

*The*  
McNair  
Scholarly Review  
TRUMAN STATE UNIVERSITY

Volume 18  
Spring 2012

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# *The McNair Scholarly Review*

TRUMAN STATE UNIVERSITY

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<i>P.S. I Forgive You: Effect of a Brief Expressive Writing Intervention on Forgiveness</i> .....	1
Christine Bowles	
<i>Funny or Downright Disturbing? Effects of Humor &amp; Darkness on Memory Recall</i> .....	13
Dwuana Bradley	
<i>African American Perceptions of Graduate School Experiences and Employment in Criminal Justice and Criminology</i> .....	23
Shawn Glispie	
<i>Breaking the Law Does Not Make Me a Criminal: Student Law Breakers' Self Perception of Criminality</i> .....	33
Chermain Jennings	
<i>Computational Studies of P22 N Peptide-boxB Complex</i> .....	43
Michael R. Jones	
<i>Shake Off the Law: Graffiti and Feminism</i> .....	55
Rebecca Pursley	
<i>An Examination of the Relationship Between Personality and Intended Bicycle Helmet Use Among College Students</i> .....	67
Siera Ramsey	
<i>A Formalist Approach to Steven Millhauser's "In The Penny Arcade"</i> .....	79
Joseph Santoli	
<i>Analysis of Alcohol Protective Factors and Attitudes of Truman State University Students</i> .....	91
Darius Taylor	

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# P.S. I Forgive You: Effect of a Brief Expressive Writing Intervention on Forgiveness

*Christine Bowles*

Dr. Michele Breault, Research Supervisor

*This study examined the potential effects of expressive letter writing on the forgiveness of college students; specifically, it examined if changes in the structure of expressive writing prompts could increase forgiveness. While research has shown that expressive writing offers both physical and mental health benefits, and forgiveness is directly related to psychological well-being, little empirical data is available on the clinical applications of expressive writing as a forgiveness intervention. This study implemented a brief, online intervention to a group (N=51) of college students to determine if expressive writing promotes forgiveness by reducing vengeful feelings, decreasing avoidant behaviors, and promoting benevolent thoughts towards the target offender. This study tested two different writing tasks to determine the most effective structure for a forgiveness-related writing intervention. It was found that expressive writing does have a significant effect on forgiveness; however, the two writing structures tested were not different from each other in their effectiveness.*

## **Introduction**

Expressive writing is a therapeutic tool in which clients write about their emotions and attitudes towards a particular subject or event. Expressive writing can also be used outside of the clinical setting and many people already utilize this technique in their daily lives. Examples of this include journals, poetry, and other such writing exercises. One particular form of expressive writing is that of expressive letter writing, wherein the client writes an emotionally charged letter about a particular person or event with no intention of sending the letter. The purpose of the letter is to allow the writer a structured and safe environment within which they can express their feelings toward someone or something. This form of expressive writing will be the topic of study for this research project, specifically looking at writing a letter to or about an offending individual.

## Literature Review

The earliest work on expressive writing was conducted by Pennebaker, Kiecolt-Glaser, and Glaser (1988), in which participants were required to write for 20 minutes a session each day for four days. Participants assigned to write about traumatic experiences showed significant increases in immune function and significant decreases in health center use and subjective distress. This study set the tone for all expressive writing research to come, and after many more expressive writing studies Pennebaker eventually published guidelines for use of expressive writing as a therapeutic tool (2010). In this article, he stated that clients should “write for a minimum of 15 minutes for at least three times” (pg. 24). My study tested these guidelines to determine if the classic expressive writing structure described by Pennebaker is the only effective intervention, or if statistically significant effects can be had in as little as one expressive writing session. Pennebaker’s other guidelines (using broad writing topics and encouraging writing for the full time allotted) were maintained for the purposes of this study.

Since Pennebaker’s work, other studies have shown that after an expressive writing intervention, participants show marked physical health benefits including improved sleep quality and duration (Mosher and Danoff-Burg, 2006). Mosher and Danoff-Burg also conducted a study in which they tested different expressive writing prompt structures (2010). They tested the classic, unstructured prompt against a narrative structured prompt. The narrative prompt encouraged participants to write out an event as if it was a story in an attempt to see if this structure would provide more health benefits to participants over the classic structure. No significant difference was shown between the two structures. My research expanded on this idea by testing two different writing prompts under a new expressive writing structure: expressive letter writing. Instead of a narrative structure, which allows participants to write about an event in a detached way, this study had a group of participants mentally confront an offending individual by writing a letter to them. Additionally, another prompt was tested that asked participants to write a letter about the individual.

Expressive writing has also been found to provide psychological benefits. Opre, Cornan, Kallay, Rotaru, and Manier (2005) found that after expressive writing task, college students showed a significant reduction in psychological distress. My research aimed to see if this psychological effect could be applied to a specific psychological component: forgiveness.

There has been extensive work demonstrating the overwhelmingly positive effects of forgiveness on psychological well-being (McCullough, Pargament, & Thoresen, 2000). One such study examined the relationship between forgiveness and adjustment in a clinical population of women with a history of trauma. The study found that women who forgave their offenders experienced less depression and anxiety and had higher self-esteem.

Despite these data, though, there is a lack of information when it comes to effective interventions for teaching or aiding forgiveness. While there is understanding of the implications of forgiveness, there is no set therapy to help lead clients toward a forgiveness act. Expressive writing has not been widely studied as a possible vehicle to teach forgiveness to clients in a clinical setting, but because of the nature of expressive

writing's benefits, it is a logical leap to believe that its benefits could possibly apply to forgiveness. This study aimed to determine if an expressive writing intervention would have an impact on the forgiveness of college students. The researcher hoped to see if such an intervention would prompt participants to forgive someone who offended them in the context of a specific transgression, not on participants' overall capacity to forgive or on increases in forgiveness-related personality traits.

## Hypotheses

1. *Expressive Writing*. A brief expressive writing intervention can cause a significant increase in participant forgiveness as evidenced by reductions in revenge motivations and avoidant behaviors and an increase in benevolent feelings.

2. *Forgiveness*. Participants writing directly to an offending individual will experience more forgiveness than participants simply writing about said individual.

## Method

### Participants

Participants were recruited from summer psychology classes at a mid-sized, public, Midwestern university. Professors awarded extra credit incentives at their discretion.

Participants received an invitation via e-mail from their professor to take part in the study, and, if they were interested, were to contact the researcher requesting to participate. The researcher assigned those who contacted to a group. Assignment was not random; each class was assigned a condition. After group assignment, participants were sent a link to the survey and instructions for taking it. A week later, the participants received a second message containing a link to the follow up survey. Of the 78 participants recruited, 51 were used for the purposes of this study.

Basic demographic information was obtained from participants, including information on race, gender, and year in school. The resulting sample was 39 females and 12 males. The sample was also largely Caucasian (82.4%) and comprised of upper-classmen (84.4%). Additionally, the majority (51%) of participants wrote about a transgression that had happened at least one year ago.

### Measures

The dependent variable of forgiveness was based on participants' responses to a forgiveness questionnaire.

*Transgression-Related Interpersonal Motivations (TRIM) Inventory-18* (McCullough, Root, & Cohen, 2006). The TRIM-18 operationally defines forgiveness as a function of three things: reductions in feelings of revenge, reductions in avoidant behaviors, and increases in benevolent feelings toward the target. Participants are prompted to keep in mind the person who offended them and respond to a series of statements. Example statements include: "I don't trust him/her," "I'll make him/her pay," and

“I have given up my hurt and resentment.” These statements illustrate avoidance behaviors, revenge motivations, and benevolence feelings (respectively). There are 18 such items with responses on a 5 point likert scale ranging from *strongly agree* (1) to *strongly disagree* (5).

The original scoring directions were modified so that high scores in the revenge and avoidance subscales corresponded to low revenge motivations and avoidant behaviors. The benevolent subscale was scored according to directions so that high scores in this subscale indicated high benevolent feelings. This allowed the researcher to calculate forgiveness (Revenge Score+ Avoidant Score+ Benevolent Score/3) and have high overall scores corresponding to high overall forgiveness.

In addition, the researcher asked several other questions which were all on a 5 point likert scale. These questions included, “How serious did you perceive this even to be at the time it happened?” and it was also asked both before and after the writing task, “How serious do you currently perceive this event to be?” Information was also gained on how long ago the transgression occurred and how open they perceived their free-write to be.

*Linguistic Inquiry and Word Count Software* (Pennebaker, Francis, & Booth, 2001). The Linguistic Inquiry and Word Count Software, or LIWC, is a text analysis software that breaks text files down into their linguistic parts. Using over 70 language dimensions, the LIWC software calculates the degree to which certain word types or groups are used in a single text file. By doing this, one can see the frequency of negative and positive emotion words, self-references, comprehension words, and many other linguistic variables. The software was used in this study to analyze the letters written by participants in the experimental conditions.

## Procedure

This study had three groups of participants and utilized a multi-group, repeated measures design. Before the pre-test, the participants were given the following instructions:

Please think about a situation in which someone hurt or offended you in some way that you are still currently upset about. This event should be something that affected you deeply, and where you still find yourself struggling to forgive the offender. Please choose an experience that you are comfortable writing about during this study, and also that was substantial enough to leave residual feelings of anger/unease toward the person who offended you.

For the following questions, please indicate your current thoughts and feelings about the person who hurt you; that is, we want to know how you feel about that person **right now**. Next to each item, click the number that best describes your current thoughts and feelings.

Participants were then given the TRIM-18 and asked how serious they perceived the event currently and at the time it happened. After this, they encountered different intervention tasks. All tasks were based around a writing prompt in which the participant was asked to write a letter that would remain confidential and not be sent. Participants were asked to write for 20 minutes, and reminded not to worry about

spelling, grammar, or sentence structure. They were also asked to refrain from using names.

Group one, or the indirect letter writing group, was tasked with the following:

In the space provided, write a letter to a friend who is a neutral, third party to this situation. **Do not** write to the person who upset you. In your letter, describe to your friend the nature of the situation, what happened, and why it upset you. Express to your friend your deepest thoughts and feelings about this.

In order to activate a mental confrontation with the transgressor, group two, or the direct letter writing group, received this task:

In the space provided, write a letter to the person who hurt you.

In your letter, confront the person and explain how you feel about the situation, exactly what they did that hurt you, and how this event is still affecting you.

These individual tasks were crafted by the researcher for the purpose of this study. The purpose of the first task is simply to have participants contemplate the offender and the event. Group two's task was designed for the participants to have a mental confrontation with the offender. The third group was a single-contact, no intervention group. They simply took the pre-test measure (TRIM-18) and encountered no intervention.

## Results

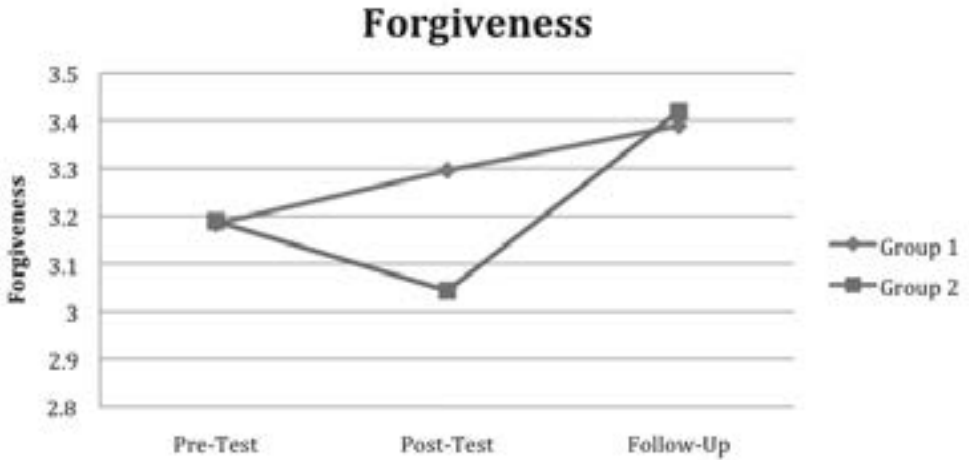
### Analysis

A 2 X 3 (Group X Time) repeated measures ANOVA was conducted to compare the effect of the different writing interventions on forgiveness over time. There was a significant main effect of time,  $F(2,78)= 9.04$ ,  $p<.01$ ,  $\eta = .19$ . This effect indicates that over time, there was a change in forgiveness scores. Tukey's test was also done as a post-hoc comparison, and these comparisons indicated that there was no significant difference in forgiveness between pre-test ( $M= 3.19$ ,  $SD= .82$ ) and post-test scores ( $M= 3.17$ ,  $SD= .96$ ). However, both the pre and post-test scores were significantly different ( $p= .001$ ) from the follow up scores ( $M= 3.40$ ,  $SD= .90$ ). These results indicate that there was a significant increase in forgiveness after the interventions, suggesting that the expressive writing intervention was effective.

ANOVA tests also indicated a significant time-group interaction,  $F(2,78)= 3.22$ ,  $p= .04$ ,  $\eta = .08$ . There was not a significant difference between the groups over time. Instead, there was a marked reduction in forgiveness for the direct group (group 2) immediately after the letter. The forgiveness increases at follow up, however, were comparable for both groups. This suggests that the direct writing prompt was not more effective in facilitating forgiveness, and instead immediately hindered forgiveness. See Graph 1.

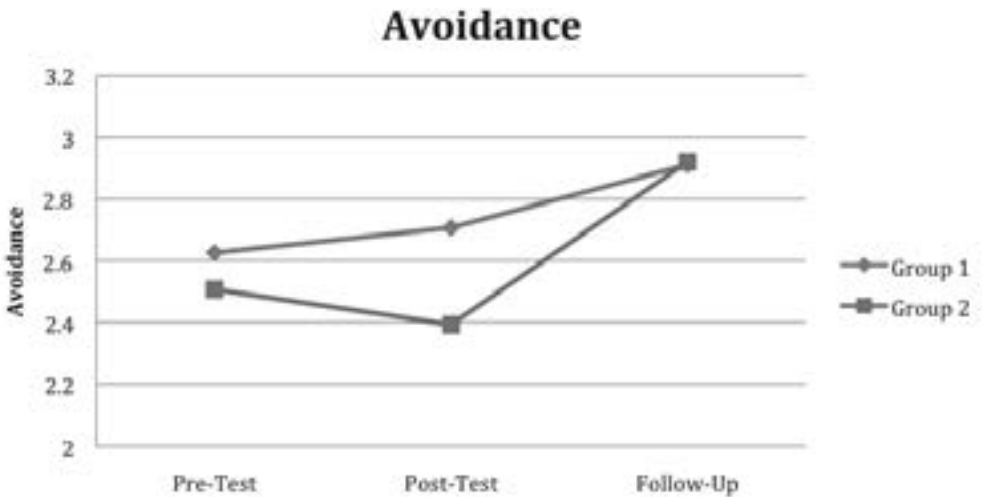
Repeated measures ANOVA tests were also run on the forgiveness sub-scores (revenge, avoidance, benevolence). There was a significant effect of time on avoidance,

Graph 1.



$F(2,78)=9.03, p<.01, \eta = .19$ . Tukey’s test indicated that there was no difference across groups between pre- ( $M= 2.57, SD= 1.05$ ) and post-test ( $M= 2.55, SD= 1.21$ ) scores. However, there is a significant difference ( $p<.01$ ) in avoidance scores at follow-up ( $M= 2.92, SD= 1.08$ ) when compared to the pre- and post-test scores. There was not a significant difference between the groups over time. These results indicate that the intervention was effective in increasing forgiveness between the pre and follow up measures. See graph 2.

Graph 2.

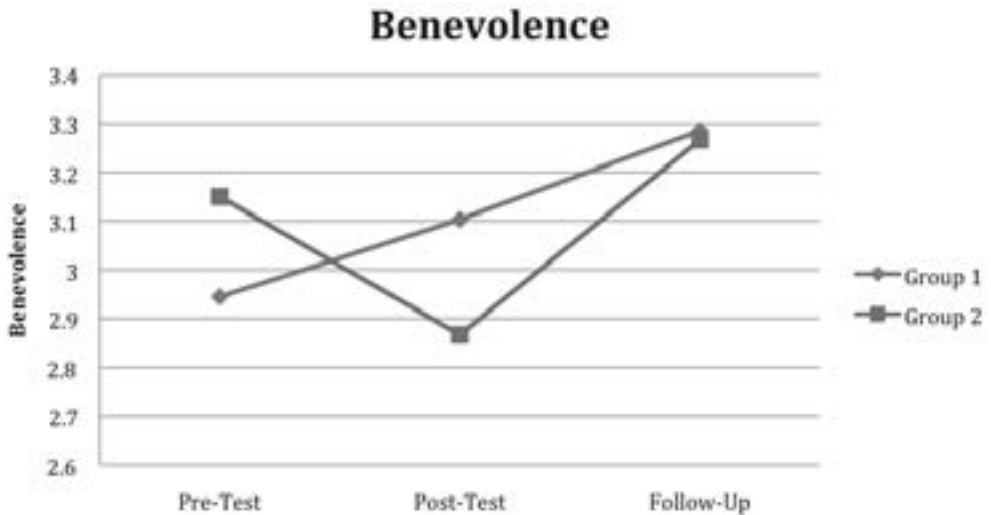


Repeated measures tests also showed a significant effect of time on benevolence. Due to violating the assumption of sphericity, a Greenhouse-Geisser correction was used, and the values for this significance were as follows:  $F(1.54, 59.92)=5.24,$

$p = .01$ ,  $\eta = .065$ . Tukey's test indicated that across all groups the pre-test ( $M = 3.04$ ,  $SD = .92$ ) and post-test ( $M = 2.99$ ,  $SD = 1.07$ ) scores were not significantly different from one another. However, follow-up ( $M = 3.28$ ,  $SD = 1.03$ ) scores were significantly different from the pre and post-test scores ( $p < .03$ ). There was also a significant difference between pre and follow-up scores.

The Greenhouse-Geisser correction also yielded a marginal time-group interaction,  $F(1.54, 59.92) = 2.72$ ,  $p = .08$ ,  $\eta = .065$ . There was not a significant difference between the scores of the different groups over time. Instead, the same pattern as seen in the overall forgiveness scores emerged: the indirect group suffered from reductions in avoidance at the post test measure but then experienced comparable gains in forgiveness at follow up. See graph 3.

Graph 3.



These same ANOVA tests also indicated that there was no significant effect of the intervention on revenge scores. The means on these scores for both groups were not significantly different from the baseline at any time of measurement.

Because of the nature of the questions on the TRIM-18 scale, it is fairly easy to figure out the measure being collected from it is forgiveness. In order to examine the possibility that the pre-test was sensitizing, the single-contact group scores were compared against the experimental data. A three level one way ANOVA was run to compare the scores against each other for both the pre and post tests. This tested whether the change in scores between pre and post tests for the experimental groups were actually from the intervention, or simply as a result of taking the same measure twice and developing sensitivity to the measure. This test suggests that there seemed to be no apparent pre-test sensitivity and that the effect on forgiveness was, in fact, from the intervention itself.

Each letter written by the experimental groups was analyzed using the Linguistic Inquiry and Word Count software. Pearson correlations were run using the language

dimensions of the LIWC and forgiveness scores at the one week follow up. A significant correlation was found between follow up forgiveness scores and use of the present tense ( $r = .38, p = .031$ ). Additionally, benevolent feelings and use of the present tense were also correlated ( $r = .43, p = .015$ ). Independent samples T-tests showed that the direct writing group used the present tense ( $M = 10.29, SD = 2.75$ ) significantly more than the indirect group ( $M = 7.46, SD = 3.4$ ),  $t(33) = -2.712, p = .011$ . These results suggest that prompting participants to speak directly to an individual encourages them to speak in the present tense, which is correlated with forgiveness.

## Discussion

### Conclusion

These results indicate that brief writing interventions can be effective, and that expressive letter writing does have a positive effect on forgiveness, as participants' forgiveness scores increased significantly at follow-up. Additionally, since the data reveals that over 51% of respondents wrote about a transgression that had happened at least one year ago, one can assume that these forgiveness scores were not simply a maturation effect as the severity of the transgression faded naturally over time in their mind. This data supports the first hypothesis that a brief expressive letter writing intervention can act as a successful forgiveness intervention. In this case, it is also shown that this particular intervention has the most effect on avoidance behaviors and benevolent feelings and found no significant effect on revenge motivations.

The data also reveals that neither the direct nor the indirect writing prompt was more effective in promoting forgiveness. In fact, the direct group, group two, had a severe decline in forgiveness immediately following the writing task, though they did show gains in forgiveness at the one week follow up. Since the forgiveness increases from pre to follow-up for both groups were comparable, though, one can conclude that the direct task used in this intervention was not more successful and it was, in fact, immediately detrimental. This data does not support the second hypothesis that direct writing is more effective than indirect writing.

Additionally, the correlations provide some insight into structuring effect differences between the two interventions. The direct writing group used the present tense significantly more than the indirect group, and forgiveness was positively correlated with use of the present tense, as were benevolent feelings. This suggests that the direct writing prompt had the desired effect of creating a mental confrontation for the participants with their offender, which may have enhanced their forgiveness gains. However, forgiveness scores at the one week follow up were comparable. This leads to speculation as to whether forgiveness scores continued to increase for the direct writing group after the one week follow up, as perhaps a later follow up would have revealed a more significant difference between the two groups.

### Limitations

A major limitation to this study is the lack of control group. A group was planned and would have taken the TRIM-18 with a transgressor in mind, like the experimental

groups, but would have written a letter about their personal hero. Due to technical difficulties with the online survey site, the data collected from the control group was rendered invalid and could not be used for this study. It would serve to strengthen the results of this project if the experimental data could be compared to a control group.

Another problem was the attrition rate. Sixteen participants completed the pre-test measure, but did not complete the post-test. Their responses were not used for this study. A problem that is fairly unique to this study is that it also had an accretion rate. Ten students used the anonymity of the survey system as a loophole and took the follow-up test so they could gain the extra credit incentive, even though they had never taken the initial survey. These ten responses were also not used for the purposes of this study. This accretion rate is a result of the online nature of the study and could most likely be accounted for if the study were conducted in person.

A major limitation of the study was that it was done under very particular time constraints. The study itself operated within a ten week timeframe, and it also had to operate around the summer class schedule of the school participants were being recruited from. Due to this limitation, a one week follow up period was as long as the study could manage. Further follow ups at longer intervals may reveal even more interesting data, including whether the effect of the intervention lasted longer than one week and also if the effect after a one week interval changed between the two groups.

### **Implications**

This study has a number of implications, and warrants further research on the topic. The results were promising, suggesting that expressive letter writing is, indeed, an effective tool to teach forgiveness to clients and also that brief interventions can have significant effects. Future research should attempt to replicate this study, adding a control group to strengthen the results, using a longer follow up interval, and studying a more diverse population. A possible addition to this study would be to test the effect of whether giving participants the option to send their letter would affect forgiveness scores. More study should also be done on writing prompt structuring effects, as there is a myriad of ways to structure the prompt which may all differ in their effectiveness. These results indicate that future research should focus on writing prompts that encourage participants to use the present tense in their letters.

Additionally, this study has many clinical implications. If brief expressive writing interventions are effective, then perhaps they can be self-implemented by people. The technique could be taught in high schools and teenagers could be encouraged to participate in self-imposed writing interventions as a preventative mental health measure. Alternatively, clients scheduling appointments with therapists could be instructed to undergo a brief writing intervention in order to enhance their well-being until the time of their appointment.

