

5-2013

Mood Congruency Effect on Academic Content Retention for Emotionally Disturbed High School Students

Lara M. Corkrey
Dominican University of California

<https://doi.org/10.33015/dominican.edu/2013.edu.04>

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Corkrey, Lara M., "Mood Congruency Effect on Academic Content Retention for Emotionally Disturbed High School Students" (2013). *Graduate Master's Theses, Capstones, and Culminating Projects*. 86.

<https://doi.org/10.33015/dominican.edu/2013.edu.04>

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Running head: MOOD, MEMORY, AND ACADEMIA

Mood Congruency Effect on Academic Content Retention
for Emotionally Disturbed High School Students

Lara M. Corkrey

Submitted in partial fulfillment of the requirement for the degree

Master of Science in Education

Dominican University of California

School of Education and Counseling Psychology

San Rafael, CA

April 2013

Acknowledgements

This paper is the culmination of a 15 year journey. In the beginning, it was a journey for the pursuit of education. At the end, it was a journey of self-exploration leading to the ultimate achievement of spending my days guiding the development of today's youth and tomorrow's leaders.

The journey would not have been possible without the support of so many. Ron Corkrey, my grandfather, for teaching me the value of education and hard work and Karen Corkrey, my grandmother, for always believing in my potential. The wisdom and love you have given me guides me daily to be my best, give to others, and make good decisions.

As an undergraduate students studying psychology, many mentors developed my passion for science and humanity. Afshin Gharib provided numerous opportunities to explore my immersing interests in science and teaching. William (Bill) Phillips and Ian Madfes gave tirelessly as they mentored me through the writing of my undergraduate thesis and professionally presenting the results.

Rande Webster fostered my compassion and passion for Special Education. She showed me a world beyond wrong-doing and right-doing: place where all students are unique individuals without labels. Sharon Gordon supported my growth as a teacher, guiding me through the best and worst of student teaching and helping me to never lose sight of the goal.

This paper would not have come to fruition without the endless support of Madalienne Peters. She has patiently provided the encouragement and insight necessary for such a mammoth undertaking. Thank you again to Bill Phillips for the statistical analysis consulting of this thesis. You helped bring the puzzle pieces together.

Finally, thank you to my students. You drive my curiosity for education and to desire to know how to better serve your curiosity. You inspire me daily while showing me the magic of teaching and the joy of living.

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Abstract

The effect of mood on the encoding and recall of memories is crucial to create more affective classroom environments conducive to retention of academic content. The current study hypothesized that emotionally disturbed (ED) students encode less academic content than their peers due to their pervasive negative mood. In three separate conditions, 73 participants were shown a 5 min video clip to either induce a positive or negative mood or to neutralize mood. Subjects were asked to rate their mood before and after the film clip. Finally, participants were instructed to recall as many words as they could from a presented word list containing emotionally positive, negative and neutral words. A paired samples t-test demonstrated statistically significant results for mood-induction in a positive, negative, and neutral condition ($p = 0.001$, $p = 0.004$, $p = 0.003$, respectively), which did concur with the hypothesis. However, no statistical significance demonstrated correlation between mood and memory.

Chapter 1 Introduction

Statement of Problem

This examiner could find no literature that directly studied the correlation between the emotional state of an emotionally disturbed (ED) student to their academic achievement. This is a gap in the literature given that the very diagnosis of emotional disturbance contains the word “emotional”. Students identified as emotionally disturbed are defined as experiencing a general pervasive mood of unhappiness or depression that impedes their ability to access the general education curriculum (National Dissemination Center for Children with Disabilities, 2012). A pervasive negative mood has the potential to severally impede students’ academic success. Emotions have the ability to strain cognitive resources by directing a student’s attention away from the current task (Pekrun, Goetz, Titz & Perry, 2002). This can ultimately lead to a reduction in student’s capacity for processing and understanding tasks (Cron, Slocum, VandeWalle & Fu, 2005, as cited in Hill, Linnenbrink-Garcia, & Tyson, 2009). The consumption of cognitive resources for task-irrelevant purposes implies that fewer resources are available for task completion, thereby reducing performance (Meinhardt & Pekrun, 2003).

Purpose

If educators are to create more affective classroom environments conducive to retention of academic content, it behooves researchers to understand and define the correlation between mood, memory, and academia.

Research Question

Do emotionally disturbed students encode less academic content than their peers due to their pervasive negative mood?

Theoretical Rationale

Research concerning disorders affected by emotion and memory, such as depression and post-traumatic stress disorder (PTSD), suggests that not only is it important to understand the

influence of emotion on encoding and recall, but to also understand the underlying neurological mechanism involved (Winkielman, Berridge, & Wilbarger, 2005). This research could have important implication for understanding the academic needs of emotionally disturbed students who often suffer from disorders such as depression and PTSD.

Assumptions

Emotionally disturbed students pervasive negative mood prevents them from encoding and later recalling academic content. Thus, emotionally disturbed student's high school success is jeopardized unless teachers can create environments conducive for retention of academic content.

Background and Need

This study was prompted by an interest in the relationship between emotion and memory. It is important to understand the cognitive processes associated with the influence of mood and emotion on memory. Mood congruence and mood-dependent memory are two cognitive processes examined in a 2000 study authored by Eich and Macaulay. Their research explored the correlation of simulated moods on both mood-congruent memory (MCM) and mood-dependent memory (MDM). For the purpose of this study, MCM is the observation that a given mood tends to enhance the encoding or retrieval of target events that share the same affective tone or valence. The definition of MDM is that events encoded in a particular mood are more retrievable when that mood is re-experienced, regardless of the event's valence.

The results of Eich and Macaulay's study demonstrated that a simulated happy mood produces MCM that is of no difference than an induced happy mood. However, while a replicated sad mood can yield MCM, it is qualitatively different than MCM constructed from an induced sad mood. In other words, mood-congruent effects elicited by replicated states of happiness and sadness are symmetric and those evoked by real moods are asymmetric.

Asymmetry stems from a process of mood repair. While, in general, people routinely strive to make a bad mood better, they seldom try to make a good mood worse. This line of thinking implies that sadness is not only a bothersome state, but a bona fide one as well.

In order to fully understand mood congruency and unconscious mood repair, the gestalt of human experience should be examined. In a 2008 study conducted by Corkrey, Madfes, and Phillips, participants were induced into either a positive, neutral, or negative mood and then asked to recall a list of emotionally cued words. Volunteers induced into a negative mood and reporting a post-study negative mood recalled not only fewer total words but also fewer neutral words. However, of the emotionally valenced words remembered, more positive than negative words were encoded and recalled. These results implied that under "normal" conditions, when mood is neutral, more neutral than emotional memories are encoded and recalled. When deviating away from "normal", when emotion has been induced by an external stimulus, overall memory is reduced because memory is filtered through emotion. It still holds true, though, that more positive words are encoded and recalled than negative words. Consequently, emotionally disturbed students experiencing bona fide negative moods who are unable to engage on mood repair are likely to encode and recall less information. This will inhibit retention of educational content and facilitate academic failure.

