereas high NA scores reflect a variety of unpleasant mood states, including guilt, stress, anger, and nervousness. Watson et al. developed this scale as a reliable and valid assessment of well-being. The PANAS exhibits high scale intercorrelations and internal consistency reliabilities (Cronbach's coefficient alpha) for PA (ranging from 0.86 to 0.90) and NA (ranging from 0.84 to 0.87) and strong convergent and discriminant correlations, ranging from 0.85 to 0.95 and -0.02 to -0.18, respectively, as determined by a principal factor analysis with squared multiple correlations. The PANAS also demonstrates increasing stability ratings over time, suggesting that the measure can be used to assess general affective qualities (Watson et al., 1988).

The lexical decision task (LDT) was designed by the experimenter using E-Prime computer software (Schneider, Eschman, & Zuccolotto, 2002) and used to measure participant's reaction time. The LDT consisted of 45 words (15 positive emotion words, 15 negative emotion words, and 15 neutral words, see Appendix D1) and 45 non-words. The 45 real words were derived from the ANEW affective word norms (Bradley & Lang, 1999) and were chosen based on valence, frequency, and word length. The 45 non-words were generated by the ARC Nonword Database (Rastle, Harrington, & Coltheart, 2002;

see Appendix D2). An additional two neutral words and two non-words were created for use in four practice trials in order to familiarize participants with the task. These practice trials were presented prior to the experimental trials and were not included in the statistical analyses. Participants were instructed to respond to a stimulus (i.e., word, non-word) on a computer screen by pressing one of two computer keys on a standard keyboard. When a word appeared, they were told to press the *z* key; and, when a non-word appeared, they were told to press the *m* key. A single stimulus was presented at one time and in a random order. Stimulus reaction time was recorded automatically by the computer program.

The Expectation Questionnaire was constructed by the author and was designed to assess specific expectancies that participants have about the effects of caffeine on behavior and personal wellness. The questionnaire also differentiated between expectations about the effects of one and four cups of a caffeinated beverage. Participants responded to questions using a 5-point Likert scale rating from 1 (*strongly disagree*) to 5 (*strongly agree*).

The Experiential Questionnaire (See Appendix E) was also constructed by the author and was developed to examine participant's actual experiences follow beverage consumption. Survey items were identical to the items on the Expectation Questionnaire. Response choices were on a 5-point Likert scale rating from 1 (*strongly disagree*) to 5 (*strongly agree*).

The Mind Over Mood Anxiety Inventory (MOM-A; Greenberger & Padesky, 1995; See Appendix F), Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1991; See Appendix G), and Student Version of the Jenkins Activity Scale (SJAS; Glass,

1977; See Appendix H) will be incorporated as filler tasks during the 15 min time period between beverage administration and completion of the reaction time test. Each instrument will also serve as a distraction from the underlying purpose of the study. The MOM-A evaluates self-reported symptoms of anxiety by examining three areas that include: anxious feelings, anxious thoughts, and physical symptoms. The BIDR is a social desirability scale that measures two forms of responding: Self-Deception and Impression Management. High scores on the BIDR represent individuals who tend to respond with high social desirability and low scores reflect those who tend to respond with low social desirability. The SJAS is designed to measure Type A behaviors that include: time-urgency/impatience, hard-driving/competitiveness, and aggressiveness/hostility. This assessment tool also contains three subscales that include: hard-driving/competitiveness, rapid eating, and rapid speaking.

The supplied beverage is non-flavored club soda. Twelve ounces of the beverage were served to each participant in a clear, plastic cup. The drinks were prepared out of sight from the participants.

Procedure

Prior to completing the experiment, participants will be asked to provide written consent for their participation via Towson University's online database. Immediately following the informed consent form, participants were asked to complete the Expectation Survey. This questionnaire was also conducted through the online database. Participants were instructed to refrain from stimulant or caffeine consumption (e.g., cigarettes, coffee, and chocolate) 5 hours prior to their in-person participation. Upon arrival, the experimenter measured and recorded each participant's height and weight.

Each participant was subsequently escorted to an isolated room to complete the PANAS. The experimenter explained that she will prepare the beverage with the appropriate dosage of caffeine (performed only for both placebo groups) while the participant completes the questionnaire.

The participants were randomly assigned to one of three groups: placebo-low dose, placebo-high dose, and control group. Although no group actually ingested caffeine, the two placebo groups were told that they consumed a beverage equivalent to either one or four cups of caffeinated coffee (low-dose and high-dose placebos, respectively). As the drinks were administered, the experimenter explained to participants in the high-dose placebo group that their beverages contained a high amount of caffeine, and they were asked to monitor any changes that they observed in their mood or behavior as a result of the caffeine. Individuals in the low-dose placebo group were told that their beverages contained a lower amount of caffeine compared to the higher-dose caffeine group, and they were asked to monitor any changes that they noticed in their mood or behavior as a result of the caffeine. All participants in the experimental groups were told that the purpose of the study was to evaluate the varying effect of caffeine on behavior and mood compared to no caffeine. Participants in the remaining (control) group were informed that they drank a decaffeinated beverage and that the objective was to compare effects of non-caffeinated and caffeinated drinks. Participants then had two minutes to finish the beverage.