Future studies should also examine the use of brief writing interventions in crisis situations. The brevity and ease of one-time writing interventions makes them very conducive to crisis environments, such as suicide hotlines or rape crisis centers, and if it could be demonstrated that expressive writing's benefits were applicable to those situations, it would be an invaluable tool.

Despite any limitations, this study is one of few to provide evidence of expressive

writing's utility in aiding forgiveness. It also suggests that sustained expressive writing sessions may not be necessary to gain significant psychological health benefits. The larger literature on expressive writing, forgiveness, and psychological well-being coupled with these results indicate that further study on this topic is warranted.

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# Funny or Downright Disturbing? Effects of Humor & Darkness on Memory Recall

*Dwuana Bradley*

Dr. Karen Vittengl, Research Supervisor

*The purpose of this project was to investigate the impact of dark humor on memory recall. Dark humor is a type of humor that makes light of content that is morbid or satirical. The results of this study indicate dark non-humorous material is better recalled than dark humor, light humor, or light non-humorous material. Finally, cued recall is not differentially impacted by the four categories.*

## Introduction




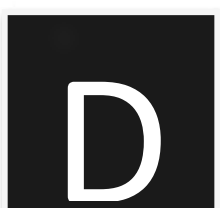
The humor effect is essentially the concept that humorous material or things associated with humorous material are recalled better than non-humorous material. Past studies have consistently supported the humor effect (Schmidt, 2002; Carlson, in press; & Kern, Mayfield, Nguyen, Bradley, & Lu, 2010). But why does the humor effect occur? What cognitive process is occurring that makes our brain select humorous material over non-humorous material? Why is it that humorous material and things in proximity to it sometimes have priority when it comes to storage space within the human memory?

Research by Schmidt (2002) supports the humor effect and proposes that the answers to the previous questions have much to do with the way people process humorous material. Schmidt tested the idea that the incongruity encountered when one tries to understand humor requires special attention. Thus when one initially encounters stimuli containing such material the brain does extra work to take in the material and has greater access to it when it is time to recall such material. However, incongruity did not explain the humor effect in Schmidt's studies.

Carlson (in press) expanded this research by studying encoding and retrieval of humorous material. Carlson's work led him to conclude that something about humor in and of itself increases memory rather than any special event occurring at either encoding or retrieval. Kern, Mayfield, Nguyen, Bradley, & Lu (2010), building directly on the research conducted by Carlson, studied the effect humorous material has on mood as a possible enhancing factor on memory recall. In other words, perhaps humor

affects mood, and it is mood that affects memory. Consistent with previous research, we found that humorous material was indeed recalled better, supporting the humor effect. Although we did find mood congruence for some stimuli, mood congruence was not found for humorous stimuli. We also found that by inducing participants' moods to those of a positive state we could increase participants' memory recall( Kern et al., 2010). Based on the idea that people may find different types of material to be funny we suggested studying humor styles as a possible influencing variable on the humor effect. For the same reason, we also suggested studying darkness as a possible influencing variable on the humor effect.

Martin et al. (2003) support the existence of four distinct humor styles: affiliative, self-enhancing, aggressive, and self-defeating. The researchers found that positive humor styles (affiliative and self-enhancing) are characteristic of what Bradley et al. (2011) describe as "light humor" and more likely to be employed by individuals higher in agreeableness, openness, conscientiousness and extraversion, while negative humor styles (aggressive and self-defeating) correspond to what Bradley et al. describe as "dark humor" characteristics and are more likely to be employed by individuals higher in neuroticism. Bradley and colleagues created 164 stimuli to test the humor effect as it relates to the big five personality traits and humor styles. One hundred and six undergraduate students from a mid-sized Midwest liberal arts university participated. The researchers used the Big Five Inventory (John, Donahue, & Kentle, 1991) to assess personalities and the Humor Styles Questionnaire (Martin, Puhlik-Doris, Larson, & Weir, 2003) to measure participants' individual differences in uses of humor on four dimensions: self-enhancing and affiliative (both of which were deemed positive styles by Bradley et al.), self-defeating and aggressive (both of which were deemed negative styles by Bradley et al.). All participants viewed one of ten sets of the original stimuli created by Bradley and colleagues. Each stimulus contained one image paired with one phrase. The images were intended to convey light humor, dark humor, dark non-humor or light non-humor (see Bradley et al., 2011). In the case of the example below A was an image of an excessively fluffy poodle, B was an image of a fairly fluffy cat poised on a window ledge aiming a rifle at the street as if he may be an assassin, C was a picture of a pollution cloud, while D was an image of a young girl simply holding a stuffed animal.

			
(Light humor)	(Dark humor)	(Dark Non-humor)	(Light Non-humor)
This is Fluffy	This is Fluffy	This is Fluffy	This is Fluffy

The phrases themselves were not intended to be dark, light, humorous, nor non-humorous in nature. All 20 phrases used were paired once with a light humorous, dark humorous, light non-humorous or dark non-humorous image. However, the

entire stimulus set was not shown to participants. Afterwards participants engaged in a surprise free recall test. Although there was a humor effect found between light humor and light non-humor, there was no overall humor effect with dark stimuli. Bradley et al. (2011) found dark non-humorous material to be associated with better recall than all other stimuli. The preceding, along with the fact that previous studies by Schmidt (2002) and Carlson (in press) did not test the effects of dark humor on memory recall makes this a unique finding compared to the reports of previous studies investigating the humor effect.

Because the Bradley et al. (2011) study reports a reversal of the humor effect when humorous material is also dark, further investigation of the way various emotional arousal relates to humor impact recall is necessary. Mather and Sutherland (2011) attribute many of the enhancing properties which others have attributed to humor to emotional arousal. In this recent study Mather and Sutherland developed a theory that they refer to as Arousal-Biased-Competition (ABC). The theory posits that “arousing material modulates the strength of competing mental representations, enhancing memory for items that dominate the contest for selective attention. This competition begins during perception and continues into long-term consolidation” (Mather & Sutherland, 2011, p. 114). The finding from Bradley et al. fall more in line with the theory being proposed by Mather and Sutherland. However, before more definitive conclusions can be made it is imperative that the stimuli set used in future studies be validated. The present study analyzed the results of the study conducted by Bradley et al. in order to create new stimuli appropriate for assessing the effect of perceived humor on memory recall through a small pilot study.

In addition, the current study sought to understand differences between cued recall and free call. Based on their study which tracked eye movement while participants viewed humorous, non-humorous positive, and non-humorous neutral texts paired with consumer brands, Strick, Holland, van Baaren, and van Knippenberg (2011) reported that “humorous text draws more attention than non-humorous text and thereby impairs memory for unrelated context.” Strick et al. found that participants viewed humorous material at encoding for longer time periods than non-humorous material. They also found a significant correlation between longer viewing and slower reaction times for recognizing brands paired with humorous material. Strick and colleagues indeed found the humor effect and suggested further research be done regarding various emotions connected with humor that might possibly be influencing memory recall.

Strick et al. (2011) also reported important practical implications for both advertising and educational purposes. The researchers explain that the impaired recall for non-humorous contextual material which occurs impacts explicit memory, rather than implicit memory. Implicit memory is virtually unaffected leaving memory benefits intact for advertisers who rely on implicit memories of consumers. In contrast, Strick et al. explain that the impaired recall for non-humorous contextual material in classroom settings could be costly for teachers who employ humor in the classroom. The preceding is due more or less to the fact that, according to the researchers findings, any important material not tied directly to humorous material would be lost for questions requiring explicit memory (i.e. short answer test questions). Moreover, the humor effect seems to have no impact on implicit memory, providing students with

little gain for material at this level (i.e. multiple choice or matching test questions). Based on the implications highlighted this study will seek to analyze difference in cued recall versus free recall dependent on type of humor or non humor of stimuli.

## Method

### Participants

Participants (n = 36) from a medium-sized Midwestern university were recruited to participate in this study. Some students received extra credit in courses on the basis that their instructor agreed to award it. All participants were 18 years of age or older.

### Stimuli

Individual stimuli from the Bradley et al. (2011) stimulus set were selected to be included in the current pilot study based on the criteria that they received an average humor or darkness rating of 4 to 7 when intended to be dark or humorous; and based on the criteria that they received an average humor or darkness score of 1 to 3 on a 7-point Likert scale when intended to be neutral. Each stimulus included one image and one phrase. In categories where there were not enough stimuli to meet the original criteria, stimuli that had not been viewed or rated by any previous participants but were intended to fit that category by the creators of the stimuli were used. The preceding action was necessary in the case of six stimulus intended to convey dark humor, and one stimuli intended to convey light humor. (See Table A)

### Procedure

When participants arrived to their designated session, the study was explained and an informed consent document was provided. Via PowerPoint, all participants viewed the same 20 phrases paired with 1 of 2 images selected to best fit the phrase conveying light humor, dark humor, light non-humor, or dark non-humor. The image each participant viewed was dependent upon the session the participant attended. After viewing a slide for 15 seconds, participants took an additional 15 seconds to rate each slide on degree of darkness and degree of humor. Afterwards, participants took an allotted 5 minutes to report their ACT score and fill out the Positive and Negative Affect Scale X (PANAS-X). Then participants took an allotted 8 minutes to free recall as many images as possible. Participants were then cued to recall 5 of the 20 phrases previously presented for the next five minutes. Participants viewed the cue for 15 seconds and used an additional 30 seconds to record the phrase that came to mind. Cues were PowerPoint slides comprised of images previously seen, but did not include the phrase itself. Finally, participants were verbally debriefed, and given a printed debriefing form.

## **Results & Discussion**

Despite the fact that the stimuli for the current study were selected on the basis that they had been previously rated on average as being dark and/or humorous, stimuli were not perceived as intended by current participants. For exact averages which reveal the way participants perceived the selected stimuli see Table B. There was a statistically significant difference found between stimuli regarding darkness versus lightness, as well as humor versus non-humor. However, overall stimuli intended to convey humor were not perceived as humorous. The average rating for stimuli which was intended to be humorous was not  $> 4$ , nor was it  $< 3$ . Therefore, the possibility exists that the mediocrity of humor used in the study is behind what appears to be a reversal of the humor effect.

A univariate one-way analysis was performed in order to determine the impact of perceived ratings on memory recall for both free and cued recall. The current study found similar patterns as the Bradley et al. (2011) results concerning the impact of perceived humor and darkness on free recall. Dark non-humor was the only category which showed statistically significant enhancement of phrase recall (See Table C). However, after running a step-wise regression model including humor ratings and darkness ratings as independent variables and phrase recall as the dependent variable, darkness was found to be the most important variable in the model but accounted for very small percentage of the variance (See Table E).

In an effort to analyze any possible influence of darkness and/or humor on cued recall a univariate analysis of variance was performed. No statistically significant results were found supporting a humor effect or darkness effect. The data revealed an overall enhancement of memory when cues were introduced.

## **Conclusion**

Humorous stimuli did not act as intended. It is indeed a challenging task to (a) create humorous material, and (b) predict how any one individual might perceive humor. Therefore, it is essential that conclusions regarding the humor effect or any darkness effect be based on participants' perception of humor. Dark stimuli were not uniformly perceived as dark. Although stimuli intended to be dark were statistically significantly different from stimuli considered to be light and the average rating was closer to the threshold of the criteria (3.86) than was intended humorous material, the material did not all meet the standards of this study.

Based on participant perceptions, dark non-humorous material were the only stimuli which produced statistically significant increases for free recall. Nonetheless, it only accounted for a very small percentage of the variance and many other variables influence memory recall. Lastly, cues enhanced memory recall; however, no benefits based on humor or darkness were found.

## **Limitations & Future Research**

Ideally mood should be recorded before viewing dark slides and after viewing dark slides to really test the effects on mood as an indicator of positive or negative affect related to the dark material. This may call for the stimuli to be separated on the basis of darkness and participants to be purposefully put into experimental groups for future research. If the humor effect is still not found, it may be worthwhile to assess arousal using a physiological measure between viewings of dark material and light material in an effort to assess arousal more directly related to viewing dark material as opposed to viewing light material. Despite the fact that the recall was described vaguely as a cognitive task throughout recruitment and the beginning of the experiment, at least one participant was able to anticipate the memory recall test which ideally needed to be a surprise. Future research should establish selection criteria which would exclude repeat participants from past experiments similar in nature, or consider moderate deception to insure that participants do not intentionally memorize the stimuli

Pilot studies by nature utilize a small sample population to provide a framework or foundation for more rigorous study which will produce more definitive results. Future research should encompass a larger sample size and incorporate more variables which may be impacting perception of humor as well as memory recall beyond darkness and humor. Those variables include: humor style, personality, mood, and specific changes in arousal states using physiological markers to indicate such change.

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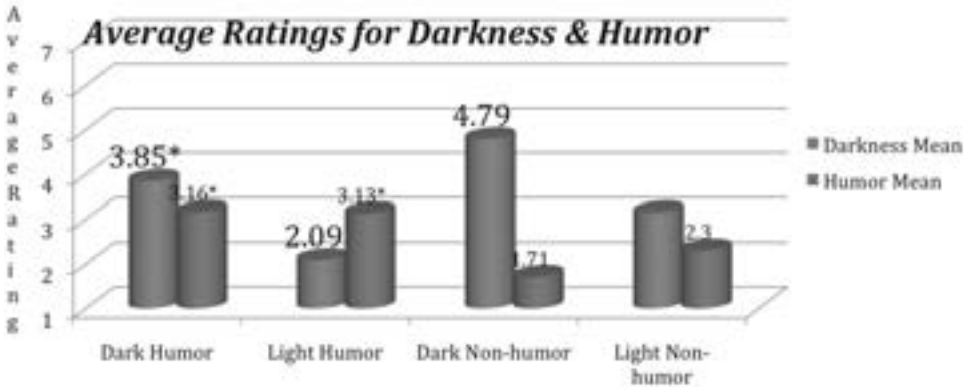
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Table A

Dark Humor Items	Darkness Avg.	Humor Avg.	Light Humor Items	Darkness Avg.	Humor Avg.
The grass is always greener on the other side.	5	4.67	It's like killing two birds with one stone.	1	5
I will want a second opinion?	5.14	4	There's an app for that!	1	6
Don't forget to lock your doors.	4	5	Bless Mommy and Daddy and Grandpa.	1.27	4.64
I could eat you up.	4	6	You have the right to remain silent.	1.71	4.29
Teamwork: we're all in it together.	*	*	Just stay calm...let me explain.	2.53	4.47
This will relieve your tension.	*	*	I told you cigars were bad for you	*	*
Who is going to get the highest score?	*	*	I could eat you up.	3.86	4.57
Mom, you're embarrassing me.	*	*	If at first you don't succeed...	1.81	4
If at first you don't succeed...	*	*	Two heads are better than one.	3	5
Can you hand it to me please?	*	*	Don't drink and drive.	3	5
Dark Non-Humor	Darkness Avg.	Humor Avg.	Light Non-humor	Darkness Avg.	Humor Avg.
Two heads are better than one.	4.17	3.5	There's an app for that!	1.06	2.31
Teamwork: we're all in it together.	4.2	2.9	Breakfast: the most important meal of the day	1.33	2.61
Bless Mommy and Daddy and Grandpa.	4.23	2.08	I will want a second opinion?	1.67	4
Just stay calm...let me explain.	4.31	2.58	Can you hand it to me please?	1.58	1.5
Look both ways before you cross the street	4.45	2.2	This will relieve you tension	1.79	1.7
Breakfast: the most important meal of the day.	4.67	3.67	Don't forget to lock your door	2.84	3
You have the right to remain silent.	4.69	1.5	Who is going to get the highest score?	1.33	1.22
It's like killing two birds with one stone.	4.75	1.95	Look both ways before you cross the street.	1.8	1.75
Don't drink and drive.	4.96	1.2	The grass is always greener on the other side.	2.56	3.1
I told you cigars were bad for you.	5.67	2	I told you cigars were bad for you.	2.86	1.82

\* indicates that slide was not yet rated, and thus selected based on intended fit of Bradley et al. 2011

Table B



\*Differences did not meet criterion to be considered true exemplars of the intended category.

Table C

Phrase	Stimulus Category A	Avg. Phrase Recall	Stimulus Category B	Avg. Phrase Recall	Phrase Recall Significance Level	F	df
8	Dark Non-humor	1.83	(Non fit)Light (2.82) Non-humor (3.12)	.53	.008	8.077	1 33
10	Dark Non-humor	1.78	Light Non-humor	.88	.064	3.679	1 33
12	Dark Non-humor	1.11	(Non fit) Light(2.65) Non-humor (3.82)	.29	.047	4.25	1 33
14	Dark Non-humor	2.28	(Non fit) Light (1.59) Humor (2.14)	.94	.006	8.803	1 33

*\*Phrase 10 is listed although it is not statistically significant at the .064 alpha level. However, phrase 10 does follow the same trend as other stimuli which were rated by participants as dark non-humor. Stimulus A (dark non-humor) reflected higher recall (1.78) than stimulus B (light non-humor) which reflected recall at an average of only (.88).*

Table D

Phrase	Stimulus Category A	Avg. Phrase Recall	Stimulus Category B	Avg. Phrase Recall	Phrase Recall Significance Level	F	df
19	(Non fit) Dark (4.12) humor (2.35)	1.44	Light(2.94) humor (4.06)	1.12	.420	.667	1 33
20	Dark Non-humor	1.78	Light Non-humor	2.35	.963	.002	1 33
10	Dark Non-humor	1.78	Light Non-humor	.88	.064	3.679	1 33
5	Dark Non-humor	1.94	(Non fit) Light (1.56) Humor (1.65)	1.41	.006	1.152	1 33

**Table E**

<b>Variable</b>	<b>Model 1B</b>	<b>95% CI</b>	<b>R squared value</b>
Constant	1.26	[1.021, 1.390]	
Darkness Score	.090	[-.010, .108]	.008

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# African American Perceptions of Graduate School Experiences and Employment in Criminal Justice and Criminology

*Shawn Glispie*

Dr. Curtis R. Blakely, Research Supervisor and Faculty Mentor

*This study examines African American perceptions with regard to graduate school experiences and employment within the fields of criminal justice and criminology. All participants were employed or previously employed in these fields. This study utilized a constructed questionnaire that asked about their perceptions pertaining to African American representation and employment trends. Responses serve as the basis by which recommendations were made to current and future scholars to remedy concerns, both real and perceived.*

## Introduction

This study examined African American perceptions related to their representation within the fields of criminal justice and criminology. Few African Americans have obtained doctoral degrees in these fields. The purpose of this study was to gain insight from African Americans that are working or that have currently worked in these fields about employment, and to see if an increase in the number of African American representatives is needed. Participants were also asked to provide suggestions for ways to encourage African Americans to pursue doctoral degrees in these disciplines. While recent studies reveal increases in the number of African Americans obtaining doctoral degrees, overall numbers appear low. It has been suggested that relatively few African Americans have obtained doctoral degrees in these fields not as a result of systemic discrimination, but due to disinterest in higher education and the fields of criminal justice/criminology. A lack of understanding about academic employment may also play a role. The research question for this study was: Do you believe African Americans are underrepresented in criminal justice and criminology -- and if so, what are some of the cause(s) and potential solution(s)?

## Literature Review

For many years, African Americans have been striving to improve their lives. Throughout the 1900s some African Americans migrated to the northern part of the country. Some strived to receive an education while others decided to work. A problem that arose frequently was that African Americans that decided to pursue education were ostracized by both white and black Americans. When African Americans pursued higher education, their families and friends would often view them as trying to leave them behind or become more like white Americans. Some African Americans achieved their educational goals while others conformed to the expectations of their fellow African Americans (Grier & Cobb, 1992).

In recent years, the number of African Americans obtaining doctoral degrees in the fields of criminal justice and criminology has increased. However, African Americans may still be lagging behind and appear to be underrepresented in these fields, especially at the doctoral level. It has been suggested that it is difficult to find qualified minorities or blacks to fill academic vacancies (Edwards, White, Bennett, & Ingrid, 1998). Earl Washington suggests that there are few black Ph.D.'s because there are few black faculty to serve as role models and mentors to those graduate students that aspire to academic employment (Edwards et al.). Little research has been conducted to study mentoring relationships among African American students in the field of criminal justice and criminology. While African American students do not necessarily need an African American mentor to be successful in graduate school, Gilbert and Tatum suggest that African Americans may be more willing to pursue doctoral studies if they see other African Americans that have done so already (Gilbert & Tatum, 1999). Other data has shown that African American faculty members, male or female, are more likely to have maintained formal relationships with white faculty members and peers. As a result, African Americans have rarely formed partnerships resulting in co-authored papers, student teaching, or work on research grants. Because of this difference in professional socialization, African Americans may suffer a disadvantage in achieving higher levels of success in academe (Gilbert & Tatum).

For those African Americans who are in the process of obtaining a doctoral degree, or have already earned it, the issue of publication becomes paramount. An integral part of being a researcher is to have your scholarship published. African Americans appear to have difficulties in this area. Their work is often overlooked by "mainstream" journals (Bing & Carmen, 2000). Mainstream journals are those that are widely regarded as being the best in the field. These journals are often the most selective and subsequently referenced the most. The study conducted by Bing and Carmen indicated that most African Americans who publish in the fields of criminal justice and criminology, do so in foreign journals suggesting that their scholarship may not undergo a rigorous peer-reviewed process, receives limited readership, and is referenced less often by their American peers (Bing & Carmen). This factor relegates the black scholar to a reduced, secondary status within American higher education.

## Methodology

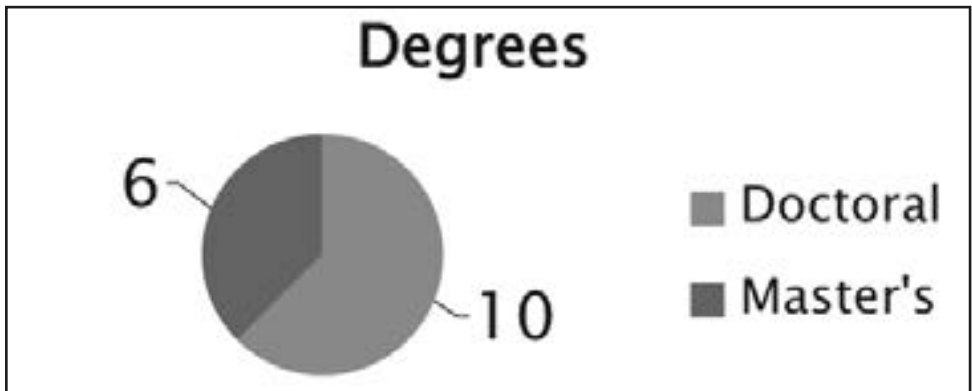
Permission was sought to administer a questionnaire to the Academy of Criminal Justice Sciences and the American Society of Criminology's minority membership sections. African Americans who work or have worked in the fields of criminal justice and criminology and are a part of these professional organizations were asked to participate. Combined, both disciplines have around 250 African American members. The questionnaire was sent to all 250 African Americans. Nine other African Americans who were not members of either organization's minority sections were also recruited to participate in the study. The target sample size was 30-50 participants. However, only 16 responses were received.

An online questionnaire was created to obtain feedback from the participants. Before the questionnaire was sent to the participants, permission from Truman's institutional review board was obtained. The approved questionnaire consisted of a combination of "Yes" and "No" questions, questions about background, and various open-ended questions about African Americans and the academic fields of criminal justice and criminology. The questionnaire was estimated to take about 10 minutes for a participant to complete. This was a quantitative study and the responses were analyzed for their results.