Chapter 2 Literature Review

Mood Effect on Retention of Academic Content for Emotionally Disturbed Students

Emotion and Mood

To better understand the association between mood, memory, and academia, it is important to first distinguish the difference between emotion and mood. Emotion is simply a reaction to a specific environmental stimulus that is short-lived (Buchanan, 2007; Matlin, 2003). Mood by contrast is a long lasting emotional experience that may or may not have a specific antecedent (Buchanan, 2007; Matlin, 2003). The ease or difficulty of encoding and recalling memories is influenced by all types of moods and emotions, whether conscious or unconscious. This idea is exemplified in two experiments conducted by Winkielman, Berridge and Wilbarger (2005), which examined emotional processes that are entirely unconscious, but still affect a person's behavior and physiological reactions, even when an individual is attentive and motivated to describe their feelings. They noted that, traditionally, conscious feelings have been considered a central and necessary ingredient of emotion. However, they conjectured that cognitive processes and states of mind can be unconscious, meaning below the level of awareness, or implicit, meaning to occur without attention or intention. Previous studies had shown that stimuli presented unconsciously can produce a consciously felt emotional reaction, but subliminal stimuli that cause conscious emotional reactions are different from emotional reactions that are themselves unconscious. Winkielman, et al. hypothesize that not only is it possible for the stimuli to be unconsciously observed, but also for the emotional reaction to be unconsciously felt while being intense enough to alter a person's behavior.

Participants of the first study were first asked to rate how thirsty they were (0 = not at all, 11=very thirsty) and then subliminally exposed to facial expressions exhibiting either a happy, neutral, or angry emotion for 16 milliseconds. The emotional expressions were embedded in a

cognitive task asking participants to classify a clearly visible face with a neutral expression as male or female. Participants in the first study were asked to rate their feelings on scales assessing their emotional experience immediately after the cognitive task ($-5 = \text{unpleasant}$, $5 = \text{pleasant}$) and then given a beverage to consume and evaluate. These individuals did not report their conscious feelings as being either more positive after being subliminally presented with the happy expression or more negative after being subliminally presented with the angry expression, $B = 1.09$, $t(35) = 10.35$, $p < .01$. Thirsty individuals who were subliminally shown the happy expression poured themselves significantly more beverage (62ml) than thirsty individuals who were subliminally shown the angry face (47ml), $B = 7.52$, $t(34) = 1.80$, $p < .08$. Exposure to the subliminal happy expression also caused thirsty individuals to drink more beverage (32ml) than after exposure to the subliminal angry expression (23ml), $B = 4.38$, $t(34) < 1.00$.

Analysis of the results of the second study revealed a prime-by-order interaction, $F(1,28) = 4.41$, $p < .05$. Participants rated their emotions either before or after they were first given the beverage and then asked how much they would be willing to pay for the beverage. Individuals who rated the monetary value of the beverage before rating their emotions were willing to pay 37 cents after exposure to the subliminal happy expression and 19 cents after the subliminal angry expression $F(1, 28) = 4.72$, $p < .04$. However, when participants rated their emotions before rating the beverage, results showed the subliminal expressions had no influence on willingness to pay, 33 vs. 34 cents, $p = .44$. Ratings of emotions again demonstrated no consciously felt effect by thirsty individuals after exposure to the subliminal facial expression ($p = .67$). While exposure to the subliminal expressions did double the beverages monetary value, the effect was only short-lived after priming.

The authors suggested that evolution is one explanation for the results of these studies. From the viewpoint of evolution and neuroscience, there is cause to suggest that some forms of

emotion can exist unconsciously. The original function of emotion was to allow an organism to appropriately react to positive or negative stimuli in the environment, which might not have always required conscious feelings. Some areas of the brain involved in emotion and memory, such as the amygdala and hypothalamus, evolved early and therefore may perform limited functions that are essentially below the level of awareness. In comparison, the human cortex, which is located at the top of the brain, is more complex and more involved in conscious emotional feelings. Research in neuroscience has demonstrated that neurocircuitry which evolved early in mammalian evolution is an integral component in behaviors that generate emotional reactions. Affective emotional reactions are controlled by these early-evolved areas of the brain, located deep below the cortex, which suggest that these reactions may occur unconsciously.

Emotional Regulation

Students who are unconscious of their emotional reactions will lack the ability to regulate those emotions. Lack of emotional regulation has the potential to have a severe negative impact academic success. Emotional regulation was the focus of a paper written by Levine and Burgess (1997) who sought to understand the effect of regulated mood on academic achievement. Emotions direct attention to information that seems immediately relevant to maintaining wellbeing or attaining goals (Frijda, 1987; Lazaros, 1991; Lerner & Keltner, 2000; Levine & Pizarro, 2004; Stein & Levine, 1987, as cited in Levine and Burgess, 1997). For instance, this researcher becomes cranky when hungry. The aversive emotional state of cranky is concentrating my attention to maintaining my vitality as food is the only resource that will produce a positive mood at that time. Thus, attention is a limited resource diverted by emotions from certain sources of emotionally irrelevant information. Consequently, a student who can regulate emotions when entering a classroom may have a distinct intellectual advantage over a

student whose emotions continue to commandeer attention. In other terms, emotionally disengagement may promote memory for non-emotional information by turning one's attention away from emotion-eliciting events and toward information in the environment. Conversely, emotional engagement, which involves focusing on emotions and their causes, may inhibit memory for non-emotional information. For their study, Levine and Burgess hypothesized that emotional disengagement would facilitate memory for non-emotional material.

Participants were recruited from public and private schools, after-school centers, and research volunteers in Orange and Riverside Counties in California. Two hundred children ranging in age from 5.2 years to 11.4 years participated in the study. Fifty-seven of the children were male and the majority of children were from middle-income homes. Four experimental conditions were administered: (a), a neutral film and no emotional regulation instructions, (b) a sad film and no emotional regulation instructions, (c) a sad film and emotional engagement instructions, and (d) a sad film and emotional disengagement instructions. Twenty-five children were randomly assigned to each of the four conditions. Results of the study demonstrated that feeling sad can interfere with children's memory for educational material. In support of the hypothesis, participants who viewed a neutral film and received no instruction to regulate their emotions recalled more educational details than children who viewed a sad film and also received no regulation instructions ($p = .05$). In further support of the hypothesis, of the children who saw the sad film, those instructed to disengage from sadness recalled more educational details than those who received no emotion regulation instructions ($p = .007$).

Levin and Burgess's study clearly demonstrates a correlation between aversive emotions and an exerted demand on cognitive resources. This in turn supports the suggestion that experiencing aversive emotions in the classroom creates a learning disadvantage (Faber & Mazlish, 1995, as cited by Levin & Burgess, 1997). Results that demonstrated that sad children

remembered less educational material underscores the importance of promoting effective emotional regulation in real world settings such as the classroom. Temporary emotional disengagement may assist student's concentration on learning. This is especially important for ED students who frequently have difficulty regulating their emotions and are often among the lowest academic achievers. A student cannot be expected to succeed at academia if their emotions are inhibiting them from encoding and recalling learned information. If educators can incorporate effective strategies for regulating emotion into the classroom, than ED students may become more academically successful.

Defining Memory

No student can academically succeed if emotions hamper encoding and recall of content learned during school. In order to assist students, especially ED students, with retention of academic content, it is prudent to study the correlation between mood and memory. Cognitive psychologists devise various theories for describing and understanding human thought processes, especially memory. The Atkinson-Shiffrin model proposed that memory can be understood as a sequence of discrete steps, in which information is transferred from one storage area to another (Matlin, 2003, p. 10). According to this model, external stimuli from the environment first enter sensory memory. Sensory memory is a large-capacity storage system that records information from each of the senses with reasonable accuracy. Some material from sensory memory is forgotten but some information transfers to short-term memory (STM). Short-term memory, now often called working memory, contains only small amounts of information actively utilized in the present moment. Thus, memories in STM are fragile. Memories then pass from STM to long-term memory (LTM). Long-term memory has a large capacity and contains memories that are very old and very new. Memories stored in LTM are relatively permanent and not likely to

be lost. Atkinson-Shiffrin proposed the ability to retrieve information from LTM and call it back to STM when the information of the memory is actively needed.

