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Depressive Rumination and the Mood-as-Input Hypothesis

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DEPRESSIVE RUMINATION AND THE MOOD-AS-INPUT HYPOTHESIS

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Abstract

The mood-as-input hypothesis was developed to explain perseverative worry. Based on this model, it is predicted that the amount of time individuals persist on tasks is based on their mood, and this hypothesis may explain the tendency for some individuals to engage in prolonged episodes of depressive rumination. However, surprisingly few studies have examined the applicability of the hypothesis to depressive rumination. Based on the mood-as-input hypothesis, it was predicted that persistence at a rumination task would be greatest in a "sad mood" condition paired with an "as many as can" (AMA) stop rule because individuals with depression have a difficult time assessing when to disengage from the rumination process. Participants were randomly assigned to one of three mood conditions (positive, negative, or neutral) through the use of movie clips from the Lion King and one of two stop rules conditions (as many as can or feel like stopping). Participants then completed the Catastrophic Interview Procedure (CIP), in which they were asked to recall a situation or event in their life that is associated with a depressed mood. More steps are indicative of greater rumination. Contrary to previous literature on the topic, there was no significant interaction between mood and stop rules on depressive steps; however the current study was the first to identify rumination as a predictor of variance after controlling for mood and stop rules indicating that the natural tendency to engage in rumination is an additional relevant variable in a basic perseveration task.

Keywords: mood, depressive rumination, stop rules, catastrophic interview

Depressive Rumination and the Mood-as-Input Hypothesis

Major Depressive Disorder (MDD) is a common and debilitating mental illness characterized by a depressed mood, decreased motivation, loss of pleasure in daily activities, and a sense of worthlessness (National Institute of Mental Health, 2013). Epidemiological studies have reported the period prevalence of depression in adults to be 6.7% in the United States (NIMH, 2013). Although effective treatments have been developed for depression, many either fail to respond to treatment or relapse. Consequently, more research is needed to understand the underlying mechanisms of depression.

Researchers have proposed that the severity and duration of depressive symptoms may be in part due to the individual's response to symptoms (Just & Alloy, 1997). In particular, Nolen-Hoeksema (1991) developed the Response Styles Theory (RST) as a cognitive model to explain the development and maintenance of depression symptoms. According to the RST, there are two distinct ways in which people experience and respond to their depressive symptoms. The first response style is distraction, where the individual constructively accepts a task as completed and moves on, with no tendency to contemplate their action or inaction. Such activities as playing basketball, working, or enjoying a hobby provide individuals with an opportunity to take their mind off of their symptoms as well as alleviate their depressed mood (Nolen-Hoeksema, Morrow, & Fredrickson, 1993). Distraction has been associated with lower levels of depression and related negative affect (Lam, Smith, Checkley, Rijsdijk, Sham, 2003). The second response style is rumination, often characterized by a dysphoric mood with a propensity to re-assess previous actions (Muris, Roelofs, Meesters, & Boosma, 2004). More specifically, rumination is defined as negative repetitive thoughts of past events and actions (Whitmer & Gotlib, 2012).

The role of rumination in depression has been well-supported. In a pivotal study, Nolen-Hoeksema and Morrow (1991) measured the response styles of depression in the San Francisco

Bay area individuals who experienced the 1989 earthquake. Researchers found that participants who had elevated levels of depression prior to the earthquake and used a ruminative response style, experienced higher levels of depressive symptoms in the days following the earthquake, when compared to those with a more distractive response style (Nolen-Hoeksema & Morrow, 1991). The researchers proposed those who engage in a ruminative response style when they are feeling depressed, experience higher levels of depressive symptoms over time.

Additional studies have been found to provide consistent support for the role of rumination in depression. For example, based on a longitudinal study of non-depressed college students, individuals who ruminate tend to experience more severe episodes of depression (Just & Alloy, 1997). Nolen-Hoeksema, Morrow, and Fredrickson (1993) also found a ruminative response style to be associated with more pronounced and longer episodes of depressed mood in a non-clinical sample. Numerous follow-up studies have found support for the association between rumination and depression, and support is particularly strong for the role of rumination in the onset of depressive episodes (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Overall, based on the above mentioned findings, it appears that individuals who have a propensity to ruminate are inclined to have difficulty disengaging from negative past events such as failures or sadness (Hawksley & Davey, 2010). Consequently, ongoing research is needed to better understand the nature of depressive rumination.