## Results

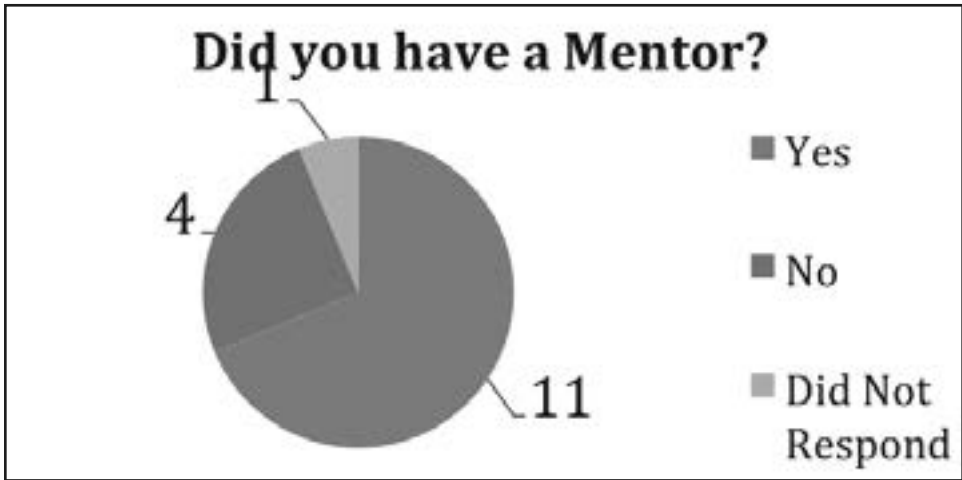
Meaningful feedback was received from the participants who completed the questionnaire. However, since the sample size was small the responses are not to be considered representative of African Americans employed in these fields. The majority of the participants received their graduate degrees in criminal justice or criminology, but there were a few that received them in other disciplines such as: psychology, sociology, public policy, etc. Ten (62.5%) received a doctoral degree and six (37.5%) received a master's degree as their highest degree (see Figure 1).

Figure 1



When the participants were asked “Were there any obstacles that you had to overcome while working toward your master’s or doctoral degree”? I received various responses. The responses ranged from “using secondary data”, “time”, “financial issues”, “mentorship”, and “working”. Some of the participants were working full time while in graduate school which made it difficult for them to balance school and employment. One of the participants was a full-time mother, employed full-time, dealt with health related issues, and commuted two and half hours to get to her institution. When the participants were asked if they had a faculty mentor in graduate school and if so what race/ethnicity was he/she, eleven (68.8%) had a mentor, four (25%) did not have mentor, and one (6.2%) did not respond (see Figure 2).

Figure 2



For those that had a mentor, eight (72.7%) had a white mentor and the other three (27.3%) had an African American mentor (see Figure 3).

Participants were asked if their relationship with their mentor was “a significant factor in your ability to obtain your degree?” The majority of participants said that their mentor was very helpful and supportive and played a significant role in their success. One of the participants noted that while he/she had a faculty mentor, no meaningful relationship existed between them. This participant only saw his/her mentor twice, once at program orientation and then upon completing an exit survey from the program.

Each participant was required to have been previously or currently employed in some capacity in one of the two fields. Six (37.5%) of the participants had been professors, five (31.25%) had been juvenile probation officers, and the remaining five (31.25%) were employed in various positions such as: a grad student, in higher education, working at the district attorney’s office, teaching and consulting law enforcement, or by the judiciary (see Figure 4).

Figure 3

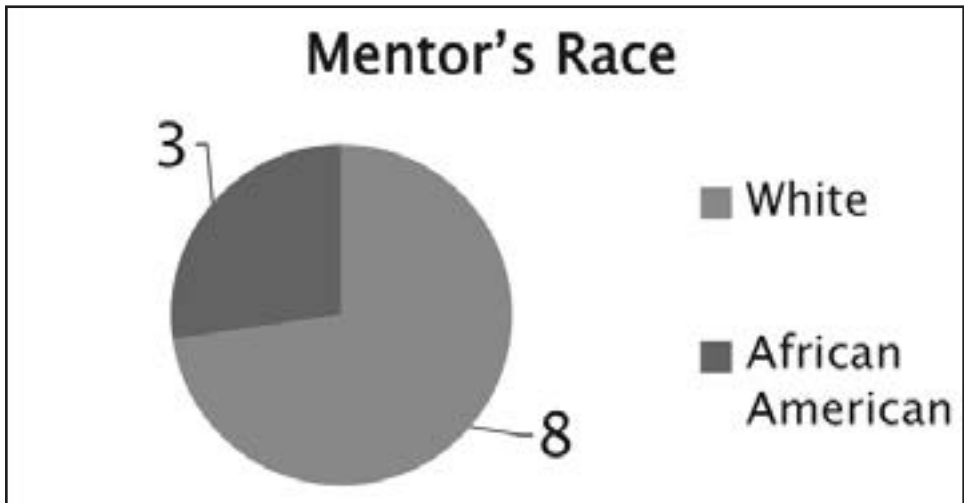
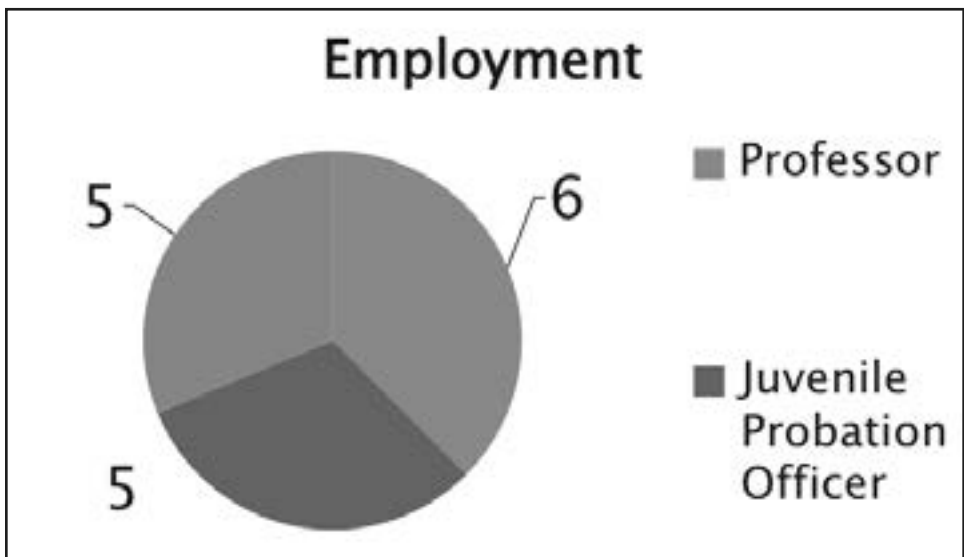


Figure 4



The participants were asked if they had any articles published. Eleven (68.8%) have published at least one article, while the other five (31.2%) have not been published (see Figure 5).

Some of the journals that their work appears in include the *Journal of Criminal Justice Education*, *Criminal Justice and Behavior*, *Criminal Law Bulletin*, *Psychiatric Services*, *Police Quarterly*, *Western Journal of Black Studies*, and *Adolescence*. Of those participants that published in journals, seven (63.6%) were published in international journals while the other three (27.3%) were not (see Figure 6).

Figure 5

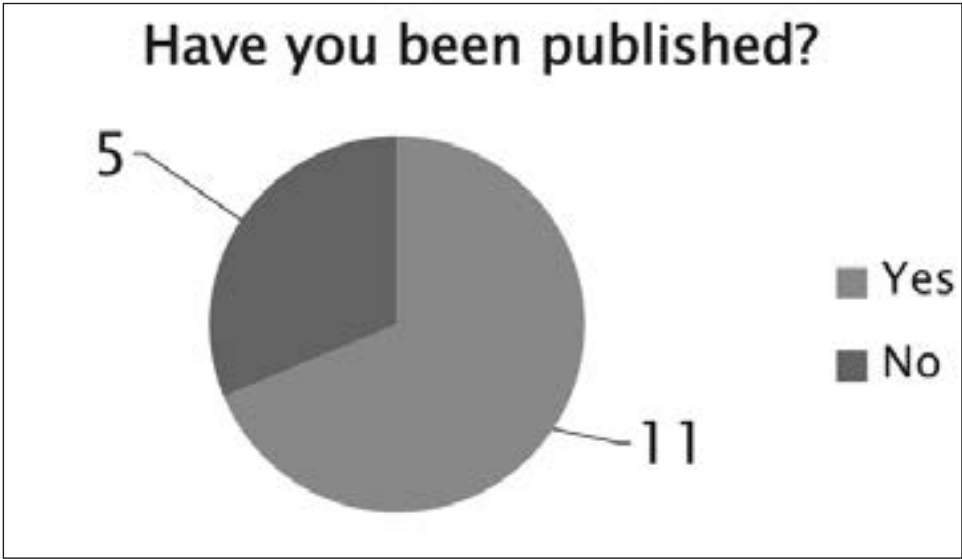
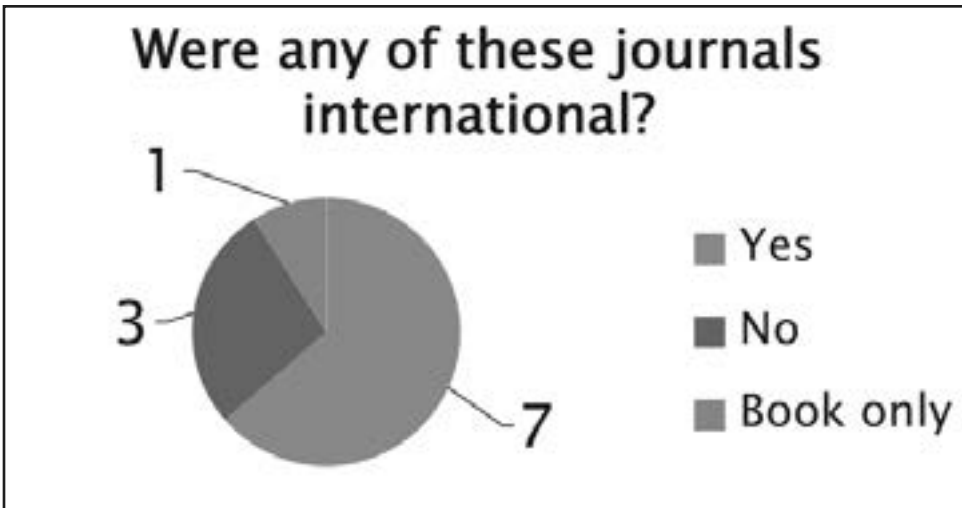
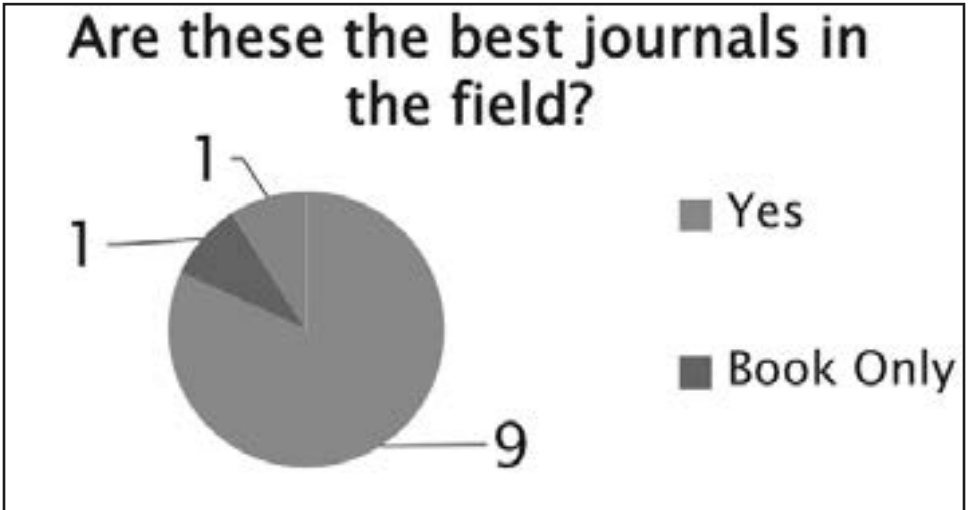


Figure 6



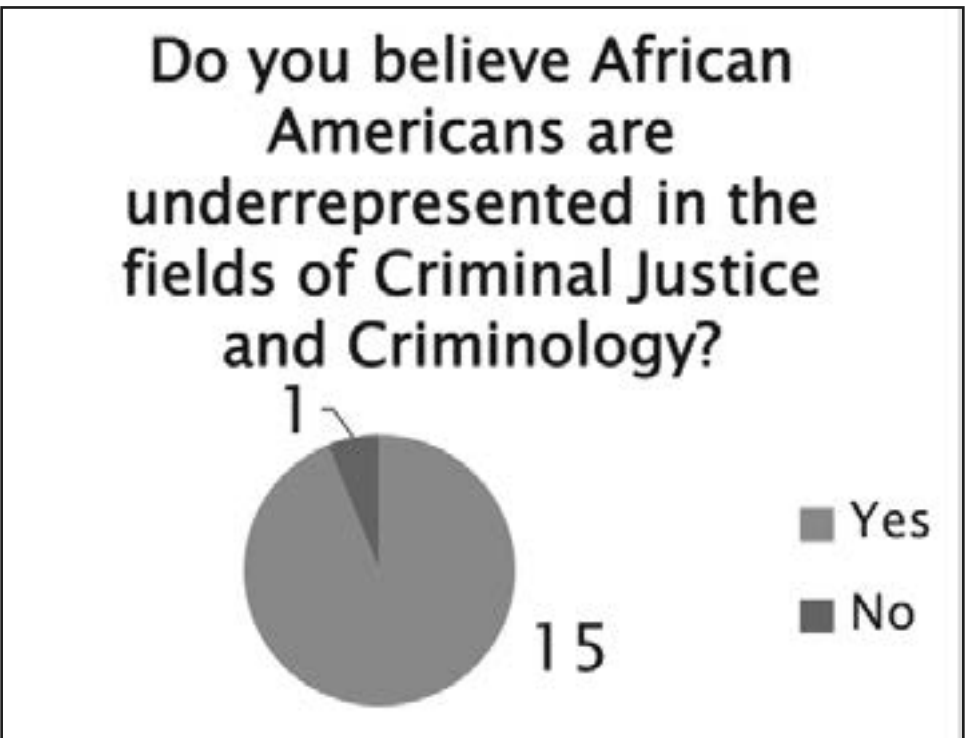
The participants were then asked if the journals were considered the best in the field. Nine (81.8%) responded yes, while the other participant (9%) responded no. One participant had published in a book but had never published in a journal (see Figure 7).

Figure 7



The participants were asked if “they believe African Americans are underrepresented in criminal justice and criminology?” Fifteen (93.8%) said that they believe that African Americans are underrepresented in the fields (see Figure 8).

Figure 8



The next question asked was “if you indicated that African Americans are underrepresented, can you identify contributing factors?” Various responses were provided to this question. These responses included: “lack of exposure on the part of academia towards minorities and their need for them and vice versa”, “not enough networking, institutionalized racism, disregard for diversity”, “not enough with doctoral degrees”, “may not be interested in the fields”, and “you have to gain the proper credentials and get hired”. The final question they were asked was to “provide any suggestions to those who may want to go into these fields of study”, suggestions included: “remain focused, disciplined, avoid politics”, “find other African Americans or minorities to get a clearer picture of academic reality”, “talk to criminologists working in academe”, “you need a faculty mentor”, “educate yourself about the program”.

## **Conclusions**

According to my study, African Americans are making strides in these fields. However, due to the low response, the conclusions I have drawn are based solely on a limited sample and are not to be considered representative of the entire African American population. The ethnicity of a mentor does not hinder a person from obtaining their degree. Having a mentor who is supportive and helpful increases the likelihood that someone will complete their graduate program. There may be some obstacles that people have to overcome while in graduate school, but they can be conquered. Some African Americans are obtaining graduate level degrees, more importantly; they are also obtaining doctoral degrees. African Americans are also publishing in mainstream journals. The majority of respondents believe that African Americans are underrepresented within the fields of criminal justice and criminology. There are many factors that may explain why African Americans may be hesitant to obtain degrees in these fields ranging from lack of exposure to academia to the storied and often violent history that exists between African Americans and the criminal justice system. However, participants provided helpful tips to those who want to obtain degrees in these fields. Although my research question was answered, further studies need to be conducted to obtain insights that can be generalized to the broader population.

## **Limitations**

While conducting my study, there were a few issues that impacted my results. Although I emailed approximately 260 people to participate in my online questionnaire, I only received sixteen responses. This could be due to the fact that it was summer and most academics are on vacation and therefore inaccessible. Furthermore, the email address list that I received from the American Society of Criminology had not been updated since the summer of 2008 which could have also affected the response rate.

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## Appendix

### Questionnaire

1. Which field of study did you obtain your degree in (criminal justice, criminology, sociology, psychology or another field)?
2. What was the highest degree you obtain (bachelors, masters, doctoral)?
3. Did a parent obtain a master's or doctoral degree?
4. While working on your master's or doctoral degree, what institution(s) did you attend?
5. Were there any obstacles you had to overcome while working toward your master's or doctoral degree?
6. Were your family and friends supportive of you when you were in graduate school?
7. Did you have a faculty mentor in graduate school? If so what race/ethnicity was he/she?
8. Describe your relationship with your faculty mentor. Would you characterize it as a significant factor in your ability to obtain your degree?
9. Are you currently or have you previously worked in the criminal justice or criminology fields?
10. If so in what capacities?
11. Have you been published (yes, no, other)?
12. What journal(s) was your work published in?
13. Were the journals peer-reviewed (yes, no, some are)?
14. Are any of these international journals?
15. Is the journal(s) that your work was published in considered one of the best journals in the field?
16. Have you written books or chapters for books?
17. Are there significantly lower numbers of African Americans employed in the academic fields of criminal justice or criminology?
18. If you indicated that African Americans are underrepresented, can you explain factors for this underrepresentation?
19. If you indicated that African Americans are underrepresented in higher education, is it due to institutional discrimination or hesitancy by African Americans themselves to pursue higher education?
20. Can you provide any suggestions to those who may want to go into these fields of study?
21. Are you currently or have you ever been a faculty member in one of these fields?
22. If so, were you recruited for the position?
23. If you are currently a faculty member, how many African Americans are on the faculty in your department (1, 2, 3, 4, other)?
24. Rank your salary compared to others in your department? (higher, about the same, lower, not sure, other).
25. If differences exist, how might you explain them?

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# Breaking the Law Does Not Make Me a Criminal: Student Law Breakers' Self Perception of Criminality

*Chermain Jennings*

Andrea Hampton, Research Supervisor

*An analysis of college students' perceptions and ideas about criminal behavior was conducted. The study aimed to determine the degree to which college students view themselves as criminals while participating in illegal behaviors. A convenience sample of college students answered questions about their criminal activities and the frequency of these behaviors. Nominal, Likert and Binary scales were used to elicit an understanding of how the participants view themselves. The scales were also used to assess the respondents' recent criminal behavior and to determine how frequently they participate in illegal acts. Lastly, open-ended short answer questions were utilized to gain an understanding of why the respondents did or did not consider themselves to be a criminal.*

## Introduction

Have you ever cut someone off while driving because you were “in a rush” and felt it justified, but when it was done to you, you thought that person was a bad driver and/ or a horrible person (Gladwell, 2000)? If yes, then you, like so many others may have fallen victim to the Fundamental Attribution Error. Have you found yourself fascinated and watching every episode of NCIS, CSI or Law in Order? Have you ever stolen anything, received a parking ticket or not worn a seatbelt while driving? If you answered yes to any of these questions then you may be a criminal or at least completely intrigued by the idea.

For the purposes of this study, it was imperative that a few words be clearly defined: deviant, crime, criminal and illegal. The Merriam-Webster Online Dictionary and Criminal Justice Professor, Larry K. Gaines, defines deviant as: “deviating especially from an expected norm”—any action that goes against or informally violates the “norms” of society would be deviating. Crime as, ‘an act or the commission of an act that is forbidden or the omission of a duty that is commanded by a public law and that makes the offender liable to punishment by that law’ The breaching of any laws or

rules set forth by a higher authority that could potentially result in conviction and/or incarceration. Criminal: 'guilty of crime', a criminal is the individual that has breached the public law. Lastly, the term "illegal" is defined as, 'contrary to or forbidden by law' (Gaines, 2008).

Deviant behaviors and criminal acts have been "glorified" for years. There are multiple television shows, both reality and crime based series that are very popular amongst viewers. Looking at the top ten television ratings list as of July 2011, you will see that for every category allotted, there are at least two crime based shows present. The categories are broadcast television, cable television and syndicated television. (Neilson Company, 2011). With ratings like these, it becomes apparent that people are intrigued by the idea of criminal acts and/or breaking the law.

In the United States, an act is not considered a crime until there has been a statute created making that particular action illegal. Therefore, if the law prohibits a certain behavior and if a person engages in that behavior, he/she is ultimately committing a crime. There have been a multitude of studies conducted on extreme felonies, white collar crimes and all the petty misdemeanor crimes that fall in between. However, this study explores whether there is another category of crime that has yet to be taken into account. This particular category would be a compilation of everyday small and petty crimes that, while they could easily go undetected, are still considered illegal even though they are not well documented. So what are these acts and who is committing them? Who are the individuals who commit these crimes and do they believe that what they are doing is wrong? This study will examine whether those who do not consider themselves criminals actually commit criminal acts and if they are committing criminal acts, why they do not view themselves as criminals.

## **Literature Review**

There has been an assortment of studies about various large scale crimes and the individuals who commit those crimes. In addition, research has also been conducted that supports the Routine Activity Theory and the "symbiotic relationship between conventional activities and illegal activities" (Osgood, Wilson, O'Malley, Bachman, & Johnston, 1996, p. 636). Routine Activity Theory, developed over 50 years ago, is one of the most well-known and utilized theories within the criminal justice field (Boetig, 2006, p.12). It is used frequently within various research quests to assess, prove or disprove actions. For example, "students who were willing to break rules or laws on-campus have a greater propensity for crime than students who chose not to break those rules or laws" (Tolson, 2009). This theory states that crime is normal and it occurs daily because it only takes one individual with a prime opportunity for a criminal act to occur. So because of this, no one person is exempt from the possibility of committing a crime. This then hints at an underlining assumption that all people, as they routinely carry out their roles in society, have the opportunity to commit a crime. For instance, things such as driving without a seatbelt or texting while driving is discouraged, even though the latter is not illegal in all states and in some states where it is illegal (e.g., MO), it is only illegal for some people, they are still high risk behaviors and, if noticed could result in a sanction. However, offenses like these that

are committed by people daily are not usually thought of by the offender as criminal acts.

According to Missouri Division-Safety Belt Statistics, Missouri's overall seatbelt usage is 77% in comparison to the nationwide total of 84% and teenage drivers have the lowest percentage of seatbelt usage at 61% (Missouri Safety Belt Statistics). However, a 2010 survey conducted on college students' responses to how often they wear their seatbelts, text message and talk on a cell phone while driving shows that a majority of students are following the rules and abiding by the laws (MCHBS, 2010). On the contrary, another study was conducted, with 276 participants, and 100% of those young drivers accepted phones calls while driving. They were fully aware of the dangers of doing so but decided that the phone call was important enough to risk their lives (Nelson, 2009).

The act of simply balancing costs against benefits to arrive at an action that maximizes personal advantage is Rational Choice Theory (Keel, 2005). Any situation involving a cell phone and law-breaking is partially due to the relationship between deviant behaviors and the deviant subculture (Osgood, et al. 1996). More specifically, this means that within this era, cell-phones have been attributed to being the root of many deviant acts. Yet, the concept of weighing the risk against benefits and means to an end in any situation stems from Rational Choice Theory. From this point of view, it is hypothesized that self-control predicts deviant action in low-cost situations. Low-cost being situations having higher opportunities for personal gains whereas utility predicts deviant action in high-cost situations (Seipel, 2010).

