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Dedication

The *Journal of Student Psychological Research* is dedicated to the memory and legacy of the late Dr. Barbara McEwen, Professor Emeritus in the Psychology Department at Southern Connecticut State University where she taught from 1967 to 1990. Dr. McEwen was a productive researcher, scholar, author, beloved teacher, and most of all, a devoted supporter of student research endeavors.
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What is Psychology?

The answer is not as simple as one may think. Students taking *Introduction to Psychology* learn a standard definition, which describes psychology as the scientific study of the mind and body, as well as a profession that applies accumulated knowledge to practical problems. The truth is that psychology encompasses so many different specializing fields of study that defining it can be challenging.

A common metaphor for representing the disciplines of psychology is that of a tree. A tree is composed of three distinct parts: the roots, the trunk, and the branches. The roots are common to all the branches of the tree, just like all fields of psychology share a common history. This common history stems from numerous roots, including the ancient Greek philosophers such as Aristotle, Socrates, and Plato, as well as classical psychologists such as Wundt, Freud, and Ebbinghaus.

This is the reason why, today, the different fields within psychology are often referred to as branches of psychology. Each branch studies its own aspect, be it developmental, social, cognition, neuroscience, educational, clinical, counselling, or any of the numerous other fields. It is important to realize that the branches can overlap, especially when there is a mutual goal or problem, and organizations like the American Psychological Association (APA) and Association for Psychological Science (APS) exist to facilitate this relationship.

It is because of this shared commonality that the *Journal of Student Psychological Research* welcomes submissions from disciplines that are part of, or related to, psychology. Although our branches represent varying approaches, the subfields of psychology share their common heritage, and ultimately, their goal of improving well-being. The journal recognizes that to achieve this goal, we must encourage and foster the perpetuation of knowledge within our field and related disciplines.

- *The JSPR Editors*
The Relationship Between Alcohol Abuse and Self-Concept Among College Students

Elizabeth Santulli
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This study examined the relationship between alcohol abuse symptoms and self-concept among undergraduate college students ($N = 1540$). While both alcohol abuse and the self-concept have been well-studied separately, research on the linkage between the two remains limited, especially among college students. Data was collected from 1540 undergraduate students (524 males & 1016 females, aged 18-24) at a Northeastern public university. Participants completed psychometric instruments assessing alcohol abuse symptoms, self-perceived competence in multiple areas of life functioning, and quantity and frequency of alcohol consumption. Results indicated that college students with alcohol abuse symptoms reported poorer self-concept overall, and in multiple areas of life functioning.

Author Note
This research was supported in part by an undergraduate research grant from the Southern Connecticut State University Foundation. This research was supervised by Kenneth S. Walters, Ph.D., Department of Psychology, Southern Connecticut State University.

Description of College Student Drinking and Alcohol Abuse

Substance abuse among college students is a significant problem nationwide, with alcohol consistently being the most commonly used substance across studies (Johnston, O'Malley, Bachman, & Schulenberg, 2010). Research over the past three decades indicates past 30-day alcohol usage by 64% to 81% of students (Schulenberg & Patrick, 2012). Past 30-day alcohol usage is significantly higher among college students, compared to non-college peers (58%). Historically, young men tend to consume alcohol more heavily and frequently than young women, although that gender gap has decreased in recent years. Binge drinking (i.e., heavy episodic drinking), which is generally defined as consuming five or more alcoholic beverages in a single episode, is also a significant issue on college campuses across the country, given its risky nature. In 2009, 37% of college students reported engaging in binge drinking during the past two weeks, compared with only 30% of non-college peers. Heavy episodic drinking rates are also higher among college student males compared to females, with a 15-20% difference between the genders (Johnston, et al., 2010). Young adult college students, compared to non-college peers, typically live in a relatively unstructured environment marked by: (a) increased demand for self-regulation, (b) encouragement of alcohol use by peers, and (c) increased tolerance for risky behaviors (Schulenberg & Maggs, 2002). Moreover, young adulthood is also a dynamic period for the development of the self, as the person emerges from adolescence and into young adulthood (Patrick, Schulenberg, Maggs & Maslowsky, 2010).

Heavy alcohol consumption is associated with numerous neurocognitive deficits. These include poorer verbal memory (Hanson, Medina, Padula, Tapert, & Brown, 2011), attention (Tapert & Brown, 1999), visuospatial skills (Hanson et al., 2011), language skills (Moss, Kirisci, Gordon, & Tarter, 1994), and executive functioning (Hanson et al., 2011). In addition, magnetic resonance imaging (MRI) studies have shown that heavy alcohol use among adolescents and young adults is associated with brain structure abnormalities, including reduced hippocampal (Medina, Schweinsburg, Cohen-Zion, Magel, & Tapert, 2007) and prefrontal cortex volume (Medina, McQueeney, Nagel, Hanson, Schweinsburg, & Tapert, 2007). Binge drinking within the same population is also associated with numerous cognitive deficits. These include poorer sustained attention (Hartley, Elsabagh, & File, 2004), memory (Scaife & Duka, 2009), spatial working memory (Scaife & Duka, 2009), psychomotor speed (Hartley et al., 2004), and response inhibition and rule acquisition in females (Scaife & Duka, 2009). Furthermore, prior research demonstrated that alcohol abuse among college students is associated with poorer academic performance, marked by lower
Therefore, the self associated with depressed mood, conduct problems, and mood disorders negatively impact the self-evaluation. In addition, psychopathology can affect the environmental conditions in which the person exists. Furthermore, the self exists. Therefore, the self-concept is dynamic rather than static, developing across the lifespan. The period of late adolescence into early adulthood is marked by the development of more sophisticated abilities toward self-appraisal and self-evaluation. In addition, psychopathology can negatively impact the self-concept, in ways that are associated with depressed mood, conduct problems, maladaptive behaviors, and even eating disorders. Therefore, the self-concept is a multi-level construct, pertaining to functioning at the affective, cognitive, behavioral, and social levels (Harter, 1999).

Self-concept is a developmental construct that changes throughout the lifespan as the individual experiences changing social and environmental conditions, as well as ongoing cognitive development (Harter, 2012). Young adulthood is a distinctly transitional developmental phase during which many persons simultaneously have characteristics of both adolescence and adulthood, although not fully fitting into either stage (i.e., emerging adulthood; Arnett, 2010). Not surprisingly, research on the self-concept among young adults, and especially college students, is lacking compared to other developmental groups.

There are multiple approaches to the assessment of self-concept. One major approach relies upon measurement of self-perceived competence in various specific domains of life functioning (e.g., social, occupational, academic), in addition to self-perceived global self-worth (Harter, 1999). This is an approach that emphasizes self-evaluation and self-appraisal. It is typical, therefore, for self-perceived competence to vary across different domains of functioning within the same individual. Such cross-domain variation represents self-perceived strengths and weaknesses in the self.

Self-concept is known to be negatively associated with internalizing problems, such as depressed mood and anxiety (Harter, 2012; MacDonald & Leary, 2012). Similarly, some maladaptive behaviors are related to negative self-concept. Those include conduct problems and substance abuse (MacDonald & Leary, 2012). In addition, different levels of self-esteem (i.e., the self-evaluative approach to the self-concept) are associated with different personality dimensions. In particular, neuroticism and its component aspects of negative affectivity and emotionality are negatively correlated with trait self-esteem (Downey & Feldman, 1996). Furthermore, of the “Big Five” personality traits, neuroticism has the strongest association (negatively) with the self-concept, primarily due to the component of negative emotionality (Halamandaris & Power, 1997).

**Description of Self-Concept.** Self-concept is a complex construct that involves the sum total of the ways in which a person: (a) views, (b) describes, and (c) evaluates him/herself. The self-concept is affected by the environmental conditions in which the person exists. Furthermore, the self-concept is dynamic rather than static, developing across the lifespan. The period of late adolescence into early adulthood is marked by the development of more sophisticated abilities toward self-appraisal and self-evaluation. In addition, psychopathology can negatively impact the self-concept, in ways that are associated with depressed mood, conduct problems, maladaptive behaviors, and even eating disorders. Therefore, the self-concept is a multi-level construct.
Harter, 1986) self-evaluative approach to the assessment of self-concept includes 12 specific domains of life functioning, in addition to global self-worth. Four of those domains pertain specifically to social relations (i.e., social acceptance, close friendships, romantic relations, & parent relations), while two others are likely heavily influenced by social comparison (i.e., physical appearance & morality). Therefore, given such emphasis on social relations and social comparison within the self-evaluative approach to the self-concept, it seems likely that alcohol abuse among college students may negatively impact the self-concept, especially within the more socially-oriented domains.

Research has found that, among early adolescents, there is a general tendency toward more positive self-evaluation among alcohol abusers, compared to frequent (i.e., two or more alcoholic drinks weekly) drinkers (Butler, 1982). Limitations to that study included not sampling college students, and assessing the self-concept with the Tennessee Self Concept Scale (TSCS), which does not utilize domain-specific self-evaluation in assessment of the self-concept. Early adolescents with greater substance usage also tend toward more negative self-evaluation, in a general sense, than those with less substance usage (Towberman & McDonald, 1993). That study also did not sample college students and used only a very general measure of self-evaluation (i.e., not domain-specific). Moreover, alcohol use/abuse was not exclusively assessed (i.e., was combined with other substances).

Research examining the linkage between alcohol abuse and self-concept specifically among college students remains limited. What little research that has been conducted has shown that female college students who abuse alcohol are generally prone to poorer self-evaluation, compared to non-drinking peers (Segal, 1975). However, that study assessed females only, and used the TSCS to measure self-concept (i.e., not a self-evaluative approach). It has also been found that, among college students, both men and women alcohol abstainers have more positive self-evaluation, generally, than frequent drinkers (Butler, 1991). However, that study also used the TSCS to measure self-concept, and assessed only drinking frequency, rather than quantity and alcohol abuse symptoms.

Purpose and Hypotheses. The purpose of this study was to examine the relationship between alcohol abuse symptoms and the self-concept in a way that extends prior research. First, this study specifically sampled college students, a highly understudied group in this area. Second, this study assessed alcohol abuse symptoms, rather than drinking quantity or frequency. Finally, this study measured self-concept from the perspective of self-evaluation in specific domains of life functioning.

First, it was generally expected that alcohol abuse among college students would be associated with poorer global self-worth. Second, given the negative effects of alcohol abuse on cognitive functioning, it was expected that college students who abuse alcohol would report poorer self-concept in the domains of scholastic ability and intellectual functioning. Third, it was expected that alcohol abuse would negatively affect the self-concept in the areas of social relations, including overall social acceptance, close friendships, romantic relations, and parental relations. Finally, it was expected that alcohol abuse would negatively affect the self-concept in areas related to social influence (i.e., social comparison), including the domains of physical appearance and morality (i.e., behavioral conduct).

Method

Participants
This study used data collected from 1540 undergraduate students (524 males, 1016 females) at a public university in the Northeastern U.S. The sample was restricted to traditional-aged students (18-24 years). Participants were initially categorized into high versus low alcohol abuse groups (see below for details), resulting in an interim sample of 900 subjects. From those, 60 were excluded for either rendering data of poor validity or having incomplete data (see below for details). An additional 24 students were then excluded through univariate and multivariate outlier analysis. The final sample consisted of 816 participants (259 males, 557 females), aged 18-24 years (M = 18.94, SD = 1.19). The majority were freshmen (56%), followed by sophomores (21%), juniors (13%), and seniors or fifth year students (10%). The sample was 85% Caucasian, with 15% comprised of various ethnic minorities (i.e., none over 5%). Regarding living situation, a majority (84%) reported living on campus, with 16% living off campus. Most students (91%) were not involved with Greek life (i.e., a fraternity or sorority).

Measures

Demographic survey. Participants completed a questionnaire including items about demographic information (see Appendix A). Students self-reported the following: gender, age, year in college, ethnicity, living situation, and Greek affiliation.

Substance Abuse Subtle Screening Inventory – 3 (SASSI-3; Miller & Lazowski, 1999). The SASSI-3 is a 93-item self-report instrument which comprehensively assesses features
of both alcohol and drug abuse and is widely used in clinical practice. Only the Face Valid Alcohol (FVA) scale was used in this study (see Appendix B). The FVA consists of 12 self-report items, reflecting obvious symptoms of alcohol abuse (e.g., “Had more to drink than you intended to,” “Had problems in relationships because of your drinking”). Items are rated on a four-point Likert-type scale and summed to form a total FVA score, with scores ranging from zero to 36. FVA scores were then converted to T-scores, based on adult population norms. Reliability and validity for the FVA have been established and documented by the test authors (Miller & Lazowski, 1999). Within the current sample, internal consistency reliability among the FVA items was excellent (alpha = .91).

Self-Perception Profile for College Students (SPPCS; Neemann & Harter, 1986). The SPPCS (see Appendix C) is a 78-item self-report multidimensional self-concept measure. It includes scales assessing global self-worth (six items), as well as self-perceived competence in each of the following specific domains (four items each): scholastics, intellectual ability, job competence, social acceptance, close friendships, parental relations, romantic relations, physical appearance, morality (i.e., behavioral conduct), humor, creativity, and athletic competence. Each item is scored on a four-point Likert-type scale. Scores on each scale are obtained by summing responses across items. For ease of interpretation, scale scores were converted to T-scores, based on the mean and standard deviation for the entire sample. Reliability and validity for each of the scales has been documented by the test authors (Neeman & Harter, 1986). Within the present sample, however, internal consistency coefficients among the 13 scales ranged from alpha = .75 to .91.

Daily Drinking Questionnaire – Revised (DDQ-R; Dimeff, Baer, Kivlahan, & Marlatt, 1999). The DDQ-R (see Appendix D) is a well-established quantity-frequency measure of alcohol usage. Participants report the number of standard alcoholic beverages typically consumed each day of the week during the past month, as well as the typical number of hours of each drinking episode. A standard drink is defined as: (a) 12 ounces of beer, (b) four ounces of wine, or (c) 1.25 ounces of liquor. The reliability and validity of the DDQ-R have been well-established and documented elsewhere (Collins, Parks, & Marlatt, 1985; Corbin, Morean, & Benedict, 2008; Kim, Larimer, Walker, & Marlatt, 1997; Morean & Corbin, 2008, Palmer, Corbin, & Cronce, 2010).

Estimated peak blood alcohol content (BAC). Participants were also asked to self-report their height and weight. Using data from the DDQ-R (i.e., typical daily drinking quantity and duration), as well as height, weight, and gender, typical peak BAC (in g/dL) was estimated for each day of the week, using a modified and more refined version of the long-standing Widmark formula (Kypri, Langley, & Stephenson, 2005). For this study, two measures were used. Those included the average weekend peak BAC (i.e., Friday & Saturday) and average non-weekend peak BAC (i.e., Sunday through Thursday).

Procedure
Undergraduate students were recruited for the study through an inter-departmental subject pool in which students earned course credit for their participation. Upon arrival, students heard a brief description of the study and informed written consent was obtained. Participants were then given a packet of self-report questionnaires to be completed anonymously in 60-90 minutes. The questionnaires included in the present study constituted only part of the entire packet. Once participants completed the packet of questionnaires, they were debriefed and allowed to leave.

A total of 1540 undergraduates participated in the larger project from which these data was drawn. Three instruments in that larger packet contained validity scales, designed to detect invalid response patterns (e.g., random responding, exaggerating, defensiveness, etc.). Those included the SASSI-3, as well as the Personality Assessment Inventory (PAI; Morey, 2007) and the NEO-Personality Inventory – 3 (NEO-PI-3; McCrae & Costa, 2010). Using author guidelines for each separate instrument, subjects were considered to have responded to the packet in a broadly invalid way if they responded in an invalid manner to any two of those three instruments. Because the SASSI-3 was specifically used in this study, any participant with an invalid response pattern on that single instrument was also excluded. Fifty subjects were excluded as invalid responders. Another 10 subjects were excluded for having incomplete data (i.e., missing data on the SPPCS).

Students were then categorized into two groups (High Alcohol Abuse vs. Low Alcohol Abuse), based on FVA scores from the SASSI-3. Those categorized into the high alcohol abuse group obtained scores greater than or equal to 1.5 standard deviations above the mean (i.e., 93rd percentile or higher), compared to normative data. Those categorized into the low alcohol abuse group obtained scores at or below the mean (50th percentile or below), compared to norms. Participants who
scored in between were excluded from the study, in order to form two groups that clearly do or do not likely present with alcohol abuse symptoms. Both groups were then separately examined for multivariate and univariate outliers according to standard procedures (Tabachnick & Fidell, 2013). That resulted in a final sample of 816 students, including 219 in the High Alcohol Abuse group (95 males, 124 females) and 597 in the Low Alcohol Abuse group (433 males, 164 females).

Results

The purpose of this study was to examine the relationship between alcohol abuse symptoms and self-concept among college students. College students with a tendency toward alcohol abuse were expected to demonstrate poorer self-concept overall, and in multiple specific areas of life functioning, compared to peers. First, thirteen one-way ANOVAs were calculated, comparing the two alcohol abuse groups on the following domains of life functioning from the SPPCS: (a) global self-worth, (b) scholastics, (c) intellectual ability, (d) job competence, (e) social acceptance, (f) close friendships, (g) romantic relations, (h) parental relations, (i) physical appearance, (j) morality, (k) athletics, (l) humor, and (m) creativity. The results of this study generally supported the hypotheses (see Table 1). Students in the high alcohol abuse group reported significantly poorer self-concept in the areas of global self-worth, scholastics, intellectual ability, job competence, parental relations, physical appearance, and morality. By far, the largest effect concerned poorer self-perceived morality (i.e., behavioral conduct; \( \eta^2 = .20 \)). The other six significant effects were milder, ranging from \( \eta^2 = .01 \) to \( .05 \).

In order to better understand the high versus low alcohol abuse groups, a set of supplementary analyses was performed. The two groups were compared on the following demographic variables: age, gender, year in college, Greek affiliation and living situation. Students in the high alcohol abuse group (\( M = 19.32, SD = 1.32 \)) tended to be somewhat older than those in the low alcohol abuse group (\( M = 18.80, SD = 1.10 \)), \( F(1, 814) = 31.85, p < .0001, \eta^2 = .04 \). Young men (37%) were more likely to be in the high alcohol abuse group than their non-Greek affiliated peers (23%), \( X^2 (1) = 60.89, p < .0001 \). Students living off campus (46%) were significantly more likely to be in the high alcohol abuse group than their peers who lived on campus (23%), \( X^2 (1) = 28.51, p < .0001 \).

Finally, the high versus low alcohol abuse groups were compared on three measures alcohol-related behavior. First, those in the high alcohol abuse group (\( M = 26.43, SD = 15.89 \)) tended to report much greater typical weekly alcohol consumption on the DDQ-R (in standard drinks), compared to those in the low alcohol abuse group (\( M = 5.94, SD = 7.70 \)), \( F(1, 814) = 606.39, p < .0001, \eta^2 = .43 \). The two groups were then compared on weekend and non-weekend peak BAC. Regarding weekend peak BAC (average of Friday & Saturday), those in the high alcohol abuse group (\( M = .15, SD = .09 \)) tended to have much greater average weekend BAC than those in the low alcohol abuse group (\( M = .04, SD = .06 \)), \( F(1, 814) = 401.84, p < .0001, \eta^2 = .33 \). Regarding non-weekend peak BAC (average of Sunday-Thursday), those in the high alcohol abuse group (\( M = .03, SD = .03 \)) tended to have much greater average non-weekend BAC than those in the low alcohol abuse group (\( M = .002, SD = .008 \)), \( F(1, 814) = 372.00, p < .0001, \eta^2 = .31 \).

Discussion

The purpose of this study was to examine the relationship between alcohol abuse symptoms and the self-concept, in a way that extends prior research by: (a) sampling college students, specifically; (b) assessing alcohol abuse symptoms, rather than drinking quantity or frequency; and (c) measuring the self-concept from the perspective of self-evaluation in specific areas of life functioning, rather than solely assessment of global self-worth.

The results of this study indicated that students who abuse alcohol tend to have poorer self-concept overall, and across multiple areas of life functioning. Students who displayed clear symptoms of alcohol abuse reported poorer self-concept in the areas of global self-worth, scholastics, intellectual ability, job competence, parental relations, physical appearance, and morality (i.e., behavioral conduct), compared to peers. By far, the largest effect found had to do with poorer self-perceived morality (behavioral conduct). In addition, it was found that students who were older, male, later in their college career, involved in Greek life, or living off campus were all more likely to be in the high alcohol abuse than their peers. Further, it was found that students who demonstrated a tendency toward alcohol abuse also tended to consume more alcohol per week, have higher weekend peak BAC, and have higher non-weekend peak BAC.
While the results of this study are meaningful and important, the study is not without limitations. One limitation is that the sample consisted of undergraduate students from only one university campus. Another possible limitation to this study is that only one measure of alcohol abuse symptoms was used. Since there are multiple other valid and reliable assessments available, using multiple measures could strengthen these findings. Finally, another weakness to this study is that the sample was not stratified, and therefore, consisted heavily of first- and second-year students.