It is possible that models developed to improve the understanding of worry may also be applicable to rumination. More specifically, consistent with rumination, worry is defined as negatively burdened and uncontrollable thoughts or images (Borkovec, Robinson, Pruzinsky, & DePree, 1983; Gladstone & Parker, 2003). Researchers have found that rumination and worry are overlapping constructs, and consequently, rumination and worry have been classified as types of

persistent negative thinking (Chan, Davey, & Brewin, 2013; McEvoy, Mahoney, & Moulds, 2010). In a study by Goring and Papageorgiou (2008), researchers conducted a factor analysis to examine the relationship between rumination and worry. Researchers concluded a quarter of the variability in one construct could be predicted by the variability in the other (Goring & Papageorgiou, 2008). Further, it is noteworthy that Major Depressive Disorder (MDD), which most typically associated with rumination, and Generalized Anxiety Disorder (GAD), which is most typically associated with excessive worry, exhibit a very high level of comorbidity (Chan, Davey, & Brewin, 2013; Penney, Mazmanian, & Rudanycz, 2013).Consequently, it is possible that models used to explain the development and maintenance of excessive worry may also provide insight into rumination.

The mood-as-input hypothesis (MAIH) has been developed to explain perseverative and catastrophic worry, which is a central feature of GAD (Davey & Levy, 1998). Based on this model, it is speculated that the amount of time individuals persist on tasks is strongly influenced by two factors: mood and stop rules. According to the MAIH, stop rules are believed to provide goals or guidelines for the completion of open-ended tasks, including problem solving (Meeten & Davey, 2012). The first is the 'as many as can' (AMA) stop rule, in which individuals tend to discontinue worry only after they have thought of all possible outcomes to a situation. The second is the 'feel like continuing' (FL) stop rule, in which worry episodes are ended when individuals feel like they are finished worrying or feel like discontinuing (Davey & Levy, 1998). These stop rules have been linked to pathologies where researchers have found that high ruminators and worriers tend to approach open-ended problems with an AMA stop rule, which may lead to prolonged episodes of worry or rumination (Watkins & Mason, 2002; Chan, Davey, & Brewin, 2013).

Based on the mood-as-input hypothesis, stop rules are influenced by the current mood of the individual engaged in an open-ended task. In particular, positive moods influence the individual by serving as an internal cue that leads an individual to believe that he or she has achieved a particular goal during a problem solving task. Consequently, individuals in a positive mood are able to disengage from a problem solving task. In contrast, negative moods signify a lack of achievement or an unsuccessful completion of a problem solving task, which leads the individual to perseverate or ruminate for an extended period of time. Overall, based on this hypothesis it is proposed that, mood influences the interpretation and approach to the completion of a task (Meeten & Davey, 2011). Further, mood is believed to interact with stop rules. In particular, negative mood combined with AMA stop rule is believed to lead to the perseveration during an open-ended task.

The MAIH has been tested through the experimental manipulation of stop rules and participant mood. Mood is most typically manipulated through the use of music (Hawksley & Davey, 2010) or video clips (Meeten & Davey, 2012). The Catastrophizing Interview Procedure (CIP) is typically used as a measure of perseveration. The procedure was originally developed by Vasey and Borkovec (1992), and was later revised by Davey and Levy (1998). The model has been extensively studied in the context of worry (Meeten & Davey, 2011). The number of catastrophizing steps are measured after manipulating mood; positive or negative, and stop-rules in conjunction with the MAIH (Meeten & Davey, 2011). In the first study conducted to test the mood-as-input hypothesis, Martin et al. (1993) induced a positive or negative mood in their participants and asked them to produce a list of bird names provided by the stop rules they received. One group of the participants were told to list as many bird names as they could (AMA stop rule), while a second group was told to stop the task when they no longer felt like