If an individual believes there is a greater benefit in participating in deviant or criminal behaviors as opposed to not, then that individual will surely continue to partake in those behaviors. Ultimately, the greater the severity, celerity, and certainty of punishment for an act, the less likely that act will be committed. The theory then assumes that conscience plays little role in determining behavior. It also assumes that human beings are rational or that when people are presented with the opportunity to commit a crime, if the perceived benefits of committing the crime outweigh the perceived costs, then the crime will be committed. So what can be done to motivate individuals to act accordingly with the rules and/or law? Maybe, stopping to seriously analyze oneself and the situation at hand will be enough to force one to abide by the rules. The Fundamental Attribution Error (FAE) demonstrates how quick humans are to personally attack someone's character with no regard for that individual's situation. Attribution refers to "an individual's implicit or explicit understanding of a cause of events and the outcomes of those events" (Heider, 1958). If a person continuously undervalues situational explanations and over-values personality dispositions, then there will be a great discrepancy between what is and what is thought.

For those who partake in illegal acts, would it be necessary for them to be caught and labeled as a criminal in order for them to act in accordance with the rules and/or law? Some people who commit crimes do not consider themselves to be criminals because they have not been associated with a stigma, have not been caught, do not inflict harm upon others or do not have a criminal record. This idea lends to the notion that those who commit small offenses will continue to do so until they are caught or reprimanded. These individuals do not see any harm in their actions; therefore, they do not acknowledge their actions as being problematic. The Labeling Theory has

focused heavily on the occurrence of secondary deviation and the extent to which the social reaction process affects or alters the labeled individual's self concept and behavior. Secondary deviation is the deviation that occurs from society's reaction or perception (Curran, 2001). Unfortunately, however, there is a possibility that receiving the label "criminal" may potentially force some to partake in such activities because of a possible disconnect between them and those who are not labeled as criminals. Receiving a label and stigma seems almost necessary for individuals to realize that no matter how small the crime committed, ultimately a crime was committed.

## Method

The study conducted was a quantitative analysis used to determine if those who do not consider themselves criminals actually commit crimes. This was a criminal justice-based study and utilized and defined terms as such.

**Participants:** This study used a convenience sample comprised of Truman State University College students ages 18-24, freshmen through seniors. The total number of participants were 38, 14 males and 24 females. The participants for this study were recruited through a Justice Systems department newsletter sent to all majors and minors asking for their participation in the study. This researcher also asked two Justice Systems' professors to allow participants of the study, with their debriefing form, to receive extra credit for their participation.

**Instruments:** An anonymous internet-based questionnaire was used containing questions allowing this researcher to gain information about the participants' demographics, current criminal behaviors, criminal history and a self-perception of their behaviors. This researcher used Nominal, Likert and Binary-scales along with short answer open ended questions. The first set of questions provided demographic information. Participants selected the appropriate response to the question asked. The second set of questions assessed the frequency of criminal activities made by the respondent. Lastly, the remainder of the questions obtained criminal history and the individuals' self-perception of their criminal activities. The short answer questions allowed the respondents the opportunity to explain why they would or would not consider themselves a criminal. (See Appendix)

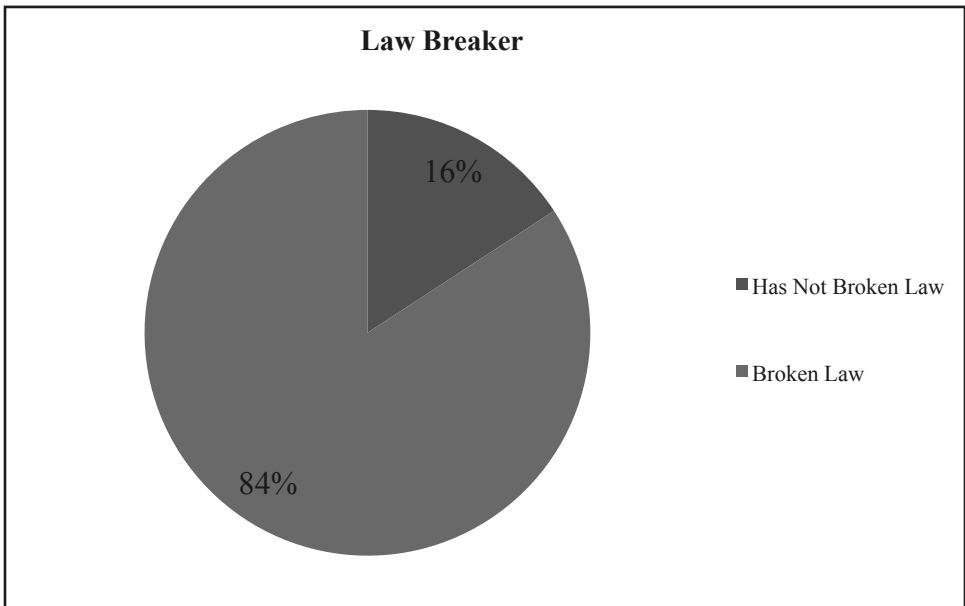
**Procedures:** Institutional Review Board's approval was sought before any actions took place. Following approval by the IRB, this researcher contacted students via the Justice System department's newsletter and through professors who provided survey participation as an extra credit opportunity. For the students interested, they were provided with an informed consent form with details about the study. It was during this time the topic of anonymity was addressed. The respondents were assured that there would be no information asked that could potentially expose their identity. Also, discussed was the issue of comfortability while taking the survey. It was explained to the participants that there should be nothing presented during the questionnaire to initiate discomfort but if they became uncomfortable they were allowed to exit the survey. After reading the informed consent form, they clicked next to continue forward with the survey. By clicking this option, they then were giving this researcher permission to utilize their responses as appropriate. At this point, the questionnaire

was displayed and after accessing and completing the questionnaire, participants then received a debriefing form thanking them for their contributions and instructions on how to receive their extra credit.

**Data Analysis:** To analyze the data collected this research put the information into an excel spreadsheet and then put it into SPSS. The responses were then analyzed to produce a descriptive analysis.

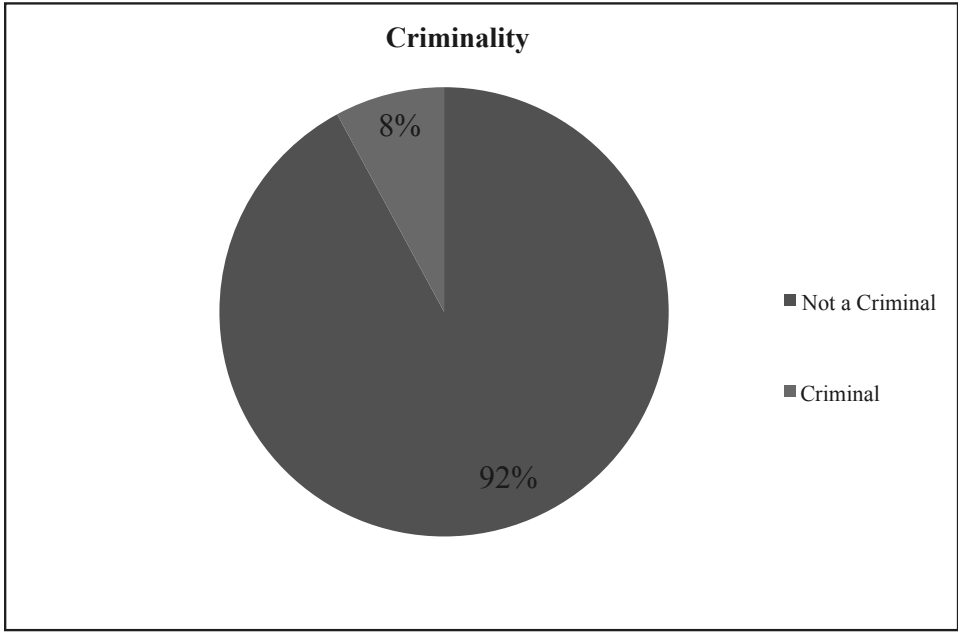
## Results

**Figure 1** (Law Breaker)



This figure demonstrates that 84% of the respondents within this survey had admitted to breaking the law while 16% reported that they had not broken any laws.

Figure 2 (Criminality)



This figure identifies 92% of the respondents as not being criminal while 8% did consider themselves to be a criminal. Looking at both the graph and the statistics it is easy to see that there is a discrepancy in perceptions of criminal behaviors by the respondents and what activities they are actually partaking in.

The results indicated that there were three respondents who considered themselves criminal because of their actions but mentioned that they did not realize that their activities would qualify them as being criminal. There were also a total of five respondents who had admitted to have been arrested but these individuals did not consider themselves to be criminals for their own reasons. As a disclaimer the categories selected for Figures 3, 4 and 5 were solely based on the perceptions of the college students and are completely arbitrary scales.

Figure 3 (Small Scale Crimes)

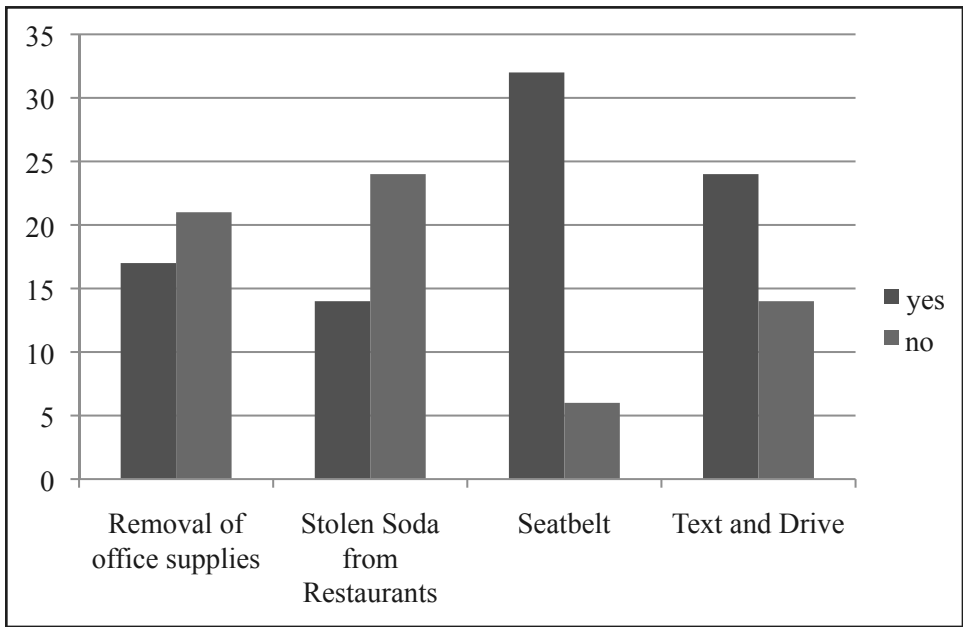
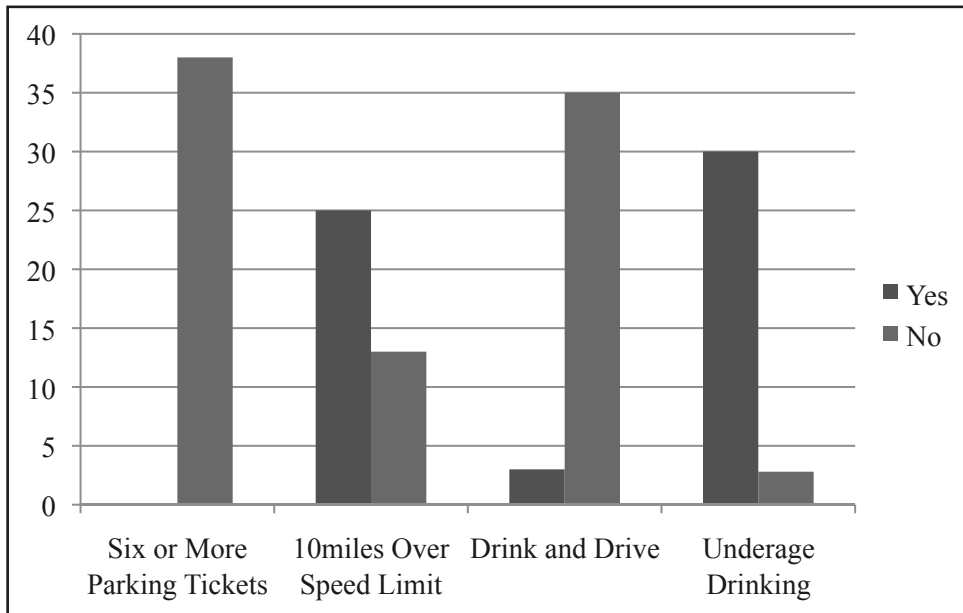
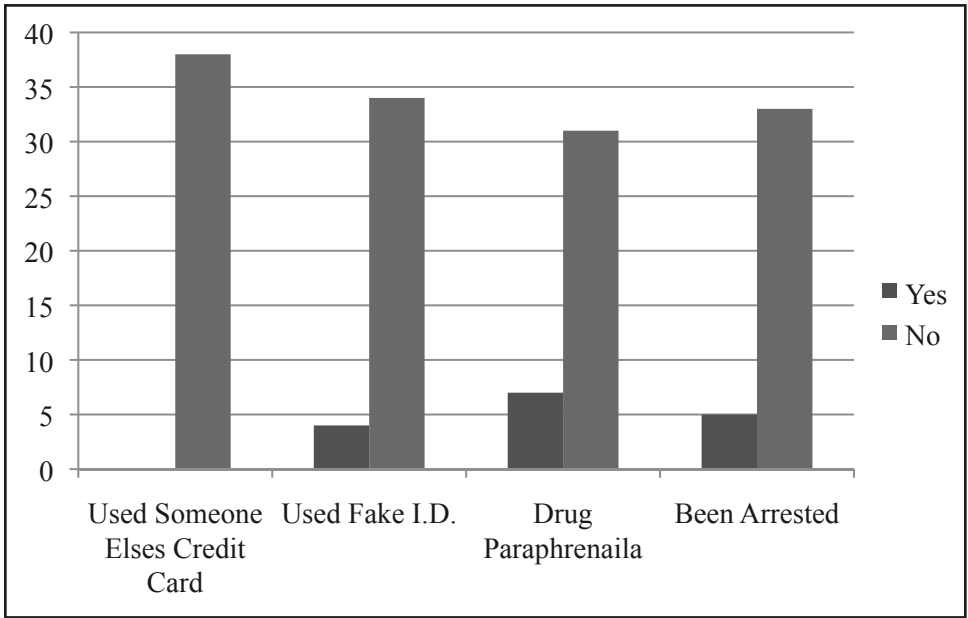


Figure 4 (Moderate Scale Crimes)



**Figure 5 (More Severe Crimes)**



These scales are comprised of the questions asked on this researcher's online survey. Looking at the respondents' responses gives an understanding of what and how the respondents perceive some of the criminals.

### Conclusion

According to the results of this researchers' study, participation in criminal activities is something that occurs daily whether an individual chooses to acknowledge it or not. It was brought to our attention that there is a category of crime that goes undocumented and undetected and because of this, those individuals who commit these crimes are not identified or reprimanded. Whenever a person is not held accountable for their actions it is likely they will continue their current behaviors due to lack of consequences. So are we criminals? Maybe, however, if everyone would realize that their actions do matter and that they are not exempt then maybe they would be prone to changing their actions.

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## Appendix A

1. Gender?  Male  Female
2. I am currently..
  - Freshmen  Sophomore
  - Junior  Senior  5th year or greater  Graduate Student
3. Current age?
4. In the past 12 months, I have removed pens, pencils, paperclips or other supplies from; work, school or a store without permission.
  - Very Frequently  Frequently
  - Sometimes  Rarely  Never
5. In the past 12 months, I have gone to a restaurant and asked for water but filled my glass with soda.
  - Very Frequently  Frequently
  - Sometimes  Rarely  Never
6. When I drive, I wear my seatbelt...
  - Always  Frequently  Sometimes  Rarely  Never
7. I text and drive...
  - Very Frequently  Frequently
  - Sometimes  Rarely  Never
8. In the past 12 months, I have received six or more parking tickets, on or off campus?
  - Yes  No
9. In the past 12 months, I have driven AT LEAST 10mph over the speed limit.
  - Yes  No
10. In the past 12 months, I drank multiple alcoholic beverages in a relatively short period of time and then drove a vehicle:
  - Yes  No
11. While under age, I drank alcoholic beverages.
  - Very Frequently  Frequently
  - Sometimes  Rarely  Never
12. In the past 12 months, I have used someone else's credit card without their permission.
  - Very Frequently  Frequently
  - Sometimes  Rarely  Never
13. In the past 12 months, I have used someone else's identification card or license to purchase alcohol or go to a bar.
  - Very Frequently  Frequently
  - Sometimes  Rarely  Never
14. In the past 12 months, I have used or carried drug paraphernalia.
  - Very Frequently  Frequently
  - Sometimes  Rarely  Never
15. Have you ever broken the law?
  - Yes  No
16. Have you ever been arrested?
  - Yes  No
17. If yes to the previous question, were you charged for the crime?
  - Yes  No
18. If charged, was it a misdemeanor offense? Explain.
19. If charged, was it a felony offense? Explain.
20. Has taking this survey changed your perception of who is a criminal?
  - Yes  No
21. If yes, explain.
22. Do you consider yourself a criminal?
  - Yes  No
23. If yes, explain

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# Computational Studies of P22 N Peptide-*boxB* Complex

*Michael R. Jones*

Dr. Maria C. Nagan, Research Supervisor and Faculty Mentor

*A bacteriophage is a type of virus that invades Escherichia coli and manipulates the cell machinery to self-proliferate. One strategy of replication is to turn viral transcription on through the process known as antitermination. P22 N peptide recognition of boxB ribonucleic acid (RNA) signals this process to occur. Molecular dynamics studies of the P22 N peptide-boxB complex were undertaken to better understand the role of arginine-rich motifs and water in peptide-RNA recognition. Systems were built under a potassium chloride buffer in the presence of explicit water solvent and simulated 65,000 frames from six starting structures. Thermodynamic properties were monitored for simulation convergence. The presence of hydrogen bonds between the RNA and peptide were compared across multiple models and sites of high water density were examined to determine preferential water binding sites.*

## Introduction

Viruses are biological particles that invade a host cell and impede the cell's viability. Viruses such as human immunodeficiency virus (HIV), human T-cell leukemia virus type-1 (HTLV-1), and hepatitis B virus (HBV) all lead to millions of deaths each year.<sup>1,2</sup> P22, a virus that infects *Escherichia coli*, requires the N protein to bind to a sequence of ribonucleic acid (RNA) known as *boxB*, which signals overexpression of essential viral biomolecules.<sup>3</sup> In this research, computational studies to better understand the mechanism of N protein-*boxB* recognition were undertaken. By studying the fundamental processes of how viruses control cellular functions, a wide range of new therapies can be developed to treat viral infections.

## Literature Review

Viruses that infect bacteria, such as *Escherichia coli*, are known as bacteriophages and attach to cells, injecting viral deoxyribonucleic acid (DNA) into the bacterium to synthesize new virions. During normal cellular transcription of the DNA genes, the enzyme RNA polymerase unwinds the double stranded DNA and transcribes new

molecules of messenger ribonucleic acid (mRNA) until it reaches a stop signal known as the terminator sequence.<sup>4,5</sup> The mRNA is then carried to the ribosome where it is translated into protein. In order to focus the cell on producing more viruses, bacteriophages use the cell machinery to synthesize large quantities of viral mRNA in a process known as antitermination so that eventually more viral proteins can be assembled.<sup>6,7</sup>

Bacteria uses two different enzymatic strategies for transcription termination.<sup>8</sup> In Rho-independent transcriptional termination, RNA transcription stops when the newly synthesized RNA forms a hairpin loop.<sup>9</sup> In Rho-dependent termination, a protein factor known as Rho destabilizes the interaction between the DNA template and the mRNA, hence releasing the newly synthesized mRNA from the elongation complex.<sup>10-13</sup> Bacteriophages circumvent Rho-dependent termination through a cascade of events triggered by N protein recognition of *boxB* RNA.

N protein belongs to the arginine-rich motif (ARM) family of RNA binding proteins.<sup>6,14-16</sup> The RNA binding domain, ARM, is characterized by a prevalence of the long, hydrogen-bond donating, positively charged amino acid arginine within active sequences of linked amino acids known as peptides.<sup>17,18</sup> Arginine can occur in sequences of approximately eight to twenty nucleotides to form ARMs. Examples of viruses that contain ARM proteins include human immunodeficiency virus (HIV),<sup>19</sup> human T-cell leukemia virus type-1 (HTLV-1) and hepatitis B virus-core antigen (HBcAg).<sup>20,21</sup> Being relatively short in length, ARMs can function as independent recognition domains since the ARM portions of the protein are capable of recognizing the same RNA molecules as the full protein.<sup>22</sup>

The stability of protein-RNA complexes can be affected by hydration patterns.<sup>18,23</sup> In other arginine-rich proteins bound to RNA, hydration patterns have modulated protein-RNA complex stability. During the late phase of the HIV life cycle, an ARM containing peptide called Rev<sup>24</sup> binds to the Rev response element (RRE)<sup>25</sup> RNA to continue viral protein synthesis. RSG 1.2,<sup>26,27</sup> a synthetic peptide designed to bind to RRE better than Rev, has been experimentally shown to bind to the RNA with higher affinity and greater specificity than Rev.<sup>26</sup>

Computational studies of Rev and RSG 1.2 bound to the RRE sequence revealed significant water networks linked to arginine.<sup>20</sup> Examinations of hydration patterns in the native HIV Rev-RRE complex found that water at the interface of the peptide-RNA complex exhibited more nonspecific binding and behaved more like bulk water whereas a smaller, yet more defined tightly bound network was observed in the RSG 1.2 synthetic peptide recognition of the same RNA.

The general intent of this study is to better understand ARM peptide-RNA recognition. Examining P22 N peptide<sup>28</sup> and *boxB* activity at an atomic level determines the significance of the hydration patterns and interactions of arginines with RNA. Computational studies of the P22 N peptide-*boxB* recognition allow an atomic level of description not otherwise accessible by traditional experimental methods.

## Methodology

### Molecular Dynamics

Computational studies using molecular dynamics (MD) simulations are essential to understanding protein-RNA recognition.<sup>29</sup> MD simulations solve Newton's equations for motion<sup>30</sup> to propagate positions and velocities of molecules throughout time (equation 1)

$$\vec{F}_i = m_i \vec{a}_i \quad (1)$$

where  $\vec{F}$  is the force exerted on an atom  $i$ ,  $m$  is the mass of the atom, and  $\vec{a}$  is the acceleration of the atom. MD evaluates the force on an atom at a particular point in time  $t$  by partially differentiating the potential energy function  $U$  with respect to  $r$ , the position of each atom,

$$\vec{F}_i(t) = -\frac{\partial U(r^N)}{\partial r_i} \quad (2)$$

which is represented in these MD simulations by the Cornell et al.<sup>31</sup> force field. In this force field,

$$U_{total} = \sum_{bonds} K_r (r - r_{eq})^2 + \sum_{angles} K_\theta (\theta - \theta_{eq})^2 + \sum_{dihedrals} \frac{V_n}{2} [1 + \cos(n\phi - \gamma)] + \sum_{i < j} \left[ \frac{A_{ij}}{R_{ij}^{12}} - \frac{B_{ij}}{R_{ij}^6} + \frac{q_i q_j}{\epsilon R_{ij}} \right] \quad (3)$$

the terms represent the energy associated with bond stretching, angle bending, rotation, and non-bonded interactions, respectively.