It is also important to note that there are multiple strengths to this study. One strength is that a large sample was obtained from a public college located in an area with few restrictions on alcohol availability (i.e., not a “dry campus” or within a “dry county”). Another strength of this study is that the assessment of the self-concept used was comprehensive and evaluated self-perceived competence across multiple domains of life functioning. This extends beyond prior studies that only assessed the self-concept in a global sense, rather than utilizing a domain-specific self-evaluation measure (e.g., Butler, 1982; Butler, 1991; Cookson, 1994; Segal, 1975; Towberman & McDonald, 1996).

Heavy alcohol consumption among young adults is associated with numerous cognitive deficits, negative behavioral effects, increased risk for mental health problems, and negative personality traits. Since alcohol is, by far, the most commonly used substance by college students (Johnson, et al., 2010), it is imperative that campuses across the United States provide effective prevention, education, early assessment, and intervention to students. In addition, while most campuses have alcohol policies, there may need to be stronger monitoring and implementation of such policies to deter students from engaging in risky alcohol-related behavior.

It is known that negative self-concept is associated with internalizing problems, such as depressed mood and anxiety (Harter, 2012; MacDonald & Leary, 2012). Negative self-concept is also related to some maladaptive behaviors (e.g., substance abuse; MacDonald & Leary, 2012), and negative personality traits (e.g., neuroticism; Halamandaris & Power, 1997). While the present findings demonstrate a tendency toward poorer self-concept among students who abuse alcohol, it is also possible that some students abuse alcohol because they have poorer self-concept. That is, heavy alcohol consumption, binge drinking, and other symptoms of alcohol abuse may be coping mechanisms that students with poor self-concept engage in as a way to (temporarily) feel better. In other words, the relationship between alcohol abuse and self-concept among college student is likely bidirectional. This speaks to the complexity of the problem and further supports the need for more careful assessment and prevention efforts of colleges and universities.

This study provides suggestions for future research. First, this study should be replicated at other campuses to ensure the generalizability of the findings. Colleges in different geographic regions and locales of the US vary highly in their cultural normal, local laws and college alcohol policies, as well as limitations on alcohol sales and availability. Second, multiple measures of alcohol abuse should be used to assess alcohol abuse symptoms. Finally, future work should study the impact of other drugs of abuse (e.g., cannabis, opiates, prescription medications, etc.) on the self-concept, in order to provide a more comprehensive understanding of how college student substance abuse affects the self-concept.

References


### Table 1

**Mean Self-Concept Scores between Students with Low Alcohol Abuse vs. High Alcohol Abuse**

<table>
<thead>
<tr>
<th>Dependent Measure</th>
<th>Low Alcohol Abuse</th>
<th>High Alcohol Abuse</th>
<th>F</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Self-Worth</td>
<td>51.25 (9.75)</td>
<td>47.12 (9.17)</td>
<td>29.66</td>
<td>&lt;.0001</td>
<td>.04</td>
</tr>
<tr>
<td>Scholastics</td>
<td>51.92 (9.54)</td>
<td>47.09 (9.29)</td>
<td>41.65</td>
<td>&lt;.0001</td>
<td>.05</td>
</tr>
<tr>
<td>Intellectual Ability</td>
<td>51.15 (9.90)</td>
<td>48.07 (9.39)</td>
<td>15.94</td>
<td>&lt;.0001</td>
<td>.02</td>
</tr>
<tr>
<td>Job Competence</td>
<td>50.79 (10.10)</td>
<td>47.87 (10.20)</td>
<td>13.38</td>
<td>&lt;.0001</td>
<td>.02</td>
</tr>
<tr>
<td>Social Acceptance</td>
<td>49.47 (10.32)</td>
<td>50.17 (9.64)</td>
<td>.76</td>
<td>.39</td>
<td>.0009</td>
</tr>
<tr>
<td>Close Friendships</td>
<td>49.40 (10.57)</td>
<td>50.23 (8.70)</td>
<td>1.09</td>
<td>.30</td>
<td>.001</td>
</tr>
<tr>
<td>Romantic Relations</td>
<td>49.91 (10.18)</td>
<td>49.52 (8.79)</td>
<td>.26</td>
<td>.61</td>
<td>.0003</td>
</tr>
<tr>
<td>Parental Relations</td>
<td>51.31 (9.02)</td>
<td>47.18 (10.82)</td>
<td>30.14</td>
<td>&lt;.0001</td>
<td>.04</td>
</tr>
<tr>
<td>Physical Appearance</td>
<td>50.55 (9.87)</td>
<td>48.78 (10.28)</td>
<td>5.06</td>
<td>.03</td>
<td>.01</td>
</tr>
<tr>
<td>Morality</td>
<td>53.03 (8.43)</td>
<td>42.99 (10.52)</td>
<td>200.31</td>
<td>&lt;.0001</td>
<td>.20</td>
</tr>
<tr>
<td>Athletic Competence</td>
<td>49.36 (9.98)</td>
<td>49.06 (10.43)</td>
<td>.14</td>
<td>.71</td>
<td>.0002</td>
</tr>
<tr>
<td>Humor</td>
<td>49.45 (10.20)</td>
<td>50.32 (9.37)</td>
<td>1.20</td>
<td>.27</td>
<td>.001</td>
</tr>
<tr>
<td>Creativity</td>
<td>50.37 (9.95)</td>
<td>49.58 (9.85)</td>
<td>1.01</td>
<td>.31</td>
<td>.001</td>
</tr>
</tbody>
</table>

*Note.* Means represent T-scores (with M = 50, SD = 10). Standard deviations in parentheses. All F-ratios had df = 1, 814
The Influence of Exposure to Minority Groups: LGBT Acceptance and Tolerance on College Campuses

Catherine Gingras
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New Haven, Connecticut

This study investigated college students’ implicit and explicit attitudes about homosexuality, the effect of persuasive messages on attitudes, and the effect of religious participation on explicit attitudes about homosexuality. Students (n=48) participated in the study by reading vignettes that portrayed either a positive or negative “coming-out” narrative, completed implicit (IAT) and explicit (HATH) measures of prejudice, and reported their level of religious participation through a demographic questionnaire. Participants exposed to either vignette, whether positive or negative, showed a reduced discrepancy between implicit and explicit scores. Those who did not receive any exposure element had a much greater discrepancy between scores. Results also indicated that religious participation was associated with higher levels of explicit prejudice. Further research is needed to gain a more comprehensive understanding as to how to eliminate or minimize discrepancy between implicit and explicit attitudes.

Campus communities across the nation are known to encourage positive attitudes and behaviors toward minority groups. It has been shown over the years through picketing and marches that when college students see injustice, they will act to dissolve and dismantle groups of thought against those who are resistant to difference. Recently in politics, the Lesbian, Gay, Bisexual, and Transgendered (LGBT) community has been attacked for their fight for marriage and equality in America. Considering that homosexuality has received more attention around the United States, this research looks to examine how accepting Southern’s campus is toward homosexual students.

Persuasion. Evidence of persuasion has been found as far back as 2,300 years ago (Aronson, 1999). Social psychologists interested in persuasion have focused their attention on three principal factors: the nature of the message, the characteristics of the communicator, and the characteristics of the audience. It has been shown that a highly credible communicator will have a greater impact on the attitudes of an audience than a less credible communicator (Cialdini, 1984). A sensible, well-reasoned message will be more effective in eliciting change in attitude than one that is less well-reasoned (Petty & Wegener, 1999). And finally that the members of an audience who become emotionally involved with an issue will be more influenced to change their attitude than members of an audience who do not (Pratkanis & Aronson, 1992).

The most influential type of persuasion is self-persuasion (Aronson, 1999). Self-persuasion convinces individuals to change their attitudes, not because someone tells them to, but because they come to believe that they really want to change. The theory associated with self-persuasion is Leon Festinger’s theory of cognitive dissonance (Festinger, 1957). The theory of cognitive dissonance states that dissonance, i.e., an unpleasant feeling, is aroused when an individual says or does something that is against his or her own believes. Festinger states that in order to reduce dissonance between attitudes and behaviors, people will need to try to bring those two aspects of self into greater harmony.

However, according to Allport (1954) attitudes and behavior involving ethnic or racial prejudice are some of the most difficult to change. Since prejudice and stereotyping are largely a function of ignorance, it is argued that if people of various racial and ethnic backgrounds are brought into contact with one another, a softening of negative attitudes toward certain races or ethnicities may occur (Aronson, 1999). Mere contact, however, may not be enough. Aronson (1999) argued that contact must be coupled with constructive and educational programming in order to produce results. In an experiment aimed at reducing hostility toward minority groups in school, Aronson structured situations so that students would be forced to cooperate with those who were different from the “norm” to complete a task given by the instructor. The experiment was called, the “jigsaw classroom”...
because it worked very much like assembling a jigsaw puzzle. Each student needed to work together to complete a task, and if they couldn’t work together, they would be penalized with loss of study time before a test. While at first it took the students several attempts to work past their differences and become a team, eventually, each student harmoniously worked together to complete the task. Aronson found very clear and consistent results; children who were in the interdependent, jigsaw classrooms showed less prejudice and greater enjoyment of school, while also developing greater self-esteem than children in traditional classrooms. In addition, the exam performance of minorities in the jigsaw classroom improved after only 10 weeks, with significantly higher scores than those in the traditional classroom setting (Aronson, 1999).

**College Tolerance.** According to Lance (2008), aversion to homosexuals is similar to a phobia in the way that the “straight” public may have irrational fears about homosexuality. Years of surveys and demographic studies have indicated that people find homosexual relations to be “wrong.” SIECUS, the Sex Information and Education Council of the U.S., has confirmed that sexual orientation is a right to all Americans (SIECUS, 2000). Green (1997) has also indicated that there has been a gradual rise in social acceptability of gay men and women in the United States over the past few years. Astin et. al. (2002) found that among college students, there has been a general trend of tolerance towards the gay community. In the 1980’s, almost half of the college student population supported laws prohibiting homosexual relations; by 2004, only 33% of students felt this way. Nevertheless, people still hold beliefs favoring heterosexuality; believing that heterosexuality is superior morally, socially, emotionally, and behaviorally to homosexuality (Roffman, 2000).

Lance (2008) finds that people who exhibit heterosexism hold the belief that heterosexuality is superior to homosexuality thus promoting prejudice and discrimination toward the LGBT community. This prejudice against homosexuality and homophobia is believed to be acquired early in life, starting primarily in early education. If children are taught to believe that homosexuality is against the norm at an early age, that belief system is generally held throughout their adult life. People are not born with prejudice and hate, but acquire these through experience. According to Lance (2008), demographic factors related to homophobia include having less education, being “born-again” or evangelical Christian, being right-wing authoritarian, of African-American or Hispanic descent, and being male. Traditional male role socialization pressures males with the expectation that they display heterosexual characteristics or otherwise be considered less socially acceptable. For example, it would be socially unacceptable for a man to cry because it shows others that he is weak and thus considered to be effeminate. Furthermore, university males seem to be more accepting of homosexual women than men. One study done by Lounderback and Whitley (1997) found that while heterosexual females and males held similarly accepting views on lesbian women, heterosexual males tended to hold more negative perceptions toward gay males than their female counterparts.

Lance (2008) conducted a study to consider the social inequality of homosexuals based on homophobia and antigay discrimination on college campuses. More specifically, his study focused on whether or not homophobia has decreased in the college campus community over time. To explore the social inequality of homosexuals based on homophobia and anti-gay discrimination on college campuses, observations of and group administered questionnaires were used to gather information from students taking a Human Sexuality course between the years of 1976 to 2006 (Lance, 2008). By using contact theory and reinforcing contact with positive messages, heterosexuals were made aware of several similarities that they had with gay people. This social contact increased mutual understanding and liking of the gay community, and a decrease in homophobia resulted (Lance, 2008). Further, the decrease in homophobia of heterosexuals based on their social contact with gay people continued over time. Thus, providing individuals with positive information about discriminated groups, such as the LGBT community, can result in positive attitude changes. Education in American society needs to occur in order to curb homophobia, and through education, true tolerance and acceptance can grow (Lance, 2008).

**Implicit Association Test.** According to McConnell and Leibold (2000), the Implicit Association Test (IAT) is a widely used instrument to measure attitudes and prejudices toward minority groups. Using two response keys, usually the “E” and “I” key, it accesses attitudes by having people quickly categorize stimulus words (McConnell & Leibold, 2000) as either positive or negative, good or bad. Depending on the time it takes to categorize the word stimuli, the program measures the difference in the average response latency, known as the IAT effect (McConnell & Leibold, 2000). Larger IAT effects reflect stronger associations in memory between concept pairings that facilitated judgment (McConnell & Leibold, 2000).

McConnell and Leibold’s (2000) study explored the relations among the IAT, intergroup
behavior, and explicit reports of prejudice. In a structured interaction, participants first met with a white experimenter, and later with a black experimenter. Interactions between the experimenters and the participants were videotaped and then later assessed by trained judges. Their study was a within-subjects design which examined how each participant behaved toward the white experimenter versus the black experimenter. First, participants privately completed a set of questionnaires with a white experimenter to assess their individual attitudes towards black and white people in a minimally reactive situation. Afterwards, participants completed a race IAT before having an unanticipated social interaction with a black experimenter. It was predicted that participants who revealed relatively more negative attitudes towards black people on the IAT would behave in a relatively less friendly fashion toward the black experimenter. This hypothesis suggests that the findings would substantiate the predictive validity of the IAT and suggest that the IAT assesses individual’s idiosyncratic attitudes (McConnell & Leibold, 2000).

Overall, McConnell and Leibold (2000) found that for all measures, larger positive scores favoring white people reflected greater negativity toward black people. At the time, McConnell and Leibold’s (2000) work was the first study to demonstrate relations among the IAT, intergroup discrimination, and prejudice, providing evidence that the IAT was related to biases in intergroup social interactions. McConnell and Leibold (2000) found that researchers can be confident that attitudes assessed by the IAT will relate to intergroup behavior. This suggests that the IAT also assesses personal attitudes in that variability in measures of prejudice are related to behavior.

**Sexuality-IAT.** Banse, Seise, and Zerbes (2001) conducted several studies using the Sexuality-IAT. Banse et al. (2001) found that their results provided convincing evidence that the Sexuality-IAT is a reliable and valid measure of implicit attitudes towards homosexuality. In Banse and colleagues’ (2001) experiment, they found a strong correspondence between IAT scores, explicit affective, and explicit cognitive attitude measures. Implicit and explicit attitudes showed an almost identical pattern of group differences between homosexual and heterosexual men and women (Banse et al., 2001). Individually, there were substantial correlations between implicit and explicit attitude measures (Banse et al., 2001). They also found that the correlation remained significant for affective attitudes and marginally significant for cognitive attitudes when they controlled for group differences (Banse et al., 2001). Their second experiment confirmed that the IAT could not be faked. Similar to the findings of Kim and Greenwald (1998), even fully informed participants were not able to fake positive implicit attitudes towards homosexuality in the IAT. While some participants may be able to concentrate on a specific answer during the task, it is too difficult for people to specifically answer positively in all categories (Banse et al., 2001).

According to Banse et al. (2001), the high correspondence between the Sexuality-IAT and the explicit attitude measures strongly supports Fazio’s MODE-model of attitudes (Fazio, 1990). The MODE-model is a measure in which attitude can be evaluated. Both implicit and explicit attitudes are measured. Explicit attitudes are those at the conscious level that are easy to self-report, while implicit attitudes are those which are unconscious and involuntarily formed in one's mind. Similarly to the MODE-model, explicit attitudes towards homosexuality could be a part of an implicit mindset that has the motivation to control prejudiced behavior (Banse et al., 2001). For example, people were more likely to report negative explicit attitudes towards homosexuality if they also had negative implicit attitudes as well as a weak motivation to control their prejudiced behavior (Banse et al., 2001). Fazio (1990) obtained a similar effect when studying racist attitudes.

Altogether, Banse et al. (2001) found that their evidence along with various other research indicates that some of the IATs (including the Sexuality-IAT) are in fact reliable and valid assessments. Adhering to a multi-method approach, the IAT, along with self-reported measures and further testing, are good indicators of human attitude (Banse et al., 2001). According to Banse et al. (2001) a lot more work is required to better understand the underlying mechanisms and range of applications of the IAT.

**Plan of Present Study.** In this study, participants were given a set of scenarios. One group was exposed to a positive “coming out” vignette from a LGBT individual, while another group was exposed to a negative vignette. A control group had no exposure. Afterward, participants were tested on the Sexuality Implicit Association Task (IAT). This assessment scored the participants’ reaction time to various matching stimuli and is a measure of implicit attitudes toward homosexuality. The participant's score on the test indicates the participant's level of comfort with regards to the LGBT community. This test has been validated by Harvard and the American Psychological Association. Once all tests were completed, participants were asked to complete a self-reported attitudes toward homosexuality
questionnaire (an explicit measure of attitudes) and were asked questions concerning their demographics. The goal of the study was to see if participant’s implicit and explicit measures were more congruent after exposure to the narratives. The hypothesis was that with exposure to a gay man’s positive experience of coming out to his family, participants would exhibit lower prejudice on IAT and HATH, and would have more congruent scores between the implicit and explicit attitudinal measures.

Method

Participants

All participants were recruited from a northeastern university campus using the SONA system, a recruiting tool used in the Psychology Department. Students enrolled in PSY 100 (Introduction to Psychology) had the option of participating in this study as part of their educational experience. Forty-eight subjects between the ages of 18 and 22 participated in the study, 14.6% (7) were males and 85.4% (41) were females.

Concepts and Measures

The study was performed all in one sitting for each participant. First, a pool of participants was collected from the SONA system. Participants completed a consent form and then were randomly assigned to read either a positive persuasive vignette (Appendix A) or a negative persuasive vignette (Appendix B), or no persuasive vignette (control group). Participants were then asked to begin the Sexuality IAT. Their scores were collected at the conclusion of the test. Next, they filled out a self-reported attitudes measure, the Heterosexual Attitudes towards Homosexuality (HATH) Scale (Appendix C), and a demographic survey for the study.

The Heterosexual Attitudes towards Homosexuality (HATH) scale was developed by Larsen, Reed and Hoffman (1980). The scale is a Likert-type scale measuring attitudes toward homosexuality. This 20-question scale asks a series of questions relating to the subject’s potential prejudice with homosexual people and/or homosexuality in general. The subject is asked to answer each question on a scale from 1 to 5, 1 being that they strongly agree and 5 being that they strongly disagree. According to Larsen et al. (1980), the HATH scale was developed from samples of college students and has high internal consistency, reliability, and construct validity.

Once they completed these tasks, participants were given a standard debriefing of the study and were thanked for their participation. All participants received one credit towards their Psychology 100 class.

Results

It was hypothesized that with exposure to a gay man’s positive experience of coming out to his family, participants would exhibit lower prejudice on the IAT and HATH, and would have more congruent scores between the implicit and explicit attitudinal measure.

Data analysis was conducted using SPSS, a statistical program used to determine both descriptive and inferential statistics, z-scores, and one-way ANOVA’s. There were three separate analyses done in the course of this experiment. First, a one-way ANOVA was conducted on the HATH scale, with no significant difference found between groups; \( F(2, 45) = 2.26, p = 1.12 \). Second, the scores that the participants received from the IAT (implicit measure) were analyzed using a one-way ANOVA. Again, there was no significant difference found between groups on the IAT; \( F(2, 45) = 2.2, p = 0.13 \). Next, the implicit and explicit measures were turned into z-scores. This was done as a way of measuring attitude change, i.e. seeing movement between scores towards more congruency. The z-explicit score was then subtracted from the z-implicit score in order to find the discrepancy between the two scores. Finally, a one-way ANOVA was conducted, revealing a main effect of vignette exposure on difference in discrepancy scores; \( F(2, 45) = 3.2, p < 0.05 \) (see Figure 1). Additionally, it was found that the HATH and the IAT correlated at a value of \( r(48) = -0.329, p = 0.01 \).
A significant difference was found among Frequency of Religion groupings (often, rarely, and never) on the HATH $F(2, 45) = 4.9, p = 0.01$. In addition, there was a significant difference among frequency of religion groupings and the difference in discrepancy scores; $F(2, 45) = 3.04, p < 0.05$. It was found that those who often attended religious services tended to have had scores which indicated higher levels of prejudice versus those who rarely or never attended religious services (see Figure 2). There was no significant difference among frequency of religion groupings on the IAT.
This study investigated the effects of positive and negative exposure on participants’ implicit and explicit attitudes about homosexuality. Implicit attitudes were found using the Sexuality Implicit Association Task while explicit attitudes were found using the Heterosexual Attitudes Towards Homosexuality scale.