A waiting period of 15 minutes that followed beverage ingestion was allotted. The placebo groups were told that the active ingredients of the beverage needed time to take effect, and the control group was told that it must also have the same passage of time

in order for all groups to be equivalent, even though those participants did not consume caffeine. During this time, the experimenter asked each participant to complete the MOM-A, BIDR, and SJAS. Inclusion of these activities functioned as a diversion from the study's objectives.

At the conclusion of the elapsed period, the participants were asked to take a lexical decision task. Participants then completed the PANAS, again, and demographic and experiential questionnaires, in order to validate the role of suggestibility in the placebo groups. All participants were debriefed, and it was disclosed to the placebo groups that they never ingested caffeine.

Results

Mood

Analyses of the PANAS measurement are grouped by the Positive Affect (PA) and Negative Affect (NA) mood scales. Each mood scale was calculated at pre- and post-tests across the three groups and subjected to a 2 x 3 (Time Point [pre-test, post-test] x Dosage Group [control, low-dose, high-dose]) mixed factorial analysis of variance (ANOVA) for PA scores and for NA scores. Descriptive statistics for PA and NA are reported in Table 2. The ANOVA examining PA did not reveal significant main effects for Time Point or Dosage Group, both Fs < 1. There was also no significant interaction between Time Point and Dosage Group, F (2, 87) = 1.41, p > .05. The ANOVA examining NA did not yield significant main effects for Time Point, F (1, 87) = 1.38, p > .05, or Dosage Group, F (2, 87) = 2.22, p > .05. There was also no significant interaction, F < 1.

Reaction Time

The reaction time dependent variable was statistically analyzed using a 3 x 4 (Dosage Group [control, low-dose, high-dose] x Word Type [positive emotion word, negative emotion word, neutral word, non-word]) mixed factorial ANOVA. Descriptive statistics for this variable are presented in Table 3. Results of the ANOVA demonstrated a significant main effect for Word Type, F (3, 261) = 66.44, $p < .05$, $\eta^2 = 0.43$; however, there was no significant main effect for Dosage Group, $F < 1$. There was also no significant interaction effect between Dosage Group and Word Type, F (6, 261) = 1.08, $p > .05$. Bonferroni post-hoc tests revealed that all participants achieved slower reaction times on the LDT for non-words (M = 597.05, SD = 64.83) compared to reaction times for positive emotion words (M = 538.98, SD = 70.60), negative emotion words (M = 531.44, SD = 63.27), and neutral words (M = 543.03, SD = 66.67). There were no significant differences in reaction times between positive emotion words, negative emotion words, and neutral words.

Experiential Survey

Evaluation of the Experiential Survey was conducted using eight one-way ANOVAs for each variable (see Table 4 for descriptive statistics). Results of the ANOVAs yielded significant main effects for *jittery*, F (2, 89) = 5.66, $p < .05$, $\eta^2 = 7.88$, and *nauseous*, F (2, 89) = 3.46, $p < .05$, $\eta^2 = 2.88$. Bonferroni post-hoc tests were conducted and revealed that participants in the control group reported lower ratings of *jittery* compared to participants in the low-dose placebo group and the high-dose placebo group. The follow-up tests also showed that participants in the control group reported lower ratings of *nauseous* compared to those in the high-dose placebo group. There were no significant main effects for the remaining variables (see Table 4).

Manipulation Check

At the end of the study, participants provided subjective ratings of how much caffeine they believed to have ingested. A one-way ANOVA was conducted to compare each dosage group, and results demonstrated a significant main effect between-groups, $F(2, 87) = 21.83$, $p < .05$, $\eta^2 = 28.82$. Bonferroni post-hoc tests indicated that participants in the high-dose group ($M = 2.38$, $SD = 1.68$) reported higher caffeine consumption than those in the control group ($M = 0.43$, $SD = 0.90$) and individuals in the low-dose group ($M = 1.09$, $SD = 0.60$). However, there were no significant findings between the control group and low-dose group.

