

Running Head: BUFFERING EGO-DEPLETION

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PREVENTING AND REPAIRING EGO DEPLETION THROUGH HUMOR

by

DAVID WELDEN

(Under the Direction of Janie Wilson)

ABSTRACT

The theory of ego depletion views the capacity for self-control as a finite internal resource that declines with continual use. As the levels of this resource decline, performance within a host of domains is impaired, resulting in negative behavioral outcomes. Previous studies have sought to find ways to address the decline in the self-control resource and the accompanying reduction in performance in a variety of different ways. One method that has been found to be effective in reducing ego depletion is the use of humor, specifically the viewing of humorous videos following an ego-depleting task. However, prevention of ego depletion using humor prior to an ego-depleting task has not been examined. In the current study, a humorous video was used in an attempt to reduce the effects of ego depletion relative to a control condition viewing a neutral video. The video was seen either before the ego-depletion task (prevention) or after the ego-depletion task (reparation). It was expected that the humorous video would buffer against ego depletion when shown regardless of whether participants viewed the video before or after the ego-depletion task. Although the humorous video did not alter ego depletion, mood was enhanced relative to the neutral-video condition.

INDEX WORDS: Ego depletion, Buffering, Humor, Videos, Self-control, Persistence

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DAVID WELDEN

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DAVID WELDEN

Major Professor: Janie Wilson
Committee: Jessica Brooks
Shauna Joye

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INTRODUCTION

Ego-depletion theory purports that self-control is a limited internal resource, an idea originally proposed by Baumeister and colleagues (Baumeister, Bratslavsky, Muraven, & Tice 1998; Muraven, Tice, & Baumeister, 1998). Ego depletion occurs when people exercise self-control and deplete the well of energy available for subsequent self-control. Since the time ego depletion was proposed, significant evidence has been found to support the self-control model of ego depletion, with ego depletion linked to a variety of negative consequences. These consequences involve deficits in cognitive processes, including impaired decision making, lack of impulse control, and failing to persist on a task that requires effort. Numerous studies have looked at ways to assist in the recovery of this self-control energy after it has been depleted. In this study preemptive buffering will be used prior to an ego depleting task to determine if the effects of ego depletion can be partially or fully mitigated.

Inducing Ego Depletion

As the broad range of consequences from ego depletion would imply, people use their self-control energy on an extremely wide array of tasks. In the available literature, ego depletion has been reliably induced by requiring participants to use behavioral, cognitive, or emotional self-control. One of the first behavioral methods used was resisting desirable foods, in which participants who had not eaten for a period of time are presented with highly desirable food items but not allowed to eat them (e.g., Baumeister et al. 1998; Tice, Baumeister, & Muraven, 2007). In the same studies participants have also been asked to eat less desirable foods (e.g., radishes) while a more desirable food such donuts or cookies are present. Participants must exercise self-control by either resisting appetizing foods or eating undesirable foods, both of which attenuate subsequent self-control.

Another method commonly employed to induce ego depletion is requiring participants to use cognitive focus. For example, participants might be shown a silent video of someone talking while distractor words appear at the bottom of the screen (DeWall, Baumeister, Stillman, & Gailliot, 2007; Gino, Schweitzer, Mead & Ariely, 2011; Schmeichel, Vohs, & Baumeister, 2003). They are told to focus on the video and avoid looking at the distractor words. A similar cognitive method for inducing ego depletion is a thought-suppression task (Tice et al., 2007). In this design, participants are asked to write down all of their thoughts for a given period of time, with the ego-depletion group receiving the added instruction of not thinking of a specific subject (such as a white bear). Cognitive self-control is required to avoid thinking about the restricted subject, and subsequent self-control is lost. Both ignoring distractors and avoiding thoughts require cognitive suppression.

Cognitive induction of ego depletion has also been created by actively concentrating on accomplishing a task. A popular method requires participants to cross out every “e” in a writing sample (Boucher & Kofos, 2012; Tice et al., 2007). Both control and ego-depleted participants complete an initial task using this simple cross-out rule, after which they are given a second writing sample. Those in the control condition continue with the previous rule, while those in the ego-depletion condition are told to cross out each “e” only when it is two or more letters removed from another vowel. In a similar task, participants must write a short essay without using certain letters such as A and N (Gino et al., 2011). A final popular cognitive method for inducing ego depletion is the incongruent Stroop Task (Stroop, 1992), during which participants are asked to name the font color for a series of words. The words themselves are color names, with the control group having consistency between the word and the font color and the ego-depletion group being presented with mismatched pairings (e.g., the word “red” in blue ink).