Computational studies can lead to a better understanding of the behavior of biomolecules and reaction mechanisms that are not readily studied experimentally. The P22 N peptide-*boxB* complex was simulated computationally to gain a better understanding of the hydration patterns and how they influence peptide-RNA recognition.

### System Preparation and Simulation

The solution structure of P22 N peptide-*boxB* complex was solved with twenty structures that fit the NMR data and deposited (PDBID: 1A4T<sup>32</sup>) into the Protein Data Bank Database.<sup>33</sup> From the solution structure, the twenty structures were separated, labeled as models and made readable for Amber 11,<sup>34</sup> a suite of programs that can be used to carry out MD.<sup>35-37</sup> The system was neutralized with K<sup>+</sup> ions and solvated in 200 mM of potassium chloride<sup>38</sup> and 10 Å of TIP4PEW<sup>39</sup> water beyond the solute in a truncated octahedral box. The RNA was modeled using the Cornell *et al.* force field,<sup>31</sup> with the Barcelona modifications (parmbc0)<sup>40</sup> and the peptide was modeled with the parm99sb<sup>31</sup> force field parameters.

The system was equilibrated according to the Cheatham et al. protocol<sup>41</sup> and heated to 300 K. MD simulations were propagated for 65.0 ns of which 55.0 ns was analyzed. Statistics were collected for every 1 ps snapshot of the trajectory. To increase sampling, six of structures lowest in energy were used for analysis.

### RMSD and Thermodynamic Analysis

Monitoring thermodynamic parameters and root-mean-square-deviation (RMSD)<sup>30,42</sup> fluctuations are useful when determining when the system equilibrated

and where to begin data analysis. The RMSD from the reference structure is essential to monitoring the system's equilibration throughout simulations. The RMSD from the reference structure is defined as the root mean square deviation in position of all atoms at time  $t$  from the corresponding position of atoms in the reference structure

$$(4) \quad RMSD = \sqrt{\frac{\sum_{i=1}^N (r_{i,simulation} - r_{i,reference})^2}{N}}$$

where  $N$  is the number of atoms and  $r$  is the position of atom  $i$ .

RMSDs from a given structure are used to monitor convergence of the simulation, making sure that simulations fluctuate around a common equilibrium value. Monitoring the RMSD from the experimental structure offers a quantitative measure of how close the simulated structure is to the reference structure; a smaller RMSD value indicates the closeness. RMSDs from the average structure of a simulation are another structural property that can be monitored for convergence.

Everything in nature wants to have the lowest possible energy to be stable. During simulations, energy is transformed differing the reference and simulated structure. Thermodynamic parameters are the controls that give qualitative information about energy transformations and are evaluated from a summary and an average. The controls that were monitored were density, total energy, and temperature. Reasonable values for the thermodynamic parameters are referenced from the starting structure.

Calculation of RMSDs and thermodynamic parameters were performed using the PTRAJ module of Amber 11 and plotted in Grace.<sup>43</sup> Simulation trajectories were visualized in Visual Molecular Dynamics (VMD),<sup>44</sup> a program designed to graphically view biological structures.

### Hydrogen Bond Analysis

A subset of electrostatic interactions that involves a hydrogen atom is called hydrogen bonding. Hydrogen bonds require a donor—a fluorine, oxygen, or nitrogen atom bonded to a hydrogen atom—to be 3.5 Å away in distance from an acceptor—a fluorine, oxygen, or nitrogen with available lone pairs of electrons—and that the total donor-hydrogen-acceptor atom angle be  $180^\circ \pm 60^\circ$ . Hydrogen bonding analysis of the six structures was performed using the PTRAJ module of Amber 11 and compared with the Carnal module of Amber 8.<sup>45</sup> Only hydrogen bonds present for at least fifty percent of the simulation time were considered significant.

### Water Density Analysis

To locate areas where water molecules more often reside on the N peptide-*boxB* interface, a three-dimensional histogram was constructed with voxels evenly spaced 0.5 Å on each side for each frame. Water density was calculated using ten times the density of bulk water, assuming each voxel was 0.125 Å<sup>3</sup> and the density of water is 0.996557 g·mL<sup>-1</sup> at 300 K. Using ten times the density of bulk water means that a water molecule is present in a voxel ten times more often than a bulk water molecule.

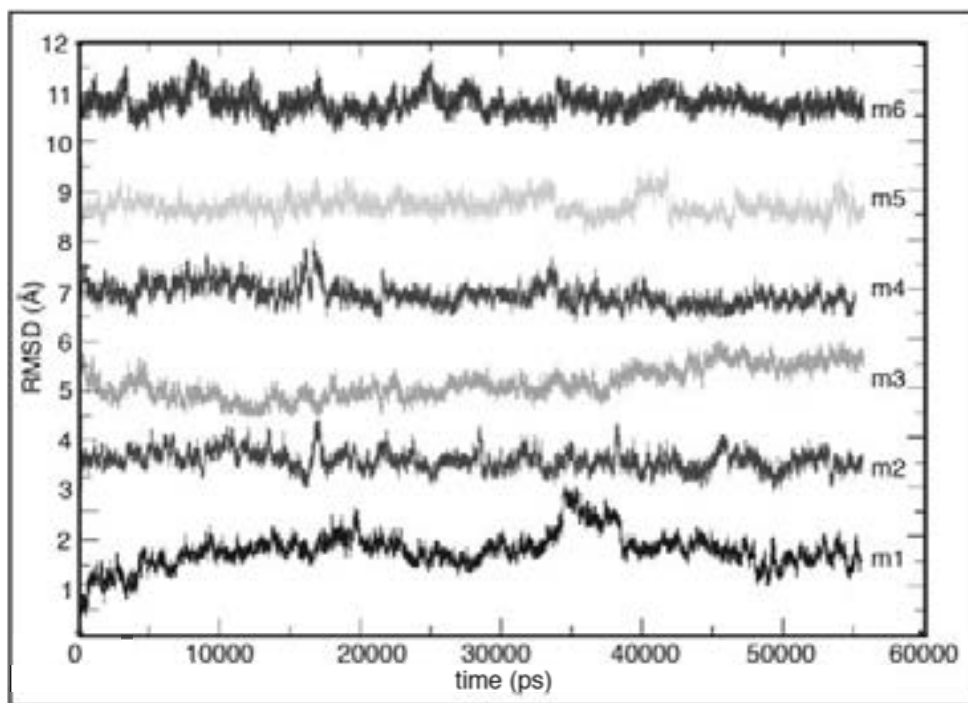
## Results

### Convergence and Stability

It is important to determine whether the system stabilized and maintained stabilization throughout simulation. RMSDs calculated from the average and starting structures showed the system equilibrated at 10.0 ns, leaving the remaining 55.0 ns to be analyzed (Figure 1) in models 1-6. Plotting the RMSD of the six structures revealed model 3 diverging from the established equilibrium. After simulating model 3 for an additional 5.0 ns, the RMSD began to decrease, but not enough to assume that it was returning to equilibrium. Because the evidence was implausible, further data analyses on model 3 were continued but not used for any conclusions. Analysis of thermodynamic parameters showed that the density, temperature, and total energy of each of the six structures fluctuated around a common value of 1.04 g·mL<sup>-1</sup>, 300.0 K, -50.0 kJ, respectively.

**Table 1. Average thermodynamic parameters from simulation.**

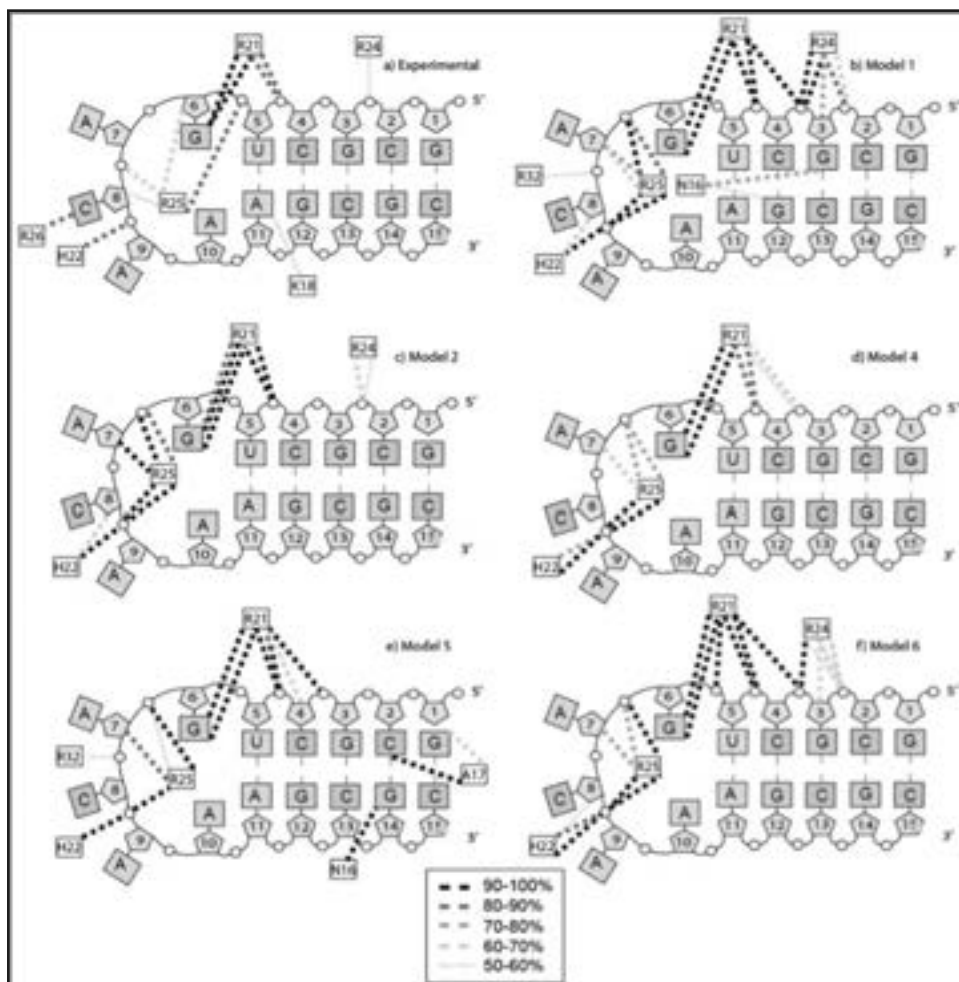
Model	ETOT (kJ)	Standard Deviation	Density (g/mL)	Standard Deviation	Temperature (K)	Standard Deviation
1	-53.0277	0.1559	1.0450	0.0019	299.97	2.48
2	-49.3205	0.1486	1.0482	0.0020	300.00	2.57
3	-56.7464	0.1632	1.0423	0.0018	299.99	2.40
4	-59.1477	0.1714	1.0407	0.0018	299.97	2.37
5	-50.5126	0.1515	1.0472	0.0198	299.98	2.54
6	-51.9535	0.1537	1.0458	0.0194	299.99	2.51



### Hydrogen Bonding in P22 N Peptide-*boxB* Complex

Experimental data from the solution structure (Figure 2a) showed hydrogen bonding and intermolecular contacts between the protein-RNA complex. The data indicated Arg21 hydrogen bonded with the guanine base of residue 6 (90-100%) and phosphate backbone of residue 5 (80-90%) with high hydrogen bond occupancies. Holding lower hydrogen bond occupancies (50-60%), Arg24 linked to the phosphate backbone of residue 3 and Lys18 linked to the adenine base of residue 11. Arg25 held multiple hydrogen bonds to the phosphate and sugar backbones of residues 6 and 8 (50-90%) whereas Arg26 held a single hydrogen bond to the cytosine base of residue 8. Additionally, His22 held a hydrogen bond to the phosphate backbone of residue 9.

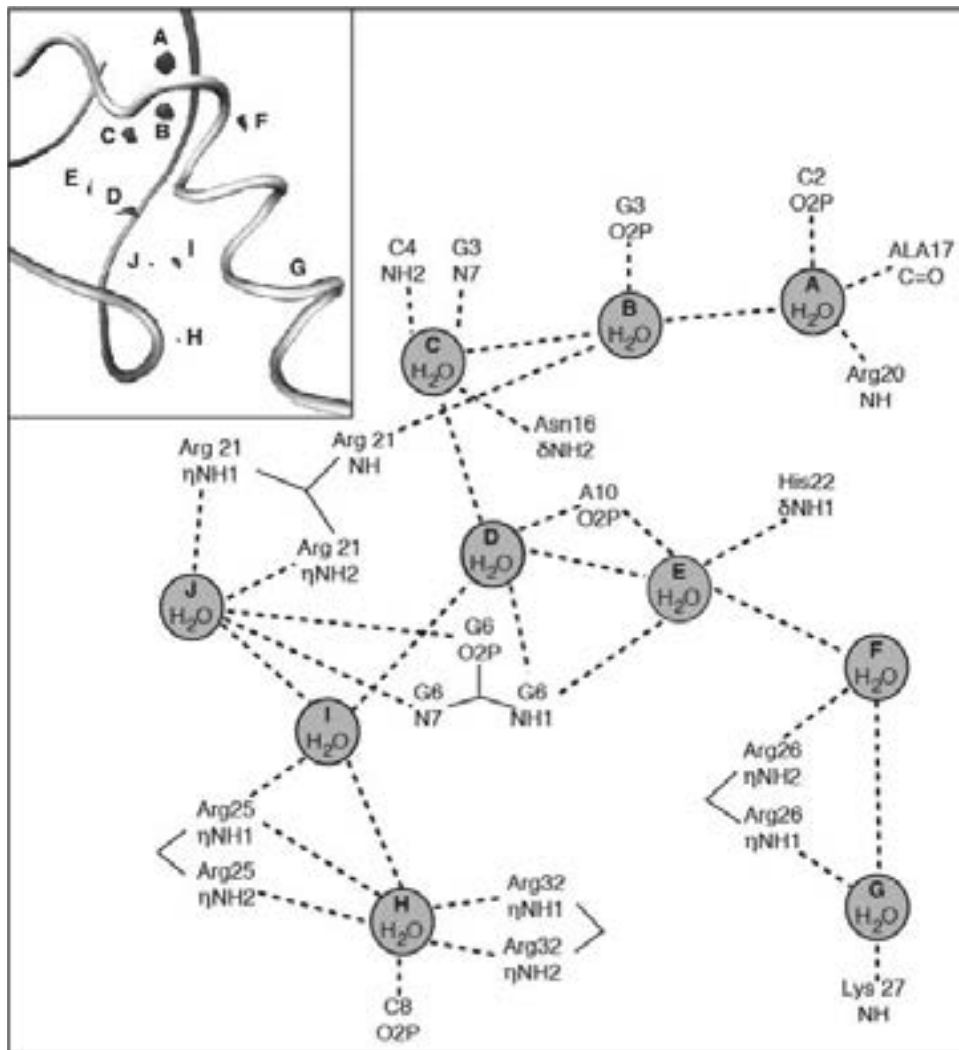
From simulation data, hydrogen bonding analysis (Figure 2b-f) showed similar, significant interactions among models 1-2, 4-6. In models 1-2, 4-6, Arg21 hydrogen bonded to the guanine base of residue 6 (80-100%) and phosphate backbones of residues 4 and 5 (50-100%; 80-90%) with high hydrogen bond occupancies. Arg24 had multiple links to the phosphate backbones of residues 3 and 4 in models 1-2 and 6. Distinctively, His22 had hydrogen bond interactions with the sugar backbone of residue 8 and phosphate backbone of residue 9 in models 1-2 and 6.



**Figure 2.** Hydrogen bonding analysis. Phosphates (represented by the small circles), sugars (represented as pentagons), and nitrogenous bases (represented as squares with a bold outline) have been shown to be important in binding. N peptide residues (represented as rectangles with an outline) have been shown to be important for specific recognition of boxB. Residues are numbered as referenced in the PDB.<sup>32</sup> Hydrogen bonds in the solution structure (a) and hydrogen bonds from the five MD simulations (b-f) present are described using percent occupancy of a hydrogen bond.

Additionally, Arg25 had common hydrogen bonding interactions with the sugar and phosphate backbone of residue 7 (50-100%) and phosphate backbone of residue 9 (90-100%) in all simulated models. Uncommon hydrogen bond interactions include: Asn16 hydrogen bonding to G6 bases of residues 3 and 12 in model 1 (70-80%; 50-60%); and Arg32 hydrogen bonding to the phosphate backbone of residue 8 in models 1 and 6 (50-60%).

## Water Binding



**Figure 3.** Water density analysis of P22 N peptide-boxB complex. Three dimensional histogram (inset) show water densities (black) between the peptide (grey spirral) and RNA (dark ribbon). Peptide hydrogen bonding partners are linked to water densities (represented as grey circles).

Water densities visualized at 10-times bulk water density (isovalue = 1229) located in the three-dimensional histograms of the 55 ns simulations (Figure 3) indicated that water molecules in multiple sites interact between the peptide-RNA interface as well as individual side-chains. Structures were positioned and individual density sites were labeled and linked to its hydrogen bonding partners. From the water binding analysis, model 1 is representative of models 2, 4-6.

## Discussion

Monitoring the system's thermodynamics showed equilibration of each model. Thermodynamic parameters (Table 1) compared relatively among each structure, maintaining low total energy and a consistent temperature and density. RMSD from the starting structure (Figure 1) indicated that model 3 began diverging from equilibrium around 38.0 ns. From this data, models 1-2, 4-6 were concluded stabilized.

From the hydrogen bonding diagrams (Figure 2), Arg21, Arg 25, and His22 hydrogen bonded to the bases and backbone of the RNA in all structures. When comparing the experimental data (Figure 2a) to the simulation data, Arg21, Arg25, and His22 appear to hydrogen bond to multiple residues, maintaining a significant occupancy (50-100%) over time. Additionally, hydrogen bonding linking Lys18 and Arg26 to RNA bases was not present 50-100% of the simulation time throughout models 1-2, 4-6. Arg24 appears to hydrogen bond with the RNA backbone only in three of the structures analyzed. Similar hydrogen bonding patterns across each structure indicates that the simulation data is consistent with the experimental data.

MD studies are capable of better defining ARM peptide-RNA interactions at atomic level detail. Previous studies of HIV Rev-RRE and RSG 1.2-RRE IIB indicated significant long-lived, structural water molecules in distinctive networks linked to arginine.<sup>19</sup> The RSG 1.2-RRE IIB complex had a tightly bound, specific water network whereas Rev-RRE complex contained a water channel with over 40 water molecules between the peptide-RNA interface.

Water binding analysis across each structure indicated similar water networks between the interface of the peptide and the RNA. In model 1 (Figure 3), each density interacts with both N peptide and *boxB* RNA. Hydration patterns of P22 N peptide-*boxB* complex relate to those of RSG 1.2-RRE IIB; water networks were compact and extended between the peptide-RNA interface.

Volumes of water densities varied per site, qualitatively representing the occupancy of either single or multiple water molecules. The precise total time that a given water site is occupied during the simulation should be calculated next. Additionally, to better quantify how tightly a water molecule is bound to a given site, the resident time of each water molecule should be quantified. This more in-depth analysis will better characterize the water network and give a better understanding for which portions of the water network may be most important to peptide-RNA binding.

## Conclusion

In this study, hydration patterns of P22 N peptide-*boxB* complex were analyzed and indicated specific water networks interacting between the peptide-RNA interface. RMSD and thermodynamic analysis indicated structures 1-2, 4-6 maintained equilibrium throughout 55 ns of simulation. Future studies include determining the water occupancy of the water densities. Once structural water molecules are explicitly identified, point mutations of protein residues could better characterize the behavior of structural water molecules in the presence of another amino acid.

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# Shake Off the Law: Graffiti and Feminism

*Rebecca Pursley*

Aaron Fine, Research Supervisor

*Miss.Tic, a Parisian graffiti artist, denies that her work has an explicit feminist aim, but insists that her work is feminine. However, when examples of Miss.Tic's work are evaluated in light of the work of major French feminist writers, there are feminist connections. While some viewers may find her sexualized images of women to be the antithesis of feminist art, this paper argues otherwise. Despite the artist's own denial, this paper will show that her work is not only feminist but, when viewed within the context of French feminism, provides a new and creative contribution to the philosophy of this movement.*

Miss.Tic, a Parisian street artist, has said that “I see feminism as a social movement. I advocate it although I do not participate in any form of it. I also see the limitations of it. Most of my thoughts contain views of feminism and these are displayed in my feminine works—the work of a woman.”<sup>1</sup> What, then, is the nature of the “feminine” that Miss.Tic mentions? While the idea of the “feminine” is considered taboo within certain feminist groups, there are others such as the *Psych et Po* feminists in France that would embrace the idea of exploring femininity. Through her graffiti art, Miss.Tic is not only confronting what is “acceptable” female action within public space, she is creating space for the “feminine” and exploring her own femininity. Despite the artist’s own denials, this article will argue that her work is not only feminist, but when viewed within the context of *Psych et Po* philosophy, extends and actuates the ideas of this movement and participates in the tradition of feminist art in the western world.

Miss.Tic’s thirty year career as a street artist has made her an important figure within the French pochoir (stencil) style. The ideas and actions that are integral to her work will be juxtaposed with the theories presented by the *Psych et Po* feminist group, with particular attention to those theories that provide an alternative context for Miss.Tic’s presentation of the feminine. In surveying street art and feminism, this article will be examining specific examples of Miss.Tic’s work, *A Lacan ses Lacunes*, *Simone de Beauvoir*, and *Creating is Resisting*. This examination will serve to highlight aspects of each work in relation to specific texts by authors such as Luce Irigaray and Helene Cixous. This analysis will demonstrate why Miss.Tic should be called part of the French Feminist movement.

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<sup>1</sup> Darryl Koe, “State of the Art: Miss.Tic,” *BK*, <http://bk.asia-city.com/events/article/state-art-miss-tic> (accessed March 30, 2011)

Miss.Tic's works often feature the image of a female figure juxtaposed with short poetry written by the artist using black spray paint with accents in red. Most pochoir style artists have particular thematic elements that carry throughout the body of their work, such as Blek le Rat's use of his namesake animal.<sup>2</sup> However, Miss.Tic's direct focus on women, as opposed to any other subject, distinguishes her work from her contemporaries. Much of the commentary presented within her work is directly related to issues surrounding women in society. This principle focus is different than that of most other Parisian street artists, who focus on everything from humor to political reform.

The reason for this distinction in theme is complicated. Miss.Tic's biography could lead one to believe that her influences come purely from her past relationships, considering that she describes this as the reason for the start of her career as a street artist in 1985.<sup>3</sup> While the origins of her work do, no doubt, lie in her past; the full duration of her career, from 1985 until the present day, reveals a broader range of motivations. For a viewer aware of the French feminist philosophy of writers such as Helene Cixous and Simone de Beauvoir, there is an undeniable echo of French feminist ideas in Miss.Tic's unique brand of *pochoir*. There are direct instances within her body of work that clearly address French feminist ideas or quotes.

Miss.Tic's identity as a woman street artist serves to further explain the implications of her art. Street art developed after World War II in New York City.<sup>4</sup> Early street artists, who called themselves writers, became famous by tagging, or writing, their name in spray paint on walls, trains, and almost any surface they could reach. Early graffiti writing was considered vandalism by law enforcement and a majority of the public.<sup>5</sup> This sense of rebellion was a draw for many graffiti artists.