Reflective-Impulsivity

The relationship between the reflection-impulsivity cognitive dimension and STM in emotionally disturbed (ED) children was the focus of an investigation conducted by Finch, Edward, and Searcy (1984). Reflection-impulsivity is the cognitive dimension that describes differences in how children solve problems (Kegan, 1965, 1966, 1970, as cited by Finch et al., 1984). Reflective children withhold responding until after examining all available alternatives and have a high probability of being correct, consequently, making few mistakes. In contrast, impulsive children respond quickly without considering available alternatives and, hence, make many mistakes. A number of studies have demonstrated the usefulness of the reflection-impulsivity dimension in making predictions about ED children. For example, Finch and Montgomery (1973) found that impulsive ED children exhibited more immature thinking than did reflective ED children. Finch et al. (1984) hypothesized that impulsive ED children would have poorer STM, as indicated by digit span performance, than would reflective, ED children.

Finch et al. (1984) tested the two hypotheses on 42 ED children (32 boys, 10 girls) in residential treatment at the Virginia Treatment Center for Children by individually administered Kagan's 1966 Matching Familiar Figures Test (MFF) by one examiner and Koppitz' 1970 Visual-Aural Digit Span Task (VADS) by another examiner in random order. The mean age of the subjects was 11.67 years (SD 2.17). The MFF is a 12-item match-to-sample task that presents the subject with one standard and six variants, only one of which is like the standard. Participants are required to indicate which of the variants is identical with the standard. Latency to the first response and errors are recorded. The VADS seeks to assess the ability of subjects to recall aurally or visually presented digits in oral or written form. The orally given sequence is

presented at one stimulus digit per second and the visually given sequence is presented for 10 seconds. Children whose mean latencies were below the group median and whose errors were above the median were designated impulsive, while those whose mean latencies were above the median and whose errors were below the mean were designated reflective. This customary procedure resulted in 14 impulsive and 15 reflective participants. Since age was related to the various measures, an analysis of covariance was performed between impulsive and reflective groups on all measures with age being the concomitant variable.

Analysis of covariance for aural intake scores demonstrated reflective children ($M=11.20$) were significantly better than impulsive children ($M=9.21$), ($p < 0.001$). The visual intake scores showed that reflective participants ($M=12.53$) scored significantly better than impulsive ($M=10.14$), ($p < 0.005$). Similarly, reflective subjects ($M = 11.80, 12.00$) were significantly better than impulsive ($M=9.79, 9.57$) on both oral expression, ($p < 0.001$), and written expression, ($p < 0.001$). These results provided strong evidence that impulsive ED children are significantly impaired in STM, as measured by the digit span tasks, when compared with their reflective counterparts. This impairment is present regardless of whether the stimulus material was presented aurally or visually and is suggestive of a general impairment in STM. Impulsive children frequently have difficulty profiting from experience and they continue to make the same mistakes. Results of the present study would suggest that impairments in memory may account partially for these reported difficulties. Since STM is a necessary process before LTM can occur, it is not surprising, given the present finding of STM deficits in impulsive children, that these children would present LTM deficits.

Contemporary Research of Information Encoding

While the current study executed by Finch et al. is revealing of STM deficits in ED children, the results should be understood in terms of modern cognitive psychology. The

Atkinson-Shiffrin model described above dominated memory research for many years (Matlin, 2003) and remains a foundation of understanding memory. However, a more contemporary model, the Collins and Loftus network model, proposes that memory is organized in terms of net-like structures with many interconnections. In this model, each concept of information is represented as a node, or location in the network. Each link in the network connects a particular concept node with another concept node. The collection of nodes and links forms a network. When an external stimulus representing a concept activates one node, the activation then spreads from that node to other nodes with which it is connected. This process, known as spreading activation, strengthens links between particular nodes every time a concept activates linked nodes. Thus, information develops from STM into LTM. If links between nodes are not developed, information may not develop into LTM. Additionally, if developed links are not strengthened, they can become inactive. Thus, if impulsive children have a deficit in STM, they may have difficulty developing and strengthen the necessary connections to form LTM.

Mood Effects on Memory

Prior research has demonstrated that mood effects memory (Corkrey, Madfes, & Phillips, 2008; Miranda & Kihlstrom, 2005; Parrott & Sabini, 1990). Affective states can influence a wide range of cognitive processes, including perception, attention, memory storage and retrieval, decision making, and cognitive problem solving (Clore & Huntsinger, 2007, 2009; Kuhbandner & Newman, 2009; Lewis & Haviland-Jones, 2000, as cited in Pekrun & Stephens, 2009).

According to this research, more information is encoded and later recalled when an individual's mood is neutral. Encoding of information decreases, or is altered, when the information is filtered through emotion. Results have typically demonstrated more information encoded when a person experiences a positive rather than a negative mood. Relating this research to an academic setting, if students have the ability to maintain a neutral mood, they may encode and retain more

academic information. A child's ability to effectively regulate their emotions has been associated with a number of measures including good social functioning and mental health (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996; Eisenberg, Fabes, Murphy, Maszk, Smith & Karbon, M, 1995, as cited in Levine & Burgess, 1997). Thus, emotion regulation augurs anticipation for improving both social and intellectual functioning. This is especially poignant for students diagnosed with emotional disturbance (ED). As expected, these students have difficulty achieving or maintaining a neutral mood, which may significantly impact their ability to access the general education curriculum.

Mood, Personality, and Regulatory Strategies

Mood is not the only factor that may contribute to students' difficulty with encoding academic content. The impact of mood, personality, and regulatory strategies on the retrieval of positive and negative memories was examined in a 2000 study conducted by Cheryl Rusting and Tracy DeHart. One prediction of the study was that the use of negative mood-regulation strategies, such as positive reappraisal, should lead to the retrieval of positive memories. Positive reappraisal occurs when a person attempts to correct an undesirable negative mood by focusing on positive thoughts and/or recalling positive memories, thus leading to mood-incongruence. On the other hand, focusing on a negative mood should, lead to the retrieval of negative memories, therefore causing mood-congruence. A second goal of the study was to examine what effect personality has on these mood-regulation strategies. Rusting and DeHart predicted that mood-incongruence would be high in individuals with high negative mood-regulation expectancies. Mood congruence was predicted from individuals with low mood-regulation expectancies.

Four experiments were performed using slightly different methodologies in an attempt to replicate and generalize the results. Individuals with both high and low negative mood-

regulation expectancies underwent a negative mood induction, followed by the manipulation of one of three different mood-regulation strategy tasks. These three strategy tasks were positive reappraisal of the event, continued focus on the negative event, and a control condition in which participants were instructed to simply list their thoughts. Finally, participants were given a memory task designed to measure retrieval of pleasant and unpleasant stimuli. For the first experiment, 49 students from an introductory to psychology class were tested individually. Participants were first asked to rate their mood and answer questions regarding their personality. Then a negative mood was induced by having the volunteers read a negative scenario and imagining themselves experiencing several negative events. Final results confirmed that participants' moods were more negative after the mood induction ($M = 4.18$, $SD = 1.80$) than before the induction ($M = 2.96$, $SD = 1.48$), $F(1,53) = 33.61$, $p < .0001$. The students were then randomly asked to complete one of the three strategy task mentioned above. Finally, a memory task instructed participants to recall details of the negative events both from the reading and imagined events. Participants who engaged in positive reappraisal retrieved memories that were less negative than those retrieved by participants in the control condition, $t(37) = 2.10$, $p < .05$, and by participants in the continued focus condition, $F(37) = 2.47$, $p < .01$, thus demonstrating mood-incongruence. Participants in the continued focus condition did not retrieve memories that were more negative than those retrieved by participants in the control condition, $r(38) = -0.91$, *ns*, hence exhibiting mood-congruence. Analysis of the personality questionnaires illustrated high negative mood-regulation (HNMR) individuals retrieving significantly more positive memories ($M = 7.70$) than did low negative mood-regulation (LNMR) individuals ($M = 5.17$), when they engaged in positive reappraisal, $t(19) = -3.73$, $p < .01$.