This activity requires active self-control in order to override the automatic tendency to read the word and instead identify the color of the writing (Dewall, Baumeister, Stillman, & Gailliot, 2007; Gino et al., 2011; Mead, Baumeister, Gino Schweitzer, & Ariely, 2009).

In a third class of ego-depletion tasks, participants are asked to alter their emotional responses. Most often, ego-depletion methodology requires participants to suppress emotions while viewing an unpleasant video (e.g., Schmeichel, Vohs & Baumeister, 2003). One of the earliest uses of this technique comes from Baumeister (1998), who told participants to either suppress all emotional responses to a video (depletion condition) or express emotion naturally (control). The two groups were further split between watching a video of stand-up comedy or watching a movie clip of a woman saying goodbye to her children as she passed away. Both of these conditions resulted in an equivalent impairment on a subsequent anagram task. Similarly, Schmeichel, Vohs, and Baumeister (2003) used a single distressing video with suppression and non-suppression conditions to reveal ego depletion with emotion suppression.

Measuring Ego Depletion

Virtually any task that can be used to generate ego depletion can also be used to measure it. At its core a measure of ego depletion is a measure of self-control, and it is this act of using self-control that generates ego depletion. For example, consumption of foods such as high-calorie, low-health snacks has indicated a loss of self-control (Baumeister et al., 1998; Baumeister, DeWall, Ciarocco, & Twenge, 2005; Hagger et al., 2013). In addition, the inability to consume negative substances such as a foul vinegar “health” drink arguably reveals loss of self-control (DeWall, Ciarocco, & Twenge, 2005). Thus, lack of self-control could come in the form of not making healthy decisions when the unhealthier choice is much easier.

Cognitive assessments of ego depletion include persistence on a task that requires mental effort such as how long participants are willing to attempt to solve puzzles. Baumeister (1998) asked participants to trace every line in a figure only once without lifting the pencil. After training with a solvable figure, participants were given an impossible figure to trace. The amount of time they are willing to work on the impossible figure, or persist on the task, is used as a measure of ego depletion.

Behavioral and cognitive assessments of ego depletion contain a similar component: persistence. When ego depleted, participants are less likely to persist, which is a clear indication of less self-control. Perhaps the easiest measure of persistence is how long a person will squeeze a handgrip. An item such as a quarter is squeezed between the handles of the handgrip, and latency for the item to fall quantifies self-control (Alberts, Martijn, & de Vries, 2011; Tice et al., 2007). Often, participants provide a baseline measure of handgrip duration, and a follow-up measure is taken after ego depletion (or a control condition). In addition to offering an objective and clear measure of self-control, the handgrip is less likely to be influenced by personality factors or other extraneous variables since participants are compared against their own baseline as a within-subjects variable.

Buffering Against Ego-Depletion

The broad range of negative effects from ego depletion (e.g., impaired decision making, lack of impulse control, and failing to persist on a task that requires effort) has led many researchers to explore ways to counteract the loss of self-control. One method is increasing self-awareness. Alberts and colleagues (2011) asked participants to complete a scrambled-sentence task in which the sentences either began with “I” or with random names (e.g., John). Participants

in the personal-pronoun condition showed more persistence on a handgrip measure of ego depletion compared to those in the random-name condition.

Perhaps tied to increased self-awareness, meditation has been shown to attenuate the effects of ego depletion. Friese, Messner, and Schaffner (2012) randomly assigned participants into ego-depletion and control groups. Of the ego-depleted participants, some were asked to meditate for five minutes. Those who completed the meditation performed at the same level as those who had not been ego depleted and significantly better than those who had been depleted and had not meditated. These results indicate that meditation (which contains components of self-awareness as well as physical relaxation) buffers against ego depletion.

Finally, ego depletion can be alleviated by inducing positive affect. Tice and colleagues (2007) examined the buffering effects of positive mood in a three-part study. In the first of these studies, participants were asked to perform a thought-suppression task to induce ego depletion. Afterward they were given a small gift of candy. Those who received the gift were then willing to drink more cups of an unpleasant vinegar drink than those in the control condition. The authors concluded that the gift induced a positive mood, providing recovery from ego depletion.

