

Abstract:

There is a reason romantic rejection and break-ups give people the “blues”. Individuals tend to describe physical pain and social pain with the same terminology (DeWall & Baumeister, 2006; Eisenberger, et al., 2003; Way, et al., 2009). There is a neurobiological overlap between the systems that control physical pain and social pain. During both physical pain and social rejection, the same brain areas (insulae in the central cortical fissure) are quite active. DeWall (2011) found that individuals who received a dose of acetaminophen had less activity in the bilateral anterior insula and bilateral posterior insula during a social rejection stimulation. Because social rejection also increases memory (Pajkos, et al., 2011), if subjects were given acetaminophen during social rejection then the memory enhancement effect should disappear. This study aims to determine whether or not reducing CNS pain activity can affect the storage, retrieval, and encoding of autobiographical memories.

Significance of Project:

In 1977, Brown and Kulik discovered flashbulb memories (FBM). These memories are the vivid recollection of details surrounding one's discovery of a sudden traumatic event (Brown & Kulik, 1977). There are many alternative views regarding flashbulb memory mechanisms. Some individuals believe that the emotions at the point of encoding are the instrumental factor (Bohannon, Julian & Aue, 2008; and many others), whereas others believe flashbulb memories are inaccurately reconstructed at retrieval (Neisser & Harsch, 1992, Talarico & Rubin, 2003). In 2010, Sauer suggested that physical pain and threat to oneself can create more enduring memories. Her study, which looked at individual's memories for first kiss, first sexual experience, and first car accidents, indicated that people were more likely to possess enduring memories if physical threat was involved. We are not sure, however, if this is a result of a direct link between specific events (such as reproduction or physical threat) to memory, or an indirect link between memory and the arousal mechanism (Julian, et al., 2009). Atkinson (2011) also indicates that physical pain can provide a memory advantage in regards to his study on childhood injury. Parents who were present at the time of their child's injury tended to have a memory advantage over those parents who were not present at the time.

Studies show that individuals describe physical pain and social pain with the same terminology (DeWall & Baumeister, 2006; Eisenberger, et al., 2003; Way, et al., 2009). This finding has suggested that there is a neurobiological overlap between the systems that control physical pain and social pain. According to Eisenberger, Liberman, and Williams (2003), similar brain activations were evoked when an individual endured physical pain as well as social exclusion, suggesting that these share a common neuroanatomical basis. This area includes the dorsal anterior cingulate cortex, as well as, activity in the right ventral prefrontal cortex. DeWall (2011) found that individuals who received a dose of acetaminophen had less activity in the bilateral anterior insula and bilateral posterior insula during a social rejection stimulation. A central acting pain killer such as acetaminophen has been found to reduce the effects of social pain (DeWall, 2010). Further, harsh social rejection has a strong agonistic memory effect. If participants experience social rejection in a laboratory simulation (encoding) and recall an autobiographical memory of a break-up (retrieval), then the effects of acetaminophen on emotional memory can be determined at both encoding and retrieval.

Because social rejection also increases memory (Pajkos, et al., 2011), if subjects were given acetaminophen during social rejection then the memory enhancement effect should disappear.

As a psychology major, I joined Dr. Bohannon's independent research lab at the beginning of my freshman year. This opportunity has provided me with a number of excellent experiences in order to further my comprehension of the world of psychology. The proposed study will further aid me in my comprehension of flashbulb memories, as well as, my comprehension of participating in psychological research. This experience will greatly assist me as I plan to continue participating in research after completing my undergraduate degree. Despite learning how to properly conduct projects in my classes such as Research Methods and Statistics, nothing is better than the hands on experience I have already experienced and will experience through research. I know that this opportunity will allow me to further understand the complicated processes involved in running experiments in the psychology world. This study is important for society as it may offer evidence for one of the views of flashbulb memories as well as provide an alternative way to cure the pain of social rejection.

Statement of Central Objective:

Social rejection increases memory (Pajkos, et al., 2011). However, if this effect is mediated by the pain centers of the brain, then who subjects are given acetaminophen during social rejection should have the memory enhancement effect disappear. Therefore, those individuals who receive a rejection but also receive a dose of Tylenol should have less of a memory than those individuals who receive a rejection but ingest a placebo. Further, to increase the sensitivity of the memory test, both an immediate and a week-delayed test will be administered.

Methods:

The design of the study is a simple 2(Tylenol vs. placebo) x 2(polite vs. harsh social rejection) x2(immediate vs. week delay memory test). The delay variable will be within-subjects as all participants will take both the immediate and delayed test.