Except for slightly different methodologies, experiments two, three, and four were identical to experiment one and resulted in similar findings. The general results from all four

procedures suggest that an individual's regulatory responses to negative events affect the activation of subsequent positive or negative thoughts and memories. These regulatory responses may be impacted by individual personality traits. HNMR individuals are more likely than LNMR individuals to engage in reducing or eliminating stressful or negative moods. This may be due to HNMR individuals having stronger connections between negative emotion nodes and positive regulatory thoughts. LNMR individuals may believe that such regulation will be unsuccessful because they have had less practice regulating their negative moods. This may cause LNMR individuals to have fewer and weaker connections between negative emotion nodes and positive regulatory thoughts. In fact, LNMR individuals might have elaborate associations between negative emotion nodes and thoughts related to regulatory failure. The belief that they will be unsuccessful may come to mind every time they experience a negative emotion, thus causing them to more successfully encode and recall negative memories.

External Factors Impacting Emotional Regulation

While mood and memory may contribute to inhibited academic success among ED students, these are not the only important variable to consider. Many factors occurring outside of school, such as a student's home and family life, directly influence academic achievement. Maltreated or malnourished children are placed at a severe disadvantage for academic success. While ED students are not necessarily emotionally disturbed because of maltreatment, they may share some similar characteristics of maltreated children such as experiencing academic difficulties, vulnerability to emotion regulation (ER) difficulties, and exhibiting patterns of emotion dysregulation. Franks, Miller, and Schelble (2010) examined the relationship between emotion regulation and academic achievement to determine if emotion regulation is related to the development of academic resilience among maltreated children. Resilience, which is rare among maltreated children, is defined by Franks et al. (2010) as children's ability to function

normatively, despite having experienced maltreatment (Jaffee & Gallop 2007, as cited in Franks et al., 2010). However, satisfactory mental health is obviously dependent on successful emotional regulation (Gross 1998, as cited in Franks et al., 2010). Franks et al. focused their study on academic resilience because academic success is tied to critical aspects of healthy adult functioning, such as employment and higher education opportunities. Furthermore, poor educational achievement is common among children who have experienced out-of-home care (Jackson 1994, as cited in Franks et al., 2010). Many children with histories of maltreatment are consequently removed from their homes and often do not demonstrate resilience. Lack of resilience and vulnerability to ER difficulties places these children at higher risk for academic failure than their peers.

Children who exhibit negative emotions in academic settings are more likely to have behavior problems and less likely to have sufficient focus during classroom tasks (Eisenberg, Guthrie, Fabcs, Reiser, Murphy, Halgren, et al. 1997, as cited in Franks et al., 2010). Research has demonstrated that ER difficulties uniquely contribute to students' academic performance as well as indirectly influence relationships with teachers and distraction from academic work (Gumora & Arsenio, 2002, as cited in Franks et al., 2010). The association between ER and students' affect in academic settings influences academic performance even when controlling for cognitive variables (Gumora & Arsenio 2002, as cited in Franks et al., 2010). Students with the ability to adequately manage their emotions are more likely to demonstrate normative abilities to focus on schoolwork. Furthermore, teacher ratings of these students' attention correlate positively with academic achievement (Trentacosta & Izard 2007, as cited in Franks et al., 2010). This research demonstrates the necessity of explicit exploration of the correlation between the increased risks of both dysregulated emotion patterns and impaired academic performance as experienced by maltreated children.

Franks et al. (2010) obtained Child and Adolescent Functional Assessment Scale (CAFAS) scores from child welfare professionals for every child in the sample population of their study. CAFAS scores are calculated based on interviews with maltreated children, their caregivers, and their teachers, as well as through review of child welfare files (Hodges, 1990, 1994, as cited in Franks et al., 2010). Scores on the School/Work performance subscale of the CAFAS were used to measure academic performance. Scores on the CAPAS Mood/Emotions subscale were used as measures of emotion dysregulation. Participants included 158 children ages 6-18 who had open child welfare services cases during the 12 months prior to data collection. White children comprised 57% of the sample ($n = 90$) and Black children comprised 43% of the sample ($n = 68$). For purposes of this study, "Hispanic" is categorized as an ethnicity, rather than a race, resulting in Hispanic children being classified as White. However, less than 1% of children in the sample were Hispanic, thus further analysis was not completed to reclassify Hispanic children. The sample was 60.8% male ($n = 96$). Age, race, gender, number of residential placement changes in the past 12 months, number of months each child welfare case had been open, score on the Moods/Emotions subscale of the CAFAS, and score on the School/Work subscale of the CAFAS were all variables examined in the study.

Results of the study were obtained utilizing linear regression to examine the relationship between the School/Work subscale, the Moods/Emotions subscale, and demographic variables. Academic resilience was indicated by lower scores on the School/Work subscale of the CAFAS, while sufficient ER ability was indicated by lower scores on the Moods/Emotions subscale. Overall, results were significant ($p < .001$). The absence of dysregulated emotion patterns ($p < .001$) was significantly related to academic resilience, as were race ($p < .001$), age ($p = .012$), and placement stability ($p = .044$). Time in the care system did not correlate significantly with academic resilience in this sample ($p = .438$).

Results contribute a general understanding of the impact of childhood maltreatment by showing that emotion dysregulation was significantly related to academic resilience. This was affirmed even when other factors commonly believed to negatively impact foster children's academic performance, such as length of involvement in the child welfare system, were not. The prevalence of academic difficulties among both maltreated children and ED students is an urgent problem because, as demonstrated in Franks' et al. (2010) study, academic success strongly contributes to resilience. In a cyclical relationship, resilience contributes to increased academic performance, which in turn contributes to building confidence when students witness their individual success at school. Confidence building may be a key component in assisting maltreated and ED students in learning to live a healthy, normative, and productive life.

Prior Research: Factors Impacting ED Students Academic Success

Students diagnosed with emotional disturbance (ED) often have limited opportunities to succeed in school and life. While this researcher could find no literature directly examining the relationship between the mood, memory, and academic performance of ED students, Trout, Nordness, Pierce, and Epstein (2003) did conduct a comprehensive review of all articles published in the last 40 years on the academic status of children with ED. For decades, researchers have demonstrated a correlation between low academic achievement and problem behavior (Hinshaw, 1992, as cited in Trout et al., 2003). This is especially pertinent for students diagnosed with emotional disturbance (ED). Compared to other disability groups, students with ED have lower graduation rates, lower reading and arithmetic scores, and are less likely to attend postsecondary school (Kauffman, 2001, as cited in Trout et al., 2003). As a result, ED students often experience a lifetime of problems in education and employment and are likely to become involved with the criminal justice system at an early age (U.S. Department of Health and Human Services, 1999, as cited in Trout et al., 2003). To improve educational outcomes for ED

students, it is essential to understand the specific characteristics and academic needs of the population. A review of literature concerning ED is necessary to identify strengths and weaknesses of current research and to determine focus for additional research. The current comprehensive review sought to examine existing research related to the academic status and functioning of ED students.

