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Depression, Emotional Eating and Food Choice

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DEPRESSION, EMOTIONAL EATING AND FOOD CHOICE

by

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A Thesis Submitted in Partial Fulfillment
of the Requirements for a Degree with Honors
(Psychology)

The Honors College

University of Maine

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Abstract

The prevalence of depression has been steadily growing throughout the years, especially among college students. Depression has been rated third amongst the presenting problems in college counseling centers (Drum & Baron, 1998) and studies have indicated that as much as 80% of college students say they have experienced some form of depression throughout college (Westefeld & Furr, 1987). Not only does depression affect college students, but positive affect does as well. Evidence that suggests that those with a history of depression may get the most benefit from having positive affect, given a negative relationship between positive affect and depressive symptoms has been found to be stronger when people are under stress, which may be common in college students (Pruchno & Meeks, 2004). Levels of negative or positive moods, which may lead to higher or levels of emotional eating, may also affect food choice. Language use also affects health, where positive emotion words are linearly related to improved health, and negative emotion words are curvilinearly related and have an inverse-U function (Pennebaker, Mayne & Francis, 1997). In this current research, I examined the relationship between negative/positive affect and their relationship to emotional eating and food choice. Hypotheses include that higher levels of depressed affect will result in higher levels of emotional eating, which in turn will increase sweet food eating, especially in women. Higher levels of positive affect are hypothesized to decrease levels of emotional eating, which in turn will decrease sweet food eating. Results indicated that emotional eating played a role in depressed/positive affect and sweet food eating. The findings of the study supported the hypotheses, suggesting that mood plays a role in food choice.

Dedication

To my parents.

Thank you for your heartfelt support,
motivation, and guidance to help me be the best I can be.

Acknowledgment

I would like to acknowledge Dr. Shannon McCoy for her undying guidance and encouragement for without it, this research would not have been possible.

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Depressed Language in College Students

“We have seen how it is originally language which works on the construction of concepts, a labor taken over in later ages by science. Just as the bee simultaneously constructs cells and fills them with honey, so science works unceasingly on this great columbarium of concepts, the graveyard of perceptions.”

- Friedrich Nietzsche

Today, there are many different mental illnesses that affect us personally or loved ones in our lives. Depression is among one of these mental illnesses in our country with a tremendously growing rate that is almost becoming an epidemic. Not only are these rates increasing among the overall population, but it is also increasing among college students as well; the future of our society. These growing rates must be targeted, given that rates of suicide among college aged students are high, and depression is a risk factor for suicide. By understanding depression more deeply in ways such as language, positive mood, emotional eating and food choice, we can better understand these relationships to help stop these increasing rates.

Depression

Depression is a pervasive and progressive mental illness that affects many individuals in today's society. Nearly 1 in 5 people will experience a major depressive episode at some point in their lives (Kessler, Berglund, Demler, Jin, Koretz, Merikangas, Rush, Walters, & Wang, 2003). In 2004, unipolar depression was listed as the third leading cause of disease burden worldwide, following lower respiratory infections and diarrhoeal diseases. Among middle-income and high-income countries unipolar depressive disorders were the leading cause of disability over heart disease, HIV/AIDS, and other illnesses (Mathers, Boema, & Fat, 2008). Expectations are that depression will

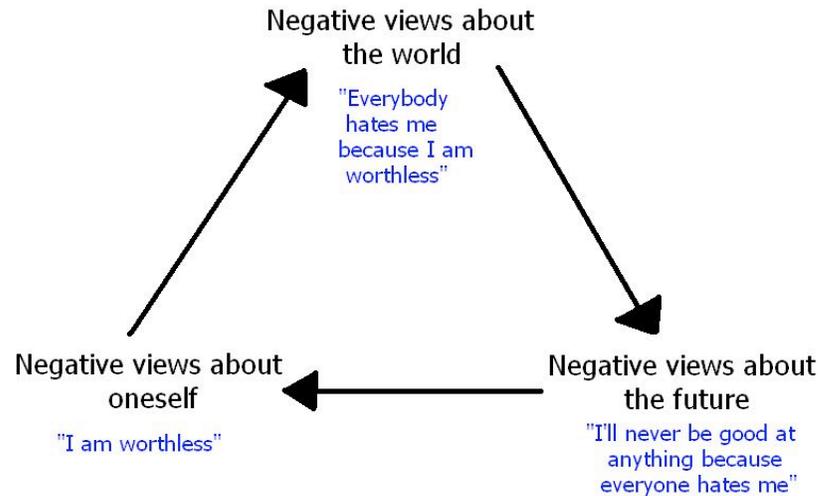
climb to the second leading cause of disease burden worldwide, following cardiovascular disease by 2020 (Mathers et al., 2008). Like cardiovascular disease, depressive disorders are typically more common among individuals with chronic conditions such as obesity, cardiovascular disease, diabetes, asthma, arthritis, and cancer (Watts, 1987; Ruiz-Tiben & Hopkins, 2006). It is also more commonly seen in those with unhealthy lifestyle behaviors such as smoking, lack of physical activity, and binge drinking (Ruiz-Tiben & Hopkins, 2006). Additionally, some studies that indicate that there is a gender difference for this mental illness where major depressive disorder has been found to be more prevalent in woman than in men (Kessler et al., 2003). Depression affects many individuals in their day-to-day life and can often result in increased work absenteeism, short-term disability, and decreased productivity (Goetzl, Hawkins, Ozminkowski, & Wang, 2003).

Aaron Beck, a leading expert in depression describes it as a specific change in mood, whether that is sadness, apathy, or loneliness. Depression induces a negative self-image, which typically involves self-blame. It promotes a desire for self-punishment, and a desire to escape or hide from reality. Physical or physically expressed changes such as anorexia, losses of libido, or insomnia are common. Other changes include increased agitation, hyperactivity, or withdrawal and inaction (Grover, 2012). Barlow (1988) furthermore characterized appraisal of things as hopeless as another defining feature of a depressed individual. Depression is also characterized as a mood disorder, where both adults and adolescents that experience depressive episodes report a higher negative affect and a lower positive affect on a daily level than those without depression (Bylsma,

Taylor-Clift, Rottenberg, 2011). Thus, depression often is associated with low positive affect.