Positive mood also has been induced using a humorous video clip. Tice and coworkers (2007, Study 2) induced ego depletion with an E cross-out task, after which participants watched either a funny or neutral video. Persistence was measured using a frustrating task in which participants had to roll a ball up a slope using two rods. Those who had viewed the funny video persisted significantly longer than those in the neutral-video condition. The inclusion of a sad video extended results concerning mood (Tice et al., Study 3 2007). Depletion was induced using thought suppression. Next, participants viewed either a sad, neutral, or funny video, with persistence measured using a change score (pre to post measures) on a handgrip task. Those in

the humor condition squeezed the handgrip significantly longer than those who saw the sad or neutral video. Taken together, these studies provide some evidence that a positive mood repairs ego depletion, at least on traditional lab-related tasks.

Humor as a buffer against ego depletion also reduces self-injurious behaviors beyond a lab setting, such as smoking cigarettes. Shmueli and Prochaska (2012) used a sample of participants trying to stop smoking. Ego depletion was induced using a food-resistance task with desserts or vegetables, with ego depletion traditionally associated with resisting desserts. Next, participants were assigned to 1 of 4 groups. In the first two groups, participants watched a humorous or neutral video clip. The other two groups wrote about either the happiest day of their lives or described a room in their house. After completing the task, participants were given a break outside, during which their smoking behavior was used as a measure of ego depletion. Those who had been depleted and watched the positive video had the second lowest rates of smoking, behind only the non-depleted funny-video group. Writing about their happiest day did not have the same effect as watching the humorous clip, suggesting that there is something about humor in particular, beyond simply a positive mood – that buffers against ego depletion.

Prior research has shown that humor buffers ego depletion by removing the effects of depletion after they have occurred. That is, showing a funny video after ego depletion attenuates depletion such that self-control returns to control levels. The current study extends prior research (e.g., Tice et al., 2007; Studies 2 and 3) by examining the potential for a humorous video to remove ego depletion. Because there was not a significant finding for the sad versus neutral videos in Tice et al.'s research, a sad video was not used in the current study. In addition to *removing* ego depletion, this study sought to *prevent* ego depletion by showing the humorous video before participants complete an ego-depleting task (in this study, the Stroop task). It was

anticipated that buffering of ego depletion will happen both through removal as well as prevention of ego depletion with a humorous video.

In this study, persistence was measured using the handgrip task, also linking findings with Tice and colleagues (2007; Study 3). In addition to persistence as a state that can be manipulated in an experimental setting, persistence is a trait inherent to each participant, and individual differences associated with trait persistence may influence results. Therefore, trait persistence was measured using a 44-item version of the big-five personality scale. Previous research (Duckworth, Peterson, Matthews, & Kelly 2007) has indicated a relationship between the big-five factor of conscientiousness and what the authors called “grit,” defined as determination or persistence. It was hypothesized that Baumeister, Gailliot, DeWall, and Oaten (2006) argued that although everyone can experience ego depletion, individuals differ in the amount of the self-control resource they naturally possess. Given the likelihood of individual differences, trait persistence will be measured to provide a potential covariate in the data.

CHAPTER 2

METHOD

Participants

Undergraduate students (42 men and 82 women) from a southeastern university were recruited for the study using the psychology department's online study enrollment system. Ages ranged from 18 to 32, with a mean of 19.5. The ethnic breakdown included 73 Caucasians, 38 African Americans, 7 Asian Americans, 2 Hispanic Americans, and 4 who reported as multiracial. Participants included 37 first-year students, 52 sophomores, 25 juniors, and 10 seniors. Participants received credit toward their research participation requirement as compensation for participating, although alternatives were offered. This study was approved by the IRB prior to data collection, and all participants were treated ethically.

Materials

Computer portions of the study were conducted using a desktop computer. Both the neutral and funny videos were edited together from publicly available videos online and lasted 4 minutes and 15 seconds. The funny video consisted of clips from a reality show in which an actor is dressed up as a horror-movie character (Chucky) and scares people waiting at a bus stop. The video also contains a clip of a remote-controlled stroller with a scary baby that pops up to frighten people. The neutral video is split approximately equally (in time) between a dripping faucet and a man mowing his lawn using a riding mower.

Pre-video mood was assessed using a single overall mood question from the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988). The question read, "Overall, my mood is," and responses ranged from very unpleasant with a -10 to very pleasant at +10. The post-video mood will be measured using the same question as well as a question asking "How humorous

was the video?” from 1 “not at all funny” to 7 “very funny.” A third question was asked: “How enjoyable was the video?” from 1 “not at all enjoyable” to 7 “very enjoyable.”