Research has shown that problem behavior has a negative influence on academic achievement and that underachievement produces consequences that foster inappropriate behavior (Bower, 1995, as cited in Trout et al., 2003). Whether problem behavior causes poor academic performance or vice versa, strong evidence indicates that academic underachievement and problem behavior engage in a reciprocal relationship that has short- and long-term influences on students' future outcomes. To better understand the influences experienced by ED students, Trout et al. assessed trends in research over time. Results revealed several critical areas affecting the education of ED students have changed over the past four decades. One area of interest is placement settings. Previous reviews demonstrated that the majority of research on the academic status of ED students was conducted in psychiatric or residential treatment settings (Epstein, Kinder & Bursuck, 1989). This limits the extent to which findings can be generalized to students served in general education placements settings. Researchers have recently begun to recognize the importance of assessing students served in the general education classroom, resource rooms, and self-contained settings within the general education building. However, a clear understanding of the academic abilities of ED students served in less restrictive settings has yet to be reached. Without this knowledge, there is limited ability to focus and target academic interventions and accommodations.

Another area of interest highlighted by Trout et al. (2003) concerned the specific skill sets and academic status of ED children. When academic status was presented as number of

years behind, at, or above achievement, there were no reports of ED students attaining above average or average scores. However, when students' scores were reported by grade levels, meaning below, at, or above grade level, 13% of the reviewed data reported that the students were performing at average ability. These findings bring into question the accuracy of using different methods to report achievement and students' scores. Additionally, when the academic status of ED students was compared to students without disabilities or with other categories of disabilities, there were several pertinent findings. For example, previous studies assessing the academic status of students with ED, attention-deficit/hyperactivity disorder (ADHD), and learning disabilities (LD), sought to determine inappropriate placement decisions through analysis of students' academic ability. Results demonstrated that many pupils with ADHD and ED were misidentified and inappropriately served in programs for LD students. These findings suggest that inappropriate placement may affect the prevention of an ED diagnosis. Furthermore, performance of ED students was often found to be equal with LD students, primarily in arithmetic and written expression, and equal to ADHD students across subject areas. These findings could affect both placement and programming decisions for ED students.

Summary

The current review revealed several important questions pertinent to future research and educational programming of ED students. Student characteristics, developmental pathways, and specific academic skill sets are some of the areas in need of additional research. For instance, no studies reviewed reported students' age when initially identified as having ED. Students identified and receiving services early may present different patterns of academic functioning than do later identified students. This may result in receiving more intensive support and treatment early in a student's academic career. Additionally, students identified early may have been achieving at a lower level, perhaps due to more severe behavioral and adjustment problems,

prompting early identification. Patterns of academic achievement for students identified at an earlier age may provide a different picture than those identified at a later stage of their academic career, providing critical information for programs advocating early intervention. Longitudinal studies would increase understanding of the developmental pathways of underachievement, help target interventions, and allow for an assessment of service utilization and the outcomes of treatment. Moreover, longitudinal studies would allow for greater examination of treatment resisters and the multitude of variables, such as problem behavior, truancy, and placement settings, which may significantly affect students' academic achievement.

Longitudinal studies would greatly contribute to a clearer understanding of the academic status of ED students and thus effective intervention strategies. However, educators must proceed with current research, which demonstrates that, historically, ED students have been unsuccessful in gaining skills necessary to achieve academically and socially (Patterson, DeBeryshe, & Ramsey, 1989, as cited in Mason, Temple-Harvey, & Vannest, 2009) and, therefore, have negative school and life outcomes. They are also least likely to receive A or B grades, demonstrate poor social adjustment, and exhibit increased behavioral difficulties when compared with students with disabilities other than ED (Bradley, Henderson, & Monfore, 2004, as cited in Mason et al., 2009). Despite the poor academic results of ED students, the No Child Left Behind Act (NCLB; 2001) mandates that the adequate yearly progress (AYP) of the academic achievement of these students be measured in the same manner as that of their nondisabled peers. Thus, the measure and accountability for student success is no longer contained in an individualized education program (IEP) and the provided special education program. Rather, success and AYP of ED students is now integrated in the broader accountability requirements of NCLB. Given these changes, it is pertinent that ED students receive academic instruction via effective academic practices designed to improve both behavior

and academic performance. It is important to note that accountability and AYP do not measure changes in social behavior, but rather change in academic behavior. Therefore, if ED students are to meet AYP, teachers require instructional expertise in academic content as well as the behavioral and social skills typically found in curriculum and IEP goals.

The majority of available research concerning academic interventions for ED students would not meet NCLB's standard of scientifically based research (Mooney, Denny, & Gunter, 2004, as cited in Mason et al., 2009). Finding effective instructional practices for ED students is challenging for researchers and even more daunting for teachers. Mason et al. (2009) conducted a review of current literature to broaden the influence of existing research by identifying academic interventions that exhibit assurance for improving the academic performance of students with ED in school settings. The review of research resulted in studies that focused primarily on instructional interventions (14 studies) and learning strategies (6 studies). For the purpose of the current study, teacher-based instructional interventions are teacher manipulated or teacher-initiated strategies designed to teach or present material. Student-centered learning strategies are interventions that are taught to generate student autonomy and generalization of learning. Thus, students are taught learning strategies and self-mediate their own learning as opposed to the teacher mediating. Mason et al. (2009) did not identify any studies that focused on curriculum-based interventions. This may indicate a lack of academically based curriculum specific to ED students.

Of the studies reviewed, only three included ED students who reportedly were instructed in the general education setting for at least part of the day. This statistic is alarming as students are increasingly being educated in general education settings. However, interventions identified in the review provide a place to begin in the quest to educate all students using evidence-based strategies. Research employing longitudinal studies may be one source providing scientifically

based interventions that potentially prevent the continued academic and behavioral problems of students. This, in turn, may decrease the number of students referred to special education.

Additionally, student academic performance may increase and consequently so may overall school performance. Positive learning experiences create positive interactions for both students and teachers. As students become more engaged in academic content and success, teachers may become more engaged in both the student as an individual and the student's success. When students are engaged, they are less likely to be disruptive (Gunter et al., 1994, as cited in Mason et al., 2009). Teaching as a vocation is a choice engaged in daily and the choice in how to teach is uniquely powerful in the effects on vulnerable populations. Students with ED are some of the most vulnerable and highest needs students requiring highly qualified teachers knowledgably utilizing effective academic practices to facilitate their students' academic and personal success.

Purpose of the Study

The focus of this paper is to explore the relationship between mood, memory, and the retention of academic content of ED students. It is hypothesized that ED students encode less academic content than their peers due to their pervasive negative mood. If prior research on the underlying neurological mechanisms involved in emotion and memory holds to be true, the pervasive negative mood of ED students will inhibit their ability to unconsciously or consciously regulate their emotions. Emotional dysregulation will in turn instigate an emotional filter to process academic content. Negative filtration will produce less encoding of academic information by ED students than students in either a neutral or positive mood. Remembering less learned material will thus cause ED student to exhibit poorer performance on assessment measures.

Chapter 3 Method

Participants

For the present study, 73 high school students (35 female and 38 male), ranging in age from 14 to 16, from a public high school in the greater San Francisco Bay Area were recruited in person from three different classes. Permission was received by proxy from the principal who was given a copy of the Research Participant's Bill Of Rights. Participants were randomly assigned to one of three separate mood conditions – positive, negative, or neutral. All subjects were tested as an in-tack group rather than individually. Cross-contamination of mood was not considered to be a confounding factor for several reasons. First, cross-contamination is expected more from comedy. If only one or two individuals are laughing, other subjects may not laugh due to social pressure. However, this experiment was inducing a positive mood more similar to joy than comedy. Second, prior research demonstrated an extreme reaction from an individual being tested in a group setting. This individual had no bearing on the other participant's reactions.