Beck is also the father of cognitive therapy, which is a therapeutic approach that states that thoughts, feelings, and behavior are all connected. Through this therapeutic approach Beck developed the depressive cognitive triad model. This is a model that explains depression in terms of one's perception, containing domain-specific appraisals. These appraisals are negative appraisals and are comprised of three distinct domains: a negative view of oneself (e.g., "I am worthless"), a negative view of the world (e.g., "Everybody hates me because I am worthless), and a negative view about the future (e.g., "I'll never be good at anything because everyone hates me; Beck, Rush, Shaw, & Emery, 1979; see Figure 1). Beck termed these three appraisals "automatic thoughts" which reveal a person's core beliefs and what they find to be true. Through his therapeutic approach he was better able to help individuals develop a healthier way of thinking by reshaping these unhelpful beliefs and thoughts. A common technique used in this type of therapy would be to help patients identify and evaluate these thoughts, and by doing so patients are able to think more realistically, which lead them to feel better emotionally and behave more functionally (Beck, 1997).

Figure 1. Aaron Beck's Depressive Cognitive Triad



Increasing evidence has indicated that depression is a disease that sticks with us. Rot, Mathew, and Charney (2009) have indicated that depression is a chronic, recurrent, and progressive illness, which can cause detrimental neuroanatomical changes in the brain. Most neuroimaging studies have found that major depressive episodes may be characterized by abnormalities in the interconnectivity of subcortical and cortical brain regions of the limbic system (Ressler & Mayberg, 2007). Lack of cortical regulation of the limbic system during psychological distress, for example, has been found to help explain stress sensitivity, emotional liability, irritability and suicide often seen in people with depression (Anand, Li, Wang, Wu, Gao, Bukhari, & Lowe, 2005).

Along the same lines, the vulnerability hypothesis proposed by Burcusa and Iacono (2007) states that those with a history of depression have psychological and/or biological attributes (e.g., gender, personality, and stressful life events) that existed before the initial onset of symptoms that provide a risk for recurrent depression. Furthermore, Maletic, Robinson, Oaks, Iyengar, Ball, and Russell (2007) provide evidence for a kindling hypothesis within depression. The word kindling, here, is used as

a metaphor that is commonly used to describe the kindling model of epilepsy. Similar to the way small burning twigs can produce a large fire; repeated subconvulsive stimulation of the brain produces seizure behavior of increasing gradual intensity that builds up to a full seizure (Abel & McCandless, 1992). In other words, “seizures beget seizures.” This model suggests that recurrent episodes lower the threshold, or increase the vulnerability for more seizures to occur (Bertram, 2007). The kindling hypothesis in depression proposed by Maletic et al., (2007) suggests a similar finding. Episodes of depression are more easily triggered over time, where someone who has a higher number of previous episodes of depression over time will more likely have future episodes of depression, sometimes in the absence of stressors.

Depression in College Students

Prevalence

Not only is the prevalence of depression increasing in the general population, it is also increasing among college students as well. Depression has been rated third amongst the presenting problems in college counseling centers (Drum & Baron, 1998), and many college students experience their first symptoms of depression during their college years (Eisenberg, Golberstein, & Gollust, 2007). Westefeld and Furr (1987) indicate that 80% of college students have some form of depression throughout their college career. There have been studies that have explored the reason behind the increasing prevalence of depression, specifically among college students. Heppner, Kivlighan, Good, Roehlke, Kills and Ashby (1994) found that some professionals working in college counseling center settings have reported that depression and suicide might be increasing on college campuses. In fact, 14 years later, 95% of counseling center directors on college campuses

perceived an increase in the number of college students with serious psychological problems. In 2008, 95% of respondents of the National Survey of Counseling Center Directors believed that there's a trend in recent years that indicate an increased number of college students with serious psychological problems. The percentage of counseling center clients taking psychiatric medicine has also increased overtime: 9% in 1993, 17% in 2000, 20% in 2003, and 26% in 2008 (Gallagher, 2008). These growing rates are alarming given the fact that depression is a major risk factor for suicide (Garlow, Rosenberg, Moore, Haas, Koestner, Hendin, & Nemeroff, 2008). Additionally, suicide is highly prevalent among college age students and has been found to be the third leading cause for death among teens and young adults from the ages of 15-24 (National Center for Health Statistics, 2011).

Depression Causes

Why are college students suffering from depression? During college, students deal with a significant transition where they experience many different things for the first time in their life. A few of these factors include having roommates, adapting to a new lifestyle, making a new circle of friends, and developing alternate ways of thinking. The transition to college begets a distinct phase in life between adolescence and adulthood, which has been coined as the term emerging adulthood (Arnett, 2000; Erikson 1968). When students head off to college they lose connections to their family, friends, peer groups, favorite activities, social support networks they have created throughout their life thus far. Therefore, this is a unique period of time where individuals become self-oriented in order to focus on personal development and identification into the journey of adulthood (Arnett, 2000). A poor development of identity can consequently make students

feel disoriented and feel a loss of their sense of self, contributing to symptoms of depression (Tartakovsky, 2008). Even personality traits such as neuroticism have been indicated as a risk factor associated with depression, especially among college-age individuals where levels of neuroticism tend to be particularly high (Roberts & Mroczek, 2008). Schwartz and Whitaker (1990) found that students perceive the most frequent contributing factors for the cause of depression to be related with grade problems, relationship problems, loneliness, and money problems.

Consequences of Depression

What happens to college students who are depressed? It has been found that depression has been linked to academic difficulties, along with interpersonal problems at college. Higher levels of depression are correlated with higher levels of impairment within these domains (Heiligenstein, Guenther, Hsu, & Herman, 1996). A study by Nyer, Holt, Pedrelli, Fava, Ameral, Cassiello and Farabaugh (2013) found that college students with suicidal ideation, compared to students without suicidal ideation, had higher levels of depressive symptoms, hopelessness, and anxiety. However, suicidal versus nonsuicidal students did not differ on measures of everyday cognitive and physical functioning, along with grade point average. A recent study has indicated that there may even be a difference in levels of depression depending on the type of institution an individual attends. It has been found that students at larger institutions are more likely to have experienced depression since coming to college and to list grade problems as a contributing factor to depression. Students from community college are less likely to cite loneliness as a factor in depression. Reasons for this finding suggest that students attending community college are more likely to have a local support network because the

vast majority of these students live within the local community. Also, they found that students who choose a college with a religious atmosphere might be more inclined to view suicide as less acceptable (Furr, Westefeld, McConnel, & Jenkins, 2001).