A 144-trial Stroop task (Stroop, 1992) was used to create ego depletion. The task consists of 48 congruent trials (a color word written in the same color; e.g., “red” written in the color red), 48 incongruent trials (a color word written in a different color; e.g., the word “red” written in green), and 48 neutral trials in which the word written was not a color word. Instructions for the Stroop require participants to respond to the word color and not the written word itself (e.g., click a computer key to indicate green even if the word itself reads as “red”).

A 44-item version of the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008) was used, with an emphasis on the conscientiousness subscale. Duckworth, Peterson, Matthews, and Kelly (2007) have argued that this subscale assess persistence, a key personality trait that may explain variability in scores on the handgrip measure (i.e., persistence when squeezing the handgrip). The conscientiousness subscale contains 9 items, 4 of which are reverse scored. An mean score was calculated to create a covariate.

Procedure

After entering the lab and providing informed consent, participants were initially given the overall mood question of the BMIS followed by a handgrip task to establish a baseline. Next, participants were randomly assigned to one of four conditions consisting of their selected video as well as the order in which they would complete the Stroop and video tasks. After watching the video and completing the Stroop, participants completed the mood assessment a second time as well as two questions about their opinions of the video. Participants then squeezed the handgrip again for as long as they were able to do so. Finally, all participants were given the 44-item version of the BFI and a demographics questionnaire before being dismissed. The overall procedure is illustrated in Figure 1.

CHAPTER 3

RESULTS

Preliminary Analysis

Conscientiousness failed to correlate with mood difference, $r(118) = -.09, p = .35$, or handgrip duration difference, $r(119) = .04, p = .66$. Therefore, conscientiousness was not used as a covariate in the primary analysis.

Primary Analysis

A 2 X 2 multivariate analysis of variance (MANOVA) was performed with the computed change in mood and change in handgrip times serving as dependent variables. Independent variables consisted of the particular video that was shown and order in which tasks were completed (Stroop and viewing a video). The overall multivariate output showed a significant effect for the type of video on dependent variables ($p < .001$). The result for mood change was found to be significant, $F(1, 124) = 16.77, p < .05$, partial $\eta^2 = .13$, with regard to the two video conditions. As shown in Figure 2, mood change was higher after watching the funny video ($M = .32, SD = 1.24, n = 60$) than the neutral video ($M = -1.18, SD = 2.47, n = 62$). However, the type of video viewed did not influence handgrip duration (deviation from baseline) in a significant manner, $F(1, 118) = .05, p = .83$. Based on exploratory examination of handgrip duration means, participants who viewed a funny video surprisingly showed a greater decrease from baseline ($M = -1.24, SD = 23.40, n = 60$) than those who viewed the neutral video ($M = -.61, SD 25.39, n = 62$).

Multivariate testing showed no significant effect of order in this study ($p = .80$). For the sake of clarity, the details of non-significant results are provided below. The order of video viewed did not significantly affect mood change, $F(1, 124) = .38, p = .54$. Based on mean trends,

mood change for the Stroop followed by a video was higher ($M = 62, SD = 2.46, n = 63$) than for a video followed by the Stroop ($M = .25, SD = 1.63, n = 59$). Similarly, order failed to significantly influence the change in handgrip duration, $F(1, 118) = .12, p = .73$. Considering means for the purpose of discussion, participants who viewed the video prior to the Stroop task showed less overall decrease in grip duration ($M = -.14, SD = 22.74, n = 59$) than those who viewed the video after completing the Stroop task ($M = -1.65, SD = 25.89, n = 63$).

Multivariate testing revealed no interaction between condition type and order ($p = .31$). Further details are reported below for the sake of detail and speculative group comparisons. The type of video and the order of conditions did not interact to affect change in mood, $F(1, 118) = .08, p = .77$, or handgrip duration change, $F(1, 118) = 2.16, p = .14$. Figure 3 shows the comparison of group means for the dependent variable of handgrip duration due to a marginal significance value of .14.

CHAPTER 4

DISCUSSION

This study sought to examine the effectiveness of positive affect induced by humor to buffer against the detrimental effects of ego depletion. In the design of the study, I attempted to recreate the findings of Tice et al. (2007), who used humor to resolve ego depletion after it had occurred. In addition, I examined the potential for humor to *prevent* ego depletion from occurring by attempting to improve affect prior to an ego-depletion task.

The type of video shown affected participant moods, this DV also served as a manipulation check to ensure that our general procedure was reliably manipulating mood. Our humorous video raised mood compared to baseline while the neutral video A variety of studies have examined mood and found modification of ego depletion. For example, Shmueli and Prochaska (2012) examined participants' smoking behavior as a measure of ego depletion. They showed that humor specifically seems to counteract ego depletion as compared with writing about happy experiences.