Materials

Word lists. To test memory encoding and recall, this study used 30 words consisting of 10 emotionally positive words, 10 emotionally negative words, and 10 neutral words (see Appendix A). The words were chosen from this researcher's unpublished thesis (Corkrey, Madfes, and Phillips, 2008). Permission was originally received from Miranda and Kihlstrom (2005), who used Toglia and Battig's 1978 *Handbook of semantic word norms* to create a list for their research. Toglia and Battig's book contains a large variety of words which have been derived from college students' ratings of words for seven basic semantic characteristics. The words were presented individually for 2 seconds on a PowerPoint slide.

Presenting the words individually was adapted from research by Nguyen, Shorpour, Bayareddy, Holguin, and Chancellor-Freeland (2008). This method was deemed by the

researcher of the current study to be effective in preventing memorization by use of mnemonic tasks such as chunking (Matlin, 2003). The process of chunking involves grouping similar words to aid in memorization. For instance, the words needle and blood could be paired together and memorized by thinking of a needle taking blood. To prevent primacy and recency, the PowerPoint slides began and ended with two neutral valence words in a row. Results of the pilot study indicated that certain words, such as butterfly and vinegar, have a stronger emotional valence. These words were placed as close to the middle of the list as possible and surrounded by either neutral or emotionally opposite valence words. The pilot study further demonstrated that memorization was better if two words beginning with the same letter were listed in a row. Thus, no two words with the same first letter were next to each other and all letters were in small case to prevent any one letter from being more distinguishable.

Film clips. Positive and negative moods were induced by showing participants a 5 min video clip (see Appendix B). A positive mood was induced with the scene from *The Lion King* showing three characters singing *Hakuna Matata*. A negative mood was induced with a clip from the original, black and white, 1931 version of *The Champ*. The scene selected is of the young boy watching his father die after winning a boxing match. In an attempt to neutralize mood, a clip from the 1962 film, *The French Chef with Julia Child* demonstrating food preparation, was exhibited to the control group. These film clips were chosen based on prior research by Gross and Levenson (1995) and Corkrey, Madfes, and Phillips (2008). All clips were shown with the original audio track.

Scales. A scale developed by the researcher was used to access mood (see Appendix C). This scale consists of 9 circles, the first circle representing a very sad mood and the last circle representing a very happy mood. Participants rated their mood both before and after viewing the film clip by filing in the circle that best corresponded to how they were feeling.

Procedure

Subjects participated in the research while attending class. The procedure did not take more than 15 mins of their time. Each group of participants was assigned to one of three mood induction conditions – positive, neutral, or sad.

Each subject was given a packet of papers. To begin the study, the researcher instructed participants to first indicate their gender and age and then turn to the second page and fill in the circle that best corresponded to the individual's current mood. A 5 min video clip was then shown to either induce a positive or negative mood or to neutralize the subject's moods, depending on the condition. After viewing the video clip, participants were again asked to complete a second mood assessment scale.

To begin the memory task, the researcher explained to all volunteers that they would now view a 1 min PowerPoint presentation of 30 words. Instruction was given to simply watch the presentation. After presenting the words, 1 min was given to recall. The experimenter then asked the subjects if anyone needed more time for recall. After completion of the memory task, participants were told the experiment was completed and they were free to leave. Finally, participants assigned to the negative mood induction group viewed the video clip used to induce a positive mood to ensure that their mood when they left the experiment was no worse than when they arrived.

Chapter 4 Results

A total of 73 high school students, ranging in age from 14 to 16, partook in the experiment. Participants included 35 females and 38 males. As experimental group membership was determined by whole class test administration, the final set of participants included 25 in the positive group, 26 in the negative group, and 22 in the neutral (i.e., “control”) group.

This researcher hypothesized that emotionally disturbed (ED) students encode less academic content than their peers due to their pervasive negative mood. This hypothesis was formulated from prior research which demonstrated positively induced moods produce mood-congruence and negatively induced moods produce mood-incongruence due to unconscious mood-repair. Additionally, memory should not be influenced when mood is not manipulated. In essence, subjects induced into a positive mood should have remembered words associated with a positive feeling. Participants induced into a negative mood should have also recalled more positive words if they are engaging in unconscious mood-repair, thus demonstrating mood-incongruence. Volunteers who viewed the neutral film clip and thus had no mood induction, should have theoretically recalled words more randomly.

To determine if the stimuli were inducing the intended mood, a paired samples t-test of the participant’s self-reported pre and post-movie mood was performed. Each circle of the mood scale was assigned a number from 1 (most negative) to 9 (most positive); a score of 5 indicates a “neutral” (neither positive or negative) mood. T-test results revealed statistical significance for reported pre and post-movie mood in all conditions indicating all film clips induced mood. Examination of the pre and post-movie data demonstrated the positive film clip produced a larger change in mood than the negative film clip. Data also supported the neutral movie had a significant impact on mood change as the mean mood score differed before and after viewing the stimulus. In support of the hypothesis, the positive movie had the desired effect of increasing the

participant's mood. However, reported post-stimulus mood remained in the neutral range. The negative movie also supported the hypothesis with the desired effect of decreasing the participant's mood. Again, reported post-stimulus mood lingered in the neutral range. The neutral film clip had the unintended effect of increasing the subject's mood, although the scores stayed in the neutral range. (see Table 1).

Table 1

Means, Standard Deviations, and Paired Samples t-test for Self-Reported Mood

Stimulus Type	Report Mood		t	p
	Pre-Movie Mean (SD)	Post-Movie Mean (SD)		
Positive Movie	5.44 (1.557)	6.52 (1.661)	(24)= -3.674	0.001
Negative Movie	6.08 (1.671)	5.08 (1.598)	(25)=3.187	0.004
Neutral Movie	5.23 (1.445)	6.14 (1.125)	(21)= -3.360	0.003

A second analysis of the data grouped participants based on the type of stimulus presented (positive, negative, or neutral film clip) compared with the type of words recalled (positive, negative, or neutral emotionally cued) and total words recalled. A one way ANOVA for each of the three types of emotionally cued words yielded no statistically significant differences. There was also no significance found with total words recalled.

Although the video clips induced the desired mood in two conditions, mood induction did not correlate with memory recall. Analysis of the means showed participants in the positive condition recalled more neutral words but fewer total words than either the negative or neutral groups. The negative and neutral conditions had statistically equal total word recall. However, the negative condition recalled more positively cued words and the neutral group recalled more negatively cued words. While participants of the neutral stimulus condition did recall more total

words as predicted, the findings were not significant enough to support the hypothesis (see Table 2).

Table 2

Means, Standard Deviations, and ANOVA for Positive, Negative, Neutral, and Total Word Recall

Word Recalled	Stimulus Type			F	p
	Positive Movie Mean (SD)	Negative Movie Mean (SD)	Neutral Movie Mean (SD)		
Positive Words	2.76 (1.332)	3.19 (1.357)	3.05 (1.397)	0.661	0.519
Negative Words	2.80 (1.384)	3.00 (1.233)	3.41 (1.182)	1.378	0.259
Neutral Words	2.88 (1.833)	2.85 (1.190)	2.55 (1.438)	0.343	0.711
Total Words	8.44 (3.536)	9.04 (2.720)	9.00 (2.878)	0.295	0.745

To further investigate the above findings, this researcher, as teacher of the participants, asked students during the class following administration what they thought of the experience. The class that had watched the negative mood stimulus reported that while some of the students thought the scene was “rather sad”, several other students found *The Champ* movie clip to be “pretty funny”. When the instructor asked the students to explain, they noted that because it was such an old piece of film, it seemed unrealistic and overly-dramatic to the point of being humorous. Given this feedback, participants were re-grouped based on their self-reported mood after viewing one of three stimuli (positive, negative, or neutral film clip) compared with the type of words recalled (positive, negative, or neutral emotionally cued).