Depression and Positive Mood

Another interesting way to look at depression is not only an increase in negative emotions, but also a decrease in positive emotions. For depressed individuals, having lower levels of positive affect, on top of already higher levels of negative affect can harm these individuals even more. First off, to better understand this relationship between positive and negative affect, Zautra, Affleck, Tennen, Reich, and Davis (2005) introduced the idea of affect polarization. Affect polarization refers to a dominance of one type of affect, positive or negative, over the other in reaction to threatening conditions such as stress or pain. The broaden-and-build theory also exemplifies similar outcomes, where when positive affect remains high during stressful situations, individuals are better able to cope, therefore decreasing levels of negative affect (Ong, Bergeman, Bisconti, & Wallace, 2006). There is also evidence that suggests that those with a history of depression may get the most benefit from positive affect, such that the negative relationship between positive affect and depressive symptoms has been found to be stronger when people are under stress (Pruchno & Meeks, 2004). In other words, the less positive affect you have, the more depressed you feel when you are under stress. Another 3-year longitudinal study of college students, those who had experienced depression prior to study participation and those who experienced an initial depressive onset during the study showed greater decreases in positive affect on more stressful days compared with students with no history of depression, suggesting similar vulnerability profiles

(O'Grady, Tennen, & Armeli, 2010). In the current research, we examine both depression and positive affect among college students.

Depression and Weight

Can depression affect our body shape and size? Several studies indicate that a relationship with negative affect and weight gain. Also, as stated above depression can be related to many other chronic health conditions such as cardiovascular disease, diabetes, asthma, arthritis, and cancer (Watts, 1987; Ruiz-Tiben & Hopkins, 2006). It has been found that depressed affect and excessive food intake are linked to each other in some studies. Geliebter and Aversa (1991) found that overweight participants reported eating considerably more than usual when they felt anxious, depressed or alone whereas normal weight participants did not show this same pattern. According to another study by Kayman, Bruvold, and Stern (1990) weight histories of women were classified under two categories: relapsers (those who had lost weight but regained it) and maintainers (those who had lost weight and maintained their normal weight for two or more years). Findings indicated that women experienced negative emotional states and unexpected stressful life occurrences during their time of relapse. Relapsers reported that they turned to food to help them feel better when they were stressed, while maintainers believed they could cope with problems by using problem-solving techniques rather than food. Therefore, depression may lead to emotional eating.

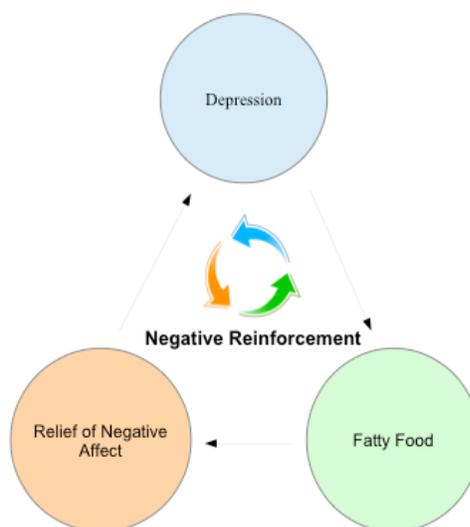
Depression and Emotional Eating

Can our emotions influence the ways in which we eat? Most literature on food cravings focus specifically on carbohydrate craving and consumption and focuses on the relationship it has with dysphoric mood. It is most commonly assumed that dysphoric

mood elicits carbohydrate craving because of a serotonin deficit. This deficit in serotonin drives individuals to consume carbohydrates because pure carbohydrates elevate central serotonin synthesis. This increase in synthesis of serotonin is said to relieve dysphoric mood, which furthermore strengthens the connection between dysphoric mood and carbohydrate consumption, which then further increases the craving for carbohydrates (Wurtman, 1987). This concept can be more readily understood as the self-medication hypothesis proposed by Leibenluft, Fiero, Bartko, Moul, and Rosenthal (1991).

Leibenluft et al., (1991) specifically proposed this hypothesis for the craving of carbohydrates and indicated that cravings for carbohydrate-rich foods exist because the consumption of these foods results in a relief of dysphoric symptoms, such as depressed affect (see figure 2). Given that an increase in carbohydrate rich food decreases negative affect, these findings tie in perfectly with the outcomes of depressive disorders exclaimed by Watts et al., (1987) where depressive disorders are typically more common among individuals with conditions such as obesity, cardiovascular disease, and diabetes.

Figure 2. Emotional Eating Model



There have also been findings for a gender difference in depression and food choice. Dube, Lebel, and Lu (2005) have found that consumption of comfort food alleviated women's negative emotions, but also produced guilt. They found that men's comfort food consumption was motivated by positive emotions whereas women's consumption was triggered by negative affect. Foods high in sugar and fat content were more efficient in relieving negative affect, whereas low-calorie foods were more efficient in increasing positive emotions. High calorie sweet foods (e.g. ice cream, cookies, chocolate) have been linked to the production of endogenous opiates and serotonin. Both of these neuroendocrine mechanisms operate on the experience of negative affects and less on positive emotions (Dube et al., 2005). It has also been found that non-depressed individuals consume more protein and depressed subjects consume more carbohydrates (Christensen & Somer, 1996). Therefore, depression may lead to emotional eating, particularly of sweet and/or fatty foods.

Depression and Food Choice

Can our choice of food be influenced by how we feel? One of the dangers of depression is that it can impact individuals not only psychologically, but physically as well. It has been found that emotions exert a powerful influence on food choice, and there is evidence that indicates that depressed individuals may consume a different diet than those who are not depressed. Up to 97% of women and 68% of men report food cravings (Weingarten & Elston, 1991) and additionally, it has been found that depressed individuals may crave, or urge to seek out and consume particular foods that are different from non-depressed individuals. Weingarten and Elston (1990) indicate that the

explanations for these cravings can be explained through the abstinence model and the expectancy model. The abstinence model proposes that craving emerge from a dysphoric state that is created when abstaining from a desire or need from that substance (e.g. food). The expectancy model suggests that a craving is prompted by exposure to either an internal or external cue that is associated with the desired substance. In other words, when we do not eat the foods we crave, we may reach a dysphoric state of mind such as depressed affect and our cravings for certain foods may be prompted by a state of mind or mood, such as depressed affect. This may be another reason why depressed affect leads to sweet and/or fatty food eating.