Based on higher reported moods among those who viewed the funny video versus the neutral video, handgrip duration should have been longer in the former group. The funny video should have buffered against ego depletion and resulted in more persistence on the handgrip task. In fact, Tice et al. (2007) showed that those who viewed a humorous video following an ego-depleting task showed less evidence of depletion than control participants viewing a neutral video The handgrip procedure used by Tice et al. (2007) was slightly different than our method; they asked participants to grip a ball of paper between the handgrip handles, a stimulus that may have been easier to hold. We used a quarter, so any loosening of the grip allowed the quarter to drop. The measure in this study was rather unforgiving.

In addition to the type of video shown, this study examined the order in which the procedure was performed. The present study sought to explore viewing a video before or after the ego-depleting Stroop task. Recall that Tice and colleagues (2007) removed ego depletion with a humorous video following the depleting task. In addition to replicating the Tice et al. results, the current study examined preventing ego depletion with humor prior to the depleting task. Overall no significant results were found for the effects of order on mood or handgrip duration. Regardless of the order of tasks, the depleting manipulation and video watching occurred close together in time, potentially masking main effects based on when each task occurred. In addition, the type of video should have exerted more influence than the order of tasks, which was seen in the mood result for type of video (above).

Although I expected a main effect of type of video on mood, I did not expect order of tasks to influence the result. Mood should have been higher after viewing the humorous video than the neutral video regardless of whether participants saw the video prior to the Stroop task or after the Stroop task. As expected, this study failed to show an interaction between type of video and order of tasks with regard to mood change. In fact, the data supported a main effect of video on mood.

As with a mood interaction, I did not expect order of tasks to moderate the result of handgrip duration. Change in handgrip duration was expected to be greater after watching the humorous video regardless of task order. That is, viewing a funny video should have both prevented ego depletion and attenuated depletion following the Stroop task. As expected, this study failed to produce a statistically significant interaction for handgrip duration; however, exploration of group means may guide future research.

First, let us focus on the first half of Figure 3, a replication of the Tice et al. (2007) study. Tice and colleagues ego depleted participants, then they removed ego depletion by showing a humorous video. In the present study, we were unable to recreate their results. Instead, the means indicate that handgrip duration change was *lower* among those who watched the funny video compared with the neutral video. Perhaps the explanation lies in the true nature of the neutral video, which showed a dripping faucet and a man mowing his lawn. After spending approximately 5 minutes sitting still and watching an incredibly boring video, the opportunity to engage in any interactive behavior was likely a relief for participants. They may have been willing (eager) to complete the Stroop task, which required viewing colors and interacting with the computer. In effect, the Stroop task became the buffer against ego depletion, resulting in a longer handgrip duration in the neutral video condition.

The second half of Figure 3 illustrates the unique contribution offered by the present study. The hypothesis was that showing a funny video viewed before the ego-depleting task should prevent ego depletion from occurring altogether. In fact, the means supported the hypothesis, at least as a point of discussion. If we continue to assume that the neutral video was not neutral but was, in fact, extremely boring, the need for activity following the boring video likely dissipated during the active Stroop task. By the time the Stroop task was completed, boredom may have passed, and the handgrip duration change showed a pure measure of ego depletion.

Study Limitations and Future Directions

One of the potential explanations for not achieving statistical significance in the experimental conditions is the high degree of variability in our handgrip measure. Times ranged substantially from just a few seconds up to a cutoff point of four minutes. The range of times

created high standard deviations and noise in the data based on individual differences, even with the use of difference scores from pre to post measure. An alternative measure with a smaller range of potential options would have decreased variability and improved the ability to detect significant results, if they existed.

One particular source of an individual difference could have been participant reactivity to the handgrip task. A large portion of the participants, particularly the males, expressed various comments indicating that they perceived the handgrip task as a challenge. They asked how long the researcher could perform the task or the maximum hold time so far in the study. Perceiving the handgrip as a challenge could have potentially mitigated some of the effects of ego depletion and decreased statistical power. According to Graham, Bray, and Martin Ginis (2014), the more motivated a participant feels, the less performance impairment is seen as a result of ego depletion. Conversely, other participants indicated a level of reluctance with regard to their ability to perform the handgrip task. This was especially true for participants who were of smaller physical stature or lower levels of physical fitness. The task was not overly challenging for most participants, but it is likely this expectation of failure could have decreased motivation.