By exposing the participants to the “coming out” narratives, their implicit and explicit attitudes were more congruent, while participants who were not exposed to the vignettes showed more discrepancy between their scores. This finding highlights the importance of exposure, in that those who had been exposed to the vignettes were more likely to have similar implicit and explicit scores than those who had not received any exposure at the trial. This indicates that through exposure to the narratives, participants’ reaction times to the Sexuality IAT indicated less preference for heterosexuality and were more consistent with their explicit acceptance of homosexuality. Similarly, Lance (2008) found that when he reinforced social contact with positive messages about homosexuality, his heterosexual participants had decreased homophobic attitudes because they had found similarities between themselves and LGBT individuals. Therefore, providing individuals with positive or negative information about the LGBT community can result in positive attitude changes in regards to homosexuality.

The participants who had not received any exposure were more likely to have higher IAT scores and lower HATH scores. This means that while participants were explicitly saying that they were overall comfortable with LGBT individuals, they implicitly did not express those feelings.

With these findings, it is important to consider causes for discrepancies between the explicit and implicit scores. One direction might be to explore background variables such as religious attendance. The comparison of attitudes toward homosexuality by religious attendance shows that participant’s religious influences coincide with their HATH scale scores. Participants who indicated that they “often” attended religious services, had lower HATH scores. Their scores were more prejudiced than those who “rarely” or “never” attended religious services. Participants who indicated that they “rarely”
or “never” attended religious services had a much higher HATH score, indicating more acceptance.

Problems/Limitations
Overall in the United States, our society is shifting, and our citizens are becoming more politically driven to support individuals who are discriminated against. Specifically, within the past 10 years, LGBT rights have changed tremendously. In all 50 states, lesbian and gay individuals can marry and adopt children within the U.S. This has been well documented by media, and most people are aware of this remarkable change in our government.

The HATH scale and the demographic questionnaire were both used by the participants as a self-report measure. The HATH scale asked many questions about whether or not participants believed that LGBT individuals deserved equal rights and if they themselves were comfortable being around people who identify within the LGBT community. Consequently, HATH scores may have been skewed due to the fact that most college-aged students have been exposed to the LGBT community by either the media or some outside source. Most HATH scores were on the positive end, meaning that most participants explicitly expressed that they were comfortable with LGBT individuals and believed they deserved equal rights. It is important to include the IAT as a more sensitive measure because it helps correct for social desirability and the ceiling effect. The HATH scale and the IAT were specifically used together in this study to help alleviate the issue of self-reporting. Thereby, participants could not specifically try and answer the IAT in a positive way, and therefore they do not have control over their score.

Future Work
Allport (1954) believed that attitudes and behavior involving prejudice are some of the most difficult to change. Aronson (1999) found that since prejudice and stereotyping are largely a function of ignorance, if people of various background are brought into contact with one another, then a softening of negative attitudes towards certain backgrounds might occur. If this study were replicated, it may be beneficial to use a secondary form of exposure on participants. While this study had only used vignettes as an exposure technique, perhaps future research can use alternative methods of exposure. Similar to McConnell and Leibold’s (2000) study, perhaps actual people who identify within the LGBT community can sit-in on the study and report their life story to participants. Perhaps direct contact along with a personal story would affect participants’ implicit and explicit scores more than the current study. Future research could be done to see how to effectively lower the discrepancy between the implicit and explicit measures. Additionally, future research should look more closely at the relationship between religious participation and explicit attitudes about homosexuality. Lance (2008) noted in his study that there are key demographic factors, including level of education, religious background, political affiliation, heritage, and gender, which can be related to homophobia. Therefore, future research should study the effects of authoritarianism, political ideologies, media coverage, sexual identity formation, or family relationships along with explicit attitudes about homosexuality.

References


Appendix A

Vignette One

The following is a story from a college student. Please read the following passage. You will be asked to complete an assessment after the reading.

“My story begins when I was five and I was taken to my first ballet class. Even though my mother had to drag me there, I suddenly had found myself in a place where I didn't feel like I would be judged for not being like the other boys and wanting to play their stupid games. In fact, I was the only boy in the ballet class and I was totally free to be my femmy little self. I never really developed any lasting friendships with boys in school, and I always perceived myself as different than most of them. Throughout the rest of elementary school, I would see other boys who would seem inexplicably similar to me, but we always strayed away from each other. I don't think we consciously recognized what we saw in each other or ourselves, but we knew the gay jokes told at recess were related to us and it was better to keep our heads low. It was only in ballet class or at home did I feel comfortable and myself.

I think my family assumed that I would be gay when I was growing up. Often when I was little I would put on my mother's lipstick or play dress up with my best friend. She would let me try on her dresses and we would perform made up plays for our mothers. My mom had worked at a gay bar when she was younger and had several gay friends so she never tried to make me behave in a gender-conforming way. However, I once asked Santa at the shopping mall for a "my size Barbie" so I could play and dress up like her and to this day my mother regrets never getting me one.

As I got older I started getting depressed in middle school. I think this had to do with several stressful home life issues, but also dealing with my sexuality. I had stopped expressing my feminine side and became very self-conscious of how different I was than most boys. I seemed only to fit in with the girls but I found myself distancing myself from them, probably because I perceived it as gay and therefore the most dreadful thing a middle school boy could be. I had even dropped out of dance classes.

The beginning of high school gave me a brand new start and really turned my life around. I went to a boarding school, which got me away from my family problems and gave me a chance to reinvent myself. About two weeks in, this girl told her friends that she had a crush on me. Those friends told me and then I asked her to be my girlfriend. This gave me a chance to be friends with all of these girls while still letting myself and others think I was straight. I also hesitantly began dancing again, but staying away from ballet which was too feminine.

Over spring break that freshman year of high school I suddenly let myself entertain the thought that I might have same-sex attractions. I had always been so busy in my life before worrying about whether I seemed gay and never had allowed myself to actually consider the idea, because deep down it excited me. My girlfriend also realized that something was happening with me and she also noticed that I was emotionally distancing myself. It was like we were becoming best friends instead of boyfriend-girlfriend. On the very day that I was going to break up with her, she told me that we should break up.

Shortly after, I told one of my friends that I thought I might be bisexual because I was finding guys attractive. The school was located in the middle of a forest and at night we would walk through the tall trees and I would tell her all my secrets. After about another week we came to one of the outdoor fireplaces that had been lit and then abandoned by previous students. There was just one log left and it was softly glowing. While we were both watching the dying fire I told her then that I was pretty sure I was gay. Still gazing at the fire she nodded solemnly, acknowledging how difficult that was for me to say. As I watched the log crumble to embers, I thought of the entire life I would never have. I didn't really know how to be gay, but I knew we couldn't get married and I had never heard of gays having children. As cliché as it sounds, I was never going to be that man with a wife and kids living in a house with a white picket fence.

After coming out to myself, the rest was easy for me. My mom had actually told me a year before I came out, "If you were gay, I'm not saying you are honey, but if you were, I would be completely okay with that. I want you to know that." So when I actually did come out to her, she was extremely supportive. I'm pretty sure that my brother saw I was gay when I put it on my Myspace and told my dad about it; however, my dad waited for me to tell him in person.

I felt that I grew up a lot that first year after I came out. I was completely out at school and I never felt like people tried to push me back into the closet. I no longer needed an excuse to hang out with girls who understood me. I allowed myself to express my feminine side again.”
Appendix B

Vignette Two

The following is a story from a college student. Please read the following passage. You will be asked to complete an assessment after the reading.

“My story begins when I was five and I was taken to my first ballet class. Even though my mother had to drag me there, I suddenly had found myself in a place where I didn't feel like I would be judged for not being like the other boys and wanting to play their stupid games. In fact, I was the only boy in the ballet class and I was totally free to be my femmy little self. I never really developed any lasting friendships with boys in school, and I always perceived myself as different than most of them. Throughout the rest of elementary school, I would see other boys who would seem inexplicably similar to me, but we always strayed away from each other. I don't think we consciously recognized what we saw in each other or ourselves, but we knew the gay jokes told at recess were related to us and it was better to keep our heads low. It was only in ballet class that I felt comfortable enough to be myself.

As I got older I started getting depressed in middle school. I think this had to do with several stressful home life issues, but also dealing with my sexuality. I grew up in a very strict family with a very conservative religious background. My family, in particular my two older brothers, were extremely homophobic. My brothers would often scream out of the car to people who were same-sex attracted (SSA), words like: fag, homo, dyke. I was so ashamed of myself, I felt like my own sexual attractions would disappoint my family. To hide myself, I began to join in with my brothers. I laughed off the hateful and slanderous remarks just so that my secret wouldn’t be discovered. I had stopped expressing my feminine side and became very self-conscious of how different I was than most boys. I seemed only to fit in with the girls but I found myself distancing myself from them, probably because I perceived it as gay and therefore the most dreadful thing a middle school boy could be. I had even dropped out of dance classes.

The beginning of high school gave me a brand new start and really turned my life around. I went to a boarding school, which got me away from my family problems and gave me a chance to reinvent myself. About two weeks in, this girl told her friends that she had a crush on me. Those friends told me and then I asked her to be my girlfriend. This gave me a chance to be friends with all of these girls while still letting myself and others think I was straight. I also hesitantly began dancing again, but staying away from ballet which was too feminine.

Over spring break that freshman year of high school I suddenly let myself entertain the thought that I might have same-sex attractions. I had always been so busy in my life before worrying about whether I seemed gay and never had allowed myself to actually consider the idea, because deep down it excited me. My girlfriend also realized that something was happening with me and she also noticed that I was emotionally distancing myself. It was like we were becoming best friends instead of boyfriend-girlfriend. On the very day that I was going to break up with her, she told me that we should break up.

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After coming out to myself, I thought it was a good time to come out to the rest of my family. One Christmas day, I gathered my family around and told them the news. They didn’t take it very well. I thought, perhaps, with the way the government was changing and how people were beginning to change their opinions on homosexuality that my family would understand. Instead my mother wept and my father and brothers began to scream at me, “Look what you have done. All that we have provided to you and you turn into a fag. You are not a part of this family anymore. Leave and never come back.”

From then on, I kept to myself. I didn't feel safe anymore, I didn't have that support and love that I felt from my friends at boarding school so I had to go back into the “closet” as some may say. To this day I struggle with being proud of who I am. I’m not sure if that will change anytime soon, but hopefully someday I find the peace within myself to admit to everyone that I am a gay man.”
Appendix C

**Sexuality IAT Score: ________**

**The Heterosexual Attitudes towards Homosexuality (HATH) Scale**

This questionnaire is about attitudes toward homosexuality. The information gathered will be used as data for a Psychology Thesis. Please answer honestly. **Return of this Heterosexual Attitudes towards Homosexuality (HATH) scale indicates your consent to have your data used in this research.**

In the following questions, rank your answers according to the scale shown here.

**Strongly Agree (1), Agree (2), Neutral (3), Disagree (4), Strongly Disagree (5)**

I enjoy the company of homosexuals.

1 2 3 4 5

It would be beneficial to society to recognize homosexuality as normal.

1 2 3 4 5

Homosexuals should not be allowed to work with children.

1 2 3 4 5

Homosexuality is immoral.

1 2 3 4 5

Homosexuality is a mental disorder.

1 2 3 4 5

All homosexual bars should be closed down.

1 2 3 4 5

Homosexuals are mistreated in our society.

1 2 3 4 5

Homosexuals should be given social equality.

1 2 3 4 5

Homosexuals are a viable part of our society.

1 2 3 4 5

Homosexuals should have equal opportunity employment.

1 2 3 4 5

There is no reason to restrict the places where homosexuals work.

1 2 3 4 5

Homosexuals should be free to date whomever they want.

1 2 3 4 5

Homosexuality is a sin.

1 2 3 4 5

Homosexuals do need psychological treatment

1 2 3 4 5

Homosexuality endangers the institution of the family.

1 2 3 4 5

Homosexuals should be accepted completely into our society.

1 2 3 4 5

Homosexuals should be barred from the teaching profession

1 2 3 4 5
Those in favor of homosexuality tend to be homosexuals themselves.

1 2 3 4 5

There should be no restrictions on homosexuality.

1 2 3 4 5

I avoid homosexuals whenever possible.

1 2 3 4 5
The Effects of Emotional Priming on Long-Term Memory

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The study investigated the influence of emotional information on a person’s memory, using happy emotional primes and a word-recall task. Eighty-four undergraduate students taking an introductory psychology course volunteered to participate in the study. Of the 84 participants, 76 participants were used in the study since eight were excluded due to procedural errors. Participants were randomly assigned to one of three conditions: mood-induction prime, mood-interpretation prime, and control. The mood-induction group wrote about a happy personal experience, while the mood-interpretation group read a happy story and the control group read a neutral story. Participants were then presented with a list of happy and neutral words. Afterwards, they were asked to recall as many words as they can. A manipulation check was executed using a mood assessment to ensure that the procedure of writing or reading a happy story did, in fact, elicit happy emotions. Results indicated that emotional priming did not have a significant effect on the number of happy and neutral words participants in the mood-induction and mood-interpretation groups were able to correctly recall. Furthermore, the control group recalled approximately the same number of happy and neutral words as the mood-induction and mood-interpretation groups. This concludes that emotional-priming did not have a significant effect on long-term memory.

Emotional Priming and Memory.
Emotional priming is defined as the facilitation of information-processing and response to a target stimulus of a specific emotional valence when preceded by a priming stimulus of the same emotional valence (Spence, Lippo, Liberman, & March, 2006). An emotional priming stimulus is a stimulus that activates representations in memory which contain emotional content. Evidence suggests that individuals are better able to remember things when they are emotionally affected by them because emotional events induce arousal and direct attention to central information (Van Damme & Smets, 2013).

Emotional priming has wide-reaching implications for informing legal practices of unreliable eyewitness testimonies. Houston, Clifford, Phillips, and Memon (2013) claim that an emotional victim or witness of a crime may perform worse on accurately recalling details of the incident. Their first study showed that individuals emotionally induced by a crime video gave more complete descriptions of a perpetrator. When an individual is emotionally aroused from a negative event, more attention is drawn to the emotionally-arousing stimulus such as the perpetrator. Despite the more complete descriptions of the perpetrator when emotionally-induced by a crime video, these descriptions of the perpetrator are not significantly more accurate than descriptions provided by individuals that are not emotionally-induced by a crime video (Houston et al.). The second part of the experiment showed that emotionally-induced participants gave better and more detailed descriptions of how a perpetrator (involved in a mugging crime) looked than participants who were not emotionally-induced (Houston et al., 2013). However, emotionally-induced participants were less accurate than their neutral counterparts when recognizing or identifying the perpetrator in a photographic lineup. Therefore, emotions may be a reason for the occurrence of the misinformation effect (Van Damme & Smets, 2013). The misinformation effect refers to the decline in an individual’s recollection of accurate details as a result of information obtained after the event. Researchers believe that stress from the emotional event may impair the ability to recognize central and peripheral details, despite an individual’s high level of confidence in his/her recollection and recognition. As a result, memory becomes distorted and an individual becomes more prone to misleading information.

Emotional priming research may inform clinicians of techniques that are helpful in clinical practices. For example, patients clinically diagnosed with an anxiety disorder can be positively primed to become less anxious in situations or less fearful of certain stimuli. Studies have shown that individuals with arachnophobia who were desensitized with humor perceived their fear in a more humorous, positive way and became less fearful of spiders later. Researchers concluded that pairing positive emotional stimuli (positive primes) with a stimulus that produces negative arousal helps clinically-
diagnosed individuals overcome negative perceptions of the stimulus (Ventis, Higbee, & Murdock, 2001).

Information-Processing Theory. The information processing theory explains that information from the outside world is gathered into sensory memory, and if it is attended to, it gets encoded into working memory. Working memory is a system that performs high-level cognitive processes such as reasoning, problem-solving, and learning (Vergauwe, Camos, & Barrouillet, 2014). If the information is maintained through rehearsal, it will get stored in long-term memory and will likely be remembered (Kuhbandner, Lichtenfeld, & Pekrun, 2011). Later on, when similar information is presented, the information stored in long-term memory will become activated and connections between the old and new information will be formed.

Priming Paradigm. According to the priming paradigm, emotional-priming is an implicit memory effect in which particular emotionally-related associations and connections get reactivated in memory before a task is carried out. A specific affective stimulus initiates information-processing, which then activates a system of concepts that are organized into emotion-specific schemes (Kusev, Van Schaik, & Aldrovandi, 2012). One example is semantic-priming, where hearing the word “nurse” will activate the following closely-related words in long-term memory: doctor, hospitals, and needles, among others. As a result, when an individual’s schemata is activated, he or she responds in the same way when new information being presented is associated with information in the activated schemata.

Emotional-priming can affect semantic priming when an individual is exposed to words that trigger negative or positive attitudes, emotions, and arousal. This is considered an emotional-priming effect because the words are associated with negative or positive consequences. The word “thief” for instance, can induce negative attitudes and emotions in an individual because he or she can become angry and fearful of being robbed. Activation spread will occur and words related to “thief” such as robbery, stealing, and crime could come to mind. Words tied with emotional valence can prime the individual to think more emotionally. Another example is when a certain stimulus causes individuals to remember more personal, emotional events such as past relationships, social events, and childhood experiences. A study found that participants in conditions that wrote about a sad personal experience reported a significantly higher negative mood rating than those in the control condition (Lee, Forbey, & Ritchey, 2011). As a result of being negatively-primed, individuals are capable of carrying out a sad emotional response towards a later stimulus. Rimmele, Davachi, and Phelps (2012) claim that emotion has a powerful effect on memory because information brought into working memory is connected to emotional memories in long-term memory.

Previous research shows that emotional priming tends to affect underlying cognitive processes of abstract thinking, perception, and interpretation, and episodic memory. For instance, a study has shown that individuals who are prompted to read poetry by expressing their thoughts and feelings out loud tend to show more understanding of a poem, relate their personal experiences directly to the poetry, and make more philosophical statements about life and death (Eva Wood, 2004). These results suggest that emotion-induction can allow individuals to interpret information beyond their literal meaning and recollect personal experiences they have encountered.

Furthermore, other studies have shown emotional priming to impact cognitive responses. Previous research from Kashima, Gurumurthy, Ouschan, Chong, and Mattingley (2007) has shown that individuals tend to respond in a way that is stereotypical of a stimulus they are exposed to. For instance, individuals primed with traits related to rudeness responded more rudely than participants who weren’t exposed to rude traits. Also, those who perceived a member of a stereotyped group were more likely to engage in the behavior associated with the stereotype. For instance, younger adults who were exposed to stereotypes of the elderly were reminded of elderly behavior and tended to behave in a way consistent with the elderly stereotype, such as responding more slowly when working on a lexical decision-task. Being primed by stereotypical traits can cause an activation spread of networks in memory associated with stereotypes of a particular race, age, or gender.

Emotional priming has been shown to affect areas of memory as well. Klettner (2013) conducted a study to examine the effects of emotional priming on word recall. Individuals were randomly assigned to reading a sad story accounting a pet’s death, followed by exposure to a list of negative and neutral words presented individually. Individuals were then asked to recall as many words as they could. Results showed evidence of word illusions. Participants in both conditions tended to recall words that were not shown to them from the list that were similar in meaning. Participants also recalled significantly greater numbers of unlisted negative words similar in meaning to the listed words. These results indicate that memory can be vulnerable and capable of being manipulated by emotional stimuli.
The effect of emotional priming on cognitive processes and behavior is well documented. Despite there being a sufficient amount of research exploring the effect of emotional priming on many aspects of an individual’s response, there is a lack of research investigating the effects of emotional priming on memory, specifically recollection of emotionally-relevant words.

The purpose of the present research is to study the effects of emotional priming on word recall. Participants were randomly assigned to either an emotional priming or control group, followed by a mood evaluation. After a mood-assessment, they were presented with a list of happy and neutral words, and then given a memory test to determine the correct number of happy and neutral words recalled. It was predicted that there would be a significant interaction between emotional priming and word valence. Participants who were emotionally-primed by mood-induction and mood-interpretation were expected to be in a happier and more positive mood than the control group and therefore, would recall more happy words than neutral words. This is consistent with research from Eva-Wood (2004) which claims that emotion helps an individual interpret stimuli beyond literal meaning and recollect personal experiences he or she has encountered. Interpreting emotions in a piece of literature may cause an individual to assess his or her own feelings about what he or she has read and make the information meaningful to oneself in some way. Mood-specific schemas would have become active in memory once an individual has received mood-induction because information from working memory is being integrated with emotional memories in long-term memory (Rimmele et al., 2012).