Depressed Language

The use of language to derive insight into a speaker's wellbeing is not a new concept for us. Freud (1901) pointed out that common errors in speech betray people's deeper motives and fears. Jacques Lacan (1968) extended the ideas presented by Freud by suggesting that the unconscious asserts itself through language. Paul Ricoeur (1976) further argued that the ways in which we describe shared events define the meanings and our own reality of these events. Thus, the words people use can help us delve into important aspects of their emotional and cognitive worlds. By focusing on word use, the style in which individuals use words, rather than the context, we can even see differences in how two people may make a simple request. For example, if someone were to say, "would it be possible for you to pass me the salt?" versus "pass the salt" both express a desire for salt. However, the word use between these two exclamations refers to differences in their relationship with who they are speaking to, their personality, and

maybe even the way the speaker understands themselves (Pennebaker, Mehl, & Niederhoffer, 2003).

Therefore, the use of language can also help us delve into the cognitive schemas of depressed individuals. By looking at the words that individual's use, we can better understand the way in which they view the world around them. Among the emerging studies on word use, pronoun use has been found the most revealing. For example Pennebaker and Lay (2002) found that elevated use of first person plural pronouns have been linked to depression, self-focus, and emotional distancing. They also found that an elevated use of second and third person pronouns suggest that the speaker is more socially engaged, or aware of their environment. Bucci and Freedman (1981) found that clinically depressed individuals tend to have an elevated use of first person singular pronouns (e.g. I, me, my) than non-depressed individuals. They also found depressed individuals to use a reduced amount of second and third person pronouns. Rude, Gortner and Pennebaker (2002) examined the language use of currently depressed, formerly depressed, and never depressed college students. Their results confirmed the same linguistic pattern of self-focus in depression for written language when comparing currently depressed and never depressed individuals. Similar to findings previously described on gender differences and depressed affect (Kessler et al., 2003; Dube et al., 2005), some evidence even suggests that there may be a difference in this pronoun use between men and women. Based on a study where college students wrote about coming to college, Pennebaker and King (1999) found a higher use of "I", "me" and "my" words in female students' stream of consciousness while examining these writings.

Furthermore, it has been found that the use of positive and negative emotions words are linked to depression as well. Depressed college students tend to use significantly higher levels of negative emotion words (e.g. sad, fight, gloom) and fewer positive emotion (e.g. joyful, share, best) words than college students who were never depressed (Rude et al., 2002). This finding ties in perfectly with the findings for depressed affect as discussed previously (Bylsma et al., 2011). Not surprisingly then, the use of positive emotion words are linearly related to improved health, whereas negative emotion words are curvilinearly related and have an inverse-U function (Pennebaker, Mayne & Francis, 1997). Baddeley, Daniel, and Pennebaker (2011) found in a case study of a particular surveyor that prior to his suicide, there was an increased use of negative emotion words in his writing nearing his death. Moreover, literature on repressive coping found that those who do not use negative emotion words when describing a traumatic event are at a great risk for subsequent health problems than those who use at least some negative emotion words (Jamner, Schwartz, & Leigh, 1988). In the current research we examine whether depressed language use predicts emotional eating and food choice in a similar manner as depression.

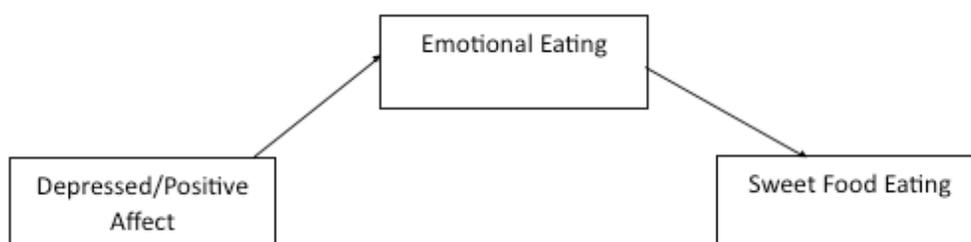
Research Goals and Hypotheses

The current research examines the relationship between depression, positive mood, emotional eating, and sweet food eating. We also control for weight (body mass index) in our study. The goal of this study is to better understand the relationship between these variables, as previously mentioned in past research there have been links that exist between these variables. There have been limited studies, however, that examine the relationship between depressed language and eating behaviors. By understanding the

relationships between these variables more fully, insight could be gained on how to better detect depression in college students, which could therefore help offer better insight on how to intervene or prevent depression in college students.

I hypothesize that depression may lead to emotional eating, which then would increase sweet food eating, especially for women. The relationship between positive mood, emotional eating, and sweet food eating will be examined. I hypothesize that an increase in positive mood will decrease levels of emotional eating, which will then decrease sweet food eating.. Lastly, this study will examine depressed language, emotional eating and sweet food eating. Similar to depression, I hypothesize that depressed language may lead to emotional eating, which then would increase sweet food eating. For a clearer understanding, I have provided a hypothetical model to present these hypotheses shown in figure 3. Finally I will also examine these relationships among men and using fatty Fast Food as an alternative marker of food choice.

Figure 3. Hypothetical Model



Method

Participants

A total of 199 undergraduate participants (164 women, 35 men) were recruited from the University of Maine psychology participant pool. Due to missing data for critical variables, the total number of participants was reduced to 196 (161 women, 35

men). Students were offered partial course credit for their participation in each session. Participant ages ranged from 18 to 22 years old ($M_{age} = 18.14$, $SD = 0.54$) and the racial composition was primarily White (95%).

Procedure

This study took place over the course of two years (2011-2012). Participants completed a measure of depression (Beck, Steer & Brown, 1996) in a mass prescreening session. This measure will be further discussed in the materials section. In session one of the study, freshmen men and women were asked to come into the lab during the first few weeks of the fall semester. Participants were then given an informed consent for the study, which also notified them that they would be contacted for optional participation for the second session of the study for partial course credit. Participants completed a questionnaire packet, which entailed measures for eating behavior (food frequency and emotional eating) and positive affect. Participants then gave a five-minute speech on their “Dream Job” that was videotaped and later transcribed and used as a measure for depressed language. A female research assistant obtained their body measurements and weight after the speech to be assessed over time. Session two of the study occurred at the end of the semester about 10 weeks after session one. Participants completed a questionnaire packet, which included measurements on eating behavior for food frequency. They gave another speech about their “Future Goals and Plans” that was also videotaped and later transcribed to measure levels of depressed language. Similarly, body measurements and weight were obtained afterwards. Measures of depressed language and body measurements were also used to indicate any differences between the times of session one and two. Speech topics for session one and two were picked because

according to studies by Carver and Scheier (1998), thinking about goals can activate both negative and/or positive emotional reactions.