In addition to the handgrip limitations, a weakness in the current study may have been the severity of the ego-depletion procedure. In the current study, participants were asked to perform a 144-item Stroop task of which only 1/3 were actual incongruent color word trials. The remainder of the trials was quite easy to complete accurately. It is possible that the limited number of incongruent trials did not fully deplete participants and could have further reduced power. Further, the task as a whole may have been long enough to allow participants to acclimate, as argued by Dang, Dewitte, Mao Xiao, and Shi (2013). Dang and colleagues reported

that brief ego-depletion tasks may be preferable in research, as participants do not establish a rhythm or coping strategy that washes out depletion.

A final weakness of the study relates to the way the procedure was executed, with participants remaining in a separate room from the researcher from approximately half of the study. Although the Stroop task varied in duration due to differences in task duration, the average time was approximately 7 minutes, and the video itself was 4 minutes and 20 seconds. This means that participants spent almost half of the study time with limited observation, opening the study up to significant confounds if they choice to not follow the instructions. In addition, the Stroop task automatically advanced to the next trial in a short period of time if participants failed to respond, creating a situation in which it is impossible to determine if participants were actively paying attention to the task or not.

Several new avenues of research could be conducted based on the findings and trends of the current study. The most obvious avenue is to repeat the study using a truly neutral video. In addition, since positive affect can be generated through mechanisms other than humor, it may be beneficial to expand the repertoire of videos to include additional types of positive content. Other studies have examined ways to increase positive affect, such as writing about a happy experience (Shmueli & Prochaska 2012) and receiving a gift (Tice et al 2007). Certainly, increasing positive mood offers one obvious way to buffer against ego depletion. Research in this area only recently began to examine various ways to buffer loss of self-control, offering a wealth of opportunities for further research. Ultimately, buffering against ego depletion has the potential to improve daily functioning, requiring ego-depletion research ultimately to seek mundane realism outside of the laboratory setting.

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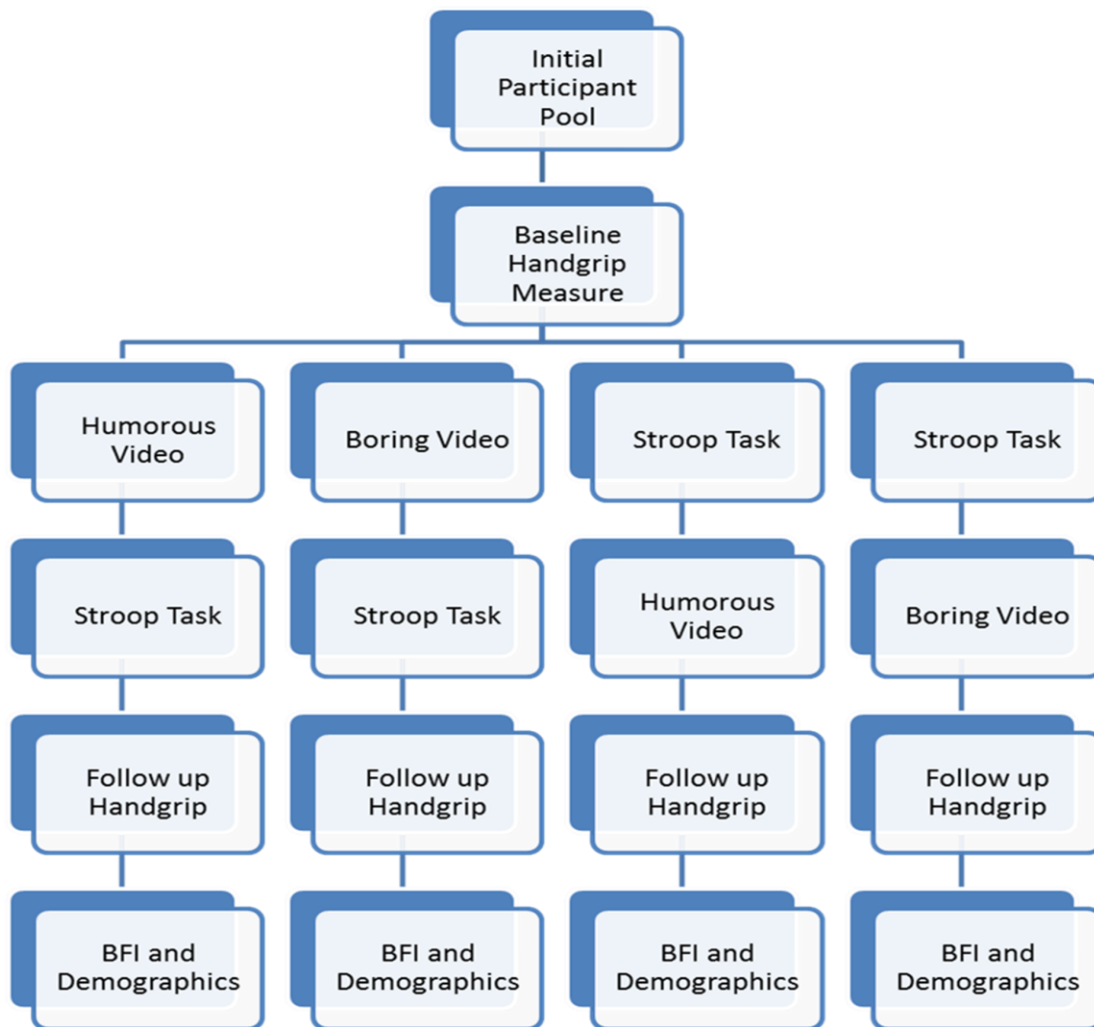