Discussion

The current study was designed to explore the placebo effect by examining effects of expectations about varying doses of caffeine using both objective and subjective measures. Specifically, it was hypothesized that (1) participants in the low-dose placebo group would have improved mood, as indicated by higher ratings of Positive Affect and lower ratings of Negative Affect on the PANAS, and quicker reaction times on the LDT compared to participants in the high-dose placebo group; (2) participants in the low-dose placebo group would exhibit greater PA scores and lower NA scores, in addition to faster reaction times, compared to participants in the control group; (3) participants in the high-dose placebo group would demonstrate a decrease in mood, as indicated by lower ratings of PA and higher ratings of NA, and achieve slower reaction times on the LDT compared to participants in the control group. The results failed to provide support for all hypotheses, as there were no significant main effects or significant interaction effects for any dependent variable.

Although the present study did not find significant effects for subjective measures of positive and negative affect, participants who were informed that their drinks did not contain caffeine reported lower subjective ratings of *jittery* compared to both placebo groups and lower subjective ratings of *nauseous* in comparison to participants in the high-dose placebo group. These findings support existing literature about the effectiveness of placebos on self-report and subjective assessment, such as research conducted by Flaten and colleagues (2003) who investigated the placebo response to varying doses of decaffeinated coffee (i.e., one cup, two cups). Positive correlations were demonstrated between expectancy and self-report of alertness after one and two cups of decaffeinated coffee. Following consumption of one cup of decaffeinated coffee, there was also significant effects between expectations and self-reports of *contentedness*. Increasing the dosage of decaffeinated coffee to two cups did not produce increased contentedness, as was anticipated by the researchers, which indicates that the placebo response was not dependent on the quantity of caffeine (placebo) (Flaten et al., 2003).

According to the response expectancy theory (Stewart-Williams & Podd, 2004), placebo effects are generated by explicit expectations about a stimulus. In other words, an individual's actual experiences with any condition (e.g., medication, caffeine) are exclusively impacted by one's anticipations and beliefs about it (Kirsch, 2005). In the current study, participants in the experimental groups (low-dose, high-dose) were provided with false impressions that they consumed a beverage with varying amounts of caffeine that was equal to one or four cups of caffeinated coffee. However, specific reactions (e.g., increased performance, improved mood) to beverage consumption were

not explicated, which may have limited the procedure and accounted for nonsignificant findings.

Anderson and Horne (2008) demonstrated a caffeine placebo effect for reaction times in moderately sleepy people who consumed decaffeinated coffee after being told that it contained caffeine. Participants received instructions regarding the type of beverage (i.e., "it's a *super* type coffee" [p. 334]) and its associated effects (i.e., "it has been proven to keep the consumer highly alert" [p. 334]). Then, prior to the first assessment, experimenters suggested to the subjects that they "should be feeling a lot more alert" (p. 334). In addition, Schneider et al. (2006) produced a placebo effect in participants who were given false information about the contents of their drink. Following beverage consumption, all subjects were instructed to read a flyer about the "scientifically undisputed" (p. 333) effects of caffeine on an individual's physiology (e.g., autonomous nervous system, cognitive efficiency, alertness). Significant effects of increased, subjective alertness were displayed in subjects who were falsely informed that their beverages contained caffeine.

Another limitation of the current study, and perhaps a barrier to finding significant results, is that participants in the high-dose placebo group were not convinced that they consumed a beverage with as much caffeine as if they were drinking four cups of caffeinated coffee. Analyses of the manipulation check revealed that these participants, on average, believed that their beverage contained a dose of caffeine equivalent to 2.38 (*SD* = 1.68) cups of coffee. Moreover, participants in the control group, on average, believed that there was caffeine in their drinks equivalent to 0.43 (*SD* = 0.90) cups of caffeinated coffee, despite being told the truth (i.e., their drinks did not

contain caffeine). Research by Levine and Gordon (2004) suggests that there may be a limit to the power of the placebo response. Patients who were in postoperative pain following oral surgery responded similarly to an observed injection of a saline solution (placebo) while being told that it is a painkiller compared to actual analgesic reactions to a hidden injection of six to eight milligrams of morphine. The placebo analgesic response was found to be less potent than active painkillers only after a hidden injection of analgesia was increased to 12 milligrams.

While the present study investigated changes in positive and negative affective mood states and their interaction with reaction times, Corson (2006; as noted in Corson & Verrier, 2007) concluded that elevated arousal has a stronger effect on performance than emotional valence. Corson (2006) designed a mood-induction study in which he created two positive-mood groups (one with high arousal, one with low arousal) and two negative-mood groups (one with high arousal, one with low arousal). All subjects completed a lexical decision task in order to compare effects of varying levels of arousal on reaction time. Results demonstrated that participants in the positive- and negative-mood groups with high arousal achieved faster responses on the LDT compared to both positive- and negative-mood groups with low arousal. In addition, there were no significant differences between the low arousal groups and a neutral-mood group. These findings may indicate that individuals who exhibit high arousal are more responsive to procedures or interventions. Further, Porter, Spencer, and Birt (2003) proposed that susceptibility to misleading information is also influenced by increased arousal. While these variables are typically explored in false memory research, similar results may translate into placebo studies given that manipulation is central to the use of placebos.