To obtain a general overview of the participant’s mood after viewing the film clips, the nine point mood scale was divided into three sub-sections. The first three circles on the left of the scale (scores 1–3) represented a negative mood, the middle three circles (scores 4-6) represented a neutral mood, and the final three circles (scores 7-9) on the right represented a positive mood. After regrouping, there were 28 participants in a positive mood, 3 in a negative

mood, and 42 in a neutral mood according to their self-report (see Table 3). The negative mood condition was not included in further data analysis as results would have been statistically unreliable.

Table 3

Post-Movie Mood Scale Responses

Movie Viewed	Post-Movie Mood Scale Scores		
	1-3	4-6	7-9
Positive Film	0	10	15
Negative Film	3	17	6
Neutral Film	0	15	7
Re-Group Total	3	42	28

An independent samples t-test results comparing self-reported post-movie mood with type of emotionally cued words and total words recalled produced no statistically significant differences. Analysis of the means found subjects who reported a post-stimulus neutral mood recalled the fewest number of neutral words as well as a larger number of positively cued and total words than subjects reporting a positive mood.. Participants indicating a positive post-movie mood recalled more emotionally cued than neutral words, specifically negatively cued words. Both groups remember more negatively cued words than positively cued words and more positively cued words than neutral words. Results still yielded no significance which would support the hypothesis (see Table 4).

Table 4

Means, Standard Deviations, and Independent Samples t-test for Positive, Negative, Neutral, and Total Word Recall

Words Recalled	Positive Mood Mean (SD)	Neutral Mood Mean (SD)	F	p
Positive Words	2.57 (1.103)	3.31 (1.440)	2.865	0.095
Negative Words	2.64 (1.311)	3.33 (1.223)	0.109	0.742
Neutral Words	2.39 (1.474)	3.05 (1.481)	0.013	0.911
Total Words	7.61 (3.023)	9.69 (2.867)	0.001	0.980

Chapter 5 Discussion

This study was prompted by an interest in the relationship between academic retention and emotion. Results were examined for a correlation between an individual's mood and the type of memories encoded and recalled. It was hypothesized that emotionally disturbed (ED) students encode less academic content than their peers due to their pervasive negative mood. This hypothesis was formulated from prior research which demonstrated positively induced moods produce mood-congruence and negatively induced moods produce mood-incongruence due to unconscious mood-repair. Additionally, memory should not be influenced when mood is not manipulated. Mood should have had no effect on memories encoded and recalled by subjects in the control condition, which involved no mood manipulation. Statistically significant data demonstrated mood induction did occur for participants in all conditions, partially supporting the hypothesis. While the experiment produced no further statistically significant data to support the hypothesis, analysis of the means expressed interesting findings.

It should be noted that data was collected from three general education classes. Students receiving special education (SPED) services were not separated from students not receiving SPED services for several reasons. First, no students receiving SPED services in any of the classes are identified as emotionally disturbed (ED) rendering it ineffective, for the purpose of this study, to analyze their results separately. Second, a student not receiving SPED services does not preclude the student from having symptoms of an ED individual. Possessing ED symptoms does not automatically qualify an individual for SPED services and not all students needing services are referred because symptoms are not always prevalent. Thus, any student has the potential to possess ED symptoms. Finally, no prior research has investigated the effect of mood and memory within an adolescent population. Thus, the current study focused on the general effects of mood and memory as related to adolescents.

In order to fully understand mood congruency and unconscious mood repair, the gestalt of human experience should be examined. While a great deal of prior research has utilized audio stimulus alone and some research has employed only visual stimulus to induce mood, very little research has combined audio and visual stimuli to induce mood. Based on this lack of research, film clips used for the current experiment were presented with the original soundtrack of the movies. All conditions successfully induced mood, including an unintended effect on the control, or neutral, group. Positive mood induction by the neutral group may have been due to participant's excitement for watching a film during class. Results suggested that mood induction was most successful when audio was presented with the films. While no conclusions can be drawn from these findings, it is possible to surmise that a combination of audio and visual stimuli creates more brain arousal and therefore has more impact on mood than visual stimuli alone. Memory may also be influenced by both auditory and visual stimulus. Auditory memory develops sequentially and consequently last for a longer duration than visual memory, which occurs holistically (Matlin, 2003). Enabling both the auditory and visual senses could aid in producing memories that not only persist for a longer duration but are also more clearly encoded.

Two film clips used in the experiment were chosen based on prior research by Gross and Levenson (1995). Their research involved five years of research to develop a set of films that reliably elicit eight emotional states. After evaluating over 250 films, selected film clips were shown to a sample of 494 undergraduate subjects. While the study was through, it is possible that the results have become dated. A movie that induced a particular mood 18 to 20 years ago may no longer be relevant to the current generation of high school students. This idea is in fact supported by feedback from subjects of the negative mood condition in the current experiment. When asked directly about their thoughts concerning the effect of the film clip, the students explained they felt it was such an old film it seemed unrealistic and overly-dramatic to the point

of being humorous. This could explain why only three participants of the negative mood condition actually reported being in a negative mood after viewing the film clip. If future research intends to induce mood with film clips, a thorough pilot study exploring the success of the selected films to induce a desired mood seems imperative.

Based on the above film clip findings, it was no surprise that when participants were grouped based on their self-reported post-movie mood, there were not enough participants reporting a post-film negative mood to produce reliable results. Even after eliminating this group, though, no statistically significant data supported the hypothesis. However, one parallel trend was found in both sets of analyses. Participants in the negative condition and participants reporting a post-movie neutral mood recalled more total words, although the findings were not significant enough to support the hypothesis. These results were not surprising given that only three subjects reported a negative mood. Furthermore, data demonstrates that while mood was induced, post-movie mood remained within the neutral range. These results implied that under "normal" conditions, when mood is neutral, more total words are encoded and recalled. When deviating away from "normal", when emotion has been induced by an external stimulus, overall memory is reduced because memory is filtered through emotion.

An important finding was that participants reporting both a positive and neutral post-movie mood recalled more positive words than neutral words but also more negative than positive words. Both groups recalled fewer neutral than emotionally valenced words. Of the emotionally cued words remembered, more negative than positive words were encoded and recalled with these two groups. If memories are encoded through a filter of emotion, positive emotions are likely to be more easily and accurately encoded unless a negative stimulus was emotionally distinctive enough to allow negative memories to be effortlessly encoded. Emotional distinctiveness occurs when a stimulus produces an intense emotional reaction which

causes events to be accurately and efficiently encoded. Examples are flashbulb memories, which are memories associated with events invoking a strong emotional reaction. These memories occur when a person first learns of a situation that causes them to be very surprised (Matlin, 2003). Flashbulb memories may also be more readily encoded because the events are self-referenced, or directly experienced by the individual. Research on the self-reference effect demonstrates that memory is greatly improved by relating stimuli to a personal experience (Matlin, 2003). Self-referencing encourages deep levels of processing which increase the accuracy of encoding and the ease of recall. When memories are personally experienced, they become a part of a person's history and emotional framework. The word list read by the participants of this study was not an event they personally experienced. While one could argue that individuals were experiencing the experiment, it is hard to imagine that the subjects were emotionally connected to the word list. Deficiency of emotional connectivity could explain the lack of statistically significant findings when individuals were grouped based on stimulus presented. Participants were thus re-grouped according to their self-reported mood to better understand the effect of mood on memory recall.