Measures

Body shape and size

Body mass index

Participants' self-reported height and weight were calculated into a BMI score, where $BMI = [\text{weight in pounds} / (\text{height in inches} \times \text{height in inches})] \times 703$.

Depression

Beck Depression Inventory (BDI)

The Beck Depression Inventory (Beck, Steer & Brown, 1996) is a multiple-choice self-report inventory used to measure the severity of depression. Participants reported their current level of depression during the past two weeks from a 0-3 scale (20 items; "I am so sad or unhappy that I can't stand it"; $\alpha = .83$) where higher scores indicated more severe depressive symptoms. One question regarding suicide was deleted from this questionnaire due to liability issues. The BDI contains specific cut offs for depression for this measure dependent on the overall score, however due to not having a clinical sample, we will instead look at higher levels versus lower levels on this scale to determine depressed affect.

The Linguistic Inquiry and Word Count (LIWC)

The Linguistic Inquiry and Word Count is a text analysis software program which calculates the degree to which people use different categories of words across a wide array of texts and speeches (Pennebaker, Booth, & Francis, 2007). Similar to Rude et al., (2002) we will be using LIWC to analyze depressed language defined as the use of first

person singular pronouns (I, me, my) as well as a higher use of negatively valenced words and a lower use of positively valenced words.

Positive Mood

Dispositional Positive Emotions Affect Scale (DPES)

The Dispositional Positive Emotion Scales (DPES) questionnaire (Shiota, Keltner, & John, 2006) is a 38-item, self-report instrument. Four subscales were used: joy (6 items; “I often feel bursts of joy”; $\alpha = .82$), contentment (5 items; “I’m generally a contented person”; $\alpha = .84$), pride (5 items; “I feel good about myself”; $\alpha = .77$), and love (6 items; “Other people are generally trustworthy”; $\alpha = .82$). Participants reported their level of agreement with each statement on a 7-point scale anchored at (1) “strongly disagree” and (7) “strongly agree.”

Emotional Eating

Block Food Frequency Questionnaire

Participants completed this self-report questionnaire to measure their typical intake of a variety of different food items (Potischman & Carroll, Iturria, Mittl, Curtin, Thompson, & Brinton, 1999). Subscales of fast food (4 items; “Any fried foods such as french fries, fried chicken, onion rings”; $\alpha = .64$) and sweet foods (5 items; “chocolate and candy bars”; $\alpha = .69$) were used.

The Dutch Eating Behavior Questionnaire (DEBQ)

Participants reported their current eating behaviors on the emotional eating subscale (11 items; “Do you feel the desire to eat when you are feeling depressed or discouraged?”; $\alpha = .94$) (Streien, Frijters, Bergers, & Defares, 1986)

Results

Preliminary Analysis

Correlations, standard deviation and means for all of the observed variables in this study are presented below in Table 1. Contrary to some prior research, the women ($N=72$, $M_{\text{depression}}=6.39$, $SD=6.48$) in the current sample did not report higher levels of depression than men ($N=33$, $M_{\text{depression}}=6.94$, $SD=6.01$). In this sample, for women, 90% would be considered to fall under the cutoff for “minimal depression” or not depressed, with only 2 participants with severe depression, 1 participant with moderate depression and 4 participants with mild depression. For men in this sample, 85% would be considered not depressed, with no participants falling under severe depression, 2 participants with moderate depression and 3 with mild depression. As stated above, since the numbers for those who were depressed were so low, we instead looked at higher levels versus lower levels of scores on the BDI scale to determine depressed affect instead of clinical depression.

For both men and women, correlations between all of the positive measures (Pride, Joy, Contentment, Love) were all significantly correlated to each other. Also, BMI was not significantly correlated to any other variables listed in the table. For men and women, positive emotions and depression tended to have a negative relationship, with stronger correlations seen for women. For women, emotional eating and fast food eating were significantly negatively correlated with each positive emotion. Emotional eating was significantly positively correlated for emotional eating in women, however not in fast food eating. For men, fast food eating and emotional eating were significantly negatively correlated to each other, but not significantly correlated to any other variable.

For women, sweet food eating was significantly negatively correlated with the emotion pride, and significantly positively correlated to emotional eating and fast food eating. For men, sweet food eating was significantly negatively correlated to contentment and love. This preliminary analyses suggested relationships in the data consistent with hypotheses if they were reflected in models

Table 1. Correlations, Standard Deviation and Means for Observed Variables

	1	2	3	4	5	6	7	8	9
1. Pride	_	.80**	.84**	.72**	-.31	.03	-.05	-.29	.18
2. Joy	.78**	_	.85**	.78**	-.18	.17	-.03	-.24	.02
3. Contentment	.82**	.78**	_	.79**	-.24	0.16	-0.13	-.24*	.22
4. Love	.60**	.67**	.66**	_	-.03	0.16	-0.13	-.24*	.22
5. Depression	-.32**	-.19	-.24*	-.33**	_	-.01	.01	.03	.09
6. Emotional Eating	-.32**	-.25**	-.26**	-.19*	.27*	_	-.34*	-.01	.14
7. Fast Food Eating	-.27**	-.20**	.26**	-.20*	-.14	.07	_	.33	-.06
8. Sweet Food Eating	-.16*	-.20	-.10	-.06	.08	.36**	.38**	_	-.27
9. BMI	-.12	-.03	-.13	-.14	.02	.14	.06	-.05	_
Mean(SD) Women	4.21 (0.81)	4.13 (0.97)	4.27 (0.98)	4.09 (0.92)	6.39 (6.48)	2.08 (0.82)	1.46 (0.85)	1.18 (0.61)	23.4 (4.50)
Mean(SD) Men	4.57 (0.73)	4.02 (1.02)	4.25 (0.99)	3.80 (1.10)	6.94 (6.01)	1.62 (0.81)	1.89 (0.75)	1.29 (0.69)	22.96 (3.32)