Figure 1. General visual representation of our 4 conditions and the procedure used for each group.

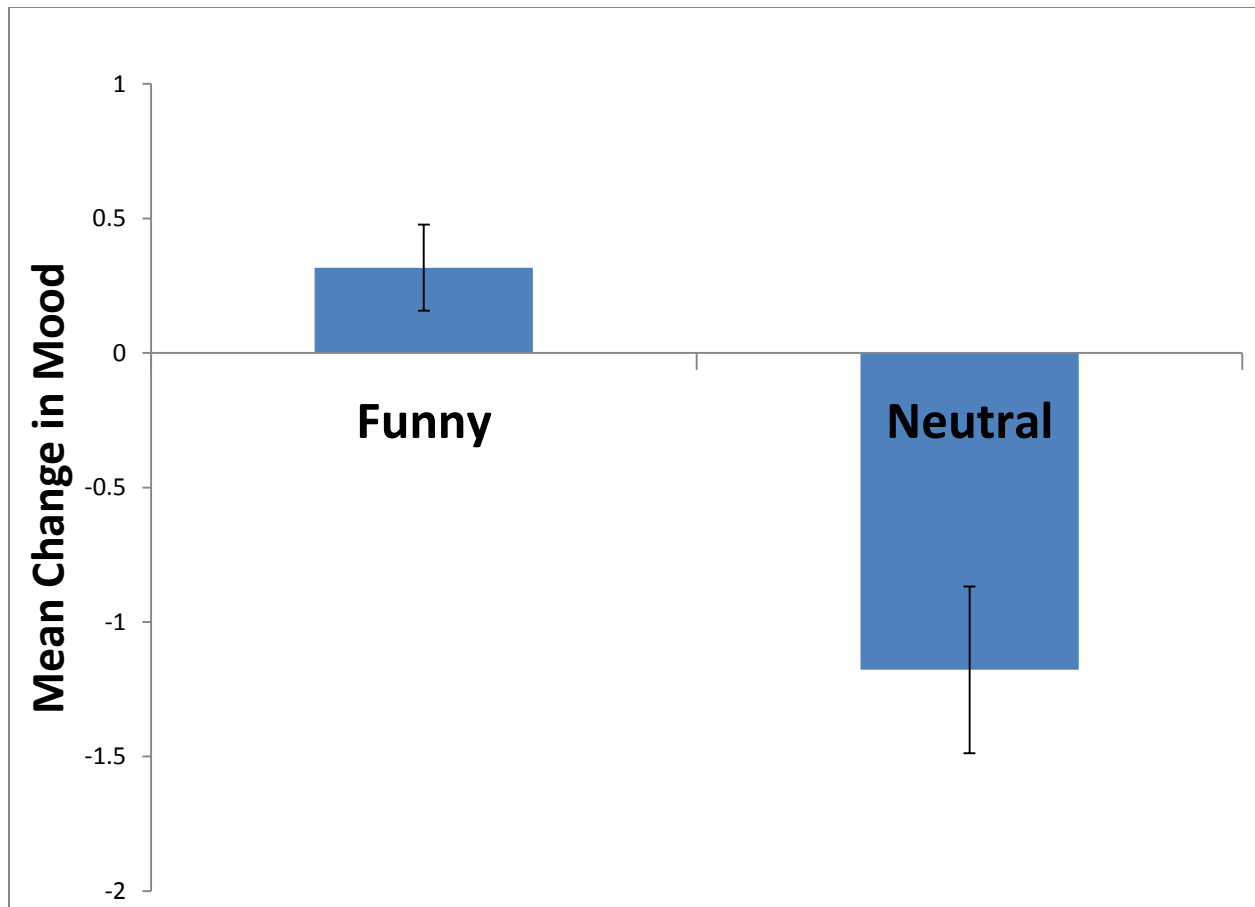


Figure 2. Participant who viewed the funny video showed a positive change in mood from baseline while those who viewed the neutral video showed an overall decrease in mood. Error bars represent *SEM*.