Although the current project did not directly assess arousal, nonsignificant results may indicate that participants had low levels of arousal, and therefore were not reactive to their expectations about the effects of caffeine, thus not producing a placebo response. Such evidence should be incorporated into future placebo research by implementing methods that will induce high levels of arousal during the experiment.

In addition to the potential boundaries of the placebo effect, there are other methodological limitations that may have impacted the outcomes of this study. All participants were not similar in self-reports of usual caffeine intake. The range of caffeine consumption for the sample was between *never* and *two to four times daily*. This may suggest wide variability in the perceptions of the effects of caffeine within the same group. Therefore, actual responses to the drinks as well as performances on the LDT and PANAS may have also produced discrepant data. Further, participants were asked to abstain from caffeine use five hours prior to the study. However, caffeine intake prior to participation was not assessed. It could be implied that some participants used caffeine, which would have made the placebos ineffective. Another shortcoming of the project, and to the sample of participants, is that it is a convenience sample. All participants were enrolled at Towson University and were required to participate in research in order to earn course credit. Collecting data from a convenience sample offers increased recruitment rates; however, this type of sample limits the external validity due to narrowed demographics (e.g., age, gender, race).

Despite the hypotheses not receiving support in this study, the placebo effect is still a widely accepted phenomenon that is incorporated into a variety of clinical research trials that include areas of medicine, surgery, and psychology. Recent research has

demonstrated that expectations can influence outcomes as much as some active substances. Although many studies produce significant results for only self-reported items and not on objective measures, improvements to subjective experiences still yield clinical significance. For example, patients who underwent oral surgery reported equal pain relief from a placebo compared to a painkiller, and when pain can delay the recovery process following surgery, a reduction in self-reported pain should be considered significant (Levine & Gordon, 2004). Maximizing this effect is important for clinicians as they may be able to provide therapeutic interventions without the potential adverse side effects of traditional pharmacology. Moreover, the efficacy of the placebo response may depend on an individual's state of arousal, in conjunction with his/her expectations about a stimulus. It is evidenced that being in a condition that provokes heightened arousal enhances performance and possibly one's proneness to suggestibility. Developing this idea through future placebo research would contribute to the field and facilitate an empirical understanding about the power of the placebo.

Table 1

Summary of Percentages of Responses on the Expectation Questionnaire

Variables	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	*n*
One Cup						
Energized	6.6%	11.1%	33.0%	44.0%	4.4%	90
Motivated	5.7%	13.6%	42.0%	33.0%	5.7%	88
Happy	2.3%	14.9%	42.5%	34.5%	5.7%	87
Awake	2.2%	9.0%	27.0%	49.4%	12.4%	89
Four Cups						
Anxious	2.2%	22.5%	10.1%	39.3%	25.8%	89
Disoriented	8.0%	31.8%	34.1%	17.0%	9.1%	88
Nauseous	8.9%	35.6%	21.1%	21.1%	13.3%	90
Jittery	3.3%	12.2%	14.4%	40.0%	30.0%	90

Table 2

Summary of Means and Standard Deviations for Scores on the Positive Affect Negative Affect Schedule

		Positive Affect		Negative Affect	
	Group[a]	*M*	*SD*	*M*	*SD*
Pre-Test	Control	27.20	6.47	12.53	3.50
(Before Consumption)	Low-Dose	27.60	7.49	13.90	4.56
	High-Dose	27.20	5.98	14.17	3.82
Post-Test	Control	25.80	7.78	12.10	2.54
(After Consumption)	Low-Dose	27.13	8.30	13.10	3.27
	High-Dose	28.50	7.74	14.10	4.77

[a]$n = 30$

Table 3

Summary of Means and Standard Deviations for Reaction Times on the Lexical Decision Task

	Group[a]					
	Control		Low-Dose		High-Dose	
Word Type	*M*	*SD*	*M*	*SD*	*M*	*SD*
Positive Emotion	539.83	75.29	536.18	58.10	540.92	79.00
Negative Emotion	525.98	66.93	535.30	53.25	533.03	70.16
Neutral	535.82	71.54	547.43	59.12	545.83	70.33
Non-Word	606.02	73.93	594.79	57.44	590.36	62.23

[a]$n = 30$

Table 4

Summary of Means, Standard Deviations, F-Ratio's, and p-values for Responses on the Experiential Questionnaire