In addition to the above hypothesis, it was expected that the mood-induction group would remember the greatest number of happy words and the fewest number of neutral words compared with the mood-interpretation and neutral groups due to the higher level of positive emotionality of the mood-induction condition and the different levels of happiness between groups. This hypothesis is consistent with the emotional priming paradigm, which suggests that emotional information initiates information-processing and activates a network of concepts that are associated with happy information stored in long-term memory (Kusev, Van Schaik, & Aldrovandi, 2012). Furthermore, the differences in mood as a result of the different levels in emotionality should have explained differences in retention of emotionally-charged words in memory. This condition should have allowed for deeper emotional-processing to emerge in long-term memory resulting in the selective-memory effect. Being in a good mood after recalling happy past life experiences should have allowed for more positive things to be attended to and remembered. It was also hypothesized that participants getting the neutral condition would remember the fewest number of happy words and the greatest number of neutral words compared with participants in the mood-induction and mood-interpretation groups. Since the control group was assumed to be in a “neutral” state, any emotional feelings being experienced should have lessened and lowered the chances of word retention reflective of an individual’s emotional state.

Method

Pilot Study: Mood-Interpretation Group

Purpose. The purpose of the pilot study was to find a reliable reading source of happy mood-induction to emotionally prime participants in the mood-interpretation group. Since the researcher could not find relevant source documents of stories used previously in other research, three stories were formulated by the researcher and pilot-tested to determine which happy story served as the best emotional priming measure. For this reason, a pilot study was conducted to assess the stimulus materials to be used as manipulations in the experiment. A sample of 22 college men and women enrolled at Southern Connecticut State University were randomly assigned to read one of three happy stories written by the researcher. Of the three stories, one described a young adult’s happy experience on a first night away at college, another described an individual’s excitement about a recent acceptance into a doctoral program, and the third story discussed an individual’s excitement about being on a family vacation. The story that showed participants to have the happiest and most positive mood was chosen for mood-interpretation in the emotional priming experiment in order to maximize likelihood that happiness would be induced.

Measures. Participants were given a mood-assessment where they gave a general rating of their mood following their exposure to the stories. Students used Watson, Clark, and Tellegen’s (1988) Positive and Negative Affect Schedule (PANAS) to rate their current mood on a 5-Point-Likert Scale. The PANAS shows high internal consistency reliability, ranging from .86 to .90 for Positive Affect and .84 to .87 for Negative Affect. Test-retest reliability is moderately high in the general solution for Positive Affect ($r = .68$), and moderately high in the general solution for Negative Affect ($r = .71$). Convergent Validity ranges from .89 to .95, and discriminant validity ranges from -.02 to -.18 (Watson et al.). A list of adjectives on the PANAS was presented to
participants (i.e. Interested, Upset, Alert, and Afraid). The adjective, “happy,” was not one of the words listed on the scale but was added for all conditions and scored separately. Participants were instructed to rate the extent to which each adjective on the PANAS applied to them on a scale from 1 to 5, with a 1 indicating Very Slightly or Not at All and a 5 indicating Extremely. Mood ratings on the PANAS for each story were scored on negativity, positivity, and happiness.

Results. When comparing average mood ratings for each story, participants that read the story discussing a young adult’s experience on his/her first night away at college, reported the highest average rating of happy mood (M = 4.00, SD = .54) and positive affect (M = 32.63, SD = 5.78), compared to the ratings when reading the other two stories, which had average happy mood ratings of 3.29 and 3.86, respectively. Therefore, this story was chosen for the mood-interpretation group as it was considered to be most effective for emotionally inducing participants.

Emotional Priming Study

Participants. A sample of 84 college men and women enrolled at Southern Connecticut State University were recruited. Participants were undergraduate students taking an introductory psychology course who did not previously participate in the pilot study. Of the 84 students recruited, 76 were used in the data since the remaining eight were excluded. The 8 students dropped were due to unusual circumstances which occurred during the study such as issues with materials (n = 5), and accidental errors during the procedure (n = 3). Participants received course credit as compensation for their time.

Procedure. When participants came for their scheduled session, they were told to take a cubicle and sit down at a computer, put their belongings away, refrain from touching the computer, and to wait for instructions.

Mood Induction Condition. Students were given a packet that had an open-ended questionnaire and a mood assessment. On the questionnaire, students wrote about a past experience that made them happy by answering a series of open-ended questions. Inducing happy mood through the use of questions for the mood-induction group was based on the interview sources of Rottenberg, Joormann, Brozovich, and Gotlib’s (2005) study. The first open-ended question instructed students to answer the following in a few sentences as best as they could: Describe a happy event that occurred in your life. Participants were provided with themes that exemplified happy memories (i.e. reaching an important life goal, going on a family trip, or meeting your significant other). The second question asked: Describe why this event made you happy. The third question asked: As you think about this event now, what thoughts or feelings come to mind? Once students completed this questionnaire, they completed the PANAS (Watson et al., 1988), a mood-assessment which instructed them to rate how they currently feel on a 5-Point Likert Scale.

Mood-Interpretation Condition. Students read the chosen story from the pilot test that was written by the researcher. Once students were finished reading, the story was taken from them and they were given a packet that had a multiple choice question on the first page and the PANAS mood-assessment on the second page. The purpose of the question was to ensure students were paying attention to the reading. The question asked them what the story was about, and gave them three answers to choose from. Once they answered the question, they rated their mood using the PANAS.

Control Condition. A neutral story used from Abbott, Black, and Smith (1985) was given to the control group to ensure neutral priming took place. Students were instructed to read the paragraph-long story and notify the researcher once they were done reading. The neutral story discussed the process of two women ordering dinner at a restaurant. Thoughts, feelings, and motives of these women were not discussed. Once participants had finished reading, the story was taken from them and they were given a packet which had a multiple choice question on the first page and the PANAS mood assessment on the second page. The question asked students what the story was about and gave them three answer choices. Once they answered, they gave a mood rating using the PANAS.

Word List on PowerPoint. In order to assure validity and reliability of word-valence, a list of emotionally/non-emotionally relevant words were sampled from a pool of 57 happy and neutral words from Nygaard and Queen’s (2008) study. The happy and neutral word sets were also of approximately equal average word frequency (Kucera & Francis, 1967). In addition, each of the words was unrelated to one another in concepts in order to avoid semantic priming effects. Words were prepared on PowerPoint slides.

When groups were done with their induction tasks, they were told to push their packets to the side and to turn on the monitor screen in front of them, in which an “Emotion and Memory” title page popped up on the screen. A set of instructions notified subjects that they would be presented with a list of words (15 happy and 15 neutral) and to sit and watch the words as they appeared. They were also told to click the mouse to start, but to refrain from clicking
the mouse moving forward as the words would appear automatically. The words were presented in the same random order for each participant and flashed on the computer screen for 4 seconds each. Participants notified the researcher once the slides finished.

**Filler Task.** After exposure to the word list, participants were given a filler task. The filler task was a sheet of paper with various shapes on both sides. Participants were verbally instructed to write down the number of sides each shape had and to notify the researcher when they were done. The purpose of the filler task was to allow time to pass after participants were presented with the word list. By allowing an interval period for greater than 30 seconds, any recency effects caused by short-term memory would be avoided and any words remembered from the list would be due to retention in long-term memory.

**Memory Test.** After subjects completed the filler task, they were told to put the filler task sheet to the side. They were given a memory test and were told to recall as many words as they could remember from the list they were shown by writing them down on a sheet of paper. Participants were timed and given a maximum of 3 minutes to finish. Once participants used up their 3 minutes, they were instructed to stop and finish writing the last word they were on.

Lastly, they were debriefed by being told the purpose of the study and reasons for why they completed certain tasks. They were thanked for participating and encouraged to ask additional questions that they may have. The entire study took approximately 20 minutes to complete.

**Measures.** Mood ratings for negativity, positivity, and happiness from the PANAS were scored separately as they were for the pilot study. The PANAS scores were averaged for each condition. In addition, the number of words participants wrote down for the memory test was recorded. Of the number of written words, the number of words remembered from the list versus the number of intrusive (words not on the list) words written was recorded. Synonyms were not counted as words recalled but plurals and misspellings were accepted. Of the words remembered from the word-list, the number of happy and neutral words recalled was recorded.

**Results**

**Effect of Priming Type on Mood.** Three separate one-way analyses of variance (ANOVs) were conducted to determine the effect of the priming conditions on each of the dependent variables: negative, positive, and happy mood from the PANAS. Results showed significant differences in PANAS ratings for the single adjective, “happy,” between the experimental conditions and control condition, $F(2, 73) = 58.17, p < .05, \eta^2 = .61$. Tukey HSD tests found that the mood-interpretation group ($M = 4.0, SD = .71$) and mood-induction group ($M = 3.65, SD = .89$) reported feeling significantly happier than the neutral group ($M = 1.68, SD = .85$), $p < .05$ for both. Mood-induction group and mood-interpretation group were not significantly different in terms of happiness.

There was a significant difference in reported positive affect between the experimental conditions and control group, $F(2, 73) = 25.85, p < .05, \eta^2 = .41$. Tukey HSD tests found that participants in the mood-induction group ($M = 30.81, SD = 6.82$) and mood-interpretation group ($M = 29.08, SD = 7.75$) had significantly higher positive affect than participants in the neutral group. The mood-induction group and mood-interpretation group did not significantly differ in positive affect.

Furthermore, there was a significant difference in reported negative affect among all three conditions, $F(2, 73) = 5.90, p < .05, \eta^2 = .14$. Tukey HSD tests found that participants in the mood-induction group ($M = 14.54, SD = 4.27$) reported significantly greater negative affect than participants in the neutral group ($M = 11.00, SD = 1.96$). The mood-interpretation group ($M = 13.44, SD = 4.47$) was not significantly different from mood-induction group or neutral group. Therefore, subjects were successfully and equally emotionally-primed by writing about their feelings and by reading about someone else’s feelings.

**Effect of Priming on Memory.** A 3 x 2 mixed ANOVA was conducted to determine the effect of the priming conditions (mood-induction, mood-interpretation, and neutral) on the number of happy words and neutral words remembered. For the number of happy words remembered, this analysis found a significant main effect of word valence, $F(1, 73) = 61.69, p < .05, \eta^2 = .46$. Overall, more happy words ($M = 4.69, SD = 1.99$) were remembered than neutral words ($M = 2.80, SD = 1.80$). However, neither the main effect of condition, $F(2, 73) = .88, p > .05$ nor the interaction of word-valence were significant, $F(2, 73) = .25, p > .05$. Despite the predictions, subjects who were emotionally-primed by mood-induction ($M = 4.42, SD = 1.92$) and mood-interpretation ($M = 4.64, SD = 1.63$) did not remember significantly more happy words than the control group ($M = 5.00, SD = 2.38$). Moreover, subjects in the neutral condition ($M = 3.00, SD = 1.76$) did not remember a greater number of neutral words than the emotionally-priming conditions, such as mood-induction ($M = 2.42, SD = 1.63$) and mood-interpretation ($M = 3.00, SD = 2.02$).
Correlations. A bivariate correlation was conducted on negative and positive affect and number of words remembered on the list. Results showed a significant positive correlation between positive and negative mood, \( r (76) = .47, p < .01 \). Participants who reported a higher positive mood rating also reported a higher negative mood rating as well. This was an interesting finding; however, it is not clear as to why participants would report a higher negative mood when in a more positive mood, other than the idea that mood-induction may increase general levels of emotionality, hence inducing a mixture of both positive and negative emotions. In addition, results showed a significant negative correlation between negative affect and the number of words remembered, \( r (76) = -.24, p = .04 \). The more negative participants felt, the fewer number of words they remembered on the list. In addition, the more negative, the fewer number of happy words they remembered, \( r (76) = -.24, p = .04 \).

Furthermore, a positive relationship was detected between negative affect and intrusive words written down, \( r (76) = .40, p < .01 \). Participants who felt more negative tended to write more words that did not come from the list. The same was found for positive mood, \( r (76) = .23, p = .04 \). The more positive subjects felt, the more intrusive words they wrote down. Therefore, the more emotional they were, the more they tended to remember.

Discussion

General Overview. The purpose of this study was to determine whether emotional priming has a significant effect on the recollection of emotional information such as words that are tied to both happy and positive associations.

Effect of Priming on Mood. The mood-induction group and mood-induction groups reported feeling happier and more positive than the neutral group as a result of receiving the emotional-priming conditions. Ratings in happiness and positive affect did not significantly differ between the mood-induction group and mood-interpretation group. Therefore, subjects were successfully and equally emotionally-primed by writing about their feelings and by reading about someone else’s feelings. These results are comparable to research which found that individuals who wrote about a sad experience reported a significantly higher negative rating on the Brief Mood Introspection Scale (Lee et al., 2011). Performing a task that elicits emotionality can prime an individual to think and feel more emotionally. Therefore, emotions are capable of being manipulated.

Correlation between Priming and Mood. Surprisingly, the mood-induction group reported feeling more negative than participants in the neutral group. It was noted that some of the participants in the mood-induction condition reported a higher level of negative mood after writing about a happy experience. This may be due to the desire to re-live that happy experience but the inability to do so. Research from Larsen and McGraw (2011) revealed that subjects who watched a bittersweet film reported more intense mixed emotions than subjects who watched a control clip. These results support the idea that positive emotions are capable of eliciting negative emotions as well.

Effect of Priming on Memory. Results suggested that students generally remembered more happy words than neutral words. However, the type of condition or mood participants were in did not significantly affect the number of words students wrote down or the number of happy and neutral words remembered. Subjects in the emotional priming conditions (Mood-Induction and Mood-Interpretation) did not remember a significantly greater number of happy words at the expense of neutral words than the neutral condition. In addition, the neutral condition did not remember a greater number of neutral words at the expense of happy words than the priming conditions.

The results of the interaction do not support previous research conducted by Rimmele et al. (2012) as well as Eva-Wood (2004) who claim that emotional-priming impacts underlying cognitive processes because emotional information brought into working memory connects with emotional information in long-term memory. It is assumed that the tasks for the mood-induction and mood-interpretation group were enough to emotionally-prime participants but not effective enough to carry over into long-term memory. Therefore, the results of this interaction do not show support for the hypothesis that emotional priming affects long-term memory.

It is possible that emotional priming did not affect memory because of the distraction of the filler task or other distracters in between manipulations. All participants completed a task which distracted them from the words they were shown to avoid recency effects and to allow information to settle to long-term memory. Since students were distracted by the filler task, the information from the filler task may have interfered with information from the word list being rehearsed in working memory. Due to working memory capacity being limited and attention being re-directed to the filler task, it is likely that the distracters could have reduced the potency of mood and priming effects, causing a decrease in word retention and an increase of intrusive-words written down. Words that were remembered were assumed to
have been rehearsed and manipulated enough prior to the distraction, and therefore became encoded into long-term memory. As a final point, emotional priming may have been effective on short-term memory, but not enough to have an effect on long-term memory.

Another possible reason for why emotional priming did not carry over to long-term memory could be that the filler task reduced any happy emotions being felt in the mood-induction and mood-interpretation conditions. Given that the filler task was a way to pass time, it was also a very neutral task and may have reduced happy feelings being experienced in the mood-induction and mood-interpretation conditions, introducing more neutrality therefore making the word retention in all three conditions to become more balanced, resulting in a non-significant difference between number of neutral and happy words recalled.

**Correlation between Mood and Memory.**
When determining the relationship between negative and positive emotions, it was found that participants who felt more positive also felt more negative. This relationship is inconsistent with the inter-correlations and internal consistency reliabilities from the Positive and Negative Affect Schedule, which show the correlations between the NA and PA scales to be invariably low, ranging from -.12 to -.23 (Watson et al., 1988). It may be possible that participants were primed by the adjectives on the PANAS and therefore, experienced both positive and negative emotions. For example, seeing the negative adjectives on the PANAS may have reminded them of unpleasant memories or a one area of their life where something unpleasant is occurring. Seeing positive adjectives on the PANAS may have reminded them of pleasant memories or pleasant events in one aspect of their life, thus making them feel more positive and giving higher self-ratings.

Results also showed that more feelings of negativity were correlated with a fewer number of happy words recalled. It is possible that inducing negative mood rather than happy or positive mood may be more effective and overpowering. Therefore, due to a significant correlation between words remembered and negative mood, negative mood-induction may be a stronger prime than positive mood-induction. Furthermore, the more negative and/or positive participants felt, the more intrusive words they wrote down. Intrusive words were words participants wrote down that were not shown to them from the word-list. Intrusive words were commonly identified as emotional words such as: happy, excited, and afraid. This result is consistent with findings regarding the misinformation effect (Houston et al., 2013). As a result of being emotionally-induced, more attention is drawn to emotionally-arousing features and people tend to give more complete descriptions of something they have seen. However, these descriptions tend to lack accuracy, despite the person’s high level of confidence in recollection. Therefore, the ability to recall exact details becomes impaired and memory becomes distorted.

### Confounding Variables and Limitations

Despite the variables that were controlled in the study, confounding variables occurred. For example, the temperature of the room was not consistent and became very hot on certain days which may have caused participants to feel uncomfortable. Some participants were also exposed to noise that occurred outside in the hallway. Other participants had their cell phones out during the study which may have caused distraction. Furthermore, some participants were not timed properly when completing the memory test and as a result, were given more time on the memory test. This may have been the reason for the formation of intrusive words. Another confounding variable is that participants in the mood-induction group wrote about different happy experiences and therefore, the level of happiness being induced in each participant was not the same. This confounding variable could not be controlled due to individual experiences.

### Implications for Future Research

Stronger methods of priming should have been implemented if the goal was to affect long-term memory. For instance, inducing negative feelings may be more overpowering than positive feelings and may be strong enough to connect to information in long-term memory. Additionally, instructing students to write about a most recent emotional experience may be more effective than instructing them to write about any past experience that occurred in their life. More recent memories may trigger a more emotional response as opposed to past memories where feelings of those long-ago, have faded.

Lastly, further research should be carried out on filler-task procedures that will pose minimal risk of interfering with emotional priming effects while simultaneously reducing any recency effects. A possibility may be to give students an easier filler-task that does not require much thought in order to decrease distractibility and reduce chances of diminished emotionality, while simultaneously avoiding recency effects and allowing more time for emotional information in working memory to be connected with emotional associations in long-term memory.

Despite insignificant effects of emotion on memory, individuals are capable of being manipulated and generally better able to remember more positive information than neutral information.
While this study examined the effects of happy emotions on long-term memory, it did not examine the effect of many different types of emotions on long-term memory. Therefore, further research is needed on how various types of basic emotions such as fear, anger, and surprise affect the way working memory processes these emotions and whether they are strong enough to affect word retention. Further research is also needed to determine how emotional priming can affect working memory when there is interference or distraction, and how much distraction must be eliminated in order for emotional priming to significantly affect word retention.

References
Appendix A

Mood-Interpretation Story

I had such an amazing first day of college! Today when I woke up, I got dressed and moved the rest of my stuff into my dorm with the help of my parents. Once I was settled in my room, I got to meet my roommates and walk around campus. It is so exciting to know that my life has progressed to the next level and I am experiencing true freedom. I even made new friends who were living on the other floors. My roommates had decided that they wanted to go out tonight and celebrate the new semester. They asked me to go too! The three of us decided to get dressed and go downtown. We looked to see if any of the clubs had good crowds. Once we found one, I called up my friends so that they would meet us there. We had a great time at the club. The music was awesome! I even met other girls at the club who go to the same school. All of us were dancing and having a great time. What a night! Not only do I now have new friends but I feel comfortable being away from home and making my own decisions. I have a feeling I’m going to love my classes too!
APPENDIX B

Word List

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<th>HAPPY WORDS</th>
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The Influence of Spirituality and Social Support on the Stress-Sleep Relationship

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The purpose of the study was to investigate the relationship between different levels of spirituality and social support and their effects on the stress-sleep relationship. One-hundred ten college undergraduates from a midsized public university in the northeast were recruited to take part in an online study. Participants completed four surveys that measured levels of stress, spirituality, social support, sleep quality, and sleep duration. A main effect was found between stress and sleep quality as well as between social support and sleep quality. No main effects were found between sleep duration and either stress or social support. Spirituality had no significant effects, and no significant interaction effects were found between any variables.