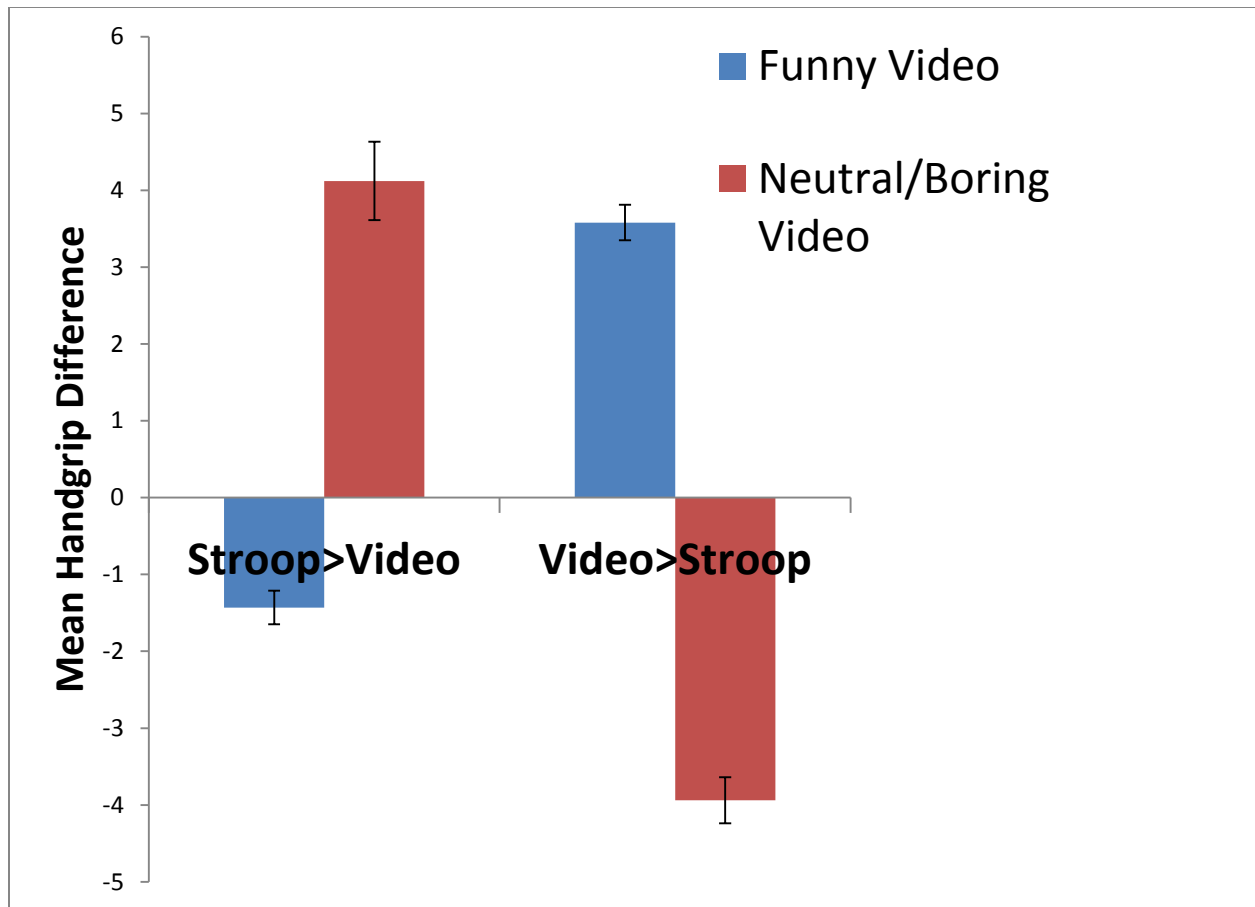


Figure 3. Interaction means are shown here for the purposes of discussion and to assist with interpretation of general trends. Error bars represent *SEM*.