	Group[a]				
	Control	Low-Dose	High-Dose		
Variables	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	Sig.
Alert	3.40 (0.86)	3.67 (0.96)	3.77 (0.90)	1.32	0.27
Anxious	2.10 (1.03)	2.60 (1.30)	2.59 (1.35)	1.59	0.21
Awake	3.50 (0.86)	3.57 (0.90)	3.57 (1.00)	0.05	0.95
Jittery	1.87 (0.93)	2.70 (1.24)	2.80 (1.32)	5.69	0.00*
Energized	2.87 (0.94)	2.87 (0.97)	3.20 (1.21)	1.01	0.37
Nauseous	1.47 (0.82)	1.63 (0.89)	2.07 (1.01)	3.46	0.04*
Motivated	2.93 (0.98)	2.93 (0.83)	2.97 (0.93)	0.01	0.99
Disoriented	1.50 (0.82)	1.80 (1.03)	1.90 (0.96)	1.47	0.24

[a]$n = 30$
*$p < 0.05$

APPENDICES

Appendix A

Indicate your age in years: _____

What is your current overall GPA? _____

Please estimate how much caffeine you believe to have consumed as part of this study by circling a number on the scale below:

0 - - - - - 1 - - - - - 2 - - - - - 3 - - - - - 4 - - - - - 5 - - - - - 6

Equate to cup(s) of caffeinated coffee or 20 oz. bottle(s) of soda

CIRCLE THE APPROPRIATE NUMBER FOR THE ITEMS BELOW:

Gender:
1: Female
2: Male

Year in school:
1: Freshman
2: Sophomore
3: Junior
4: Senior
5: Other _____

Race/ethnicity:
1: Asian, Pacific Islander
2: American Indian, Native American, Native Alaskan
3: Black, African American
4: Hispanic, Latino, Latina
5: Middle Eastern
6: White, Caucasian
7: Other: _____
8: Prefer not to answer

Major:
1: Psychology
2: Non-Psychology: _____
3: Undecided

How often do you drink caffeinated coffee?
1: I never drink caffeinated coffee
2: 1 – 3 times per month
3: 1 – 4 times per week
4: 1 time per day
5: 2 – 4 times per day

6: 5 or more times per day

How often do you drink caffeinated soda?

1: I never drink caffeinated soda
2: 1 – 3 times per month
3: 1 – 4 times per week
4: 1 time per day
5: 2 – 4 times per day
6: 5 or more times per day

How often do you drink caffeinated tea?

1: I never drink caffeinated tea
2: 1 – 3 times per month
3: 1 – 4 times per week
4: 1 time per day
5: 2 – 4 times per day
6: 5 or more times per day

Do you regularly smoke cigarettes?

1: Yes
2: No

Do you regularly consume any other stimulant(s)?

1: Yes
If yes, please specify (optional) _____
2: No

Please briefly indicate your reasons for consuming caffeine

_____

_____

Appendix B

Expectation Survey

Instructions: Below is a set of opinions about the effects of caffeine. Please circle the number that best describes the extent to which you agree or disagree with each opinion.

Drinking one cup of a caffeinated beverage makes me feel…

1. Energized.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. Motivated.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3. Happy.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4. Awake.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Drinking four cups of a caffeinated beverage makes me feel…

5. Anxious.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. Disoriented.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

7. Nauseous.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. Jittery.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Appendix C

Positive Affect Negative Affect Schedule

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way ***right now***. Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested	_____ irritable
_____ distressed	_____ alert
_____ excited	_____ ashamed
_____ upset	_____ inspired
_____ strong	_____ nervous
_____ guilty	_____ determined
_____ scared	_____ attentive
_____ hostile	_____ jittery
_____ enthusiastic	_____ active
_____ proud	_____ afraid

Appendix D1

LDT Words

Positive	Negative	Neutral
Proud	Afraid	Machine
Beautiful	Alone	Rain
Desire	Anger	Chair
Sex	Dead	Foot
Excellence	Death	Serious
Surprised	Destroy	Hospital
Success	Failure	Month
Truth	Fat	Phase
Devoted	Hell	Seat
Justice	Pain	Engine
Acceptance	Sick	Column
Vacation	Stress	Door
Spirit	Tragedy	Part
Victory	War	Paper
Fun	Crisis	Table

Appendix D2

LDT Non-Words

Thraucs	Gnolm	Daughste
Spreafths	Div	Ghlew
Psoosts	Pol	Threlks
Glurmbed	Unce	Kerft
Speuths	Lurl	Thwoed
Joarch	Tourled	Sckwi
Twowte	Skilge	Germth
Whaimed	Dwycsts	Tror
Splaughch	Dauppth	Breu
Gwoartchz	Psenx	Drobs
Geevs	Jurde	Teuf
Nante	Gnonze	Gherm
Sckraummed	Spleul	Beuk
Jop	Loun	Guix
huk	thro	cwulbed

Appendix E

Experiential Survey

Instructions: The following statements describe different feelings and emotions. The corresponding scales represent the extent to which you agree or disagree with the statements. Please circle which number best describes how you feel ***right now***.