Note: Correlations presented above the diagonal are for Men and those below the diagonal are for Women. For correlations involving depression (N = 107). * $p < .05$, ** $p < .01$

For this study, we will be focusing primarily on women given they had a bigger sample and higher levels of depressed affect than men. A series of regression models were used to test my hypotheses. Each regression model was tested in SPSS using a

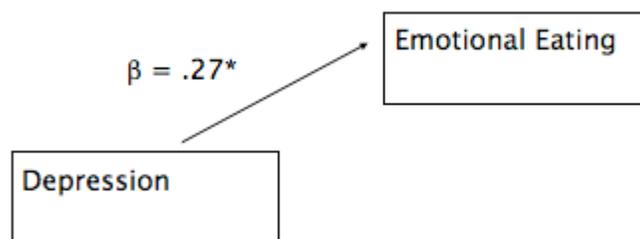
program called Process (Hayes, 2013). The structure of the models includes the variables emotional eating, sweet food eating, and either a measure of depressed or positive affect. BMI was controlled for in each model because it may be associated with each given variable.

Depression and Emotional Eating

Does depression increase sweet food eating for women? I hypothesized that depression may lead to emotional eating, which then would increase sweet food eating, particularly for women. To test this hypothesis we conducted a series of regression models and then tested the indirect effect of depression on sweet food eating through emotional eating. We controlled for BMI in this analysis because it may be associated with depression, emotional eating, and sweet food eating. For this analysis, our sample size was a bit lower ($N = 72$).

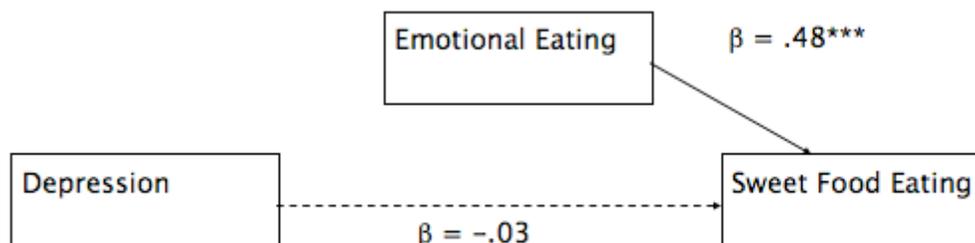
The first regression model tested whether depression is associated with higher levels of self-reported emotional eating. As predicted, the more depressed women were, the higher their emotional eating score ($\beta = .27, p < .05$). Therefore, as depression increased, emotional eating increased as well. BMI was not a significant predictor of emotional eating ($\beta = .17, p > .14$). The model was significant and accounted for 10% of the variance in emotional eating ($R^2 = .10, F(2,69) = 3.92, p = .02$). This model is shown in figure 3a.

Figure 3a. Depression and Emotional Eating



The next model examined sweet food eating with both depression and emotional eating as predictors, controlling for BMI. Surprisingly, BMI was not a significant predictor of how much sweet food women reported eating ($\beta = .01, p > .90$). Consistent with predictions, the more a woman reported emotional eating, the more sweet food she reported consuming ($\beta = .48, p < .001$). With emotional eating in the model, there was no direct relationship between depression and sweet food eating ($\beta = -.03, p > .76$). The overall model was significant ($F(3,68) = 6.20, p < .001$) and accounted for 21% of the variance in sweet food eating. This model is shown in figure 3b.

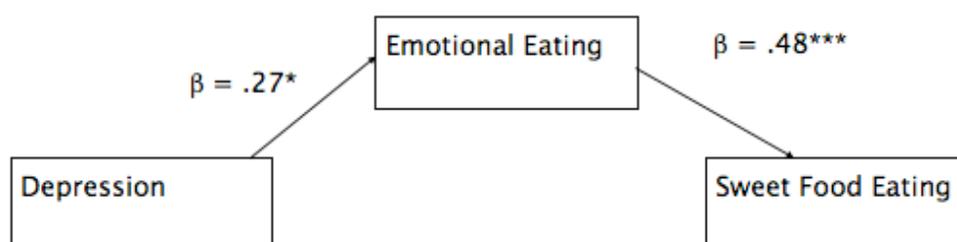
Figure 3b. Depression, Sweet Food Eating and Emotional Eating



The last model tested whether depression significantly increases sweet food eating through emotional eating. To test this effect the Process program uses bootstrapping, which is a statistical strategy that takes multiple estimates of this indirect path and

determines how much they are likely to vary from each other from estimate to estimate. The estimate of the indirect effect is .014 and the confidence interval ranges from .002 to .036. This is a small effect, but it is significant since the confidence interval does not include 0. Therefore, consistent with predictions, depression is associated with increased sweet food eating through emotional eating. This model is shown in figure 3c.

Figure 3c. Depression and Sweet Food Eating



We did not observe these relationships for fast food eating for women. For men, we did not observe these relationships for either sweet food eating or fast food eating.

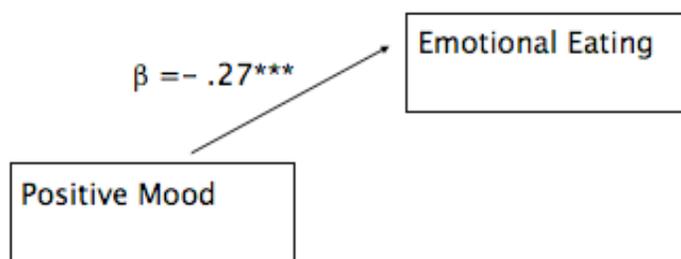
Positive Mood and Emotional Eating

Does positive mood decrease emotional eating for women? I hypothesized that an increase in positive mood would decrease levels of emotional eating, which would then decrease sweet food eating. We tested the same emotional eating mediation model used for depression, but instead looked at positive mood as the predictor of emotional eating and sweet food eating. To simplify the analysis, we averaged the 4 indicators of positive mood (Pride, Joy, Contentment, Love; $\alpha = .91$). The same steps to test the mediation model described in the analysis for depression were followed for this model. For this analysis, more women completed the positive mood measure than the Beck Depression measure giving us a higher overall sample ($N=161$). We also controlled for BMI in this

analysis because it may be associated with positive mood, emotional eating, and sweet food eating.