Many of the early writers participated in other illegal activities in addition to graffiti, such as gang involvement and trespassing. This high crime lifestyle was not one that many women were accepted into.<sup>6</sup> Street art therefore was, and still is, a male dominated movement. It was typical for early women writers to have to defend their work from disrespect from their male counterparts.<sup>7</sup> However, there is now a strong, albeit small, female presence in the field.

In the study of street art, much of the information about female involvement comes from interviews in which the artists talk about their work. LADY PINK, who started writing graffiti in 1979 during the second wave of American feminism, attests to the feminist nature of her work.<sup>8</sup> Miss.Tic, on the other hand, asserts that her intentions for her work are purely feminine in nature; however, the artist's intention is not the only factor that creates meaning. Roland Barthes developed the theoretical model called reception theory that argues against using the intentions and biography

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<sup>2</sup> Magda Dansyz, *From Style Writing to Art: A Street Art Anthology* (Rome, Italy: Drago, 2010), 39.

<sup>3</sup> MISS.TIC. MISS.TIC in Paris (*Official Website of the Artist*). <http://www.missticinparis.com>.

<sup>4</sup> Joe Austin, *Taking the Train: How graffiti art became an urban crisis in New York City* (New York: Columbia University Press, 2001), 15.

<sup>5</sup> *Ibid.*, 23.

<sup>6</sup> Eric Felisbret and Luke Felisbret, "Female Writers," *@149st: Documenting New York City Graffiti*, <http://www.at149st.com/women.html>.

<sup>7</sup> Elayne Clift, "Women Graffiti Artists: Changing the Landscape Worldwide," *Public Republic*. <http://www.public-republic.net/women-graffiti-artists-changing-the-landscape-worldwide.php> [accessed February 16, 2011]

<sup>8</sup> *Ibid.*

of an author within the analysis of their work. Instead, in his essay “Death of the Author,” Barthes would argue that a work can be examined through looking at how it can be interpreted by the viewer, without any relation to the author.<sup>9</sup> These ideas were later translated into criticism of the visual arts. Because of this theoretical idea, a feminist interpretation of her work is still relevant.

Feminist critical theory in art developed in the 1970s and continues today, although the goals have shifted. In art history, feminist critics in the past focused on three different tasks: recuperating the experience of women and women artists; critiquing and deconstructing the authority, institutions, and ideologies that created the gender bias; and evaluating the traditional cultural and psychological roles assigned and demonstrated by women.<sup>10</sup> Contemporary feminist critics are still doing these things, but are also considering the role of the art historian or art critic in their interpretations because of the innate gendered point of view that each person has. This part of the feminist movement even attempts to examine and critique other feminists in order to better understand the motivations for talking about life in a gendered way. Miss.Tic speaks about her art in this gendered way when she calls it primarily feminine. However, this use of the term feminine has been very controversial in the field of feminist theory, and its use as a concept and a descriptor has been mostly discouraged in feminist circles.<sup>11</sup>

Many artists who have been the focus of feminist critical theory have created work with visual and ideological similarities to Miss.Tic’s art. Miss.Tic is certainly not the first or only artist who relies on the pairing of text and image to create strong messages within art. Barbara Kruger also uses similar means to convey ideas about feminism, politics, and contemporary society. Similarly, Kruger also displays her work in public spaces through posters and magazine covers.

In the study of Barbara Kruger’s work, there is little debate that her work is feminist. The kinds of words and phrases that she uses, such as “Your body is a battleground,” are similar to those that Miss.Tic would use in her street art. Kruger also frequently features female figures, however they are often gritty black and white images that do not appeal to the male gaze in the way that Miss.Tic’s figures often do. Because of Kruger’s popularity during the 1980s, the time during which Miss.Tic began working, it is possible that Miss.Tic would be familiar in part with her depictions. Regardless of this direct connection it is significant that by this time artists throughout the western world were using similar means to reach the same feminist ends.

For some viewers Miss.Tic’s art may not seem feminist at first glance because of the overt way in which she portrays sexualized women. However, her work fits into the practice of a particular branch of the French feminist tradition. There are two major branches of feminist thought within France that developed in the 1970s, *Movement de Libération des Femmes* (MLF) and *Psychanalyse et Politique* (*Psych et Po*).

The distinguishing traits of these two very different organizations come from the theoretical basis of their discussions of the female gender and the feminine. MLF

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<sup>9</sup> Roland Barthes, “The Death of the Author,” In *Image – Music – Text*, translated by Stephen Heath (New York: Hill and Wang, 1977), 146.

<sup>10</sup> Helen Langa, “Recent Feminist Art History: An American Sampler,” *Feminist Studies* 30, no. 3: 2004, 706.

<sup>11</sup> Griselda Pollock, *Vision and Difference: Feminism, Femininity, and Histories of Art*, (London: Routledge, 1988).

feminists sought, as did British and American feminists, such as Griselda Pollock and Linda Nochlin, ways to evaluate and reconstruct society that eliminated patriarchal power and gender bias in any form.<sup>12</sup> These feminists often tried to employ the use of asexual terminology to eliminate gendered ideas all together. For example, there has been a shift in the English language towards the use of gender neutral titles for careers, such as from “mailman” to “mailperson.” The *Psych et Po* feminists, such as Helene Cixous, Luce Irigaray, and Julia Kristeva, were more interested in investigating the feminine “other,” and—rather than eliminating gender—examining how the “feminine” has been diminished through the domination of masculinity.<sup>13</sup> Through this investigation, they attempt to discover and discuss the feminine and bring it into existence within masculine society.<sup>14</sup> They also maintain the importance of the distinctions between these two oppositional forces. It was not uncommon for the members of the *Psych et Po* movement to eschew the use of the term ‘feminist’ in relation to themselves because of its ties to the MLF.<sup>15</sup> Miss.Tic employs similar tactics, not only when talking about her work, but also talking about herself and her relation to the feminist movement.

The expression of femininity is one of the driving factors behind many of the early writers in the *Psych et Po* feminist tradition who wanted to “inscribe femininity.”<sup>16</sup> Anglo-American and MLF feminists would characterize femininity as a patriarchal construct and disparage it because of the connotations it is believed to have in masculine society, such as weakness, passivity, and submission. Feminists associated with the *Psych et Po* movement in France deny these negative ideas. For them, femininity is something that has not yet been defined outside of masculinity, and therefore is elusive and must be consciously found through exploring one’s own relationship with the feminine. Miss.Tic’s work is an example of art that also strives to investigate that which is feminine through the creation of femininity. Because Miss.Tic directly implicates these ideas of the *Psych et Po* movement, there is a strong case that her work can be called feminist.

The following three case studies support the argument that Miss.Tic’s work participates in *Psych et Po* philosophy. These pieces are selected from Miss.Tic’s body of work based on the clarity with which they engage with French feminist ideals though there are certainly other examples of her art that could be considered in the same way. These pieces are entitled *Simone de Beauvoir*, *A Lacan ses Lacunes*, and *Creating is Resisting*. They will be discussed in order of decreasing direct reference to feminist figures or ideas, in order to display Miss.Tic’s involvement and participation in the history of French feminist philosophy. These works will be discussed in light of the work of writers such as Simone de Beauvoir and Luce Irigaray whose ideas appear in the work.

Miss.Tic features a likeness of Simone de Beauvoir in “Simone de Beauvoir” (Fig 1). This reveals an obvious awareness of French feminist history. The significance of this choice is amplified because Miss.Tic has abandoned the generic female form found in much of her work. That generic female form that characterizes the majority

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<sup>12</sup> Claire Duchen, *Feminism in France: From May '68 to Mitterrand* (Boston: Routledge, 1986), 33.

<sup>13</sup> Claire Duchen, *Feminism in France: From May '68 to Mitterrand*, 32.

<sup>14</sup> Helene Cixous, *The Portable Cixous*, ed. Segarra, Marta, (New York: Columbia University Press. 2010), 3.

<sup>15</sup> Claire Duchen, *Feminism in France: From May '68 to Mitterrand*, 83.

<sup>16</sup> Helene Cixous, *The Portable Cixous*, 30.

of Miss.Tic's street art is not meant to recall any specific woman, but rather represents any and all women.<sup>17</sup> Any person that she chooses in place of this must be particularly meaningful. Beauvoir's iconic work, *The Second Sex*, written in 1949, served as a foundational text for feminist writers. Beauvoir is important to feminist thought because she first codified the idea of the eternal feminine in relation to feminism.<sup>18</sup> She also confronted the masculine-centric nature of the French language. This idea is especially important to feminist arguments in languages such as French that have gendered nouns. Miss.Tic causes the viewer to consider these things, among other examples of Beauvoir's writing, by the inclusion of pages of text behind this image.

In the words that accompany this piece, Miss.Tic writes "intelligent woman, I restore your body language." This "body language" is exactly what Beauvoir and other French feminists were striving for metaphorically when they wrote about their experience in the female gender. Miss.Tic's comments about bringing the female body into the French language challenge the gendering of masculine and feminine words. In romance languages as a whole, every noun is grammatically labeled masculine or feminine. French feminists often discuss the connotations that develop because of the unchanging nature of that engrained gender, and how that affects their feminist goals. Miss.Tic has been quoted as saying "I painted woman to restore the body language."<sup>19</sup> This passage serves to demonstrate that Miss.Tic is interacting, through her own style of art, with French feminist thought.

Simone de Beauvoir's work focuses on the nature of femininity and the eternal feminine. She argues that biological sex is not simply the duality that it had been referred to in the past but rather a system in which men represent both the positive and neutral and women are the negative.<sup>20</sup> This unbalance is tackled in Anglo-American and MLF feminism by attempts to restore an unsexed medium to the neutral; however, this is not the case for *Psych et Po* theorists. *Psych et Po* theorists would instead attempt to enhance and develop the idea of the feminine outside of its connection to the negative that was established as its relationship to the masculine. This enhancing and developing of the feminine is one of the goals of Beauvoir's writing, as it is in the work of many of the other major French feminists.

Not all of Miss.Tic's work features such direct references to a feminist writer. In the case of "*A Lacan ses Lacunes*" (Even Lacan has his shortcomings) (Figure 2), she refers to Jacques Lacan, a writer whose work is frequently critiqued in *Psych et Po* theory. Her statement takes a powerful stance on the side of all of the French feminist writers. In many of their writings their aim was to take the psychoanalytic writings of psychoanalyst Sigmund Freud and of Lacan that dealt so heavily with gender and sexuality and look at the place of the feminine and woman within those ideas. There was often little room for a woman in the original texts. In his work, *The Symbolic Order*, Lacan writes about what he calls the Law of the Father, which he argues is ingrained in every child when becoming a member of society.<sup>21</sup> This "law" negates

<sup>17</sup> Christophe Genin, *Miss.Tic: femme de l'être*, (Paris: Les Impressions Nouvelles, 2008), 12.

<sup>18</sup> Simone de Beauvoir, *The Second Sex*, Trans. H.M. Pashley (New York: Knopf, 1952), 15.

<sup>19</sup> MISS.TIC. *MISS.TIC in Paris (Official Website of the Artist)*. <http://www.missticinparis.com> [First accessed February 17, 2011]

<sup>20</sup> Simone de Beauvoir, *The Second Sex*, 35.

<sup>21</sup> Jacques Lacan, *Écrits*, trans. Alan Sheridan (New York: Norton, 1977), 48.

the existence of the feminine by placing a center of masculinity at the root of every person's societal life.<sup>22</sup> This gave rise to the work of writers such as Luce Irigaray, who sourced the masculine bias as far back as to ancient Greece.

Irigaray argues that the difference between the sexes depends on the male viewpoint.<sup>23</sup> This viewpoint originates in the writings of ancient Greece, such as Plato's *Symposium*. Because these ideas came out of writing, this masculine bias was centered in language. These masculine-centric traits remained a part of language patterns as they developed and remain today.<sup>24</sup> Irigaray claims women must strive to understand the "masculine feminine" before they can truly discover the "feminine feminine."<sup>25</sup> This "masculine feminine" is how femininity has come to be defined in the masculine-centric world. It is, instead of being true femininity, actually masculine at its roots, and therefore false in the eyes of the *Psych et Po* tradition. Irigaray's aim was to expose the ways that language, and therefore society, are centered on the male sex and "rediscover a space for the feminine."<sup>26</sup>

The space that Irigaray is creating for the feminine carries power in Irigaray's opinion because of its relegation to otherness. Because it is the reverse of the masculine, it has the innate ability to challenge the normative. Irigaray equates masculinity within society as unification, stabilization, and rationalization, and because of this, the feminine in her opinion "must resist, must maintain multiple and diffuse."<sup>27</sup> This multiplicity can also be seen within Miss.Tic's writings, which often feature multiple meanings. In "A Lacan ses Lacunes", the title phrase is meant to sound similar to the phrase "*a chacun se chacune*" which roughly translates to "every Jack has his Jill."<sup>28</sup> In referencing this phrase, Miss.Tic is adding another layer of meaning to her art. This idea of masculine domestic superiority is talked about in Lacan's writing. However, in appropriating that phrase to talk about the shortcomings of this writer and his ideas, Miss.Tic is undermining the powerful cultural pull of these idioms.

This is amplified by the female figure that is paired with these words. This woman, painted in black, gestures directly at the viewer. Because of her powerful stance and facial expression, this figure is definitely not one that is influenced by the idea of masculine power and superiority. Instead this figure is obviously a representation of strong femininity, with long flowing hair and clothing that makes her female characteristics prominent while not making these characteristics weak.

Even more common in the body of Miss.Tic's work are pieces that do not reference French feminism, but could rather be interpreted as Miss.Tic's own way of participating in that discussion. "Creating is Resisting" (Figure 3) attempts to, as Helene Cixous wrote in her text *Laugh of the Medusa*, create "*la nouvelle de l'ancien*" (the feminine new from the masculine old).<sup>29</sup> Miss.Tic's creation of these feminine, new pieces of art serves to concretely manifest this philosophy.

<sup>22</sup> Jacques Lacan, *Écrits*, 48.

<sup>23</sup> Luce Irigaray, *This Sex Which is Not One*, trans. Catherine Porter (Ithaca: Cornell University Press, 1985), 23.

<sup>24</sup> Susan Sellers, *Language and Sexual Difference: feminist writing in France* (New York: St. Martin's Press, 1991), 8.

<sup>25</sup> Claire Duchon, *Feminism in France: From May '68 to Mitterrand*, 87.

<sup>26</sup> Susan Sellers, *Language and Sexual Difference: feminist writing in France*, 8.

<sup>27</sup> Claire Duchon, *Feminism in France: From May '68 to Mitterrand*, 90.

<sup>28</sup> Christophe Genin, *Miss.Tic: femme de l'être*, 45.

<sup>29</sup> Helene Cixous, *The Portable Cixous*, 27.

In “Creating is Resisting”, a female figure faces the viewer head on. This direct confrontation matches the directness of the statement that goes along with the piece “creating is resisting”. The directness of this piece makes the resistance posed by this idea seem even more deliberate. The black and white color of the painting mimics the black and white nature of the statement that Miss.Tic creates within it. This idea of direct resistance is also present in the French feminist movement. Cixous herself argues that woman must “shake the Law.”<sup>30</sup> In this case Cixous was referring to the masculine “Law” of society.<sup>31</sup> While Miss.Tic is using this statement in this way, she is also “shaking the law” in the more literal sense by illegally placing her art on private property and in public space.

Cixous also writes about the importance of women writing the body and putting this “into the world, and into history, by her own movement.”<sup>32</sup> In Miss.Tic’s early work, she literally painted *pochoirs* of herself. Painting one’s body on the streets of Paris is an explicit way of painting it into the world. In doing so, Miss.Tic is not only acknowledging the ideas of French feminism but realizing them in a new way. This type of creation not only is a form of participation in the French feminist movement, but serves Miss.Tic’s purpose of resistance to masculine power by creation.

Although she is resisting the idea of masculine power, some might argue that she is serving the male gaze.<sup>33</sup> Miss.Tic’s work, in this interpretation, is not feminist because she is creating images of sexualized female figures in public spaces. If this is the case then Miss.Tic’s art plays directly into the masculine gaze. This gaze, theorized to be internalized in all members of society, regardless of gender, turns the image of the female into something to be consumed or possessed. While there are certainly viewers that do consume Miss.Tic’s imagery without thought, there is also an element of hyperbole introduced by her writing that serves to deaden this purpose. Because her work does not only contain these images of the female body, there is clearly feminist meaning present in her work.

Instead of relying on traditional art spaces to convey her messages, Miss.Tic alters public space. The boundaries between public/private and masculine/feminine space become blurred when considering her street art. While the images she creates of scantily clad female figures may play into the desire of the male gaze, the poetry that interacts with these images readily bites back at the viewer and this idea. A woman in lingerie is not simply a sexual object for viewing pleasure when paired with words like “*Le masculin l’emporte mais où?*” (The masculine prevails, but where?). The use of the nude body in advertising that is displayed on streets is typical; however, a nude displayed in spray can stencil on the side of a building on the *13<sup>e</sup> arrondissement* of Paris with Miss.Tic’s poetry makes a very different kind of statement. Her work captures the attention of the male gaze in imagery, while defeating it with her words.

Her words are as vital for understanding the feminist implications of her work as the figures themselves are. While much can be said about placing a female body on the walls of Paris, her poetry also serves to evoke a strong response. She uses idioms and other word play to layer meaning within her poetry. These same tactics were often

<sup>30</sup> Susan Sellers, *Language and Sexual Difference: feminist writing in France*, 141.

<sup>31</sup> Helene Cixous, *The Portable Cixous*, 24.

<sup>32</sup> Helene Cixous, *The Portable Cixous*, 27.

<sup>33</sup> Lucy Lippard, *Get the Message? A decade of art for social change* (New York: E.P. Dutton, Inc., 1984), 73.

used by writer Helene Cixous in her writings on feminist philosophy.<sup>34</sup>

In this extreme way, Miss.Tic's work serves to confront masculine notions of acceptable female behavior in public space. This is a direct challenge to the notion that the proper role for female sexuality in the public sphere is aimed at male consumption. Instead Miss.Tic claims this space for her own expression. When Helene Cixous discussed "writing the body," she may not have intended it to be written for the world to see in street art style, but this is exactly what Miss.Tic is doing by creating her art.

Miss.Tic's street art is not solely feminine, despite her inclination to describe it as such. It is feminist, but also is not merely this. She participates in the tradition of French feminist thought that allows for these two terms to be subtly intertwined instead of standing as simple opposites. Furthermore she uniquely extends and incarnates these theories in the realm of direct action. She does not simply relay the messages of authors such as Luce Irigaray and Helene Cixous, but imposes on them the direct nature of graffiti, furthering their ideas. Instead of allowing femininity to remain in the margins, Miss.Tic has found her own notion of femininity and is ready to display it in the most striking way. Miss.Tic is doing as she claimed she would, "*Je ferai jolie sur les trottoirs de l'histoire de l'art.*"<sup>35</sup>

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<sup>34</sup> Helene Cixous, *The Portable Cixous*, 6.

<sup>35</sup> "I will make beauty on the sidewalks of Art History." From: Miss.Tic. *Miss.Tic in Paris (Official Website of the Artist)*. <http://www.missticinparis.com>.

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# An Examination of the Relationship Between Personality and Intended Bicycle Helmet Use Among College Students

*Siera Ramsey*

Dr. Jennifer Hurst, Research Supervisor

*This study examines the relationship between personality types and helmet use among undergraduate students from a smaller liberal arts university. The Big-Five Trait Taxonomy (John & Srivastava, 1999) was used to assess personality characteristics in relation to risky behavior associated with helmet use. In concordance with the Theory of Planned Behavior (Ajzen, 1998) this study incorporates both direct and indirect measures of attitude, perceived social norms, and perceived control, as predictors of behavior toward bicycle helmet use. An original survey was constructed combining the Big Five Inventory (John & Srivastava) questionnaire along with a self-constructed questionnaire designed according to the guidelines of the Theory of Planned Behavior. Regression analysis was conducted to explore the most influencing factor of the Theory of Planned Behavior on bicycle helmet use. A series of t-tests were conducted to investigate difference in bicycle helmet use in subjects high and low in each dimension of the Big Five Trait Taxonomy.*

## Introduction

In today's society bicycling is a common mode of recreation and transportation for many. This is especially true among college campuses in the U.S. Although bicycling is a popular and convenient mode of recreation and transportation, there are potentially serious risks involved when safety precautions, such as the use of helmets, are not considered. Although, few studies have examined attitudes toward helmet use (Ross, Ross, Rahman, & Cataldo, 2007; Coron, McLaughlin, & Dorman, 1995), there is little or no information available about the relationship between personality characteristics and helmet use. The purpose of this research is to enhance knowledge about the relationships between the personality characteristics of young collegiate men and women and their tendencies to engage in behaviors that can potentially compromise their health. More specifically, this study aims to identify personality characteristics that influence the use of helmets while bicycling.

## Review of Literature

Twenty-two states currently enforce laws that require helmets to be worn for bicyclist between 15 and 17 years of age or younger. However, throughout the twelve mid-western states, no federal or state level mandate exists for the use of bicycle helmets for bicyclists of all ages (Insurance Institute for Highway Safety, 2011). Furthermore, few counties enforce a local helmet law for all bicyclists, thus leaving millions susceptible to injury. The National Transportation Safety Administration (NTSA) reported that 44,000 bicyclist were injured in 2006, with 773 of these injuries resulting in a fatality (NTSA, 2007). Fortunately, studies have shown that bicycle helmet use can effectively reduce injury in an event of an accident. Fullerton and Becker (1991) reported in their study of undergraduates that no student wearing a helmet at the time of his/her accident required hospitalization or professional attention for a head injury. In contrast, in a study of patients who obtained emergency room care for a serious bicycle-related head injury, only 4% of patients had been wearing helmets (Thompson, Rivara, & Thompson, 1989). Despite the protection that helmets provide, many bicyclists do not wear one. The National College Health Assessment (NCHA) reported that 48.4% of students have not worn a helmet while riding a bicycle in the last 12 months, (NCHA, 2009).

Previous studies show that barriers to helmet use among college students include cost, inconvenience, physical discomfort of helmet wearing, concerns about ridicule, perceived ability of helmets to prevent head injury, and visual impairment associated with helmet wearing (Fullerton & Becker, 1991; Coron et al., 1996). Many of these barriers reflect individual internal beliefs. These beliefs can further reflect the individual's behavior as illustrated by Ajzen's Theory of Planned Behavior. According to Ajzen (2006), intentions are influenced by the individual's beliefs, the pressure to conform to what is considered socially acceptable, and the individual's perceived control of the behavior. This theory supports the idea that behavior is, in part, a product of beliefs, and further research suggests that behavior may also reflect upon an individual's personality.

The connection between health and personality has been sufficiently researched, and is now widely accepted that certain personality characteristics are predictors of health outcomes and longevity (Friedman, 2000; Hong & Paunonen, 2009). Models of personality, such as the Big Five Trait Taxonomy, offer the advantage of examining the personality contributors to risky health behaviors within a comprehensive framework. The Big Five model illustrates five major dimensions of personality that account for the majority of variation in human behavior. Those dimensions are Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Digman, 1990; Goldberg, 1993; John & Strivastava, 1999). The Openness dimension broadly describes a person who is independent-minded, or intellectual. A conscientious individual is one who is orderly, responsible, and dependable. Extraversion indicates an individual who is talkative, assertive, or energetic, while Agreeableness can be defined as good natured, cooperative, or trustful. Finally, synonyms for Neuroticism are emotional instability, compulsiveness, or chaotic.