1. I feel alert.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. I feel anxious.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3. I feel awake.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4. I feel jittery.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5. I feel energized.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. I feel nauseous.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

7. I feel motivated.

1	2	3	4	5

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. I feel disoriented.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Appendix F

Mind Over Mood Anxiety Inventory

Indicate the numbered answer that best describes how much you ***usually*** experience each symptom.

	Not at all	Sometimes	Frequently	Most of the time
1. Feeling nervous	0	1	2	3
2. Frequent worrying	0	1	2	3
3. Trembling	0	1	2	3
4. Muscle tension, aches, or soreness	0	1	2	3
5. Restlessness	0	1	2	3
6. Easily tired	0	1	2	3
7. Shortness of breath	0	1	2	3
8. Rapid heartbeat	0	1	2	3
9. Sweating not due to heat	0	1	2	3
10. Dry mouth	0	1	2	3
11. Dizziness or light-headedness	0	1	2	3
12. Nausea, diarrhea or stomach problems	0	1	2	3
13. Frequent urination	0	1	2	3
14. Flushes (hot flushes) or chills	0	1	2	3
15. Trouble swallowing or “lump in throat”	0	1	2	3
16. Feeling keyed up or on edge	0	1	2	3
17. Quick to startle	0	1	2	3
18. Difficulty concentrating	0	1	2	3
19. Trouble falling asleep or staying asleep	0	1	2	3
20. Irritability	0	1	2	3

21. Avoiding places where I might be anxious	0	1	2	3
22. Frequent thoughts of danger	0	1	2	3
23. Seeing myself as unable to cope	0	1	2	3
24. Frequent thoughts of approaching doom	0	1	2	3

Appendix G

Balanced Inventory of Desirable Responding

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

1----------2----------3----------4----------5----------6----------7

NOT TRUE SOMEWHAT TRUE VERY TRUE

_____ 1. My first impressions of people usually turn out to be right.

_____ 2. It would be hard for me to break any of my bad habits.

_____ 3. I don't care to know what other people really think of me.

_____ 4. I have not always been honest with myself.

_____ 5. I always know why I like things.

_____ 6. When my emotions are aroused, it biases my thinking.

_____ 7. Once I've made up my mind, other people can seldom change my opinion.

_____ 8. I am not a safe driver when I exceed the speed limit.

_____ 9. I am fully in control of my own fate.

_____ 10. It's hard for me to shut off a disturbing thought.

_____ 11. I never regret my decisions.

_____ 12. I sometimes lose out on things because I can't make up my mind soon enough.

_____ 13. The reason I vote is because my vote can make a difference.

_____ 14. My parents were not always fair when they punish me.

_____ 15. I am a completely rational person.

_____ 16. I rarely appreciate criticism.

_____ 17. I am very confident of my judgments.

_____ 18. I have sometimes doubted my ability as a lover.

_____ 19. It's all right with me if some people happen to dislike me.

_____ 20. I don't always know the reasons why I do the things I do.

_____ 21. I sometimes tell lies if I have to.

_____ 22. I never cover up my mistakes.

_____ 23. There have been occasions when I have taken advantage of someone.

_____ 24. I never swear.

_____ 25. I sometimes try to get even rather than forgive and forget.

_____ 26. I always obey the law, even if I'm unlikely to get caught.

_____ 27. I have said something bad about a friend behind his or her back.

_____ 28. When I hear people talking privately, I avoid listening.

_____ 29. I have received too much change from a salesperson without telling him or her.

_____ 30. I always declare everything at customs.

_____ 31. When I was young I sometimes stole things.

_____ 32. I have never dropped litter on the street.

_____ 33. I sometimes drive faster than the speed limit.

_____ 34. I never ready sexy books or magazines.

_____ 35. I have done things that I don't tell other people about.

_____ 36. I never take things that don't belong to me.

_____ 37. I have taken sick-leave from work or school even though I wasn't really sick.

_____ 38. I have never damaged a library book or store merchandise without reporting it.

_____ 39. I have some pretty awful habits.

_____ 40. I don’t gossip about other people’s business.

Appendix H

Student Version of the Jenkins Activity Scale

Instructions: In the questions which follow, there are no "correct" or "incorrect" answers; the important thing is to answer each question AS IT IS TRUE FOR YOU. Your responses are valuable only if you complete each and every question, so be sure to complete every question by circling the response that best fits you.