Students will be recruited to participate throughout summer courses. During this time they will be informed of the nature of the study and the time commitment (1.5 hours). Students will then attend an initial

testing session and a follow-up one-week later. At the beginning of the initial session, participants will give written informed consent and take a MDI (major depression inventory) to determine if they show signs of depression. The MDI's will be graded and those with a score higher than 30 (indicating they may be severely depressed (Olsen et. al, 2003)) will be dismissed and provided with information to contact the Counseling Center. The remaining participants will be given a 500 mg dose of either a placebo or Tylenol. They will then complete a crossword puzzle for twenty minutes to ensure that the medicine or placebo has reached their blood stream. The participants will then watch a short video of a person of the opposite sex introducing themselves. They will fill out a short questionnaire regarding the video and write a letter to the individual asking them on a date. They will then view one of two videos. The first will be of a rejection because the person has already made plans with someone else. In the second video, the person will be rejected because the actor does not see them as romantically adequate or interesting. Following the second tape, the participants will fill out a survey that asks them to describe the events taking place, the individual, and their emotions. There will be both a free recall section and a probed response section. Finally, they will complete a survey about a break-up that they have previously endured. This survey will also include free recall and probed questions. Participants will be debriefed and given candy to ensure they leave in a happy mood.

One week later the participants will return for a follow-up session. They will be asked to fill out a short survey similar to the original regarding what they remember from the video they viewed the week before, as well as their previous and current emotions and arousal. Because the individuals complete both a lab induced memory as well as a previously endured autobiographical memory (a break-up), memories will be obtained both at encoding and retrieval. This will allow us to determine whether Tylenol plays a role in either encoding, retrieval, or both processes.

Upon collection of the data, the free recall will be scored for the presence of flashbulb canonical features (see Julian, et al., 2009). The probed questions will be scored on the presence or absence of the correct answer. The data will be divided into eight groups: four female groups and four male groups. Each gender will have individuals placed into nice rejection and Tylenol, nice rejection and placebo, harsh rejection and Tylenol, and harsh rejection and placebo. Data will analyzed using ANOVAS.

Progression of Project:

Week	Progression
1	-Begin recruiting participants from summer school classes and through email
2	-Recruit participants -Run subjects (Initial Testing)
3	-Recruit participants -Run subjects (Follow-up Testing)
4	-Recruit Participants -Run subjects (Initial Testing) -Compose scoring rules
5	-Score protocols -Recruit participants -Run subjects (Follow-up Testing)
6	-Recruit participants -Enter data -Analyze data
7	-Recruit participants -Run subjects (Initial Testing)
8	-Recruit participants -Run subjects (Follow-up Testing) -Score protocols
9	-Enter data -Analyze data -Compose presentation and results

Feasibility:

In order to conduct this study, rooms will be reserved through correspondence with the psychology department's secretary, for participants to attend both initial and follow-up testing. Tylenol pills as well as water pills will be used in this procedure and will be purchased. Antihistamines will also be purchased and kept on hand in case of allergic reactions. Protocols and writing utensils will be provided by the psychology department.

Working on Campus:

This study will be conducted on campus.

Personal:

The proposed research has gained my interest for a number of reasons. Primarily, previous research has been done by my lab regarding social rejection, yet none has taken into consideration the effects of a painkiller. In 2011, Pajkos, a member of our lab, discovered that social rejection increases memory. Pajkos' study has many similar components to mine, however, by adding the Tylenol factor, we are taking it to a new level. It is our hopes that I will replicate Pajkos study and determine whether or not Tylenol does have an effect on memory formation.

This field of research is also one of the newest in psychology. More and more research is being done regarding the connections between social rejection and physical pain and I have become extremely interested in this field of research. This research suggests that if the paincenter is affected during social rejection, individuals may be able to take over the counter pain killers such as Tylenol in order to cure pain from

romantic rejection, social rejection, or other social exclusion. This simple fix for a complex problem (social rejection) may be the next big accomplishment by the world of psychology.

Aside from this project itself, I am looking forward to the experience that this opportunity will grant me. Hands on involvement is the best way to learn and scientific research is the best way to accomplish this. Although I have learned much through my psychology classes such as Research Methods and Statistics, in regards to proper ways of running experiments, how to receive IRB approval, and composition of an accurate protocol, the experience of actually accomplishing all of these tasks will grant me much more comprehension of the intensity of research. This experience will prove invaluable for my future as a psychologist.

Presentation:

At the end of the Butler Summer Institute, I will present my findings of this study to the community. I will also present at Butler's Undergraduate Research Conference in April 2012. The proposed research will also be presented in the 2013 Association of Psychological Sciences convention and the 2013 Southeastern Psychological Association convention. The proposed research will also be submitted to the Association for Psychological Science Journal, *Psychological Science in the Public Interest (PSPI)*.

Research Approvals:

Approval has been received and can be found in the attached document.

Transcripts:

Transcripts have been attached to this document.

Works Cited:

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