Analysis of the means showed most participants reported being in a neutral mood prior to viewing a film clip. It is possible to theorize from the results of this data that people are usually in a neutral mood. The small number of participants reporting a pre-film negative mood could further reflect that, in general, negative emotions are avoided. Perhaps people are only in a negative mood when experiencing tiredness, hunger, are simply having a "bad day", or suffering from a mental disorder such as depression or Post Traumatic Stress Disorder (PTSD), common symptoms of emotionally disturbed individuals. It is simple, then, to comprehend why flashbulb memories are so easily created. If a large percentage of the population is regularly avoiding negative emotions unconsciously, a negative event that is emotionally distinct would have a

dramatic effect on mood, thereby greatly affecting memory. Repeated exposure to negative events which drastically alter a person's mood could effortlessly lead to the development of PTSD or depression. If it is routine for negative emotions to be unconsciously avoided, it can be empathized why patients would also be unconscious of suffering from symptoms of depression or PTSD. When the symptoms of a mental disorder are not consciously observed, help is not sought and no relief can be brought to the individual.

There is further evidence supporting the idea of unconscious mood-repair. Mood reported by participants after viewing the negative stimulus did induce mood and demonstrated statistically significant reduction of mood. These subjects also recalled more positively cued words than negatively cued, neutral, or total words recall. The results do seem to suggest that inducing a negative mood has enough impact to specifically effect emotional memory. Since the results indicate a shift in mood significant enough to impact memory, it seems reasonable to conceive that participants were engaging in unconscious mood-repair to avoid negative feelings. If people are unconscious of generally being in a positive or neutral mood, they may also be unconsciously avoiding negative emotions by engaging in mood-repair.

Avoiding negative emotions unconsciously does make evolutionary sense. Winkielman, Berridge and Wilbarger noted in their 2005 study that some areas of the brain involved in emotion and memory evolved early and therefore may perform below the level of awareness. It is advantage to the survival of a species if instincts can be relied upon to sense danger so that brain function may focus on more immediate needs such as food. An organisms instincts sensing fear may cause that organism to unconsciously increase the distance between itself and the adverse stimulation. It makes evolutionary sense for an organism to avoid a potentially dangerous and harmful situation in order to maintain self-preservation. Avoiding adverse environments could lead to poorer memory encoding because not only is an organism not paying

close attention to the stimulus, but it may also be preparing to flee from a potentially harmful situation. In the case of the present study, participants reporting a positive mood after viewing the negative stimulus may have been relying on primal evolution instincts to distance themselves from the negative stimulus.

Alternatively, subjects may have been engaging in unconscious-mood repair because negative emotions are simply uncomfortable to the human psyche. In general, people do strive to make a bad mood better, yet they seldom try to make a good mood worse. The results of Eich and Macaulay's 2000 study demonstrated that a true positive mood is no different than an induced positive mood. However, a replicated negative mood is qualitatively different than an induced negative mood. Findings by Eich and Macaulay (2000) implied that a negative emotional state is not only a bothersome condition, but a bona fide one as well. In essence, if a negative mood is merely feigned, the feelings of being uncomfortable may not be strong enough to motivate an individual to engage in mood repair.

Results from Rusting and DeHart's 2000 study suggested that positive personality traits may allow an individual to recall negative emotional memories with less accuracy and thus live a more adaptive, healthy life. An individual's regulatory responses, or emotional filter, to emotion may be impacted by their personality traits. How a person normally responds to negative events could affect the activation of subsequent positive or negative thoughts and memories. In essence, individuals with personalities that allow them to easily and unconsciously engage in mood-repair are more likely to be able to reduce or eliminate stressful or negative moods. This may be due to these persons having stronger connections between negative emotion nodes and positive regulatory thoughts. Individuals who do not possess the ability to easily engage in mood-repair may believe that mood regulation will be unsuccessful because they have had less practice adjusting their negative moods. This may cause these individuals to have fewer and

weaker connections between negative emotion nodes and positive regulatory thoughts. In fact, according to Rusting and DeHart (2000), these individuals might have elaborate associations between negative emotion nodes and thoughts related to regulatory failure. The belief that they will be unsuccessful may come to mind every time they experience a negative emotion, thus causing them to more successfully encode and recall negative moods and memories. It is easy to see how a perpetual cycle of this type of thinking can lead to depression.

One of the most interesting findings of this study is that most participants reported either a neutral or positive post-stimulus mood yet recalled a larger number of negatively cued words than positively cued words. These results contradict the current hypothesis as well as most research studying mood and memory. It begs the question why. One key difference of the current study is that the population was all high school students. Most research is conducted using college students but adolescent brains are biologically different than adults. It is strongly believed that teenagers are subject to dramatic mood swings caused by frequent hormone fluctuations. In concurrence, mood induction was the only statistically significant result obtained by subjects of this study. This clearly exemplifies adolescents as a vulnerable population subject to easy manipulation and responding to visceral emotional experiences and stimuli. Thus, it is not surprising that teenagers are responding to both emotional film clips and emotionally cued words. As discussed above, negatively valenced experiences can produce a stronger reaction than positively valenced experiences. This is especially true if the individual has not matured emotionally to develop positive personality traits. Consequently, it is not astounding that young adolescents respond stronger to negatively cued words even when reporting a positive or neutral mood.

If teenagers do not exhibit mood-congruency, this could bode well for emotionally disturbed (ED) students. While these individuals do exhibit a pervasive negative mood, results

of this study implies that adolescents may learn through different constraints than adult-aged college students. Current emotional states seem to impact learning for college students more than high school students. While it is clear that emotions influence adolescent's encoding and later recall of memories, results of the current study do not suggest that inducing a neutral mood will increase retention of academic content. Thus, changing an emotionally negative mood to a neutral mood may have no positive ramifications for ED students. The crux is for teachers to create educational environments conducive for retention of academic learning. Results of this study imply changing high school student's moods is not crucial as teenagers are not susceptible to mood-congruent memories. Future research should further investigate the relationship of mood and memory specifically in an adolescent population. However, other variables for creating more affective high school classroom environments conducive to retention of academic content should be considered.

The connection between emotion and memory is not easily or clearly understood. Human psychology and the human brain are very complex entities that do not readily give up their secrets. A better understanding of the affect of neurobiological on emotion and memory, while discussed briefly, was outside of the scope of this study. However, these findings are crucial if the field of education is to fully understand the effect of mood-congruence on memory and academic retention. Identifying how memories are created has many crucial applications. Not only can this knowledge help patients suffering from depression and PTSD, but it can also aid students with learning and individuals suffering from memory deteriorating diseases such as Alzheimer's. Memories are the glue that assists us with not only remembering the past and predicting the future, but also knowing who is friend or foe, and what environments might be unsafe. When one can no longer piece their world together with the glue that binds their daily life, they cease to exist as a sentient, unique individual.

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APPENDIX A

Emotional Word List

trouser	vinegar
bush	bouquet
rabbit	offend
station	blanket
trash	butterfly
dream	scar
table	gift
frown	toaster
office	rat
needle	friend
movie	rope
spider	blood
telephone	smile
dentist	puddle
cake	closet

Appendix B

Description of Film Clips & Accompanying Music Selections

The film clips was shown with the original audio track.

The Lion King

A positive mood will be induced with a 5 minute video clip from *The Lion King*. This clip is of three characters singing and dancing to *Hakuna Matata* as Simba, the main-character, grows into a mature lion.

The Champ

A negative mood will be induced with a 5 minute clip from the original, black and white, 1931 version of *The Champ*. The scene is of the young boy watching his father die after winning a boxing match. This is not a graphic, violent, or gory scene. The point of the clip is to induce sadness, not disgust or fear.

French Chef with Julia Child

In an attempt to neutralize mood, a 5 minute clip from the 1962 film, *The French Chief with Julia Child* will be exhibited. As the name implies, this is a food preparation demonstration.