The Big Five factors have been referred to in the past in developing theories and mechanisms for health-risk behaviors (Booth-Kewley & Vickers, 1994; Hong &

Paunonen, 2009). Of the five dimensions, Conscientiousness has been found to be the single most important factor associated in both health outcomes as well as health risk behaviors. Several studies have shown that individuals low in Conscientiousness and Agreeableness were more likely to advocate negative attitudes and engage in unhealthy behaviors with tobacco use, alcohol consumption, risky sexual activities, and unsafe driving (Bogg & Roberts, 2004; Hong & Paunonen).

In this study the Big Five factors will be used to determine specific characteristics of personality that advocate helmet use. Based on the findings of previous research, regarding the relationship between Conscientiousness and Agreeableness, a prediction that participants who score low in these areas of personality will lack the desire to take safety precautions when bike riding, can be made. This may also infer that these individuals will also hold a negative attitude towards the use of bicycle helmets.

## **Methodology**

### **Participants**

Participants consisted of a sample of 200 college students from a small liberal arts university. All participants were at least eighteen years of age. Participants were recruited from a variety of courses offered at the institution throughout the summer semester. 30% of participants in this study were male. 68% were female. 2% did not indicate gender. The proportion of upperclassmen and lowerclassmen was relatively equivalent (42.9%- 1st or 2nd year students; 55.6%- 3 or more years). 75.3% of participants were between the ages of eighteen and twenty-one. 17.7% were twenty-two or twenty-three years of age. The remaining 5.4% were twenty-four years of age or older. Of the two hundred participants, 33% indicated that they never ride a bicycle. 29% ride a bike at least once a week. 11.8% indicated that they ride a bicycle two or more times a week, while another 11.8% use a bicycle three or more times a week. 12.8% were daily bike riders.

### **Instruments**

The Theory of Planned Behavior questionnaire guidelines (Ajzen, 2006) were used to develop the first part of the survey that assesses attitudes, perceived norms, and perceived control in relationship to the use of helmets while bicycling. These items predict behavior, which infer either a negative association with helmet use (risky behavior) or a positive association with helmet use (non-risky). The questionnaire consisted of 32 questions formatted in a collaboration of Likert and semantic differential scales on a 7- point range. These scales were constructed to measure attitudes, subjective norms, and perceived control both directly and indirectly.

The second part of the survey incorporated the Big Five Inventory Questionnaire (John & Srivastava, 1999). The Big Five Inventory uses a list of 44 items, consisting of everyday descriptive phrases that collectively measure the Big Five personality dimensions. The participants rate the items indicating to what degree he/she self-identifies with the adjective or phrase. The assessment incorporates a 5-point scale ranging from 1 (disagree strongly) to 5 (agree strongly), with 3 indicating an indecisive or neutral position.

## Procedure

Following IRB approval, surveys were self-administered in various courses during the summer. After informed consent was given, participants were allotted twenty minutes to complete the survey. After all available classes were recruited, the process of data entry and analysis began. Data from surveys were gathered, checked for completion, and numbered. Data was then entered into the Statistical Package for the Social Sciences (SPSS) data file for analysis and interpretation.

Negatively worded questions or phrases were recoded for both the Theory of Planned Behavior (TPB) and the Big Five Inventory (BFI) items. Before analysis began, variables coinciding with the Theory of Planned Behavior were computed by multiplying corresponding variables, summing the variables, and taking the mean, as indicated by the TPB Questionnaire Guidelines (Ajzen, 2006). The new composite scores represented the Indirect Measures for the three theoretical components: Attitudes, Perceived Control, and Subjective Norms. The Direct Measures of these variables were computed by summing the direct items of measurement and taking the mean. According to the TPB Questionnaire Guidelines, using both Direct and Indirect Measures is suggested for stronger statistical power, however, in this study only Direct Measures were used for analysis. Predictor variables in a regression analysis are supposed to be moderately correlated to each other, and contrary to the TPB Questionnaire Guidelines, a series of simple bivariate correlations conducted between Direct and Indirect Measures reported a lack of a strong or even moderate relationship between the two measures. In addition, the sample size was not sufficient to generate the power needed for six predictor variables. (See Appendix A) Furthermore, the Direct Measures consisted of more scale items and accounted for the majority of the variance in results. Therefore, the choice was made to only use the Direct Measures. Generalized Intention was computed by the mean of the three direct measures of intention. A series of regression analyses were completed to investigate which factor of the TPB best predicts intended helmet use; first using the direct measures of Attitudes, Perceived Control, and Subjective Norms as the predictor variables and the Generalized Intention score for helmet use as the dependent variable.

In an effort to capture potential difference in helmet use based on difference in personality characteristics, a series of t-tests was conducted. Using a frequency distribution for each personality trait, individuals were identified who fell into the upper and lower 33% to create a high scoring group (labeled as 1) and a low scoring group (labeled as 2) on each personality variable. By factoring out the middle scores, the researcher hoped to highlight any differences in helmet use by comparing only those that ranked the highest or lowest in a given personality dimension. After groups were defined, a series of t-test were then conducted using the Generalized Intention variable as the test variable and each dimension of personality as the grouping variable.

## **Results**

A regression analysis was conducted examining the predictors of bicycle helmet use, using only Direct Measures. Three predictors were simultaneously entered into the model: Attitudes, Perceived Behavioral Control, and Subjective Norms. Together, these predictors accounted for 45% of the variance of intended bicycle helmet use. All of these variables were significant predictors of helmet use. Subjective Norms ( $\beta = .504$ ) and Attitude ( $\beta = .168$ ) were the strongest predictors and were positively associated with bicycle helmet use, whereas Perceived Control was negatively associated with bicycle helmet use ( $\beta = -.195$ ). (See Appendix B) Further regression analysis was conducted using the Big Five personality types as the predictor variables and bicycle helmet use as the dependent variable. Collectively, these variables only accounted for 1.8% of the variance. From this analysis Conscientiousness was indicated as a significant predictor in intended bicycle helmet use ( $\beta = .164$ ). (See Appendix C)

A series of independent samples t tests were then calculated to compare the Big Five personality types to intended bicycle helmet use. Each personality factor (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) was divided into two groups; Group 1 indicated those who scored high (top 33%) for that particular characteristic and Group 2 indicated those who had a low score (bottom 33%). The analysis of Openness ( $t_{(136)} = .496, p > .05$ ), Conscientiousness ( $t_{(123)} = .192, p > .05$ ), Extraversion ( $t_{(140)} = .883, p > .05$ ), Agreeableness ( $t_{(139)} = .734, p > .05$ ), and Neuroticism ( $t_{(126)} = .081, p > .05$ ) all produced insignificant results. (See Appendix D)

## **Discussion**

The components of the Theory of Planned Behavior were used in this study to identify specific factors that influence the intention to wear a helmet while bicycling among college students. Results of the regression analyses identified Subjective Norms as the strongest predictor of bicycle helmet use and Attitudes as the second strongest predictor.

Contrary to previous studies, the personality characteristics of Conscientiousness and Agreeableness were not significantly associated with intention to wear a helmet while bicycling. Therefore, the hypothesis that predicted that people who are low in the areas of Conscientiousness and Agreeableness would be less likely to wear a helmet while bicycling, is not supported by the results of this study. Furthermore, no significant difference in intention to use a bicycle helmet was identified between participants ranked low and high in any of the five personality dimensions.

## **Limitations**

The sample size ( $n=200$ ) obtained for this study was not large enough to draw conclusions for the population in general. In addition, significant kurtosis in the score distribution for four of the five personality traits did not lend to reliable results in the series of t-tests conducted for the Big Five Personality characteristics. Perhaps with a

larger sample size a greater distribution of scores, without significant kurtosis, might reveal differences with the other personality characteristics as well.

The Theory of Planned Behavior suggests a strong correlation between the Indirect and Direct Measures of the three factors of the model. However, only weak to moderate correlations were identified in the areas of Attitude, Subjective Norms, Perceived Control. The correlation between the direct measure of attitude and indirect measure of attitude was positive moderate strong, and statistically significant ( $r = .339$ ,  $p < .001$ ). The correlation between the direct measure of norms and indirect measure of norms was positive moderately strong, and statistically significant ( $r = .527$ ,  $p < .001$ ). The correlation between the direct measure of control and indirect measure of control was negative moderately strong, and statistically significant ( $r = -.376$ ,  $p < .001$ ). These results call into question the internal validity of the TPB measure as outlined in the Questionnaire Guidelines.

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**Appendix A**

		Indirect Norms	Indirect Attitude	Indirect Control
Direct norms	Pearson Correlation	.527	.211	.418
	Sig. (2-tailed)	.000	.003	.000
	N	200	200	200
Direct attitude	Pearson Correlation	.418	.339	.404
	Sig. (2-tailed)	.000	.000	.000
	N	200	200	200
Direct control	Pearson Correlation	-.337	-.130	-.376
	Sig. (2-tailed)	.000	.066	.000
	N	200	200	200

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.774a	.599	.586	1.12074

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.591	.707		.835	.405
	DirectAttitude	.003	.110	.002	.030	.976
	DirectControl	-.146	.069	-.110	-2.136	.034
	DirectNorms	.486	.084	.322	5.754	.000
	IndirectAtt	.013	.006	.110	2.174	.031
	IndirectControl	.053	.011	.279	4.893	.000
	IndirectNorms	.040	.010	.232	3.807	.000

a. Dependent Variable: GeneralIntention

## Appendix B

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.678a	.460	.451	1.29081

### Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.100	.809		-.123	.902
	DirectAttitude	.347	.117	.168	2.974	.003
	DirectControl	-.261	.077	-.195	-3.405	.001
	DirectNorms	.761	.087	.504	8.732	.000

a. Dependent Variable: GeneralIntention

## Appendix C

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.206a	.043	.018	1.72703

### Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.186	1.615		.734	.464
	Extraversion	-.119	.157	-.056	-.760	.448
	Conscientiousness	.488	.224	.164	2.177	.031
	Openness	-.116	.214	-.039	-.542	.588
	Agreeableness	-.049	.229	-.016	-.215	.830
	Neuroticism	.361	.190	.146	1.906	.058

## Appendix D

	Group	N	Mean	Sig.	t	df
Openness	1	76	2.97	.496	-.086	136
	2	62	3.00			
Conscientiousness	1	75	3.40	.192	1.806	123
	2	50	2.80			
Extraversion	1	78	2.73	.883	-1.172	140
	2	64	3.06			
Agreeableness	1	78	3.04	.734	-.013	139
	2	63	3.04			
Neuroticism	1	67	3.06	.081	1.804	126
	2	61	2.53			





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# A Formalist Approach to Steven Millhauser's "In The Penny Arcade"

*Joseph Santoli*

Dr. James D'Agostino, Research Supervisor and Faculty Mentor

*Steven Millhauser has received little attention for his literary work; his short story "In the Penny Arcade" specifically has seen almost none. This formalist approach of his story "In the Penny Arcade" will scrutinize different aspects of the work itself, including plot form, the narrator's reflective nature, situational irony, the role of sense deprivation, significance of color, the function of a young narrator, and a sharpened focus on recurring words and patterns of the story in order to investigate how Millhauser utilizes these techniques to illustrate the narrator's growth of perception and imagination.*

## The Formalist Approach

Though most of Steven Millhauser's work is overdue for serious criticism, this study will focus on the story which has received nearly no attention at all, the title story of his first published short story collection *In The Penny Arcade*. Besides a few passing references in book reviews, the only criticism that "In The Penny Arcade" has received is a small section in a larger analysis of his work which does little more than summarize (Alexander 27). This neglect is particularly adverse when Millhauser clearly desires the work to be a central component of his short story collection.

This study will focus on the text itself and how it stands on its own a-historically. The text will be analyzed with a concentration on the words themselves, including their connotative and denotative values as well as any implications. Multiple meanings for a word as well as the patterns in which it occurs in will be the focus of this study. Patterns in recurring colors, images, and references to time will also be evaluated. A formalist approach regards the piece as autonomous, and only looks inside the text for meaning (Guerin 74). The formalist approach is an especially effective method in examining "In The Penny Arcade" because of its rich use of language and unusual narrator perspective.

## Plot Summary

“In The Penny Arcade” begins with a young boy, aged twelve, returning eagerly to an arcade he had last visited two years previous. As he explores the miscellaneous games and machines of the penny arcade, he is acutely aware of an unidentifiable and enigmatic secret that he must find, “something mysterious and elusive I could hardly name” (Millhauser 136). The light people and the dark machines of the arcade disappoint him at first, as each machine does not seem to own the magic of his previous visit, rather, they look withered and forgotten. Even the people he sees own a general stiffness (138). The urgency of the narrator’s search heightens as he makes his way to the back of the arcade, finally stumbling upon a dark and quiet abandoned room. The narrator experiences a heightened sense of awareness during a brief deprivation of sight and sound in this room. Excitedly, he visits each machine again, re-experiencing each one with a renewed perception. The machines of the arcade were “waking from their wooden torpor” (141) and present the narrator with new and intricate experiences. The time transcendence of the narrator’s past perceptions returning wears off quickly however, and the narrator remarks that “the strange hush, the waking of creatures from their wooden slumber, seemed dim and uncertain, as if it had taken place long ago” (144). He is unclear of when the revival of the machines had happened currently or if it remained in his past. His final realization reveals to him that his perception was the owner of the magic, not the machines: “They had not betrayed me: I had betrayed them. I saw that I was in danger of becoming ordinary, and I understood that from now on I would have to remain vigilant” (145).

## Form of the Plot

The plot structure of “In The Penny Arcade” can be compared to the reflection of a mirror. The story involves a journey from a warm summer day in August into the shadows of an arcade and back again. He realizes that the machines are dull and wooden in his first experience of each, unlike the ones from his previous visit two years ago. He makes his way to an abandoned room in which the plot reverses, and moves outward again. The plot unfolds in nearly perfect opposite order from this point. The narrator visits each of the machines for a second time, and becomes aware of the returned magic of the machines: “The creatures of the arcade were waking from their wooden torpor” (141). Previously the machines had been rigid and artificial, while now they have become more personified and dynamic. The plot finishes with a return to the simple pleasures of the sun, the narrator having found the secret and leaving with a new reflection on the machines, and in himself: “I recognized that I myself had become part of the conspiracy of dullness, and that only in a moment of lavish awareness, which had left me confused and exhausted, had I seen truly” (145).

The literal form of the story, the spatial dimensions of Millhauser’s paragraph development, alters the reader’s interpretation of the piece’s themes. While many of the paragraphs tend to remain long and detailed, it is within the few short paragraphs that Millhauser isolates essential themes of the work. Within the few short paragraphs of the story, there is remembrance (137), tremulous stillness (141), denouement

(144), and the narrator's awareness of the truth (145), all main themes of the story. By assigning these crucial discoveries into discrete paragraphs, Millhauser effectively juxtaposes the representation of the penny arcade in the longer paragraphs with stark moments of clarity and insight of the narrator.

## Time References

This narrative doubling of the plot is hinted by the numerous references the narrator makes to his memory of his past visits to the penny arcade: "I had *remembered* a plunge into the enticing darkness" (135). The narrator pairs references to his past with each of his first visits to the machines of the arcade: the fortune teller: "Her one good eye had a vague and vacant look, as if she had misplaced something and could no longer *remember* what it was" (136-137); "I remembered how I had once been afraid of looking into her eyes" (137); the cowboy: "...the voice came from the cowboy's stomach. I had *forgotten*" (137); and the viewer machine: "...I tried to *recall* the troubling, half-naked woman I had seen two years earlier, but my *memory* was vague and uncertain" (139). The final reference to his memory claims the crucial piece of the puzzle the narrator has been searching for, the source of his perceptions that he has nearly forgotten: "I could not understand why [the machines] had been set apart in this enchanted cavern, but I had no doubt that here was the lost penny arcade, crowded with all that I had longed for and almost *forgotten*" (140). After his visit to the abandoned room, the narrator does not reference his previous memories. He no longer has any difficulty in "remembering" anything about his previous visits to the arcade. The references to his previous perceptions of the arcade have stopped because they have been realized with his current perceptions of the arcade and the narrator begins his experience of sensations rather than lamenting on past memories.

## Senses as Form

The narrator must purge several senses including the noisome sounds as well as the bright sights of the penny arcade to find its secret. This deprivation of senses allows the narrator to achieve a heightened sense of awareness required for the secret of the penny arcade to emerge. The narrator frantically tries to rid himself of several senses, specifically sound and sight, to achieve the sense of perception he so longs to find: "I felt that if I could not find whatever it was I was looking for, my entire life would be harmed" (138). It is only in breaking away from these senses that the narrator can find the real beauty, its ability to restore his youthful perceptions, of the arcade: "I longed to escape from the sounds of the penny arcade and into the lost beauty and darkness" (137).

The use of sound can symbolize a barrier for the return of the narrator's past perceptions. The pervasive noise of the arcade prevents the narrator from finding the secret of the penny arcade, and he seeks out silence. The theme of silence appears even at the beginning of the story: "...the world seemed hushed and expectant" (135). Only the abandoned room in which the narrator finds after traveling through the arcade

also owns this “hush.” As the rest of the arcade maintains its noisy nature, his visit remains melancholy: “Among the mysterious ringing of bells, the clanks, the metallic whirrings of the penny arcade I could hear the bright, prancing, secretly mournful music of the merry-go-round and the cries and clatter of the distant roller coaster” (135-136). The narrator is distracted by the noise, and wishes to find a silence, an escape from the sounds of the arcade to find the elusive secret.

The sense of hearing is not the only sense that the narrator wishes to escape from. A brightness pervades the arcade and distracts the narrator from his goal of discovering the secret of the arcade. Alongside the silence, darkness also appears very early in the story: “I saw at once that the darkness was not dark enough. here sunlight entered through the open doorway shaded by the narrow overhanging roof” (135). The darkness of the story is where the revealing takes place: “the darkness seemed thicker toward the back of the penny arcade, as if it had retreated from the open doorway and gathered more densely there” (136).

This darkness eschews the narrator’s need for his sense of sight, as the silence forces the narrator to discard his sense of hearing. This deprivation of senses advances the narrator in his search for the secret of the penny arcade. It is in the darkest part of the penny arcade, the abandoned room, in which the “forbidden dark” waits, the place in which the narrator finally finds the secret of the penny arcade, his past perceptions that have been nearly forgotten.

While in the abandoned room, avoiding the noise and the light that pervades the rest of the arcade, the narrator has developed another sense: “It was too dark for me to see clearly, but some other sense was so heightened that I was almost painfully alert” (140). The hush falls over the penny arcade while he is in the room (140), cutting the narrator off from his sense of hearing and sight, enabling his past and present perceptions to merge. The narrator is aware of this bereavement of his senses, and knows that “In that hush, anything might happen. All my senses had burst wide open. I was so tense with inner excitement, which pressed against my temples, that it seemed as if I would expand to fill the entire hall” (141); “The creatures of the penny arcade were waking from their wooden torpor” (141). Although his senses of sight and hearing have both been blocked, a new sense has burst in his mind. The narrator discontinues his references to the past and instead experiences actual sensations. All his senses have returned with a greater concentration and the machines have changed because of the narrator’s change of perception, shown by the change of the language in the story which we will explore in a later section.

Sensations appear just as often in the second half of the story as memories are in the first. The narrator has replaced his need for memories with his sensory experience of the present. Each machine is now paired with the narrator’s sensation, not his memory of sensations from his former visits: the cowboy: “Even as I approached I *sensed* that he had changed” (141); the fortune teller: “for a moment I had the *sensation* of someone behind me. I turned, and saw in the glass booth across the hall the fortune teller staring at me...”; the viewer machine: “I had the sense that I was coming closer and closer to a dark mystery that cunningly eluded me” (143). Initially the narrator struggled to remember how he had experienced each machine in his last visit two years ago but ultimately his second visit to each machine collapses both the past and present perceptions. The physical senses attached to each machine show that

his perceptions, past and present, are no longer separate.

The machines own a magical effect for the narrator while this silence continues. The people of the arcade are entirely quiet as the narrator experiences each machine for a second time: "Through the quiet hall I rushed furiously along" (142). The darkness is not absent, at least not physically, but now resides in the machines of the arcade: "From the shadow of his hat brim, his eyes blazed darkly" (141); "between [the fortune teller] and the cowboy I could feel a dark complicity" (141).

The re-emergence of sound and light in the arcade accompany the narrator's return to his current perceptions. The silence of his second visit to each machine is interrupted, and the machines return to their wooden and magic-less state:

"Hey!" I tore my face away. A boy in a yellow T-shirt was shouting at his friend. People strolled about, bells rang, children shouted in the penny arcade. Bright, prancing, sorrowful music from the merry-go-round turned round and round in the air" (143).

The penny arcade appears tired and weary for the narrator after the noise and brightness of the penny arcade return. The narrator's senses return as they were in the first half of the story, and he references time once more, returning to memories instead of sensations by the end: "The strange hush, the waking of the creatures from their wooden slumber, seemed dim and uncertain, as if it had taken place long ago" (144). He knows that only in the deprivation of other senses did his previous perception return, confirming his need for silence and darkness.

## **Language of the Arcade**

The language that the narrator uses before and after his returned perceptions play a large role in showing how the machines have changed. It is clear by the narrator's first visit to each machine that they are dull to him, faded: the fortune teller: "She looked as if the long boredom of uninterrupted meditation had withered her spirit" (137); the cowboy: "Slowly, wearily, as if dragging their way reluctantly from a deep well, the words struggled forth" (137); and the viewer machine: "A faded picture in dim colors showed a woman with faded yellow hair...she was wearing a tall white hat that had turned nearly gray, a faded white tuxedo jacket, faded black nylon stockings with a black line up the back, and faded red high heels" (138). The narrator scarcely uses any other words besides "faded" to describe the enervated state of the machines of the arcade.

The descriptions for the narrator's second visit to each machine change drastically. The machines are no longer dull, but are luminous: the fortune teller: "across the hall the fortune teller [stared] at me with piercing blue eyes (141); the cowboy: "Radiant with spite, noble with venomous rancor, he looked at me with fierce amusement" (142); the viewer machine: "She blossomed with shimmer, silk, and shadow, ushering me into a lush and intricate realm of always more dangerous exposures, which themselves proved to be new and dazzling concealments" (143). This contrast created by the descriptions of the machines, first as wooden and dull and then as shimmering and luminous, display the return of the narrator's childish perception.

Words such as "dissolving" and "disappearing" appear several times, such as the

narrator's entrance into the abandoned room: "With a feeling that at any moment I might dissolve, I stepped over the rope and entered the forbidden dark" (140); when visiting the cowboy for a second time: "In the tremulous stillness, which at any moment might dissolve, he seemed to await me" (141); and in his parents: "My mother and father shimmered on their bench, as if they were dissolving into light" (Millhauser 145). This sense of dissolving always appears in proximity or relation to the narrator's resurgence of his past perceptions. His past perceptions are in danger of dissolving, which have only transcended time for the narrator for a brief period. The narrator fears that *this magic may dissolve* at any moment. The narrator's connection of this language to his parents makes an interesting paradox, as the older boys of the arcade display no imagination, but the parents do? Perhaps the past perceptions have returned to the parents as well by age, or perhaps they acknowledge the fact that their son has regained his past perceptions.

### Irony in a Coming of Age Tale

Though the story contains elements from a traditional coming-of-age tale such as the narrator leaving his parents to enter the arcade, and his claim to be a "big boy" (135), the irony lies in the fact that the most important epiphany and growth for the narrator comes from an instance in his past. The narrator does not only experience a return of past perception, but also experiences a sexual awakening superimposed on his reconnection with childhood memory.