The first model tested whether positive mood is associated with higher levels of self-reported emotional eating. As predicted, the higher a woman's positive mood, the lower her emotional eating score ($\beta = -.27, p < .001$). Therefore, as positive mood increased, emotional eating decreased. BMI was not a significant predictor of emotional eating ($\beta = .14, p = .08$). The model was significant and accounted for 9% of the variance in emotional eating ($R^2 = .09, F(2,158) = 8.09, p < .001$). This model is shown in figure 4a.

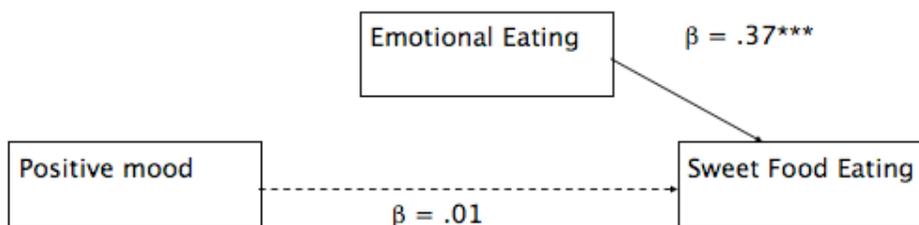
Figure 4a. Positive Mood and Emotional Eating



The next model predicted sweet food eating with both positive mood and emotional eating as predictors, controlling for BMI. Surprisingly, BMI was still not a significant predictor of how much sweet food women reported eating even in this larger sample ($\beta = -.04, p > .61$). Consistent with predictions, the more a woman reported emotional eating, the more sweet food she reported consuming ($\beta = .37, p < .001$). With emotional eating in this model, there was no direct relationship between positive mood and eating sweet food ($\beta = .01, p > .15$). The overall model was significant ($F(3,157) =$

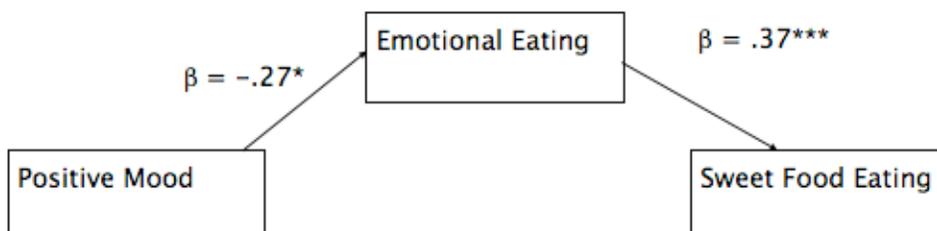
8.24, $p < .001$) and accounted for 14% of the variance in sweet food eating. This model is shown in figure 4b.

Figure 4b. Positive Mood, Sweet Food Eating and Emotional Eating



The last model tested whether positive mood significantly decreases sweet food eating through emotional eating. This test examined whether the complete path from positive mood to emotional eating, and emotional eating to sweet food is significant. Similar to the depression model, the Process program also used bootstrapping to find an estimate of this indirect effect. The estimate of the indirect effect is $-.08$ and the confidence interval ranges from $-.17$ to $-.03$. The confidence interval does not include 0 so the indirect effect is significant. Therefore, as hypothesized, positive mood is associated with decreased sweet food eating through emotional eating. This model is shown in figure 4c.

Figure 4c. Positive Mood and Sweet Food Eating



We did not observe these relationships for fast food eating. Although the indirect effect was not significant for fast food, we did find that higher positive mood was associated with lower fast food consumption, even with both emotional eating and BMI in the model ($\beta = -.25, p < .001; R^2 = .07, F(3,157) = 3.75, p < .05$). We also did not observe these relationships for men for sweet food eating or fast food eating.

Depressed Language and Emotional Eating

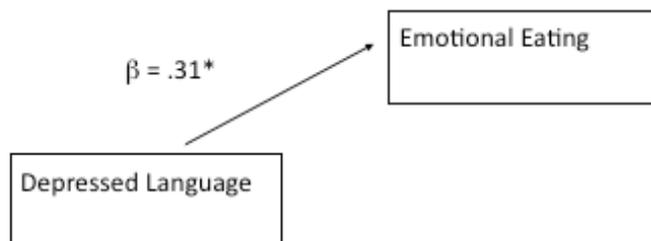
Does depressed language increase emotional eating? I hypothesized that depressed language may lead to emotional eating, which then would increase sweet food eating, particularly for women. To test this hypothesis we conducted a series of regression models and tested the indirect effect of depressed language on sweet food through emotional eating. We tested the same emotional eating mediation model as above and the same steps to test the mediation model described in the analysis for depression were followed for this model. For this analysis, we had a much smaller sample size ($N=41$) of women who gave a speech. This was due to differences in data collection (some women wrote a response vs gave a speech) and difficulty with completing all of the transcriptions. BMI was controlled for in this analysis because it may be associated with depressed language, emotional eating, and sweet food eating.

The first regression model tested whether depressed language is associated with higher levels of reported emotional eating. As predicted, the more depressed language women used, the higher their emotional eating score was ($\beta = .31, p < .05$). Therefore, when depressed language increased, emotional eating also increased. BMI was not a significant predictor of emotional eating ($\beta = .18, p > .27$). The model was significant and

accounted for 13% of the variance in emotional eating ($R^2 = .13$, $F(2,38) = 2.74$, $p = .08$).

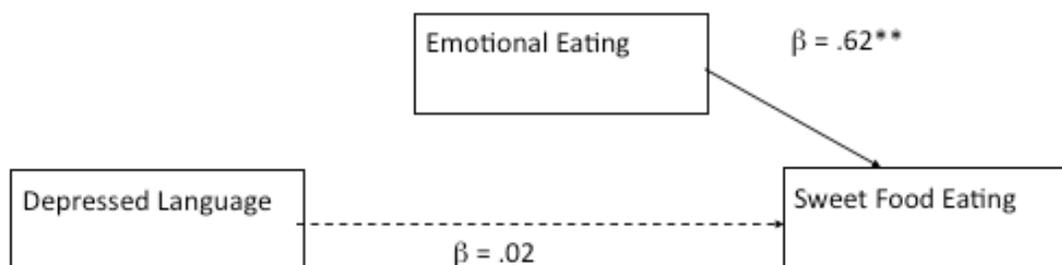
This model is shown in figure 5a.