The negative effects of stress on an individual’s physical and mental health have been well-documented across the stress literature (Belkic, Landsbergs, Schnall, & Baker, 2004; Surtees, Wainwright, Luben, Wareham, Bingham, & Khaw, 2008). Among many health detriments, which include an increased risk of cardiovascular disease and stroke, an individual’s quality and duration of sleep has been consistently linked to the amount of stress experienced (Doi, Minowa, & Tango, 2003; Fuligni & Hardway, 2006; Kalimo, Tenkanen, Härö, Poppius, & Heinsalmi, 2000). Sleep restores the human brain and body of lost energy over the course of the day. Sleep is vital in the recovery of physical and mental strain placed upon the individual (Danielsson et al., 2012). Thus, it is of importance to further understand the relationship between stress and sleep by understanding the factors that influence this relationship. Knowledge of this relationship can improve the academic success of college students whose sleep disturbances are a function of stressful circumstances. In addition, the investigation of potential variables that influence the stress-sleep relationship can contribute to developing drug-free treatment methods for improving sleep among individuals who suffer from sleep disturbances or sleep disorders.

Sleep is often evaluated on two criteria: sleep duration and sleep quality. Sleep duration is the amount of hours of sleep that an individual obtains, whereas sleep quality is the type of sleep experience an individual undergoes. Difficulty maintaining sleep and inability to achieve slow-wave sleep are best described as examples of poor quality sleep. In contrast, undisturbed, slow-wave sleep is considered good quality sleep. The amount of sleep needed each night varies for each individual. However, research suggests that the optimal amount of sleep for adults is between 7-8 hours (Hublin, Partinen, Koskenvuo, & Kaprio, 2007). Sleeping below this optimal amount of time on a recurrent basis puts individuals at risk for health and social detriments such as diabetes, hypertension, and impaired social relationships (Beihl, Liese, & Haffner, 2009; Carney, Edinger, Meyer, Lindsey, & Istre, 2006; Gangwisch et al., 2006). Previous studies have shown inconsistent averages of sleep duration intervals for college students (Hicks, Fernandez, & Pellegrini, 2001; Hosek, Phelps, & Jensen, 2004). However, previous research has agreed that sleep is an essential factor in academic success. Students who have shorter sleep durations display difficulties with visual-motor reaction time, critical thinking abilities, and attention to task (Taub, 1980). Deficits in both sleep quality and sleep duration have also been observed to cause disruptions in working memory tasks, further impacting student performance (Steenari et al., 2003).

Students often encounter stress throughout their college career, a factor known to impact sleep quality and duration when making the transition from high school to college life. Students typically have a larger workload, more responsibility, and greater independence than they had been accustomed to previously. Therefore, it is not surprising that college students are a commonly studied sample in regards to understanding how stress affects sleep quality and quantity. A recent study by Galambos, Howard, and Maggs, (2011) examined sleep quantity and quality among first-year students at a Canadian university. First-year college students were studied across five
months using several measures such as the Pittsburgh Sleep Quality Index (PSQI) for sleep quality and duration and a four-item version of the Perceived Stress Scale (PSS) measuring the amount of stress experienced. Negative affect and stress were found to be significant negative predictors of sleep quantity across months suggesting a relationship between the three variables. Sleep quality, on the other hand, was poorer in students who experienced greater financial stress and who were more independent of parental care. Due to sleep quality’s connection to financial stress and independence from parental care, it was suggested that these students potentially feel anxious about their increased financial responsibility. Independent students may potentially experience more anxiety when receiving less parental contributions on payment of bills, school supplies, and other necessities. However, results could also be attributed to less responsible sleep habits due to less interference from parents. The parent’s absence allows for students to decide when to sleep and when to wake up, thereby causing a change in their body’s normal sleep cycle. Results from this study lends further support for the hypotheses that college students experience high levels of stress which in turn affect their sleep quality and quantity because new lifestyle changes are made in order to adjust to college life and culture.

A new lifestyle for college students often entails finding employment so that they can support themselves financially (Bozick, 2007). Recent research has shown evidence of work stress as a significant factor affecting employee sleep quality and duration (Akerstedt, Fredlund, Gillberg, & Jansson, 2002; Akerstedt, Knutsson, et al., 2002; Peterson et al., 2013). Dahlgren, Keckland, and Akerstedt (2005) investigated the impact that different levels of work-related stress (i.e., high or low) had on sleep quality, fatigue, and cortisol. Results show that during the week, participants experienced higher levels of stress, fatigue, anxiety, and poorer sleep quality. Moreover, while a four-way interaction was found for stress, feelings of tension, irritation, time pressure, and prediction of sleep quality, it is not mentioned whether any of these variables affected the prediction of sleep quality on their own.

Findings on work stress have implications for college students who both work and go to school. Although most college students do not work full-time, it can be reasoned that the academic demands of full-time study and part-time work may affect undergraduate students in similar ways to how adults perceive the demands of work. The United States Department of Labor (2014) reported that 6 out of 10 recent high school graduates attended a 4-year college and 28% of these students participated in the labor force. Moreover, 31% of working students attending 4-year schools were full-time students. Thus, the potential for stress among college students is similar to those of adults’ work stress because students are often forced to meet academic and job demands that combine to form a full-time work load.

Health implications become a concern when stress levels consistently continue to affect sleeping experiences. A unique study that assessed this relationship between stress and sleep was conducted by Kashani, Eliasson, and Vernalis (2012) in which they examined disturbed sleep as a possible link between perceived stress and risk of developing cardiovascular diseases (CVD). CVD—otherwise known as heart diseases—are life-threatening diseases that negatively affect the heart, veins, and blood vessels and have been one of the leading causes of death and disability in the U.S. in recent years (Centers for Disease Control and Prevention [CDC], 2007). This study consisted of 350 participants with an average age of 54 from a CVD prevention program. Participants were asked to complete questionnaires measuring stress levels, sleep duration, and daytime sleepiness due to insufficient sleep. The PSQI and the PSS were among the measures used to assess stress levels and sleep disturbance. Findings suggest participants who reported higher levels of stress suffered from shorter sleep duration, poorer sleep quality, greater sleepiness and fatigue, and higher risk of diagnosis of sleep apnea (Kashani, Eliasson, & Vernalis, 2012). Women and younger participants reported higher perceived stress scores than men and older participants. Factors such as spirituality and social support are suspected to be involved in the stress-sleep relationship with those having more resources to handle stress receiving less stress scores. Thus, individuals evaluate their ability to cope with stress effectively based on the perceived availability of resources that can be used to combat a stressor.

The Transactional Model of Stress and Coping proposed by Folkman (1984) suggests that individuals identified situations as stressful due to a lack of resources available to cope with and manage the stressors. Individuals first went through a primary appraisal in which they identified the situation as irrelevant or stressful, and categorized stressful situations as a harm or loss, a challenge, or a threat. Upon identifying the stressor as a threat, the individual proceeded to secondary appraisal of the situation in which he/she must evaluate the extent to which resources were available to help effectively cope with the stressor. The resources considered for management of the stressor consisted of physical, social, psychological, and material assets. When a
stressor is perceived to exceed one’s resources of managing and coping with the stressor, stress is experienced. According to Folkman (1984), an individual’s ability to cope with stress is influenced by the individual’s appraisal of available resources. Among these are social resources which consist of friendships and social networks that provide emotional support and tangible assistance. Psychological resources are also considered by an individual when dealing with stress. Psychological resources are beliefs that the individual will overcome the situation and this leads to the preservation of self-esteem, morale, and hope. These psychological and social resources considered in secondary appraisals of stress are analogous to spirituality and social support, respectively, because of their similar ways of helping individuals cope with stress. Thus, evaluation of these factors may be important to the understanding of how stress affects an individual’s duration and quality of sleep.

Social support has been shown to be a significant resource in one’s ability to cope with stress. Hamaideh (2011) conducted a study that examined the relationship between social support, occupational stress, and quality of life (QOL) among Jordanian nurses. According to the subscales of the Mental Health Professionals Stress Scale (MHPSS), Jordanian nurses identified “a lack of resources” as the second highest level of occupational stress, which is consistent with the secondary appraisal process in the Transactional Model of Stress. Results demonstrated that occupational stress had a significant negative correlation with social support where higher levels of occupational stress were associated with lower social support.

Thus, while previous research on social support has demonstrated an ability to reduce occupational stress, spirituality has been identified as another resource capable of reducing the amount of stress experienced by an individual. Similar findings of stress reduction have been found when assessing levels of spirituality among participants. Labbé and Fobes (2010) examined how the level of spirituality in young adults contributed to different responses in stressful situations. Participants who were categorized as highly spiritual had lower state anger and lower respiration rate in response to a stressful mental task when compared to participants with lower levels of spirituality. However, no differences between groups were found in regards to heart rate and skin conductance. These results suggest that spirituality serves as a protective factor in that it allows individuals to remain more neutral and calm when presented with stressful situations.

In a unique study assessing the role of spirituality and social support in coping with stress, Calicchia and Graham (2006) examined the relationship between spirituality, life stressors, and social resources among graduate students. A significant negative relationship was found between levels of existential well-being and stress from a spouse/partner and extended family. In other words, those who reported being more spiritual experienced less stress from extended family and significant others. Furthermore, a negative relationship was found between social support and overall stress such that greater social support available to graduate students correlated with less overall experienced stress. Consistent with these findings, Gopelrud (1980) found that graduate students in Psychology experienced greater levels of stress when socially isolated compared to other graduate students with more social support. Similar findings of a buffering effect occurred while assessing the moderating function of spirituality on emotional and physical adjustment to daily stress in college students in Korea. Students who were more spiritual than their peers experienced less negative affect and fewer physical symptoms in response to stressful situations (Kim & Seidilitz, 2002). Although these studies have found evidence supporting stress’ relationship to spirituality and social support individually on graduate students, it is yet to be seen how both factors interact to moderate the effects of stress on the quality and duration of sleep of undergraduate students.

Although few studies have examined how spirituality and social support together affect sleep quality and duration, some research suggests that each of these variables is related to sleep quality and duration. In a study assessing sleep quality among HIV-infected individuals, those who reported being more spiritual experienced better overall sleep quality and less sleep disturbance (Phillips, Mock, Bopp, Dudgeon, & Hand, 2006). In terms of social support, full-time Swedish working individuals experienced poorer quality sleep when reporting less emotional support (Nordin, Knutsson, Sundbom, & Stegmayr, 2005). Working individuals who had high work demand, low control of situations, and low emotional support, experienced poorer sleep overall. Akerstedt et al., (2002) reported similar findings among Swedish working individuals in which a combination of high work demands, low decision latitude, and low social support contributed to participants’ continuous rumination about work and disturbed sleep.

Higher levels of stress have been demonstrated to negatively impact an individual’s sleep quality and duration (Dahlgren et al., 2005; Kashani et al., 2012). Furthermore, individuals with
greater spirituality and social support have been shown to experience lower levels of stress (Calicchia & Graham, 2006; Gopelrud, 1980; Kim & Seidilitz, 2002). Few studies have looked at the relationship between sleep and social support or sleep and spirituality (Phillips et al., 2006). Additionally, limited research has been conducted to investigate the relationship between stress, spirituality, and social support and how they, together, affect an individual’s sleep quality and duration. Moreover, spirituality and social support were often studied individually in regards to their effect on stress levels, but interactions between the two variables and their effect on stress have not been examined.

Research has often examined workers and college students for signs of stress and sleep impairment due to the workloads these two populations tend to experience (e.g., Gopelrud, 1980; Kim & Seidilitz, 2002; Calicchia & Graham, 2006). Moreover, student samples usually consist of graduate students because of the high work demand and stress derived from possible implications of failure to their career aspirations. Few studies have investigated these effects on undergraduate students; the studies that have examined undergraduates have been primarily outside the United States. Thus, undergraduates will be studied to provide more generalizable findings of stress and sleep. These students also tend to have high workloads and higher perceived stress, particularly when they are involved in many different aspects of student life or are first-year college students.

The current study investigated the potential for spirituality and social support to influence stress’ effect on sleep quality and duration. There were three hypotheses in this study. First, we predicted that individuals who experience higher levels of stress will have poorer sleep quality and shorter sleep duration compared to individuals with low levels of stress. Secondly, individuals who experience high levels of stress and have low levels of spirituality and social support are predicted to experience poorer sleep quality and shorter sleep duration than those who experience low levels of stress, and have high levels of spirituality and social support. Finally, spirituality and social support will act as protective factors against stress, such that high levels of stress, spirituality, and social support will result in better sleep quality and duration than those with high levels of stress and low levels of spirituality and social support.

Method

Participants

Participants were college students at a midsized public university in the northeast. Based on power analysis, 110 students were recruited for the study (Cohen, 1992). Participants were recruited through the subject pool system and participation in the study helped students fulfill course requirements. The sampling strategy employed was convenience sampling and biases in sampling were minimal due to anonymous completion of online surveys.

The sample was comprised of mostly women (70.9%). Most participants identified as Caucasian (68.2%), followed by Hispanic/Latino (12.7%) and African American (10.9%). Christianity (65.5%) was the most commonly practiced spiritual belief; Atheism was second (29.1%). The majority of participants were currently in their sophomore year (45.5%), freshman year (25.5%), and junior year (20%) with students primarily between 17 and 20 years (83.6%) of age. A small amount of participants were first-generation college students (21.8%), however the majority were not (78.2%). Approximately half of students lived on campus (45.5%).

Materials

Miller Measure of Spirituality. Degree of spirituality was defined by scores on the Miller Measure of Spirituality (Miller, 2004) (see Appendix A). Each question was rated on a 5-point Likert scale with ‘1’ being “strongly disagree” and ‘5’ being “strongly agree”. A sample item from the measure was, “My belief in a higher being affects and influences most of my life.”

Miller’s (2004) spirituality measure consisted of two factors: Prosocial Beliefs and Importance of a Higher Being. Both showed good internal consistency and reliability with alpha coefficients of .88 and .91, respectively. Distinction between aspects of religiosity and spirituality have also been demonstrated with correlations of -.05 for religious behavior and -.03 for religious beliefs in Factor 1, and correlations of -.36 for religious behavior and -.39 for religious beliefs for Factor 2. Thus, the measure is effective in distinguishing spirituality from religiosity, an important distinction in the current study where differences between spirituality and religiosity are often not known to students.

Perceived Social Support Scale. Social support was defined by the participant’s score on the Perceived Social Support Scale (Dahlem et al., 1991). Each of the 12 questions were rated on a 7-point Likert scale with ‘1’ being strongly disagree and ‘7’ being strongly agree. A sample item from the measure was, “I can count on my friends when things go wrong.”

The Perceived Social Support Scale’s reliability was measured using Cronbach’s coefficient alpha, which was calculated at .91 (Dahlem et al., 1991). A principle components analysis revealed
83.9% of variance in scores was accounted for by three factors (Friends, Significant Other, and Family), lending support for construct validity. This measure has shown consistent reliability when tested on university undergraduates.

**Perceived Stress Scale.** Stress was defined as the score received on the Perceived Stress Scale (PSS) (Cohen et al., 1983). The Perceived Stress Scale has been used in research targeting an individual’s perception of general stress experienced. The measure consisted of 10 questions with responses ranging from ‘0’ (never) to ‘4’ (very often). A sample item from the measures was, “In the last month, how often have you felt that you were unable to control the important things in your life?”

In the original study, coefficient alpha reliability for the PSS was shown to be at .84, .85, and .86 in three samples (two college samples, and one smoking cessation sample) (Cohen et al., 1983). Test-retest reliability was shown to be at .85 when the instrument was administered two days apart, but this was reduced to .55 when administered six weeks apart. The Perceived Stress Scale displayed good predictive validity with correlations between .52 to .76 for symptomatology measures (physical and depression). Concurrent validity was also demonstrated with the Perceived Stress Scale with small to moderate correlations with the number of life events on the Life-Event Scale (Cohen et al., 1983).

**Pittsburgh Sleep Quality Index.** Sleep quality and duration was assessed using the Pittsburgh Sleep Quality Index (PSQI) which is a widely used subjective measure of sleep experience (Buysse et al., 1989). A sample item from the measure was, “During the past month, how many hours of actual sleep did you get at night?”

Internal Consistency of the measure was reported at .83 with test-retest reliability at .83 for sleep quality and .80 for sleep duration (Buysse et al., 1989). PSQI has a sensitivity of 89.6% in identifying those who suffer from sleep disorders and a specificity of 86.5% in identifying those who do not have any form of sleep disorder (Buysse et al., 1989). Significant differences in global PSQI scores between a control group and patients with depressive or sleep disorders were further validated by polysomnographic results (Buysse et al., 1989).

**Procedure.** Measures for stress, sleep, spirituality and social support was combined into a single survey and administered online through the university subject pool system. When completing the survey online, measures were presented in a randomized order to control for possible order effects.

Prior to beginning the survey, participants were given a brief description and instructions for completing the survey. The description explained that the study measured sleep quality and sleep duration among undergraduates and that the survey would take approximately 15 minutes to complete. Participants were told to answer questions to the best of their ability while selecting only one best answer and that they had the right to stop taking the survey at any time. Upon proceeding to the next page and giving consent, participants started by completing a demographic form, and then the survey. Once completed, they were presented with a debriefing page and thanked for their participation in the study.

**Design.** The current study used a 2x2x2 between subjects, quasi-experimental factorial design. The three independent variables were the amount of stress (high, low), amount of spirituality (high, low), and amount of social support (high, low). A median-split method was used for each independent variable to separate participants into high or low groups. Stress was defined by scores on the Perceived Stress Scale with scores above the median translating to high stress and those below the median equating to low stress. Spirituality was defined by scores on the Miller Measure of Spirituality. Scores above the median were considered high spirituality and scores below the median were categorized as low spirituality. Social support was also defined by scores on the Perceived Social Support Scale. Similar to spirituality and social support, scores above the median were defined as high social support and those below the median as low social support.

Two dependent variables were examined. Sleep quality and sleep duration were determined by total scores on the PSQI. All scores in the PSQI operated in reverse order such that higher numbers represented poorer sleep than lower numbers. Thus, for sleep quality higher numbers on this scale indicated poorer sleep quality and lower numbers greater sleep quality. Similarly, higher numbers PSQI indicated shorter sleep duration and lower numbers indicated longer sleep duration.

**Results**

Two three-way factorial ANOVAs were used to analyze these data. Table 1 displays means and standard deviations for all independent variable combinations. The first analysis assessed the main effects and interactions of stress, social support, and spirituality on sleep duration. Social support was trending toward significance $[F(1, 86) = 3.16, p = .08]$. There were no main effects on sleep duration from stress $[F(1, 86) = 0.75, p = .39]$, or spirituality $[F(1, 86) = 0.10, p = .75]$. Interaction effects on sleep
duration were all also non-significant: stress and social support \( F(1, 86)= 1.52, p = .22 \), stress and spirituality \( F(1, 86)= 1.05, p = .31 \), social support and spirituality \( F(1, 86)= 0.42, p = .52 \), and stress, social support, and spirituality \( F(1, 86)= 0.004, p = .95 \).

### Table 1

*Means and standard deviations for all independent variable combinations.*

<table>
<thead>
<tr>
<th>IV Level Combinations</th>
<th>Sleep Quality, M (SD)</th>
<th>Sleep Duration, M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low ST, Low SS, Low SP</td>
<td>6.44 (2.87)</td>
<td>7.00 (0.92)</td>
</tr>
<tr>
<td>Low ST, Low SS, High SP</td>
<td>6.00 (3.46)</td>
<td>7.00 (0.82)</td>
</tr>
<tr>
<td>Low ST, High SS, Low SP</td>
<td>5.85 (2.44)</td>
<td>6.96 (1.08)</td>
</tr>
<tr>
<td>Low ST, High SS, High SP</td>
<td>4.70 (1.84)</td>
<td>7.32 (0.88)</td>
</tr>
<tr>
<td>High ST, Low SS, Low SP</td>
<td>8.68 (3.67)</td>
<td>6.71 (1.31)</td>
</tr>
<tr>
<td>High ST, Low SS, High SP</td>
<td>8.90 (2.96)</td>
<td>6.21 (1.08)</td>
</tr>
<tr>
<td>High ST, High SS, Low SP</td>
<td>5.00 (0.82)</td>
<td>7.33 (1.15)</td>
</tr>
<tr>
<td>High ST, High SS, High SP</td>
<td>7.00 (2.41)</td>
<td>7.14 (0.78)</td>
</tr>
<tr>
<td>Total</td>
<td>6.68 (3.06)</td>
<td>6.93 (1.04)</td>
</tr>
</tbody>
</table>

ST: Stress, SS: Social Support, SP: Spirituality

The second 3-way ANOVA examined the effects of spirituality, stress, and social support on sleep quality. There was a main effect of stress on sleep quality, \( F(1, 92) = 6.23, p = .01, \eta^2 = .06 \) (see Figure 1). Those who reported higher amounts of stress \( (M=7.40, SD= 0.48) \) had worse sleep quality than those with low stress \( (M=5.75, SD = 0.45) \).