1. Is your everyday life filled mostly by:
    a. Problems needing solutions
    b. Challenges needing to be met
    c. A rather predictable routine of events
    d. Not enough things to keep me interested or busy

2. When you are under pressure or stress, do you usually:
    a. Do something about it immediately
    b. Plan carefully before taking any action

3. Ordinarily, how rapidly do you eat?
    a. I'm usually the first one finished
    b. I eat a little faster than average
    c. I eat at about the same speed as most people
    d. I eat more slowly than most people

4. Has your spouse or some friend ever told you that you eat too fast?
    a. Yes, often
    b. Yes, once or twice
    c. No, no one has told me this

5. When you listen to someone talking, and this person takes too long to come to the point, do you feel like hurrying them along?
    a. Frequently
    b. Occasionally
    c. Almost never

6. How often do you actually "put words in his mouth" in order to speed things up?
    a. Frequently
    b. Occasionally
    c. Almost never

7. If you tell your spouse or a friend that you will meet them somewhere at a definite time, how often do you arrive late?
    a. Once in a while
    b. Rarely
    c. I am never late

8. Do most people consider you to be:
    a. Definitely hard-driving and competitive
    b. Probably hard-driving and competitive
    c. Probably more relaxed and easy going
    d. Definitely more relaxed and easy going

9. Nowadays, do you consider yourself to be:
    a. Definitely hard-driving and competitive
    b. Probably hard-driving and competitive
    c. Probably more relaxed and easy going
    d. Definitely more relaxed and easy going

10. How would your spouse or closest friend rate you?
    a. Definitely hard-driving and competitive
    b. Probably hard-driving and competitive
    c. Probably more relaxed and easy going
    d. Definitely more relaxed and easy going

11. How would your spouse or closest friend rate your general level of activity?
    a. Too slow, should be more active.
    b. About average, is busy most of the time
    c. Too active, needs to slow down

12. Would people who know you well agree that you have less energy than most people?
    a. Definitely yes
    b. Probably yes
    c. Probably no
    d. Definitely no

13. How was your “temper” when you were younger?
    a. Fiery and hard to control
    b. Strong, but controllable
    c. I almost never got angry

14. How often are there deadlines in your courses?
    a. Daily or more often
    b. Weekly
    c. Monthly
    d. Never

15. Do you ever set deadlines or quotas for yourself in courses or other things?
    a. No
    b. Yes, but only occasionally
    c. Yes, regularly

16. In school, do you ever keep two projects moving forward at the same time by shifting back and forth rapidly from one to the other?
    a. No, never
    b. Yes, but only in emergencies
    c. Yes, regularly

17. Do you maintain a regularly study schedule during vacations such as Thanksgiving, Christmas, and Easter?
    a. Yes
    b. No
    c. Sometimes

18. How often do you bring your work or study materials related to your courses home with you at night?
    a. Rarely or never
    b. Once a week or less often
    c. More than once a week

19. When you are in a group, do the other people tend to look to you to provide leadership?
    a. Rarely
    b. About as often as they look to others
    c. More often than they look to others

In the two questions immediately following, please compare yourself with the average student at your university.

20. In sense of responsibility, I am:
    a. Much more responsible
    b. A little more responsible
    c. A little less responsible
    d. Much less responsible

21. I approach life in general:
    a. Much more seriously
    b. A little more seriously
    c. A little less seriously
    d. Much less seriously

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Tracy L. Riloff

Curriculum Vitae

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Cherry Hill, NJ 08003
(609) 502-4322
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EDUCATION

Expected May 2011	**Towson University**, Towson, Maryland Master of Arts, Clinical Psychology GPA: 4.0
May 2008	**Ramapo College of New Jersey**, Mahwah, New Jersey Bachelor of Arts, Psychology, Biology Emphasis

RESEARCH EXPERIENCE

September 2008-
May 2011 **Master's Thesis**
Towson University, Towson, Maryland
Committee Chair: Kerri A. Goodwin, Ph.D.

- *Placebo Effect: The Impact of Expectation of Caffeine on Reaction Time and Mood*
  Duties: Conceptualized an original research project. Independently implemented research protocol including recruitment, data collection using E-Prime, and data entry and maintenance. Performed statistical analyses (between-subjects one-way ANOVA, 2X3 mixed factorial ANOVA, regressions) using SPSS.

January 2010-
May 2011 **Research Assistant**
Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, Maryland
Johns Hopkins Burn Center
Principal Investigators: James A. Fauerbach, Ph.D.,
Shawn T. Mason, Ph.D.,
Neda F. Gould, Ph.D.

- *Burn Rehabilitation: Integration of Nintendo Gaming Technology*
  Duties: Assist in ongoing protocol development and implementation that investigates the integration of Nintendo Wii and X-Box Kinects into rehabilitation programs for burn survivors. Other responsibilities include maintaining communication between medical care providers and the psychology department, preparing and coordinating IRB submissions as well as organizing and maintaining clinical materials.