continuing listing bird names (FL stop rule). The researchers found that mood had an effect on the number of bird names produced along with the stop rule given. Participants who were in a positive mood persisted at the task in the "feel-like continuing" stop rule condition considerably longer than those in the negative mood. Interestingly, the researchers found that those in the "as many as you can" stop rule condition and who experienced negative mood persisted at the task the longest, leading Martin to hypothesize that individuals use their moods to determine whether a certain task has been successfully completed or not in relation to the stop rule (Martin et al., 1993). According to a review on the mood-as-input hypothesis, Meeten and Davey (2011) reported the hypothesis has been supported in relation to worry (Davey et al., 2005, Davey & Wells, 2006; Startup & Davey, 2003), and other perseverative thinking patterns, such as obsessive compulsive disorder (Davey, Fields, Startup, 2003; MacDonald & Davey, 2005; Van den Hout et al., 2007), depression (Nolen-Hoeksema & Morrow, 1991: Watkins & Mason, 2002; Hawksley & Davey 2010), and perfectionism (Egan, Wade, & Shafran, 2011).The model has been widely applied to the study of perseverative worrying; however, surprisingly few studies have examined the applicability of the mood-as-input hypothesis to depressive rumination.

By adapting the mood-as-input hypothesis and CIP, Watkins and Mason (2002) were the first to evaluate the potential relevance of the MAIH to rumination. In particular, the authors used the Ruminative Response Scale (RRS) to split a non-clinical sample into high and low ruminators. Without inducing mood, sixty participants were assigned to one of the three stop rule conditions; AMA, FL, and no stop rule. Following random assignment of condition, participants were provided the rumination interview to measure the perseveration of their rumination. As hypothesized, high ruminators provided significantly more steps on the CIP for their depressed mood in both the AMA and no stop rule conditions. Based on these findings, researchers

proposed that high ruminators have a greater tendency to default on an AMA stop rule compared to FL and suggest the use of an FL stop rule could reduce the frequency of rumination (Watkins & Mason, 2002).

Hawksley and Davey (2010) further investigated the mood-as-input hypothesis and depressive rumination by introducing a mood induction through the use of music. Sixty non-clinical participants were randomly assigned to one of four conditions based on their assigned mood (positive vs. negative) and designated stop rule (AMA vs. FL). Participants in the negative mood condition listened to eight minutes of Gyorgy Ligeti's *Lux Aeterna* (Startup & Davey, 2001) in a room with blackout curtains and a small lamp, while those in the positive mood induction listened to Delibes (1870) Mazurka from Coppelia (as cited in Hawksley & Davey, 2010) in a fully lit room. After given the assigned stop rule, participants were provided with the rumination interview. As hypothesized, participants in the negative mood induction, paired with the AMA stop rule, produced significantly more statements for their rumination compared to those in the positive mood induction combined with the FL stop rule. The results were consistent with previous literature regarding worry (Meeten & Davey, 2011), providing initial evidence for the premise that the mood-as-input hypothesis be applicable to depressive rumination (Hawksley & Davey, 2010).

Further expanding research on rumination, Chan, Davey, and Brewin (2013) explored the mood-as-input hypothesis on rumination in clinical and non-clinical samples, with 25 participants in each condition. Clinical participants were diagnosed with MDD according to the DSM-IV. After assigning participants to one of the two stop rules, the rumination interview was conducted. As hypothesized, clinically depressed participants in the AMA stop rule condition produced significantly more steps during the task than the non-clinical participants or those

assigned to the FL stop rule. Clinical participants also reported they were more likely to use AMA directed approaches in everyday life suggesting that treatments aimed at underlying beliefs could impact the tendency to engage in rumination (Chan, Davey, & Brewin, 2013).

Focus of the Current Study

Due to the lack of supported use of the mood-as-input hypothesis as it pertains to rumination, the focus of the current study was to offer expansion by exploring trait rumination and the mood-as-input hypothesis using an induced positive, negative, or neutral mood through the use of movie clips. Although the mood-as-input hypothesis has provided insight into pathological worry, comparatively little research has focused on depressive rumination. Consequently, the current study adds to a small number of studies in the area. Of the three studies which exclusively examined the relevance of the MAIH to rumination, only one manipulated mood and did so through the use of music (Hawksley & Davey, 2010). Therefore, the current study was a replication and extension of Hawskley and Davey (2010). In addition to being only the second study to examine mood induction, another unique contribution of this study is the examination of the role of trait rumination on perseveration. Further, this study explored the relation between rumination steps and other constructs, including positive and negative beliefs about worry.