A main effect was also revealed for social support, \( F(1, 92)= 8.019, p < .01, \eta^2 = .08 \) (see Figure 2). Thus, participants who reported higher levels of social support \( (M=5.64, SD = 0.47) \) experienced better quality of sleep than those who reported lower levels of social support \( (M=6.51, SD= 0.47) \). No significant main effect was found for spirituality on sleep quality \( F(1, 92)=.056, p =.81 \). Interaction effects on sleep quality were all also non-significant: stress and social support \( F(1, 92)=1.946, p =.17 \), stress and spirituality \( F(1, 92)= 2.075, p = .15 \), social support and spirituality \( F(1, 92)=.168, p = .68 \); and stress, social support, and spirituality on sleep quality \( F(1, 92)=.885, p = .35 \).

Regressions were also performed to assess the effects of stress and social support’s ability to predict sleep quality and sleep duration. Spirituality was removed from these analyses due to lack of significant effects within the ANOVAs. Sleep quality was significantly predicted by stress, \( \beta= .31, t (99) = 3.28, p < .01 \), and social support \( \beta= -.27, t (99) = -2.57, p=.01 \). When examining sleep duration, stress was revealed to be a significant predictor \( \beta = .20, t (109) = 2.123, p = .04 \). Social support was not a significant predictor of sleep quality, \( \beta = -.15, t (109) = -1.628, p = .11 \).

**Figure 1:**

*Levels of sleep quality under high or less stress*
Despite social support’s direct effect on sleep quality, an interaction effect was not observed between stress and social support. High social support has been linked to lower levels of stress in several studies (Akerstedt et al., 2002; Calicchia & Graham, 2006), however it may not have been observed in the current study due to differences in type of stress experienced. Social support may be better suited to combat work stress or occupational stress more closely related to future careers. This may due to the importance of performing well in these fields or careers, so as to avoid the risk of being terminated from a position one enjoys. Such experiences may be different from the undergraduates in the current study who were mainly within the first two years of study and may not have been primarily concerned about the repercussions of their course grades on potential careers or graduate school. It could also be reasoned that some jobs require tasks that inflict a more significant amount of stress on workers and, as a result, produce a need for social support. These two points could explain the different results of the current study compared to Hamaideh’s (2011) study of occupational stress among Jordanian nurses and Calicchia and Graham’s (2006) study of graduate students stress for career-oriented work.

Spirituality was not found to be a significant contributor to the reduction of stress nor to improved sleep quality and duration. This finding conflicts with previous research indicating that spirituality is an effective protective factor against stress (Labbé & Fobes, 2010; Tuck, Alleyne, & Thinganjana, 2006). Cultural differences in emphasis and utilization of spirituality may also be inferred to be a result of differences between the current study and that of Kim and Seidlitz’s (2002) study on Korean college students’ spirituality.

Another potential factor influencing the use of coping resources for stress may also be the age of the individual (Folkman, Lazarus, Pimley, & Novacek, 1987). As adults increase in age, they may come to rely more on spirituality than social support as a protective factor as a result of negative life experiences over the course of their life (Wink & Dillon, 2002). On the other hand, younger adults may be more inclined to use social support to cope with stress, because the situation is perceived as being amendable to change, and thus use problem-focused forms of coping (Folkman et al., 1987). Moreover, it is expected that young adults are still learning about themselves as they progress through college, thus spiritual and religious beliefs are not completely established. However, the time in which spirituality begins to be utilized as a stress reduction method does not appear to be far from young adults as
Calicchia and Graham (2006) found evidence of spirituality reducing stress among graduate students. The type of circumstance may also play a factor in spirituality’s use in reducing stress, such that it is more often used when in dire life-or-death situations, as observed by Phillips et al.’s (2006) study on HIV-infected individuals. Like social support, spiritual implementation could also be dependent on the specific causes of stress such as uncertainty over one’s future.

A limitation of the study pertains to the size of the sample. Recruitment of more participants would have enhanced the power behind the study and possibly contributed to additional significant findings. Some combinations of the IV’s only contained three or four participants within them, which was not a representative sample of those groups.

Future research in this area should focus on the role of rumination within the stress-sleep connection. When stressed, individuals typically ruminate about the stressor often enough that it negatively impacts sleep (Akerstedt, Knutsson, et al., 2002). The type of stressor experienced by individuals should also be considered as well for future stress studies (Matud, 2004). Different stressors may require different types of protective factors to be utilized in reducing stress. The current study attempted to provide more information on this topic not only for further knowledge on this subject, but to find ways of curtailing stress experienced by college students. Spirituality and social support were two resources examined for their effectiveness in reducing stress. Reducing stress can result in better sleep quality and duration among college students, potentially leading to greater rates of academic success.

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Appendix A

Miller Measure of Spirituality (MMS)

Factor I (Prosocial Beliefs)
1. I am often intrigued by things or matters that seem to be mysterious or unexplainable.
2. It is important for people to be at peace with themselves.
3. It deeply saddens me when I perceive that another person has suffered some sort of injustice.
4. If you think someone or something is important to you, then you should deeply value it.
5. There are some occurrences in the natural world that seem to be beyond scientific understanding.
6. There is more to this world than what can be seen and physically studied.
7. People need to frequently evaluate what should be cherished in their lives.
8. I tend to reflect upon the events that occur in my life.
9. Sometimes it takes a major loss to occur before a person realizes what is truly important in life.
10. Changing or growing as a person in a good way is one of the noblest endeavors that a person can undertake.
11. Every experience allows a person to learn something new about themselves.
12. I am very compassionate towards the needs of others.
13. I am always trying to find ways to express myself
14. The search for meaning allows one to find inner peace.
15. The process of self-discovery is very important to me.
16. People should work to enact their most idealistic beliefs.
17. I try to turn painful experiences into something that allows me to grow as a person.
18. Religious leaders must always emphasize the importance of compassion and tolerance for all.
19. I hope that most people will go to a good place after they die.

Factor 2 (The Importance of a Higher Being)
1. My belief in a higher being affects and influences most of my life.
2. I feel the need to communicate with some type of higher being.
3. I consider myself to be a spiritual person.
4. I firmly believe that good prevails over evil.
5. I feel that each and every person has a unique mission to fulfill in life.
6. My life would have little meaning if I did not believe in a higher being.
7. I regularly seek inner strength and guidance from a higher being.
8. By helping others, I am showing my love for my supreme or higher being.
9. I try to serve my higher power as best I know how.
10. I feel that I have a personal connection to some type of higher being.
11. I am moved by sacred rituals.
12. I am searching for the ultimate truths of everyday life.
When You Fail to Reject the Null Hypothesis: Methodological Considerations for Null Results

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Null results typically indicate that the experimental manipulation lacks effect. This conclusion, however, assumes, appropriateness, validity, and reliability of the experimental design. We describe a troubleshooting process in which previously validated assessments were sequentially modified in order to reveal preference behavior in rodent animals. Through the use of positive control experiments, flaws in a Conditioned Place Preference (CPP) procedure were uncovered and altered in order to reveal preference behavior. Our work highlights the importance of the inclusion of positive controls, and validating even well-established methods prior to experimentation.

Positive control experiments refer to those in which the appropriateness of an assay is determined by using it to assess an already known phenomena. For example, the appropriateness of a new measure of intelligence may be determined by testing a group of individuals that have already been tested using a previously established measure and comparing results. While positive control experiments are commonly used when determining the effectiveness of a new assay, they are often overlooked when using a measure that was previously found to be both valid and reliable. Failure to carry out a positive control experiment in this type of instance, however, incorrectly assumes that a particular assay will be carried out in exactly the same way. Even when trying to follow a previously established measure as closely as possible, there still may be a variety of confounding variables that have been overlooked by a researcher who could be using this method for the first time. The following series of experiments conducted at Southern Connecticut State University’s Behavioral Neuroscience Lab using a behavioral assay known as Conditioned Place Preference (CPP) support this idea.

CPP is a measure used to assess the extent to which an animal finds a stimulus rewarding. An animal is exposed to a chamber composed of two distinct compartments. In one compartment, the animal is conditioned via exposure to a reinforcing stimulus (CS+). In the other compartment, the animal is not given access to this reinforcer (CS-). After conditioning, the animal is then given a choice between both compartments. If the animal did indeed evaluate the CS+ as rewarding, it will later spend more time in the side in which it was previously given access to this stimuli. If, on the other hand, the animal finds the stimulus aversive, it will later spend more time in the environment in which it received no reinforcement.

**Experiment 1: Using CPP to Assess the Effect of Paternal Age on Social Preference.**
While there is a large body of research regarding the effects of advancing maternal age, the effects of advancing paternal age were widely overlooked until recently. Now, researchers have begun to examine the interaction between paternal age and the prevalence of mental disorders among offspring, with findings indicating that advanced paternal age is indeed associated with the development of a variety of deleterious effects in offspring (Byrne et al., 2013; D’onofri, 2014; Hultman et al., 2011; Malispina, 2001; Reichenberg et al., 2006; Tsuchiya et al., 2008). Of particular interest to this study, autism is a behavioral disorder which is typically characterized by repetitive behaviors, impaired language, and deficits in social interaction (Benaron, 2009). While it has been established that advanced paternal age is associated with increased rates of autism among human offspring, many findings are still merely correlational (e.g. Reichenberg et al., 2006; Tsuchiya et al., 2008; Hultman et al., 2011).

This experiment looked to identify differences among two groups of rodent animals: offspring sired by young aged (YA) fathers (aged 3-5 months) and offspring sired by advanced age (AA) fathers (aged 2-2.5 years), in order to determine whether or not advanced paternal age was indeed a causal factor in the development of autism-like behavior in adolescent rodents. More specifically,
this experiment examined the effects of paternal age on the social interaction of adolescent rats.

**Animal Production.** Sprague-Dawley rats were used for this experiment. This strain of rats has been comprehensively assessed for social behavior, with peak levels of social interaction identified as occurring during specific days of development (Varlinskaya & Spear, 2008), which highlights the most appropriate time to assess for deficits in social interaction. All animals were maintained in a temperature-controlled environment (22°C), on a 12:12 light-dark cycle, with lights on at 0700 hours, and food and water available ad libitum. All animals were treated in accordance with the guidelines set forth by the National Institute of Health (1986), and all protocols were approved by the Institutional Animal Care and Use Committee of Southern Connecticut State University.

For breeding, one male and one female rat were placed in a standard, clear maternity tub measuring 45cm X 24cm X 21cm, where they remained pair-housed for up to 5 days. After this, female rats were pair-housed together until approximately gestational day 20, at which point they were separated and singly housed. Animals were then checked daily for parturition. The day parturition was detected was deemed post-natal day (PND) 0. Litters were culled to a total of 10 pups while maintaining equal sex ratios, whenever possible. As standard in rodent studies, only male pups were used for experimentation. A total of 12 animals per group were used, for a total of 24 animal subjects. Litters remained group housed with the dam until PND 21, at which point pups were weaned and pair-housed. At PND 40 (+/- 5 days), CPP testing began.

**CPP Methods**

A CPP chamber was built consisting of two distinct environments made up of equal parts black and white. On one side of the chamber, the walls consisted of black and white horizontal stripes, and the floor was composed of parallel metal bars. On the other side of the chamber, the walls consisted of vertical stripes, and the floor was composed of a metal grid. The two middle walls were entirely removable for initial and final preference testing. All conditioning and testing trials were recorded on a camera positioned above the testing chamber.

Initially, middle walls were removed, with test subjects placed in the neutral middle area and allowed to ambulate freely around the chamber for 10 minutes. Video data was then analyzed for time spent on each side of the chamber. The side in which the subject spent more time was deemed their preferred environment, while the side in which the subject spent less time was deemed their non-preferred environment. After this, walls separating each side were put back into the chamber (see above image). As standard for CPP, subjects were then conditioned with the positive reinforcer (CS+), in this case a novel conspecific (animal of the same age and sex) on their non-preferred side to ensure that an increased preference for that side would indeed indicate that the subject found the CS+ rewarding, and not merely a reflection of its natural preference. This conditioning
occurred on the day following the subjects’ initial preference testing, and consisted of one 10 minute trial. The following day, the walls were removed, and animals were again allowed to freely ambulate around the chamber for 10 minutes to measure preference of each environment.

**Results.**
As standard assessment for CPP testing, the percent preference for the side previously paired with the reinforcer (% preference = (time in CS+ / total amount of time spent in either side of the chamber) * 100) was examined. Initial percent preference for the CS+ side was then compared to final percent preference for the CS+ side for both groups using a paired samples t-test. For the YA group, no significant difference was found in preference times pre- (M = .29, SD = .15) and post- (M = .34, SD = .30) conditioning, t(9) = -.72, p = .49. Likewise, for the AA group, no significant difference was found pre- (M = .29, SD = .18) and post- (M = .35, SD = .29) conditioning, t(12) = -.85, p = .41. A one way analysis of variance was conducted in order to determine differences between groups’ overall change in preference, with no significance between YA (M = .04, SD = .22) and AA (M = .05, SD = .27) subjects found, F(1,21) = .004, p = .949.

**Discussion**
These findings were contrary to what was expected, as the control subjects sired from the YA fathers should have shown an increased preference for the side in which they were given access to the CS+. These findings would suggest that, under some circumstances, social interaction is not an effective reinforcer in rodent animals. However, because experiments have consistently shown social interaction to serve as a strong reinforcer during adolescence (e.g. Trezza et al, 2009; Varlinskaya and Spear, 2008), a follow-up experiment was performed to determine whether or not the chamber and methodology used were indeed appropriate for use in CPP.

**Experiment Two - Using Positive Controls to Verify Null Results**
During this experiment, SCSU’s CPP chamber and methodology was assessed to verify the unexpected null results of the previous experiment. Because food is a known primary reinforcer in rodent animals and has been used in many CPP studies (e.g. Spyraki, 1982), we used a palatable food reward (a Reese’s peanut butter cup) as the CS+ in this experiment, as opposed to social interaction.

**Animal Production.** Animal production occurred according to methods as described above. All animals used for this experiment were bred from young aged sires and dams (aged 3-5) months. A total of 6 adult male animals aged 1 - 1.5 years were used for this experiment.

**CPP Methods**
In experiment 1, subjects overwhelmingly preferred the environment with the grid flooring, perhaps due to it being easier to grasp than the parallel flooring. Because of this, grid flooring was removed and replaced with the parallel bars to match the other side. Since the floors were no longer different, different designs of equal parts black and white (one checkered and one striped) were created and placed below the bar flooring in order to further differentiate each side. As in the previous experiment, a video camera was suspended above the chamber.

On experimental day one, walls were removed and subjects were placed in the neutral middle area and allowed to ambulate freely around the chamber for 10 minutes. Video data was then analyzed for time spent on each side of the chamber. As described above, subjects were then conditioned with the CS+ on their non-preferred side. Instead of just one 10 minute session, subjects underwent two 10 minute conditioning sessions per day, with the additional session added so that subjects would also be conditioned on their preferred side with no stimuli (CS-). This insured that final percent preferences reflected an actual preference or aversion to the reinforcer, as opposed to an animal’s willingness or reluctance to explore an environment in which they had previously spent more or less time. Additionally, animals were conditioned for four days, instead of just one, to allow for more time learning which condition was experienced in each environment. On the sixth day of experimentation, walls were removed and subjects were again placed in the neutral middle area of the chamber and allowed to freely ambulate for 10 minutes to measure final preferences.

**Results**

As described above, a percent preference score was determined for each animal pre- and post-conditioning. A paired samples t-test revealed that subjects did not exhibit a change in preference pre- (M = .32, SD = .17) and post- (M = .49, SD = .32) conditioning, t(5) = -1.18, p = .29.

**Discussion**

As in experiment one, this would suggest that the stimulus used does not serve as a reinforcer in rodent animals. As this is known to be untrue, we were able to conclude that our CPP chamber and methodology were, indeed, still flawed and in need of further revision.

**Experiment Three: Using Positive Controls to Verify the CPP Method**

During this experiment, SCSU’s CPP chamber and methodology were further modified in order to try to establish a valid Conditioned Place Preference procedure. A subset of animals from the previous experiment were used.

**CPP Methods.** In experiment two, it was not uncommon for the food reward to fall through the flooring, preventing subjects from consuming the entire portion. To prevent this, clear plexi-glass was placed over the bar flooring. This had the added benefit of making it easier for the animal to ambulate within the chamber.

Since subjects had already been assessed for preference in experiment two, this portion of the experiment was not needed. Following the same methods as described in experiment two, subjects were conditioned for an additional ten days. After this, subjects were then reassessed for preference.

**Results**

Again, a paired samples t-test was performed in order to assess whether animals had an increase in preference for the side in which they experienced the CS+. This time, subjects did show a significant increase in preference pre- (M = .37, SD = .07) and post- (M = .52, SD = .09) conditioning, t(5) = -3.01, p = .03.

**Discussion**

After optimizing our lab’s CPP protocol, we are able to conclude that results from experiment 1 and 2 are invalid, as the CPP methodology was proven to be flawed. This series of experiments shows the importance of running a positive control when using a new experimental measure. Even when trying to follow previously established methodology as closely as possible, there can still be a variety of confounding variables, which may affect experimental results. Positive controls should be run to avoid reporting incomplete, inconclusive, or inaccurate information. If we had not run positive control experiments, we would have reported that, under some conditions, social interaction is not an effective reinforcer in rodent animals. Importantly, these premature results could have affected future experiments. Now that our CPP methodology has been verified, a new series of tests can begin to assess the effect of paternal age on social development.

**References**


Does Encouragement Impact the Performance of Pessimistic Avoidant Strategy?

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The present study sought to identify the effect of encouragement on lifestyle disposition (optimism and pessimism) and motivation temperament (approach and avoidant) during tasks. Encouragement has been found to decrease pessimistic individuals’ performance on cognitive tasks (Norem & Cantor, 1986). It was hypothesized that: (1) optimism and pessimism would be correlated with approach and avoidance motivations, respectively; (2) encouragement would negatively impact performance of pessimists and avoidance motivated individuals on a scrambled sentence task (SST); and (3) word orientation would impact performance of avoidance motivated individuals and pessimists. Lifestyle disposition and motivation temperament of 109 students were measured followed by completing a computerized SST with or without encouragement. Optimism and pessimism were positively correlated with their counterparts. When analyzing lifestyle disposition as a spectrum, approach motivation was not correlated with disposition while avoidance was negatively correlated. Individuals with higher avoidance motivation performed significantly faster with scrambles compared to any other group.

Optimism and pessimism are traits that vary in individual’s personalities. People may maintain a balance of both, but others may fail on a particular side of the continuum, being more optimistic or more pessimistic. While optimists expect future outcomes to be beneficial and cope using problem-focused methods, pessimists expect negatives outcomes and cope by disengaging (Scheier, Carver, & Bridges, 1994). Optimism and positive thinking, as a means to improve quality of life, is present in several cultures worldwide (Kubokawa & Ottaway, 2009). The idea of a more positive oriented lifestyle has been adopted by Eastern cultures (Kubokawa & Ottaway, 2009) seeing the West’s promotion of optimism in television shows, movies, books, and other media outlets in the 20th century. With this influence, optimism became a popular topic of interest for research in the field of Positive Psychology (Seligman & Csikszentmihalyi, 2000).

After becoming president of the American Psychological Association in 1998, Martin Seligman sought to refocus psychology’s tenacious obsession with what is negative and abnormal, and encompass learning, building, and promoting positive qualities as well (Seligman & Csikszentmihalyi, 2000). Research in positive psychology had been growing since the era of humanistic psychology and more so after Seligman’s initiative, but with the rise of attention to positivity, some concepts regarding negative traits were overshadowed. A major problem with this area of research is the neglect in recognizing the potential benefits of pessimism.

Support for benefits can be seen from an evolutionary standpoint: maladaptive behaviors abate over time due to inefficiency; therefore, it may be true that even negative thoughts or behaviors persist through generations because they have had some impact on survival (Sasaki, Sakamoto, Moriwaki, Inoue, & Ugajin, 2013). Anxiety, for example, especially in excess, can be negative, but anxiety can also be adaptive, causing individuals to be more cautious and engage in avoidant behavior as an effective method of survival. Throughout recent decades, optimism can be seen in cognitive therapies as people attempt to "correct" negative, or maladaptive thinking. But is all negative thinking maladaptive? Considering this, more research on the utility of behaviors that may appear to be negative is necessary to attempt to close the gap between psychology’s traditional objective of focusing on fixing what is wrong and the new perspective of promoting the positive.