- *Face Transplant: Helping Guide the Future of Face Transplant with Information From Burn Patients with Facial Scars*

  Duties: Assist in protocol coordination and implementation for a research study that aims to develop a standardized, psychometric tool that will inform the medical, ethical, and psychological community about perspectives of face transplantation from burn survivors who sustained facial injury.

- *Sleep Disturbance Following Severe Trauma: A Potential Biomarker and Therapeutic Target for Post Traumatic Stress Disorder?*

  Duties: Screen potential participants for a research study that investigates the nature of sleep disturbances in individuals with Posttraumatic Stress Disorder. Other responsibilities include organization and maintenance of clinical materials.

January 2009-
May 2011

Research Extern
Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, Maryland
Johns Hopkins Burn Center
Principal Investigator: James A. Fauerbach, Ph.D.
Una D. McCann, M.D.
Barbara J. de Lateur, M.D.

- *The Johns Hopkins University Burn Model System*
- *Long-Term Follow-Up of National BMS Database Sample*
- *Preventing Secondary Complications and Disability Among Patients with Acute Burn Injuries*
- *Augmented Exercise Program in the Prevention of Deconditioning Among Survivors of Severe Burns*

Duties: Administer psychosocial assessments for longitudinal, multisite research programs that investigate recovery and reintegration among individuals with burn injuries. Tracking and contacting research participants via the telephone, e-mail, and postal mail. Data entry and maintenance using Excel and SPSS. Performed literature searches and reviews. Assisted with training undergraduate and graduate externs.

July 2009-
September 2009

Graduate Research Assistant
Department of Psychology, Towson University, Towson, Maryland
Principal Investigator: Ellyn G. Sheffield

- *Advanced IBOC Coverage & Compatibility Study*
  Prepared for NPR Labs and iBiquity Digital Corporation

- *Consumer Testing of Coded Audio for Use in Playaway Audio Books*
  Prepared for Findaway World, LLC

Duties: Consented participants and implemented protocols for two studies that examined consumer satisfaction of different audio samples in varied settings, including controlled laboratories and an automobile.

CLINICAL EXPERIENCE

September 2010-
May 2011

Clinical Psychology Practicum Student
Department of Psychiatry and Behavioral Sciences, Johns Hopkins University, School of Medicine, Baltimore, Maryland

Johns Hopkins Bayview Care Center
Supervisors: Luis F. Buenaver, Ph.D., C.B.S.M.
Neda F. Gould, Ph.D.

- Administer and score neuropsychological assessments (COGNISTAT, RBANS, MMSE-2, HVLT-R, Trail Making Test-A, Trail Making Test-B, Clock Drawing Test, FAS, COWAT) to inpatients on the rehabilitation unit.
- Responsible for integrated report writing and assist with recommendations for patients with cognitive impairments
- Communicate test results to the interdisciplinary team to aid with patient's rehabilitation program and discharge planning
- Received exposure to supportive psychotherapy, Cognitive Behavioral Therapy, and Cognitive Behavioral Therapy for Insomnia
- Received exposure to manuscript reviewing and critiquing

January 2008-
May 2008

Undergraduate Psychology Fieldwork
Rudolf Steiner Fellowship Community, Chestnut Ridge, New York

- Assisted in direct health care and well-being of older adults living in a therapeutically oriented community
- Participated in case management involving health, illness, death, and spirituality

July 2007-
August 2007

Co-Facilitator, Group Therapy
Brighter Day Behavioral Inc., Lawrenceville, New Jersey

- Assisted and observed interactive groups and activities for individuals with chronic psychiatric disorders

PROFESSIONAL PRESENTATIONS

Allen, L., Rios, R., Jochai, D., **Riloff, T**., Mason, S. T., & Fauerbach, J. A. (November, 2010).Changes in PTSD Symptoms and Global Psychological Impairment in Major Burn Survivors. Talk held at the 43rd annual meeting of the American Burn Association, Chicago, Illinois.

WORKSHOPS and TRAINING ACTIVITIES

April 2009	**Certified Smoking Cessation Group Facilitator** American Lung Association
March 2007	Participant, *National Leadership Conference*, *Sigma Delta Tau* Baltimore, Maryland

HONORS and AWARDS

September 2010- May 2011	Graduate Student Association Research Award
January 2011	Participating Artist, The National Arts Program, 3rd Annual Exhibition Baltimore, Maryland

PROFESSIONAL AFFILIATIONS

American Psychological Association
American Psychological Association of Graduate Students
Sigma Delta Tau National Panhellenic Sorority

GRADUATE COURSEWORK

Assessment of Intelligence
Advanced Abnormal Psychology
Psychotherapy & Behavior Change I
Personality Assessment
Statistical & Research Issues
Psychotherapy & Behavior Change II
Advanced Personality Assessment
Ethical, Lethal, & Professional Issues
Research Methods & Statistical Analyses
Cognitive Therapy I
Women and Aging