There were five established hypotheses in the current study. The first hypothesis was that persistence at a rumination task would be greatest in the negative induced mood condition compared to the positive mood condition as indicated by a higher number of rumination steps. The second hypothesis was that the use of an as-many-as-can stop rule would result in a higher number of rumination steps. The third hypothesis was that a significant interaction would occur between the negative induced mood state and an AMA stop rule. This interaction was expected

to result in an increased number of steps in the Catastrophic Interview Procedure compared to all other conditions, such as the positive and neutral mood induction paired with the FL stop rule. The fourth hypothesis was that trait rumination would be a predictor of variance in the CIP after controlling for stop rules and mood. The fifth hypothesis suggests the CIP and Ruminative Response Scale would be correlated with depressive symptoms as identified by the Depression Anxiety Stress Scale.

Method

Participants

Participants were volunteer undergraduate and post-baccalaureate students at the University of North Florida's Psychology Department (*n*=155), who took part in the study in exchange for course extra credit. Of the 155 participants, 127 were female (81.9%), and 58% were psychology majors. The mean participant age was 22.66 years (range from 18 to 52). Academic class standing was as follows: 18.7% freshman, 11% sophomores, 37.4% juniors, 31% seniors, and 1.9% post-baccalaureate. Regarding relationship status, 141 participants were single (91%), 12 were married (7.7%), and 2 were divorced (1.3%). Forty-five of the participants (29%) reported being diagnosed with a psychiatric disorder (see table 1).

Design and Procedure

Participants were randomly assigned to one of six conditions. The designated conditions were assigned according to the mood induction and stop rule they were provided. The conditions were labeled as Happy/AMA (*n*=26), Happy/FL (*n*=26), Sad/AMA (*n*=26), Sad/FL (*n*=25), Neutral/AMA (*n*=26), and Neutral/FL (*n*=26).

Participants completed the study in a controlled laboratory setting. All participants were informed of the nature of the study and provided their consent to participate. First, participants

filled out one of the visual analogue scales ranging from 0 to 100 which assessed current levels of anxiety, sadness, and happiness. Participants then filled a number of self-report questionnaires (see measures section below).

Following completion of the self-report measures, mood induction was conducted based on the procedures outlined by Rottenberg, Ray, and Gross (2007) and used by Meeten and Davey (2012). In particular, the authors used video clips from the animated cartoon movie, *The Lion King* to induce a positive or negative mood in participants. Consistent with Rottenberg (2007), the authors also used a screen as stimuli in the neutral condition. Building on the researcher's use of mood induction to explore the area of worry, the current study used specific movie clips from *The Lion King* for the positive mood induction (3.16 minutes) (The Lion King Songs, 2011) and negative mood induction (3.25 minutes) (Miller, 2013). A commercial screensaver was used for the neutral mood induction (3 minutes). To further enhance mood induction and remain consistent with protocol, the lights were turned off during the negative mood condition and left on during the positive and neutral mood induction while the movie clip was playing (Meeten & Davey, 2012).

Following completion of the mood induction task, participants again completed the visual analogue scales measuring current mood of anxiety, sadness, and happiness. The contrast in Visual Analogue Scale (VAS) scores from the first to second administration served as a manipulation check.

Next, the Catastrophic Interview Procedure was administered with procedures consistent with Chan, Davey, and Brewin, 2013; Hawksley and Davey, 2010; and Watkins and Mason, 2002. The Interview was modeled after the Catastrophizing Worry Interview by applying the same principles of worrisome thought to depressive rumination. Before the interview,

participants were provided directions on how to complete the interview based on the assigned stop rule. Participants in the AMA stop rule group were instructed to list as many sentences as they could, while the participants in the FL stop rule group were instructed to finish the interview once they no longer felt like continuing. Once instructions regarding the stop rule condition were provided, participants were asked to recall a situation or event in their life associated with a depressed mood (Watkins & Mason, 2002).

A debriefing was conducted following the completion of the interview. During the debriefing, participants were told the true purpose of the study and were provided with details to the University's counseling services. Participants were also given an opportunity to watch the "happy" movie clip if they had undergone the sad mood induction.

Measures

The Ruminative Response Scale. The Rumination Response Scale (RRS) is a 22 item self-report measure (Fresco et al., 2002) adapted from the original 71 item Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991). The RRS assesses the amount to which an individual ruminates or thinks negatively on past events as well as strategies in response to a negative mood or depression (Chan et al., 2013). The scale has found to possess good internal consistency, adequate test-retest reliability, predictive validity, and convergent validity (Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema, 2000; Watkins & Mason, 2002).