One of the first studies to examine the effect of pessimism on performance was conducted by Norem and Cantor (1986). Researchers assessed effects of test anxiety on performance on a puzzle-tracing task. Performance was not statistically different between optimists and pessimists on this task, which challenged the idea that pessimistic thinking is self-defeating. However, interestingly, pessimists performed more poorly than optimists when participants were verbally encouraged prior to the task. Encouragement was intended to identify how external influences impact the performance of these individuals. It seems that encouragement
disrupts the defensive pessimism strategy while having no deleterious effect on optimists.

Further research by Norem and Illingworth (2004) expanded on Norem and Cantor’s (1986) findings with an investigation of the effects of mood on optimism and pessimism. Undergraduates were screened for optimistic or pessimistic strategies and then completed a survey about their mood. The participants were then asked to work on as many mental arithmetic problems as they could in a 10-minute time frame without writing down anything but the answers to each of the problems. The researchers found that pessimists in a positive mood performed more poorly than pessimists in a negative mood, while optimists had no performance differences between moods. Overall, this study suggested that both optimists and pessimists have strategies to maintain anxiety effectively, but variables such as mood and encouragement can disrupt their efficacy.

Norem and Cantor (1986) coined the term “defensive pessimism,” referring to a strategy used in an attempt to harness anxiety as motivation by setting “unrealistically low expectations” before entering situations. The counter method, for an optimistic approach, was referred to as “strategic optimism.” Strategic optimists set high expectations and typically are not as anxious as their defensive counterparts (Norem & Illingworth, 2004). These studies support the notion that pessimism has some beneficial uses, such as managing anxiety for motivational use in some situations; however, pessimistic strategies are more susceptible to disruption.

In more recent research, similar strategies can be seen broadly in terms of motivation temperament: individuals following approach motivations strive to achieve positive outcomes, such as success, while individuals following avoidance motivations strive to avoid negative outcomes, such as failure (Roskes et al., 2013). Similar to the optimism-pessimism dichotomy, approach motivation is seen as positive, while avoidance motivation, which shares traits of defensive pessimism, is believed to be negative. Previous research suggested that optimism is not influenced by mood and encouragement (Norem & Cantor, 1986; Norem & Illingworth, 2004), and similarly, approach motivation is less cognitively demanding and susceptible to influence than avoidance motivation (Roskes, Elliot, & De Dreu, 2014).

Although increased vigilance and threat aversion may be useful at times, avoidance motivation, like defensive pessimism, is susceptible to interference by constraining variables (Roskes et al., 2013). The researchers investigated the effect of time pressure on test performance based on motivation temperament by giving college students cognitive tasks to complete in a short or long time period (high pressure vs. low pressure, respectively). Results consistently suggested that high time pressure impaired the performance of avoidance motivated individuals more so than approach motivated individuals. Similar to the findings of Norem and Cantor (1986), optimists and pessimists performed equally under the undisrupted condition, but only pessimists performed more poorly when under stress.

Debeer, Raes, Williams, and Hermans (2013) investigated cognitive performance in terms of autobiographical memory when approach and avoidant states were induced via the Scrambled Sentence Task (SST). The sentences were intended to prime the corresponding state of either approach or avoidance motivation. Individuals who were avoidance motivated showed more reduction in memory after being primed in both approach priming and avoidance priming conditions. It may have been that the task itself induced an avoidant strategy, despite the attempt to prime for approach motivation in one of the conditions. Although priming may not have been as effective as intended, results suggest a similarity between pessimism and avoidance motivation: both strategies have been more susceptible to internal and external influence compared to their counterparts, optimism and approach motivation (Debeer et al., 2013; Norem & Cantor, 1986).

Approach and avoidance motivation resemble optimism and pessimism, but are they actually correlated? Based on previous literature, optimism and pessimism are dispositional, which may determine an individual’s coping stability, strategies, and spontaneous responses in various situations (Scheier et al., 1994). On the other hand, approach and avoidance motivation are elicited responses dependent upon the current situation. In some cases, one motivation temperament would not be feasible compared to the other, such as threatening situations calling for avoidance motivation over approach (Roskes et al., 2014). However, in other situations they are interchangeable depending on the individual. Considering this information and the similarities between lifestyle disposition and temperament, a question can be raised as to whether one motivational temperament (i.e., approach vs. avoidance) is more disposed toward a particular lifestyle disposition (i.e., optimism vs. pessimism).

The purpose of the current study was to investigate the relationship between lifestyle disposition and motivational temperament among college undergraduates, as well as the effect of encouragement on these traits in an academic test taking setting. If they are related, it then becomes interesting to see if the interfering effects of
encouragement occur equally for pessimistic and for avoidant individuals. This study attempted to provide further research on the role of pessimism, motivation, and encouragement on performance on a cognitive task. Previous research has frequently focused on the role of optimism, but dismissed pessimism as an independent variable (Ferguson & Goodwin, 2010). Therefore, both dispositions were assessed in the current study to add to the research. It was hypothesized that lifestyle disposition would be a predictor of motivation temperament, that is, optimism would be positively correlated with approach motivation and pessimism would be positively correlated with avoidance motivation.

Furthermore, it was hypothesized that the performance of pessimistic individuals and avoidance motivated individuals would be affected by positive encouragement on a scrambled sentence task, whereas optimistic individuals and approach motivated individuals would not be impacted by encouragement, based on Norem’s and Cantor’s (1986) findings. In addition, it was hypothesized that word orientation in the scrambled sentence task would impact the performance of pessimistic individuals and avoidance motivated individuals, corresponding with Debeer’s et al. (2013) findings, and not those of optimistic or approach motivated individuals.

Method

Participants
A total of 111 participants, Southern Connecticut State University students, were recruited via online SONA sign up. Participants’ ages ranged from 18 to 49, with a mean age of 19.58 (SD = 3.76). The SONA system was used for those in an introductory psychology course participant pool for partial fulfillment of a course requirement. Participants were randomly assigned to an encouragement or non-encouragement condition. Each group received both approach and avoidance scrambled sentences in random order during the task. For analysis, participants were grouped as optimist or pessimist, based on median split of the LOT-R scores (Scheier et al., 1994), and then grouped as approach or avoidance based on median split of the ATQ scores (Elliot & Thrash, 2010). The sample was intended to appropriately represent the student population as this study is intended to be generalizable to college undergraduates.

Materials
Life Orientation Test-Revised (LOT-R). Lifestyle disposition was defined by scored responses to the Life Orientation Test-Revised (LOT-R) (Scheier et al., 1994), a self-report measure used to assess optimistic and pessimistic dispositions, which included ten items and four filler items. Participants responded on a 5-point Likert scale with choices of I agree a lot, I agree a little, I neither agree nor disagree, I disagree a little, or I disagree a lot. Three items reflected an optimistic disposition (e.g., “I’m always optimistic about my future”) and three items reflected a pessimistic disposition (e.g., “I hardly expect things to go my way”). Scores ranged from 0 to 24 on a spectrum where lower scores (0 to 11) indicated pessimism and greater total scores (12 to 24) indicated optimism. Scores were also viewed in independent optimism and pessimism measures each with scores ranging from 0 to 12. This measure had been reported to have an acceptable level of internal consistency, with Cronbach’s alpha calculated to be .78 (Carver, Scheier, & Segerstrom, 2010).

Approach-Avoidance Temperament Questionnaire (ATQ). Motivation temperament was defined by scored responses to the Approach-Avoidance Temperament Questionnaire (ATQ) (Elliot & Thrash, 2010), a 12-item self-report measure used to assess approach or avoidance temperament. Participants responded using a 7-point Likert scale with choices ranging from 1 (strongly disagree) to 7 (strongly agree). Of the 12 items, 6 reflected approach temperament (e.g., “Thinking about the things I want really energizes me”) and 6 reflected avoidance temperament (e.g., “I react very strongly to bad experiences”). Scores for each temperament ranged from 7 to 42. Greater scores, divided by median split, reflected greater temperament of each motivation.

Approach Avoidance Oriented Scrambled Sentence Task (AAOSST). Performance was defined by reaction time to complete individual computerized scrambles in an Approach-Avoidance Oriented Scrambled Sentence Task (AAOSST) adapted from Debeer et al. (2013). This 30-item task consisted of 15 approach oriented sentences and 15 avoidance oriented sentences in which participants were asked to construct a grammatically correct sentence using five out of six randomly ordered words (e.g. “choices making people decisions important embrace”). This would appear in the approach oriented sentence with the word “embrace” unique to variation, “people embrace making important decisions” being one correct sequence. The avoidance oriented version of the sentence would use the same context, but substitute “avoid” for “embrace.” Participants used keyboard keys 1-6 next to each word to indicate their intended sequence of words. Reaction time (in seconds) began recording when the scramble was displayed, ended upon the participant pressing the enter key, and repeated for each scramble. Accuracy was scored for each scramble orientation after completion; grammatically
correct sentences using only five words were scored as correct. Using more or less than five words to make a sentence was considered incorrect.

**Encouragement.** Prior to starting the AAOSST, participants in the encouragement condition were given a scripted line of verbal encouragement “Based on previous students’ success, I think that you will probably do very well on the upcoming task.” This was adopted from Norem and Cantor (1986), but was changed (“based on previous students’ success,” rather than “based on your GPA”) to fit the conditions of this study.

**Procedure**

Students signed up via SONA system for one of three positions in a given time slot. This grouping was intended to simulate an academic class in a test taking setting. Knowledge of the study, prior to participation, was limited to the information provided in the SONA study advertisement. Participants were led to believe performance and personality were being measured during the study.

First, consent forms were collected, and the researcher handed out packets and informed the group that each packet contained demographics sheets requesting the age, grade, current GPA, and degree of study, followed by a series of measures including the LOT-R (Scheier et al., 1994) and ATQ (Elliot & Thrash, 2010), which were counterbalanced. The researcher requested that participants respond as accurately as possible based on the instructions listed on each scale without skipping a response and place the writing utensil down when finished.

After completing the measures, the researcher collected the worksheets, and proceeded to give verbal instructions for the computerized scrambled sentence task, which were also on the computer screen. Participants were told to work as quickly as they could and to begin when instructed.

For groups of participants randomly assigned to the encouragement condition, the researcher commented to the group as a whole based on scripted encouragement adapted from Norem & Cantor (1986): “Based on previous students’ success, I think that you will probably do very well on the upcoming task.” For those in the no-encouragement condition, the researcher did not make an encouraging comment. The computer software automatically recorded the time taken on each scramble in the task.

The encouragement comment used in this study was a form of false feedback, necessary deception, intended to influence performance. When being debriefed, participants were informed that the nature of the study was to assess whether or not there was a pattern of performance based on their personality. The encouragement comment was scripted, not influenced by any previous participant, and given to groups at random. Collection of data was not expected to exceed a 30-minute timeframe.

**Design**

This study intended to assess the correlation between lifestyle disposition, levels of optimism and pessimism based on scores on the revised LOT-R (Scheier et al., 1994), and motivation temperament, approach and avoidance, based on participants’ scores on the ATQ (Elliot & Thrash, 2010). A series of Pearson correlations were conducted to analyze the relationships between these traits.

The quasi-experimental portion of the study also used the lifestyle disposition and motivation temperament variables, but examined their susceptibility to interference. Participants were randomly assigned to one of two conditions: an encouragement group, in which participants received positive encouragement prior to engaging in the scrambled sentence task, or a no-encouragement group, in which participants did not receive encouragement. The dependent variables were the participants’ performance on the scrambled sentence task, the time taken to complete all sentence scrambles (reaction time), and the accuracy of each scramble orientation (accuracy).

Sets of 2x2 ANOVAs were conducted to examine the effects of lifestyle disposition (optimism vs. pessimism) and encouragement (encouragement vs. no-encouragement) on time to solve scrambled sentences and accuracy. A second set of 2x2-ANOVAs were conducted using the same variables with motivational temperament (approach vs. avoidance), in place of lifestyle disposition, on time to solve scrambled sentences and accuracy.

**Hypothesis**

The first hypothesis predicted that there would be a positive correlation between lifestyle disposition and motivation temperament. More specifically, optimism would be positively correlated with approach motivation, and similarly a positive correlation between pessimism and avoidance motivation. Previous research has investigated qualities, consequences, and variability of these dispositions and temperaments (Debeer et al., 2013; Norem & Illingworth, 2004; Roskes et al, 2014; Sasaki et al., 2013), but neglected to explore the correlation between disposition and likeliness to adhere to one of the motivations than the other. In theory, optimists may have more variance in an academic situation as to which motivation they align with based on past experience in the academic setting, whereas pessimistic individuals’ will be more
likely to adopt avoidance motivation due to their more negative nature.

The second hypothesis predicted that the performance of pessimists would be negatively impacted by encouragement. The third hypothesis predicted that avoidance motivated individuals would also be negatively impacted by encouragement. Norem and Cantor (1986) found that pessimists’ performance was impaired by encouragement on a puzzle trace task, similar results were expected with a more difficult task: unscrambling sentences correctly. It was also expected that avoidance motivated individuals would follow suit, in theory, due to the similarities of avoidance motivation to pessimism, and the findings that this motivation was susceptible to some type of interference (Debeer et al., 2013; Roskes et al., 2013). The final hypothesis predicted that word orientation in the scrambled sentence task would have an effect on individuals’ performance.

**Results**

Of the original 111 student sample, due to invalid responses to measures, data for two of the participants’ was omitted. The results included data on 109 students’ lifestyle dispositions and motivations being assessed.

This study sought to investigate the relationship between optimism, pessimism, approach and avoidance motivations. As expected, approach motivation was positively correlated with optimism, \( r(107) = .220, p = .021 \), while avoidance motivation was negatively correlated with optimism, \( r(107) = -.53, p < .0001 \) and positively correlated to pessimism, \( r(107) = .449, p < .0001 \).

Although optimism and pessimism are sometimes viewed to be a continuum rather than separate dispositions, this study analyzed them individually, as well as on a spectrum. The results suggested that avoidance motivation was negatively related to the lifestyle disposition spectrum, \( r(107) = -.551, p < .0001 \). Optimism was also found to be negatively correlated with pessimism, \( r(107) = -.548, p < .0001 \) and positively correlated with lifestyle disposition spectrum, \( r(107) = .858, p < .0001 \). Lastly, pessimism was negatively correlated to the lifestyle disposition spectrum, \( r(107) = -.898, p < .0001 \).

Due to software error, the accuracy and reaction times to scrambles of seven students were not recorded. Of these 104 students, 51 randomly received encouragement, while 53 did not receive encouragement. A series of correlations were conducted and found a negative correlation between avoidance motivation and reaction time to avoidance scrambles, \( r(101) = -.236, p = .017 \); however, there was no relationship found between avoidance motivation and approach scrambles, nor accuracy to either type. No significant correlations between approach motivation and reaction time nor accuracy were found.

High and low motivation temperament groups were created by median split, then reaction times were examined using a 2 (low temperament, high temperament) x 2 encouragement (yes, no) analysis of variance (ANOVA). The first ANOVA revealed a main effect of avoidance motivation, \( F(1, 99) = 4.19, p = .043 \); participants with low avoidance had a slower reaction time to approach scrambles \( (M = 493.46) \) than high avoidance \( (M = 357.47) \). There was no interaction between avoidance motivation and encouragement. Similarly, there was a main effect in regards to avoidance scrambles \( F(1, 99) = 5.093, p = .026 \); again, low avoidance reaction times were slower \( (M = 426.99) \) than those with high avoidance reaction times \( (M = 361.39) \), but no interaction with encouragement.

No significant main effect or interaction of optimism and pessimism on reaction time of approach words nor avoidance words were found. A main effect of optimism on accuracy of approach words was found, \( F(1, 99) = 5.83, p = .018 \) and a marginal effect of optimism on accuracy of avoidance words, \( F(1, 99) = 3.49, p = .065 \). The main effect of pessimism on reaction time was found to be significant, \( F(1, 99) = 7.33, p < .01 \).

**Discussion**

As predicted, optimism and pessimism of college undergraduates were found to be strongly related to motivation temperament. Optimism was positively correlated with approach motivation and negatively correlated with avoidance motivation and pessimism. Similarly, pessimism was found to be positively correlated with avoidance motivation and negatively correlated with approach motivation. This suggests that people who are typically pessimistic individuals are more likely to adhere to using avoidance motivation. While avoidance motivation was negatively correlated with the lifestyle disposition spectrum, unexpectedly, a significant relation between the spectrum and approach motivation was not supported. This could be attributed to the current sample being more neutral in the lifestyle disposition spectrum, leaning more towards optimism, but pessimistic individuals were more avoidance motivated whereas optimistic individuals were not necessarily approach motivated. Eichner, Kwon, and Marcus (2014) argue that lifestyle disposition should not be dichotomized, as many researchers in the past have, because optimism and pessimism are dimensional rather than two distinct traits; with that in mind, this finding suggests
that lifestyle disposition may not drive motivation temperament.

Performance of pessimistic and avoidance motivated individuals was expected to be influenced by encouragement prior to engaging in unscrambling sentences, however, this was not reflected in this study. Norem and Cantor (1986) prescreened students for demographic information, which would make a statement about GPA more believable, the change for this was intended to account for students who may not know their GPA. The changes made to the encouragement script for this study may have changed the impact of the statement leading to no effect on performance as previous studies suggested (Norem & Cantor, 1986; Norem & Illingworth, 2004).

In this study, the scramble sentence task was used as a means of a challenging cognitive task rather than a priming method, differing from Debeer et al. (2013). Although no difference in performance between lifestyle dispositions, nor motivation temperaments, and their counterparts was displayed, the hypothesis that predicted scramble orientation (approach vs avoidance) would influence performance was supported in avoidance motivation. After creating groups of high and low avoidance motivation groups via median split, it was revealed that individuals with higher avoidance motivation reacted faster than low avoidance to both approach and avoidant oriented scrambles without significantly decreasing accuracy. This stands in line with previous research suggesting that the avoidance temperament is not absolutely negative; it has beneficial aspects as it can be used to foster motivation in performance to efficiently complete a task (Debeer et al., 2013; Norem & Illingworth, 2004; Roskes et al., 2014; Sasaki et al., 2013).

Considering the findings of this study, in conjunction with previous research, a new question can be raised: What type of encouragement effects the pessimistic and avoidant strategies? Test anxiety can be common amongst students and as a response proctors may reply with reassuring or encouraging statements. Previous research suggests, due to susceptibility, positive responses may be counterproductive in that proctors may be unknowingly disrupting some students’ strategies, thus swaying performance, but the current study suggests otherwise. Considering performance did not differ despite encouragement, further investigation into what type of encouragement affects these cognitive strategies can be beneficial in academia.

Future studies may also benefit from creating a stronger encouragement statement as an attempt to create disturbance in performance strategy as past research has (Norem & Cantor, 1986; Norem & Illingworth, 2004). Focusing the encouragement on individuals’ skills or performance may play a role in affecting their strategy rather than a vague statement about their peers. The scrambled sentence task can also be improved by ensuring that both approach and avoidance laden scrambles are of equal difficulty, which may influence the results of performance.

Although the approach and avoidance oriented words were typically antonyms of each other, word difficulty may differ or change the complexity of the sentence. Creating an equal balance between scrambles would aid in identifying reaction time differences to each type. Clearer definition of instruction would also play a role, informing participants whether punctuation is allowed would limit the number of possible responses and also impact difficulty of scrambles.

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Reward Expectancy of Intrinsic Motivation

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The drive to complete a task for the sheer enjoyment of doing so is seen as behavior guided by intrinsic motivation. However, research suggests that expected external rewards can turn this “play” into work. The current study looked at the effect of expected external rewards on intrinsic motivation. At Southern Connecticut State University, college students (n = 36) were randomly assigned to three conditions: expected reward, unexpected reward, and no reward to measure motivation. The hypothesis was that participants in the expected rewards condition would experience lower levels of intrinsic motivation than those in the other conditions. Results showed that the participants in the unexpected reward and no reward conditions maintained higher intrinsic motivation. The hypothesis that participants in the expected reward condition would have lower intrinsic motivation was supported.