We are cued in to this coming-of-age plot by the very beginning of the story as the narrator leaves his parents to venture on his own in the arcade. This physical movement away from the parents is a traditional plot device for launching a conventional coming-of-age tale. The narrator at first scorns his childish yearnings: "For a moment I was tempted by the derrick, but at once despised my childishness and continued on my way" (136). As the narrator travels deeper into the arcade however, he ceases such claims against his own childhood, rather, he seeks his re-experience his past perceptions of the arcade.

The narrative of the story not only reveals a return to past perceptions for the narrator, but includes a subtle, underlying sexual subtext that comes with growing into adolescence. The narrator is not only re-experiencing his past perceptions of the arcade, but is also re-contextualizing his urgent search through the penny arcade as a fervid awakening. This is clear from his second experience of the viewer machine, which is freighted with provocative language: "Exhausted by these intensities, I watched her anxiously yet with growing languor, as if something vital in the pit of my stomach were being drawn forth and spun into the shimmer of her inexhaustible disrobings" (143). This sexual awareness which has culminated in the narrator's speech pervades the story throughout: "...pushed the metal tongue in and out..." (137); "With fearful steps I came to a machine carelessly covered with a cloth; peering intensely at the exposed portion" (140); "Thrusting in my dime, I pressed my hot forehead onto the cool metal" (142). The use of these bodily words and functions offers a subtle acknowledgment that the narrator is not only reviving the perceptions of the child, but is layering new perceptions of sexual nature onto his discovery of his

past perceptions.

The use of a first person twelve year old narrator allows Millhauser to show us the world as a child would perceive it. Metaphors throughout the story show the reader the youthful perception of the narrative. He says, "I had remembered a plunge into the enticing darkness of *movie theaters* on hot bright summer afternoons..." (135); "I could see the deep lines made by their combs like *knife cuts in wood*" (136); "some covered with cloths like furniture in a closed room in a *decaying mansion in a movie*" (140); "the creatures had been freed from the paralyzing beams of commonplace attention that held them down as surely as the little ropes held down Gulliver in my illustrated book" (145). The metaphors compare the subject to movie theaters, illustrated books, and knives, all of which are likely to appear in a child's life of leisure.

## Contrast of Light and Dark

The use of color appears with little significance throughout the story except for the specific color "black" which plays an important role in symbolizing darkness and latent possibility in the machines of the arcade. The cowboy specifically is described as owning a black hat, shirt, pants, boots, sideburns, mustache, belt, and pistol (137). At first it may seem to be a trivial use of the color as a description, but upon closer examination, the importance of the specific description of "black" is revealed. This darkness creates an important contrast between the rest of the bright arcade. The narrator eschews his sense of sight in order to find his imagination, and the use of "black" allows the reader in to the theme of the necessity of darkness.

Millhauser continuously inscribes secondary characters that are estranged from the child-like capacity for wonder that stands as the object of the narrator's mysterious quest. They differ from the machines in both lightness and stiffness. Darkness is not only used as a necessity for recapturing the imaginative capacities of the childhood, but also is used in the descriptions of the machines. The people of the arcade are described as lighter than the arcade, signifying their lack of magic unlike the black machines: "a father held up a little blond girl" (136); "a tall muscular teenager with a blond crew cut and sullen gray eyes" (136). On the contrary, the machines of the penny arcade that have the capability for magic are described as black, or dark and shadowy like the arcade. In addition to the especially black cowboy, the minor machines also own this specific color, like the black-haired Hawaiian woman on the pinball machine (136), or the black wheel of the car racing machine (136). The narrator goes contrasts black machines to light descriptions of the people of the arcade, then repeats this pattern once again. This contrast between the dark machines of the arcade and the light people show the strong difference between the latent possibility of imagination the machines can utilize and the lack of this imagination that the people of the arcade have.

The older boys of the arcade are tough, muscular, or display the appearance of tough attributes, such as tucking a pack of cigarettes into their t-shirts (138). The narrator first tries to imitate the older boys of the arcade in his approach to the fortune teller: "tense with longing, with suppressed excitement, and with the effort of appearing tough, dangerous and inconspicuous, I came at last to the fortune teller

in her glass booth” (136). Though the attempt to be like the older boys leaves him “betrayed and uneasy” (137) as he leaves the fortune teller, he comes no closer to discovering the secret of the arcade.

The narrator does not make the same mistake twice however, and physically distances himself from the older boys when looking through the viewer machine for the first time (138). The narrator is distancing himself from the older boys now literally and metaphorically. This distance that the narrator places in between himself and the older boys signifies his reluctance to simply allow his perceptions to develop as the other boys’ have, but searches for deeper past perceptions that are nearly lost.

## **Urgency of the Imagination**

Before even entering the arcade, the narrator is aware of a secret he cannot articulate. Throughout the story, the narrator is acutely aware of this omnipresent secret that he cannot grasp. It is a secret that the penny arcade has held safe, and one that the narrator must find. He admits, “It was not prizes I came out of the sun for. It was something else I had come for, something mysterious and elusive that I could scarcely name” (136). Though he does not know it yet, it is his imagination that he is trying to recover.

The narrator’s search of an elusive secret deepens around every turn with increasing urgency: “I felt that if I could not find whatever it was I was looking for, my entire life would be harmed” (138); “Anxiously I continued my sad wandering, searching for something I could no longer understand...” (139). He is nearly hopeless before discovering this secret. Without it, he remains restless, anxious, and angry. He attempts to try each machine first, but grows weary from the search, as the machines do not seem to own the same power they had owned in his last visit to the arcade. Other machines he simply passes by without hope (138).

## **Setting as an Allegory**

Conflating setting and psychology can reveal another symbolic use of the penny arcade itself. The penny arcade represents the mind of the narrator. The setting of the story is focused on throughout, first by the title, then by long descriptions of the machines and the rooms of the arcade. As perception also plays an important role in the story, it becomes apparent that the arcade represents the perceptions of the narrator’s mind in physical form.

The dark and shadowy corners of the penny arcade represent the narrator’s nearly lost childhood perceptions, but also signify the possible return of these perceptions, as darkness is an enabler for the narrator’s past and present perceptions to merge. The machines for the teenagers are still present, such as the pinball machines, but the narrator is not interested in their brightness. His past perceptions lie in the darkest room of the arcade, in the darkest room of his mind of which he has not visited in two years. The machines covered in cloth in this room are covered because they have become almost completely abandoned, but also because they need no description.

They are neither blond or bright like the magic less people of the arcade, nor are they black like the other machines with latent opportunity. They are the “true” machines, the ones of which represent his true past perceptions, and own no distinct shade. The narrator is certain of their true magical nature, and thus the narrator begins to experience the arcade as he did two years previous.

The narrator also includes subtle references of a biblical nature. Similar to a “fall from grace” the narrator claims the arcade possesses a “fall from mystery” (139). This draws a parallel from the Garden of Eden in biblical past to the magical penny arcade from the narrator’s past. The narrator perceives the arcade as having suffered a “fall from mystery” into an iniquity of dullness. The narrator gives us another altered reference to Eve after his first visit to the cowboy: “I looked about; a little girl holding a candied apple in a fat fist stared up at me without expression” (138).

## **Conclusion**

Millhauser’s fiction makes good use of literary techniques. The evolving language of the story plays an important part in understanding the main theme and epiphany of the narrator. Words such as “dissolving” appear in the story to create sufficient tension. Sharp contrasts between the people of the arcade and the machines represent Millhauser’s skillful use of the technique. The use of a specific young narrator displays Millhauser’s skill in crafting a narrative that convincingly fits the role of a twelve year old boy by using metaphor and underlying sexual subtext. The skillful use of time transforms into sensations, supporting the epiphany gained by the narrator. This formalist approach of Millhauser’s “In The Penny Arcade” may lend itself to other, more comprehensive studies of Millhauser’s fiction. This study may prove useful as a base for another approach to Millhauser’s work in the future.

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# Analysis of Alcohol Protective Factors and Attitudes of Truman State University Students

*Darius Taylor*

Dr. Jerry Mayhew, Research Supervisor

*In order to gain knowledge of the potential effectiveness of certain protective factors to estimate specific attitudes regarding alcohol use by Truman State University students, data from the 2011 Missouri College Health Behavior survey were analyzed. Factor analysis of the 17 protective items of the survey yielded four distinct loadings. The sum of each loading was entered in a logistic regression analysis to determine the specific protective factors that predict the negative alcohol attitudes of Truman students within their first through fourth year of college. The results of this study found that a limiting factor that included items which restricted drinking behavior and a friends factor which relied on friends to help regulate drinking behavior were major predictors of students' attitude about drinking. Hopefully this information will aid in the development of successful class specific, alcohol risk prevention interventions on campus.*

## Introduction

It is no secret that today alcohol use continues to be a significant problem amongst college students. Thus, the National Institute on Alcohol Abuse and Alcoholism's (NIAAA) annual statistics should not be surprising. According to NIAAA, 1,825 college students between the ages of 18 and 24 die from alcohol-related unintentional injuries annually, including motor vehicle crashes, and 599,000 students in that age bracket are unintentionally injured under the influence of alcohol (Hingson et al., 2005). Thousands of alcohol-related incidents could have potentially been avoided if the individuals' attitudes towards alcohol had incorporated protective factors related to alcohol use. Protective factors can be defined as characteristics, variables and/or conditions present in individuals or groups that enhance resiliency, increase resistance to risk, and fortify against the development of a disorder or adverse outcome (National Center for Children Exposed to Violence Resource Center, 2003). The development of attitudes without consideration of protective factors directed towards alcohol use can potentially put the individual or those around him or her at greater risk for

negative alcohol related consequences (Schaus et al., 2009; Wechsler et al., 1995). A health behavior theory known as Social Cognitive Theory (SCT) further supports the argument. According to the National Cancer Institute (2005), SCT describes a dynamic, ongoing process in which personal factors (i.e. attitudes), environmental factors, and human behavior exert influence upon each other. Reciprocal determinism, a component of SCT, is the dynamic interaction between behavior, personal factors, and environment, where each influences the others (Glanz and Rimer, 2005). Recent investigation offers promise that cognitive-behavioral strategies can modify the negative consequences of drinking by reducing the episodes of binge drinking (Martens et al., 2007). Therefore, the aim of the current study was to determine which protective factors expressed by Truman State University students in the 2011 Missouri College Health Behavior Survey would predict their alcohol-related attitudes. In an effort to monitor how these attitudes might change freshmen- and sophomore-specific data were compared to junior- and senior-specific data. This investigation of the relationship between the alcohol-related protective factors and attitudes may provide meaningful information for the alcohol education efforts at Truman State University to reduce high-risk drinking behaviors.

### **Literature Review**

The Missouri College Health Behavior Survey 2011 was established by the Missouri Partners in Prevention Coalition to collect data on students' use of protective factors and their respective attitudes and behaviors on topics of concern at participating colleges and universities in the state. The factors and attitudes surveyed addressed the six areas of alcohol, mental health, well-being, tobacco, gambling, and illicit drugs. It is through this survey that specific knowledge on the attitudes and behaviors of Truman State University students toward alcohol use, misuse, and abuse was obtained. The high response rate to the 2011 Missouri College Health Behavior Survey at Truman is justification of and provides support for the specific attitudes and behaviors to have reasonably strong ecological validity.

According to Hingson (2010), the increase in the past 7 years in alcohol related traffic and other unintentional injury deaths among 18 to 24 year olds, both in college and not in college, underscores the need for colleges and their surrounding communities to expand and strengthen interventions demonstrated to reduce excessive drinking among college students and those in the same age group who do not attend college. Recently, researchers have established that specific protective behavioral strategies are associated with less drinking and fewer alcohol-related problems (Benton et al., 2004; Delva et al., 2004; Martens et al., 2004, 2005). If the protective behavioral strategies for a specific population can be identified potential successful interventions can be mapped to center around the strategies that college students may not be proficient in when choosing to engage in drinking.

## Methodology

The primary data used for this study came from the 2011 Missouri College Health Behavior Survey. A list of seventeen alcohol protective factors and five attitudes of students associated with alcohol were compiled. The list of protective factors was the predictor variables or independent variables for the model, while the list of alcohol attitudes acted as the dependent variables. Prior to performing a binary logistic regression, a principal-components factor analysis was computed to determine common factors and prevent potential multicollinearity amongst predictor variables. The factor analysis of the seventeen protective factors identified four distinct loadings or areas of interest which were labeled as: Drinking, Alternatives, Limits, and Friends.

In order for the dependent variable to be a dichotomous factor the attitude towards the use of alcohol was coded to represent positive attitudes (0) and negative attitudes (1). Positive attitude (0) was estimated by collapsing the following responses into a single variable: "Drinking is never a good thing to do," "Drinking is alright, but a person should not get drunk," and "Occasionally getting drunk is okay as long as it doesn't interfere with academics or other responsibilities." Truman students who answered that "Occasionally getting drunk is okay even if it does interfere with academics or responsibilities" and "Frequently getting drunk is okay if that's what the individual wants to do" were coded as a negative attitude (1). For the second analysis, the response of "Occasionally getting drunk is okay as long as it doesn't interfere with academics or other responsibilities" was moved to the negative attitude category. With the newly coded dependent variables, two separate logistic regression analyses were computed using the likelihood ratio test. The likelihood ratio test is a form of forward stepwise regression which adds or subtracts an independent variable (i.e. protective factors) from the model based on a set level of statistical significance for acceptance. In order to analyze the difference in behaviors and attitudes of freshmen and sophomores compared to juniors and seniors a Mann-Whitney test was performed.

## Results

The Mann-Whitney test produced only one protective factor (adding extra ice to drinks) out of seventeen that was statistically different ( $p=.011$ ) between the freshmen/sophomore group and junior/senior group. Therefore, the entire cohort ( $n=230$ ) was used for further analyses.

**Table 1** shows the results of the factor analysis of the protective factors which produced four different eigenvectors which were labeled: Drinking, Alternatives, Limits, and Friends. Based on this statistical factor analysis, a conceptual factor analysis was composed to include all 17 protective factors; this is shown in **Table 2**. The measures of the conceptual factor analysis included examining the similarities between protective factors on a non-numerical basis, but with respect to the eigenvectors produced in **Table 1**.

**Table 1: Factor Analysis Solution Matrix**

	Component			
	Drinking	Alternative	Limits	Friends
PBS - Designated Driver				.730
PBS - Set Number Drinks	.569			
PBS - Alternate Drinks		.734		
PBS - Friend Monitoring				.738
PBS - Avoid Drinking Games	.716			
PBS - Leave Predetermined Time	.515			
PBS - Home with Friend				.639
PBS - Monitor Drink Location			.699	
PBS - Drink Shots	.778			
PBS - Stop Drinking Predetermined Time				
PBS - Drink Water		.870		
PBS - Extra Ice		.553		
PBS - Avoid Mixing				
PBS - Drink Slowly	.576			
PBS - Avoid Keeping Up	.521			
PBS - Limit Money			.545	
PBS - Eat Before/During			.688	

**Table 2: Conceptual Factor Analysis**

New Factors	Protective Factors/Behaviors					
Drink_two	PBS - Avoid Keeping Up	PBS - Avoid Drinking Games	PBS - Drink Shots	PBS - Stop Drinking Predetermined Time	PBS - Avoid Mixing	PBS - Drink Slowly
Alternative_two	PBS - Alternate Drinks	PBS - Drink Water	PBS - Extra Ice	PBS - Eat Before/ During		
Limits_two	PBS - Leave Predetermined Time	PBS - Monitor Drink Location	PBS - Limit Money	PBS - Set Number Drinks		
Friends_2	PBS - Designated Driver	PBS - Friend Monitoring	PBS - Home with Friend			

The first analysis included all of the new factors found in **Table 2** acting as the independent variables and the new binary factor representing alcohol attitudes as the dichotomous dependent variable necessary for a logistic regression (**Table 3**). The dependent variable used was labeled as “new\_att\_2” and was the variable that included the “Occasionally getting drunk is okay as long as it doesn’t interfere with academics or other responsibilities” item in the positive category of the alcohol attitudes. After performing a likelihood ratio forward stepwise logistics regression analysis, the results were that the Friends\_2 factor identifies 98.6% of the positive attitude of Truman students correctly.

**Table 3: Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a	limits_two	-.677	.171	15.627	1	.000	.508
	Constant	.746	.753	.981	1	.322	2.108
Step 2b	limits_two	-.365	.205	3.156	1	.076	.694
	friends_2	-.509	.202	6.373	1	.012	.601
	Constant	1.103	.784	1.982	1	.159	3.014

a. Variable(s) entered on step 1: limits\_two.

b. Variable(s) entered on step 2: friends\_2.

The second analysis also included all of the new factors found in **Table 2** acting as the independent variables and the new binary factor representing alcohol attitudes as the dichotomous dependent variable (**Table 4**). Similarly, the dependent variable used was labeled as “new\_att\_3”, but the “Occasionally getting drunk is okay as long as it doesn’t interfere with academics or other responsibilities” item was moved to the negative category of the alcohol attitudes. After performing a likelihood ratio forward stepwise logistics regression analysis, the results were that the Drink\_two and Limits\_two factors identify 96.6% of the negative attitude of Truman students correctly.

**Table 4: Variables in the Equation**

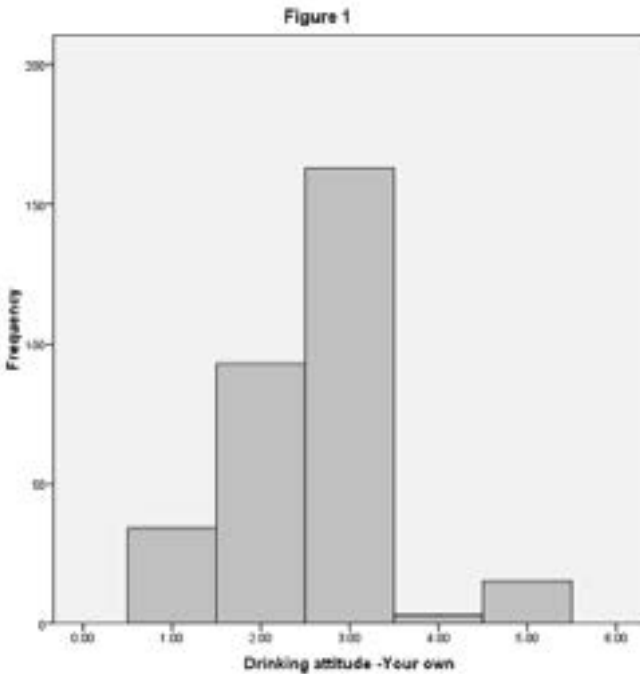
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a	drink_two	-1.003	.207	23.565	1	.000	.367
	Constant	4.928	.833	34.972	1	.000	138.079
Step 2b	drink_two	-1.317	.251	27.471	1	.000	.268
	limits_two	.524	.212	6.110	1	.013	1.689
	Constant	3.532	.930	14.417	1	.000	34.188

a. Variable(s) entered on step 1: drink\_two.

b. Variable(s) entered on step 2: limits\_two.

## Discussion

Due to the abnormal distribution noted in **Figure 1**, a logistic regression analysis was performed. The greatest frequency of response was in category 3 indicating that Truman students' predominant attitude towards alcohol was that "Occasionally getting drunk is okay as long as it doesn't interfere with academics or other responsibilities." The sum of the frequencies of categories 4 and 5 combined were substantially smaller than noted in category 1 which stated, "Drinking is never a good thing to do". This factor was the major reason why the third category was applied to the positive category (combination of attitudes 1 and 2) and the negative category (combination of 4 and 5). To perform this analysis without the third category entirely would reduce the validity of the test, due to majority of Truman students selecting this category. Since category 3 has a certain amount of ambiguity pertaining to whether it is a positive or negative attitude it can easily fall under either category.



- 1 "Drinking is never a good thing to do"
- 2 "Drinking is alright, but a person should not get drunk"
- 3 "Occasionally getting drunk is okay as long as it doesn't interfere with academics or other responsibilities"
- 4 Occasionally getting drunk is okay even if it does interfere with academics or responsibilities"
- 5 "Frequently getting drunk is okay if that's what the individual wants to do"

## Limitations

With the primary intentions of this study centering on a linear regression analysis, the unequal variance and distribution of the alcohol attitudes prevented the use of this statistical technique. Therefore, logistic regression was employed which allows the estimation of a dichotomous variable from a selected list of independent variables. It also may be argued that the sample size of 230 was not large enough to represent all

the attitudes of the approximate 5,600 undergraduate students that attend Truman State University. The ambiguity produced from the answers to the attitude question within the Missouri College Health Behavior Survey may have prevented students from polarizing their answer to produce a concrete position on the topic (example below). In the statement illustrated below, there is no clear definition of what “drinking” and “getting drunk” is, a fact which may also contribute to the low response to this specific question.

**Which statement below about drinking alcoholic beverages do you feel best represents your own attitude?**

Drinking is never a good thing to do

Drinking is alright, but a person should not get drunk

Occasionally getting drunk is okay as long as it doesn't interfere with academics or other responsibilities

Occasionally getting drunk is okay even if it does interfere with academics or responsibilities

Frequently getting drunk is okay if that's what the individual wants to do.

## **Conclusion**

The first logistic test showed us that when deciding to drink, Truman students with positive alcohol attitudes were using a designated driver, asking a friend to monitor their drinking habits, and going home with a friend. The second test showed us two things: first, when deciding to drink, Truman students with positive alcohol attitudes were avoiding keeping up, avoiding drinking games, not drinking shots, stopping drinking at a predetermined time, avoiding mixing drinks, and drinking slowly. Second, when deciding to drink, Truman students with negative alcohol attitudes were not leaving at a predetermined time, not monitoring their drinking location, not limiting money spent, and not drinking a set number of drinks. These findings agreed with Sugarman and Carey (2007) who isolated three factors relative to college student drinking: selected avoidance of heavy drinking activities and situations, strategies used while drinking to minimize problems, and alternatives to drinking alcohol.

According to Glanz and Rimer (2005), as a person adopts new behaviors, it causes changes in both the environment and in the person. Schaus et al. (2009) recently noted that brief invention strategies can have a significant positive effect on alcohol-related behaviors and reduce the problems associated with excess consumption. In conjunction with previous findings, the current results indicating that protective factors can significantly predict the negative alcohol attitudes at all levels of college enrollment and provide a basis for the institution to invest in alcohol risk prevention centered on the use of these protective factors.

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# The McNair Scholarly Review

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<i>P.S. I Forgive You: Effect of a Brief Expressive Writing Intervention on Forgiveness</i> .....	1
Christine Bowles	
<i>Funny or Downright Disturbing? Effects of Humor &amp; Darkness on Memory Recall</i> .....	13
Dwuana Bradley	
<i>African American Perceptions of Graduate School Experiences and Employment in Criminal Justice and Criminology</i> .....	23
Shawn Glispie	
<i>Breaking the Law Does Not Make Me a Criminal: Student Law Breakers' Self Perception of Criminality</i> .....	33
Chermain Jennings	
<i>Computational Studies of P22 N Peptide-boxB Complex</i> .....	43
Michael R. Jones	
<i>Shake Off the Law: Graffiti and Feminism</i> .....	55
Rebecca Pursley	
<i>An Examination of the Relationship Between Personality and Intended Bicycle Helmet Use Among College Students</i> .....	67
Siera Ramsey	
<i>A Formalist Approach to Steven Millhauser's "In The Penny Arcade"</i> .....	79
Joseph Santoli	
<i>Analysis of Alcohol Protective Factors and Attitudes of Truman State University Students</i> .....	91
Darius Taylor	