Figure 5a. Depressed Language and Emotional Eating



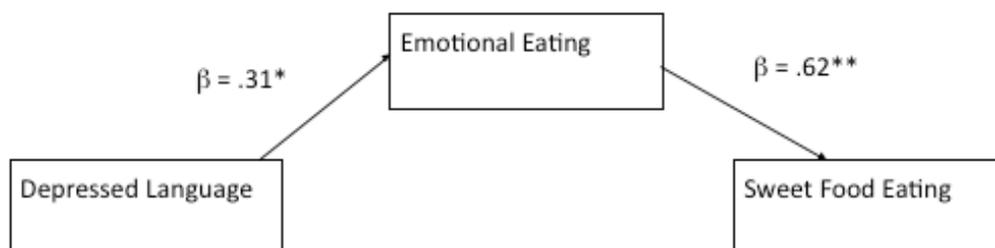
The next model predicted sweet food eating with both depressed language and emotional predictors controlling for BMI. Again, BMI was not a significant predictor of how much sweet food women were eating ($\beta = .004$, $p > .98$). Consistent with predictions, the more a woman reported emotional eating, the more sweet food she reported consuming ($\beta = .62$, $p < .001$). With emotional eating in the model, there was no direct relationship between depressed language and sweet food eating ($\beta = .02$, $p > .91$). The overall model was significant ($F(2,38) = 2.74$, $p = .08$) and accounted for 37% of the variance in sweet food eating. This model is shown in figure 5b.

Figure 5a. Depressed Language, Emotional Eating and Sweet Food Eating



The last model tested whether depressed language significantly increases sweet food eating through emotional eating. This tests to see whether the complete path from depressed language to emotional eating, and emotional eating to sweet food eating is significant. Similarly with the other models, we used the same Process program that uses bootstrapping to test this effect. Our estimate of the indirect effect is .110 and the confidence interval ranges from .005 to .246. This is a small effect, but significant since the confidence interval does not include 0. Therefore, we can conclude as hypothesized that depressed language is associated with an increase in sweet food eating through emotional eating. This model is shown in figure 5c.

Figure 5c. Depressed Language and Sweet Food Eating



We did not observe these relationships for fast food eating for women. For men, we did not observe these relationships for either sweet food eating or fast food eating.

Discussion

Consistent with predictions, emotional eating mediated the relationship between sweet food eating and depressed/positive affect for women. Lower levels of depressed affect lead to an increase in emotional eating, which in turn raised levels of sweet food eating. Positive affect was associated with a decrease in emotional eating, which in turn

lowered levels for sweet food eating. Contrary to predictions, BMI was found to be a non significant factor for emotional eating in each model.

When evaluating the relationship between depression and sweet food eating, we found that those with a higher depressed affect also had higher levels of sweet food eating for women. The reason why depressed affect might influence sweet food eating is because it is associated with higher levels of emotional eating. We did not observe these same relationships for fast food eating in women. For men, we did not observe these relationships for either sweet food eating or fast food eating. However, we did find that fast food eating was negatively correlated to emotional eating in men. The relationships found for depression were the same for depressed language as well.

When examining the relationship between positive mood and sweet food eating, it was found that higher levels of positive mood was associated with decreased sweet food eating through emotional eating for women. Therefore, the reason why positive mood might influence sweet food eating is because it is associated with lower levels of emotional eating. We did not observe this same relationship with fast food eating for women, however we did observe that higher positive mood was associated with lower fast food consumption. For men, we again did not observe these relationships for sweet food or fast food eating. However, we did observe that some positive emotions (love and contentment) were negatively correlated to sweet food eating in men. Consistent with findings from Dube et al., 2005, women consumed a higher sweet food diet when experiencing negative affect compared to men. One interesting thing to point out as well is that the Beta correlation is the same for the depression and positive mood model, even with the varying sample sizes.

There are a few potential problems with this current research. First, having only 35 men in the study, we cannot be as confident in their results compared to women. Therefore the relationships depicted in each model may not be representative of the population for men. Also, due to complications within the lab, participants in 2012 were asked to give a written essay on the same prompts instead of a speech. While transcribing, the written essays were significantly shorter than the speeches, which affected our sample size for depressed language. Also, due to a low return rate for session two, the sample size for depressed language at time 2 was lower than expected.

Limitations to the results of the current research may be due to missing data, as not every participant responded to every item in each questionnaire. Due to missing data on some critical variables, some women had to be cut from this study, giving us a lower overall sample size ($N=196$). There was also missing data for BDI, leading sample sizes for this measure to be lower as well ($N=107$). Furthermore, only using women in each model cut sample sizes even lower. Another limitation to the current research is that it is important to note that these are all correlational effects or relationships, not direct causes.

Despite these flaws, the results of this current research propose important messages. Even at low levels of depression, we still see effects in this sample. Most participants were considered not depressed according to the BDI clinical cutoff scale, however as depression increased, we still see effects as shown in the results, even though these participants wouldn't necessarily be in treatment. Therefore the next question to ask is whether these results are associated with just a negative mood effect, or would these correlations be even stronger with a clinical sample? Further research in this domain could help indicate this relationship. Also, although the sample size for men was very

small, they showed lower levels in emotional eating. Therefore it is hard to tell if these results are due to a lower sample size or if emotional eating is differently associated with mood for men compared to women. A bigger sample size would give us more definitive results, which could also be depicted in further research.

Given the high prevalence of depression among college students, it is imperative that research increase on this topic and intervention become more apparent among college campuses. Depression is a well-documented public health concern in today's U.S college population, therefore, detecting the onset of depression, especially among college students is critical. This current research provided different outlets to identify and define depression through language use, specifically pronoun use. Pronoun use may be an overlooked linguistic dimension that could have important meaning for researchers in health and social psychology. Pennebaker and Lay (2002) found that pronouns are markers of self-versus group identity (I versus we) and how people focus on or relate to others, which gives us another outlet to help us better identify those who are depressed versus non depressed. In sum, the current research demonstrates that among female college students moderate to low levels of depression, depressed language use, and low levels of positive affect can all lead to emotional eating of sweet foods.

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Author's Biography

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Upon graduation, Jhen-da will be in Orono for the summer for an internship with the Campus Special. Following that she plans to return to work on an advanced degree in Clinical Psychology.