Motivation is responsible for driving people to achieve objectives every day (Ryan & Deci, 2000). Motivation can either be extrinsic or intrinsic. Deci and Ryan (1985) explain that extrinsic motivation is an action performed only because of the outcome. Intrinsic motivation, on the other hand, is the drive one has because of the enjoyment he or she receives from an activity (White, 1959). An example of intrinsic motivation in children is child choosing to learn about the solar system out of interest (Gottfried, 1985). Extrinsic and intrinsic motivation can create solutions through problem solving (Deci, 1971; Daniel & Esser, 1990) or can contribute to problems including anxiety and fear (Gottfried, 1990).

Extrinsic and intrinsic motivation are both manipulated by tangible or theoretical rewards, though studies have shown that the presentation and type of reward may affect intrinsic motivation (Lepper, Greene, & Nisbett, 1973). In child populations, rewards can be as simple as verbal reinforcement, a break during the school day, a token economy, grades and stickers on assignments, or monetary reinforcement (Pierce & Cameron, 2002; Deci, Koestner, & Ryan, 1999). When a reward is reinforced on a randomized schedule, a child may still have high levels of intrinsic motivation despite receiving inconsistent external rewards (Deci, 1971; Lepper, Greene, & Nisbett 1973).

Extrinsic motivation is seen when a student completes homework only to please their parents (Ryan & Deci, 2000). If a neighbor pays a child for gardening or yard work, extrinsic motivation to receive the monetary reward may replace the child’s intrinsic motivation to be outside (Deci, 1971). If the child is rewarded unexpectedly for gardening, however, the child could achieve intrinsic motivation while still receiving a monetary reward.

Motivation is crucial in education because it affects how children learn, how teachers educate students, and it can create long-term behaviors when the child becomes an adult (Pierce & Cameron, 2002). One experiment that studied intrinsic motivation among children was Deci’s (1971). He had his participants work on challenging puzzles and gave positive comments such as, “I know how hard this puzzle was, but you did such a good job,” or, “You completed the puzzle a lot faster than anyone else.” The results of this study demonstrated that positive verbal rewards increased intrinsic motivation. For the participants who did not receive any verbal rewards, their intrinsic motivation was not lowered. A teacher can incorporate these phrases into the classroom to show students that someone cares about their education and effort, therefore increasing the student’s intrinsic motivation (Butler, 1983; Deci, 1971).

Existing research has provided extensive information about the effect of monetary rewards on motivation. Deci (1971) also studied intrinsic motivation when external rewards like money and positive verbal reinforcement were used in a college student demographic. Deci conducted two experiments with the goal to understand how money plays a role in intrinsic motivation. His hypothesis was that money would decrease intrinsic motivation but verbal rewards would increase intrinsic motivation.

Each experiment relied on task contingency for there to be an effect on intrinsic motivation. The participants had to recreate puzzles that were drawn...
on a piece of paper. In the expected reward condition, the participants were aware of the monetary reward for each puzzle completed. The experimenter left the room and observed whether the participants worked on the puzzles with no one around. If the participant was looking or manipulating the puzzle in anyway, this was taken as a sign of motivation. Deci also provided a questionnaire to determine if participants found the task interesting and enjoyable in order to assess their intrinsic motivation.

The results of this study supported his hypothesis as the participants had the lowest amount of intrinsic motivation when they knew about their monetary reward.

Lepper, Greene, & Nisbett (1973) examined children’s levels of intrinsic motivation when paired with external rewards. These researchers first obtained baselines for the children’s intrinsic motivation for coloring and then studied the level of intrinsic motivation for coloring after they received a reward for completing the activity in comparison to those that expected the reward from the beginning. There were three conditions in their study: expected, unexpected, and no reward groups. The expected reward condition knew they would receive the “Good Player Award” for completing a coloring activity. The unexpected reward condition were unaware of the “Good Player Award” until after they had finished the coloring activity. The no reward condition were never made aware of the award.

The experimenters hypothesized that the children’s baseline level of intrinsic motivation in the expected reward condition would lessen once they were made aware of the award while the unexpected and no reward groups would maintain their baseline levels of intrinsic motivation.

Their results demonstrated that once a child saw the “Good Player Award” in the expected reward condition, the child was less likely to continue the activity, demonstrating decreased intrinsic motivation. In contrast, children in the unexpected and no reward conditions demonstrated no effect on their intrinsic motivation and still continued to color. These results display the effects of having an expected award and how it decreases intrinsic motivation.

In the present study, the main focus was on how the expectation of a monetary reward decreases intrinsic motivation. During this study, there were three conditions: expected, unexpected, and non-reward. The non-reward group served as the control group.

It was predicted that the expected reward condition would show less intrinsic motivation due to their knowledge of the monetary reward. The unexpected and no reward groups were expected to have higher intrinsic motivation. The independent variable was the expectation of an external, monetary reward. The dependent variable was the level of intrinsic motivation each participant reported and that the experimenters observed. The current study predicted that an expected reward would decrease participants’ intrinsic motivation.

**Method**

**Overview and Design.** This experiment utilized a one-way, between-groups design. There were three reward conditions: unexpected reward, expected reward, and no reward. Level of intrinsic motivation was measured after the activity by using a valid and reliable motivation scale called the Intrinsic Motivation Inventory (IMI) and observation in the lab. The use of the IMI is based on a thesis from Weichman (2007). The IMI questionnaire assesses participant’s intrinsic motivation for tasks.

**Participants**

Thirty-six undergraduates volunteered to participate in this study (24 females and 12 males). Participants were recruited from within the Psychology Department participant pool. Each participant was assigned to a condition through random assignment. Twelve participants were in the expected reward, 12 participants were in the unexpected reward, and 12 participants were in the no reward categories. The participants were not aware of the $4 compensation when they signed up for the study to not skew the results.

**Materials and Measures**

The materials used were three iPads and three computers for Tanzen puzzles. In the experimental lab, six desks faced each other as three pairs. There were two experimenters to carry out the experiment for each of the three conditions. The experimenter used a stopwatch to track the amount of time it took for the participants to complete the puzzles.

The experimenters also administered the IMI and a demographic survey. The IMI contains a list of phrases that relate to effort, enjoyment, pressure, tension, and anxiety (Weichman, 2007). The participants ranked each item on a seven-point Likert scale with a semantic differential (1: not at all true, 4: somewhat true, and 7: very true). Some examples of items include, “I enjoyed doing this activity very much” and “I put a lot of effort into this.”

Participants were also given a sheet of dollar bills for them to note how many Tanzen puzzles were completed during the time allotted to work on the puzzles.
Procedure

Prior to the start of the experiment, the participants waited outside of the experimental room along with confederates who were pretending to participate. The experimenters obtained informed consent from each participant before the experiment began. In the expected reward condition, the participants were told they were going to receive $1.00 for every Tanzen Puzzle they played within four minutes. There were only four puzzles they could complete within this time period. The experimenters gave participants a sheet in order to keep track of how many puzzles they completed. At the end of the four minutes and before the participants in the expected reward condition were given their award, the IMI form was passed out and the participants were told “You will receive payment at the end of this study”. For the unexpected and no reward conditions this phrase was not used before the distribution of the IMI form.

Once inside the lab, the experimenters paired each participant with a confederate so that they were facing one another. The experimenters showed the participants how to use the iPad and the Tanzen application. The experimenters then addressed the confederates to show them how to use the laptops.

The participants were instructed with “You have four minutes to play with these puzzles.” It was made clear that the participants would be playing with the puzzles and not working on them. Specifically, the experiment did not aim to measure how well the participants worked through the puzzles. The confederates were to watch their paired participant for these four minutes in order to measure the number of puzzles each participant completed and attempted.

The participants were then administered the IMI. The IMI was used to determine participant’s motivation after completing the Tanzen puzzles. The experimenters informed the confederates and participants about having to leave briefly to pick up some forms. While the experimenter was absent for four minutes, participants were able to work on the same Tanzen puzzles, or play with other applications on the iPad. Confederates watched the participants during a “free choice period”. This period gave participants the choice to work on the same Tanzen puzzles, or choose a different application available to them on the iPad, such as crosswords or Sudoku. The experimenters returned and handed out the demographic form. After the forms were collected, the experimenters gave out debriefing forms and copies of the consent forms.

Results

Intrinsic motivation was measured both behaviorally and via self-report through the IMI. The behavioral measure was an observation of whether or not the participants played with the Tanzen puzzle during the four-minute free choice period. The self-report measure displayed participants’ responses on the IMI, where higher scores indicated higher levels of intrinsic motivation. Because the overall IMI scale score was unreliable (Cronbach’s Alpha= 0.42), self-reported intrinsic motivation was measured at the item level, with Task Enjoyment measured using the item “I enjoyed doing this activity very much” and Task Effort measured with the item “I tried very hard on this activity.”

Based on information provided by the participants from the Demographic Form on average, the participants did not abhor or relish the Tanzen puzzles. Overall, participants believed they were moderately good at and enjoyed puzzles. Twenty-four of the participants liked crosswords, word searches, and sudoku. Four of the participants liked Candy Crush and three of the participants liked picture puzzles based on their answers from the demographic form. There were only three participants that did not report any specific puzzle they liked. The IMI scale and demographic form could also be used to interpret the participant’s level of effort and enjoyment, which are two main factors for Intrinsic Motivation.

A Chi-Square analysis of the behavioral data showed that participants in the Expected Reward condition (ER) were significantly less likely to engage with the target Tanzen task during the free play interval compared with participants in both the Unexpected (UR) and No Reward (NR) conditions (X²= 36). None of the 12 participants in the Expected Reward condition played with the Tanzen during the free-play session. In contrast, all 12 of the participants in the other two conditions did. Thus, the hypothesis that the expectation of a reward would undermine intrinsic motivation for the task was supported.

Two one-way between-groups ANOVAs were performed for the IMI scale items. The ANOVA on the Task Effort item was not significant, F(2, 33) = 1.88 , p = .32. Participants in the three reward conditions did not differ significantly in their self-reported effort on the Tanzen task (ER: M = 5 , SD = 0.31; UR: M = 4.67 , SD = 0.31; NR: M = 5.33, SD = 0.31). However, the second ANOVA showed a significant effect of reward condition on Task Enjoyment, F(2, 33) = 1.83, p = .0001 . Post-hoc comparisons with Tukey corrections showed that participants in the ER condition reported significantly lower task enjoyment (M = 3.83, SD = 1.64) than
participants in the UR condition ($M = 6.33, SD = 1.45$), but their task enjoyment did not differ significantly from participants in the NR condition ($M = 4.67, SD = .49$), all p-values <.01. Thus, the hypothesis that expected rewards would undermine self-reported intrinsic motivation was partially supported.

**Discussion**

This study examined whether expected external rewards decreased intrinsic motivation, turning play into work. Current findings support the findings from Deci (1971). Conditions were based off independent variables from Lepper, Greene, and Nisbett (1973), while Deci (1971) was used for the design. Results partially supported the hypothesis that when someone received an expected reward their intrinsic motivation would decrease. Specifically, enjoyment played a significant role for the participants’ intrinsic motivation. However, effort based questions measured on the IMI scale were not statistically significant. Therefore, the external reward has a statistically significant relationship with intrinsic motivation when paired with scheduled conditions. More importantly, when the participants unexpectedly found out they were going to be paid, their intrinsic motivation increased. The No Reward condition reported the highest motivation. These findings suggest participants were in the experiment for the experience, thus providing a baseline for intrinsic motivation. This is especially true compared to the Expected Reward condition, where the lowest amount of intrinsic motivation came from the interaction with the monetary reward.

The experiment had an important advantage, which was the strong manipulation of the variables. This allowed for strong internal validity. The independent variable with the external reward allowed for the manipulation of the dependent variable. Therefore, the undermining effect occurred without chance. Cameras were not used in this study; however, confederates watched participants during the free choice period. This allowed for good construct validity in the experiment.

On the other hand, there were two limitations to this study. The sample of the population had some problems that may have affected external validity. The subject pool was a convenience sample. The participants may have already been motivated to participate in a psychological study because of the location where they were recruited. This possibly could have affected the external validity and may not be a true representation of a college student population.

Also, there was inconsistency among the electronic devices used (i.e., the type and power life charge) throughout the experiment. Future studies should strive for the same type of electronic devices. This may have affected how well the confederates were able to see participants’ performance. It should be mentioned also that the researchers noticed that when participants’ interest was heightened in the task, they leaned over the device to hide it so the confederates could not see their activity. Further, electronic devices used in the study should have the same electronic applications, which will decrease the variability in free choice tasks. Some of the iPads had very different applications besides the ones the experimenters had chosen to use.

Future research in this field should be conducted to show how grades serve as a reward for students, particularly those in high school. One possible avenue of study would be comparing passive and strict teaching styles and the possible effects on student motivation as measured by grades. This may help teachers have a better understanding on how high school students are best motivated. This is particularly important for high school students who are preparing for college. Prior research by Butler (1986) explored the effects of no feedback on student grades by assigning them to one of three feedback conditions. The results demonstrated that providing feedback affected their motivation and effort. The future study would aim to expand on this research.

Additionally, future research could investigate the relationship between verbal rewards as positive reinforcement and intrinsic motivation to explore the hypothesis that making students feel good about themselves through verbal rewards would lead sustained motivation. It may also be worthwhile to assign the independent variable of gender (men and women). Women are often seen as caregivers, so they might respond better when they receive verbal reinforcement.

In conclusion, findings support the hypothesis. The undermining effect worked on the Expected Reward group to manipulate their levels of intrinsic motivation. The experiment turned the Expected Reward into extrinsic motivation. On the other hand, the Unexpected Reward group had the highest level of intrinsic motivation and the No Reward group was also intrinsically motivated. The importance of intrinsic motivation can really dictate how people perform their jobs or a simple task. Based on the research, expected external rewards like money decrease intrinsic motivation and negatively affect someone’s enjoyment for a task.

**References**


Metacognitive Ease and Self-Disclosure among College Students

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Individuals tend to self-disclose undesirable attributes in disfluent situations (Joinson & Paine, 2007). The present study investigated disfluency on theft disclosure with or without bystanders present. Participants (N = 100) read a (fluent vs. disfluent) vignette describing an opportunity to steal money. Self-disclosure of theft was significantly greater in the disfluent condition, independent of bystander presence. This study adds to the burgeoning literature on issues of metacognitive ease and disfluency on self-disclosure of negative attributes.

Metacognitive ease refers to situations that are cognitively fluent, where information is easy to process, while metacognitive distress refers to situations that are cognitively disfluent (Alter & Oppenheimer, 2009). One question worth consideration is how metacognitive ease or distress (i.e., fluency or disfluency) affects self-disclosure of negative attributes. The current body of theory and research point to two different predictions regarding this question.

According to Joinson and Paine (2006), individuals are likely to have greater self-disclosure when situations are disfluent. In their research, survey methods, which reduced human involvement within the environment, increased disclosure of sensitive personal information when presented in a disfluent state. When material is difficult to process, individuals allocate more resources to processing the information, which draws attention away from interpersonal features of the environment.

Alternatively, it has also been found that when information is fluent, individuals are willing to self-disclose to a greater extent (Alter & Oppenheimer, 2009). According to this perspective, disfluency functions as an alarm signaling the need for greater scrutiny and deliberation before acting. Vigilance is thus activated and individuals work to protect the self. In doing so, self-disclosure of negative attributes is minimized.

The goal of the present study is to test the effect of disfluency on self-disclosure of a negative attribute, in this case, the willingness to commit a theft. Consistent with Joinson and Paine (2006), we predict that disfluency creates greater concentration on processing the material and in doing so, pulls attention away from the interpersonal features of the testing situation, creating an illusion of being alone in the room. Thus, we predict that participants will be more apt to disclose willingness to commit theft when the task is presented disfluently compared to when the task is presented fluently. When the situation is fluent, we predict that participants will be less focused on processing the material, and consequently more aware of the testing situation and their role as a participant, and will experience a greater need for social desirability.

Method

The current study uses fictionalized accounts of an incident where a student finds a wallet containing money. The vignettes are either written in large bold font (fluent) or small italicized font (disfluent), and the wallet is either found in the presence or absence of bystanders (i.e., a transient environmental cue, Gao, Greenberg & Wong- on-Wing, 2015).

Participants

One hundred subjects between the ages of 18 and 52 participated in the study, representing diverse ethnic backgrounds: 56% Caucasian, 26% Black, 9% Hispanic, 4% Asian, and 5% Other. The mean age of all subjects was 20 years old. Of the total sample, 14% were male (N=14) and 86% were female (N=86).

Tasks and/or Measures

Participants were randomly assigned to one of four vignettes describing an incident where a student finds a wallet containing money. Creating metacognitive distress, via disfluency, we used a 50% gray-italicized, small (11-point) Times New Roman font, and creating metacognitive ease we used a bold, 0% gray large (14-point) Times New Roman font. In half of these, bystanders were present.

After reading the vignette, participants were asked six questions concerning how they would handle the situation, three which related to their
willingness to steal and three to their willingness to help (i.e., not steal). All questions were answered using a 4-point Likert scale. Two manipulation checks were used to verify that the paragraph was disfluent/fluent and that bystanders were present or absent.

Bystander, $F(1, 96) = .8, p = .33$ and no interaction between Bystander and Disfluency, $F(1, 96) = .583, p = .45$ (see Figure 1).

Similarly, we predicted that disclosing helping/not stealing would be lower in the disfluent than in the fluent condition, and the presence of bystanders should increase reporting of helping/not stealing. To test these predictions, we conducted a 2(disfluent vs. fluent) x 2(bystanders, present vs. absent) factorial analysis on reporting of helping/not stealing the money. We found a main effect of disfluency, $F(1, 96) = 3.9, p < .05$, with the mean in disfluent condition 6.24 and in fluent condition, 6.8. There was no effect of bystander (see Figure 2).

**Figure 1**

**Figure 2**
**Discussion**

These findings support Joinson & Paine (2006), who found that individuals will disclose more personal information when the response is provided in an environment that seems private. We believe that the cognitive demand created by the disfluent vignette causes participants to increase their task focus, thus decreasing their awareness of the experimenter. This decreased awareness of the experimenter and the interpersonal situation helps establish a private venue which leads to increasing levels of self-disclosure of negative attributes. The fluent task leads to an increased awareness of the experimental setting and to a reduced willingness to disclose negative attributes. Interestingly, the presence or absence of bystanders within the vignette had no effect on the amount of self-disclosure concerning willingness to steal or help. While supporting the argument that disfluency leads to greater self-disclosure of negative attributes, this study points to the need for future work elucidating the mechanism by which disfluency affects willingness to admit to less socially desirable facets of the self. In contrast to our findings, Alter and Oppheimer (2009) suggest that metacognitive ease leads to greater self-disclosure. Future work should investigate the conditions under which disfluency and fluency operate to increase self-disclosure, and to explore mediating factors such as a sense of privacy and reduced human involvement. This study adds to the burgeoning literature on issues of metacognitive ease and disfluency on self-disclosure of negative attributes.

**References**


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Mission Statement

The Journal of Student Psychological Research (JSPR) was created to provide a forum for Southern Connecticut State University (SCSU) student research. Both undergraduate and graduate students from psychology and related fields are invited to submit original research and gain experience in the submission, revision, and publication process. Student authors and student editors of JSPR will learn valuable research and writing skills that will help them in future endeavors such as submitting manuscripts for future publications, applying to Master’s and doctoral programs, and seeking employment. The JSPR wishes to form an interdisciplinary relationship through the journal with psychology-related fields such as, but not limited to: Clinical/Counseling Psychology, Communications Disorders, Education, Exercise Science, Nursing, School Psychology, Social Work, Sociology, and Women’s Studies. We envision JSPR as a vehicle for advancing SCSU’s mission as a student-centered institution focused on empowering “every undergraduate and graduate student with the knowledge, skills and perspectives essential for active participation and impassioned, ethical leadership in our rapidly changing, global society” (http://www.southerncit.edu/about/scsu-info/mission.html).

Instructions for Contributors

Current and former students of SCSU may submit manuscripts as sole authors or first authors on research that they independently conducted while at Southern (SCSU faculty members are encouraged to supervise and mentor students during the research and publication process). Manuscripts submitted to JSPR should meet the following criteria:

1) Original research which has not been published or has not been currently submitted for publication elsewhere.
3) Empirical studies should all have IRB approval before publication.
4) Include contact information for the first author.

Students may submit manuscripts on a rolling basis, but submissions after the deadline (to be posted at the start of each Spring semester) will not be considered for publication until the following year. The journal will be published annually in the beginning of May.

Manuscripts should be submitted electronically to jspr@southerncit.edu. Correspondence about manuscript status, and decisions to accept, revise, or reject will be done via e-mail.

Questions concerning policies, deadlines, manuscript review process, publication status, or related matters should be sent electronically to jspr@southerncit.edu.

Inquiries regarding joining the student editorial board should be sent to jspr@southerncit.edu.