The Positive Beliefs about Rumination Scale. The Positive Beliefs about Rumination Scale (PBRS; Papageorgiou & Wells, 2001) is a 9 item self-report scale used to measure the metacognitive beliefs about the positive benefits of rumination. The PBRS is scored on a 4 point Likert scale of 1 (do not agree) to 4 (agree very much) (Chan et al., 2013). The PBRS has found to possess good internal consistency and test-retest reliability. Support for discriminant validity

has been found, as the scale can distinguish individuals with major depression symptoms from those with social phobia symptoms (Roelofs, Huibers, Peeters, Arntz, & Os, 2010).

The Negative Beliefs about Rumination Scale. The Negative Beliefs about Rumination Scale (NBRS; Papageorgiou & Wells, 2001) is a 13 item self-report scale used to measure the metacognitive beliefs about the disadvantages of rumination. The NBRS is scored on a 4 point Likert scale of 1 (do not agree) to 4 (agree very much) (Chan et al., 2013). The NBRS was found to have high internal consistency and test-retest reliability. Support for discriminant validity has been found, as the NBRS can distinguish individuals with major depression symptoms from those with panic disorder, agoraphobia, and social phobias (Roelofs et al., 2010).

The Penn State Worry Questionnaire. The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is the most widely used measure of worry (Dash & Davey, 2012). It is a 16 item self-report questionnaire designed to measure the degree and frequency with which one experiences worry (Penney et al., 2013). The PSWQ is scored on a 5 point Likert scale of 1 (not at all typical of me) to 5 (very typical of me) (Meeten & Davey, 2012). The PSWQ has high test-retest reliability and good internal consistency (as cited in Dash & Davey, 2012).

The Depression Anxiety Stress Scale. The Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995) is a 21 item self-report measure adapted from the original DASS-42. This scale measures the severity of depression, anxiety, and stress symptoms. Used in clinical and non-clinical samples, the DASS has exhibited strong internal consistency as well as convergent and discriminant validity (Brown, Chorpita, Korotitsch, & Barlow, 1997).

Visual Analogue Scales. The Visual Analogue Scales (VAS) were used to assess the current mood of the participants on a 100 point scale, where 0 signified “not at all” sad or happy,

and 100 signified extremely sad or happy. Participants were instructed to place a tic mark along the line at the point which matched their current mood. The VAS were administered at the beginning of the study and again after participants underwent the mood induction. This technique has been used in multiple psychological studies measuring mood induction (Chan et al., 2013; Davey et. al, 2007; Meeten & Davey, 2012; Startup & Davey, 2001).

The Catastrophic Interview Procedure. The Catastrophic Interview Procedure (CIP) was designed to assess perseverative thinking. First, participants begin by writing their current main issue at the top of the page provided, signified as "X" and await instructions (such as; "My cat passed away this week"; see Appendix A). The interviewer initiates by asking "What is it that depresses you about X (your cat passing away)?" The question is then repeated, substituting X for the participant's previous response (such as; "My cat was my closest friend" and "I do not know how to cope with the loss of a best friend"). The interview is terminated when the participant is unable to provide another response or repeats the same response three times (Meeten & Davey, 2012).The standardized form and inability for the participant to provide any responses longer than the sentences provided is used to reduce experimenter bias. The number of steps provided by the participant is used as the dependent variable as a measure of perseveration at the task. The hypothesized number of steps is based on the participant's assigned stop rule with more steps being indicative of more rumination (Dash & Davey, 2012).

Results

Manipulation Check

One-Way Analyses of Variance were conducted to assess for potential differences in VAS ratings collected prior to and following the mood induction task. No significant differences were identified between groups prior to the mood induction for the sad VAS scales [$F(2,153)=$

2.37, p= .097] and the happy VAS scales, F(2, 153)= .616, p= .541. However, following the manipulation, significant between-group differences were found for both the sad VAS [F(2,154)= 40.044, p< .001] and happy VAS, F(2,154)= 27.40, p< .001. Based on post hoc analyses of the sad VAS, all three conditions were found to be significantly different, with participants in the sad mood condition reporting higher levels of sadness (M=46.37, SD= 30.13) than those in the neutral (M=18.88, SD= 23.21), or happy mood condition (M=7.40, SD=10.26). The opposite trend was true for the happy mood condition, with participants reporting higher levels of happiness (M=79.67, SD=19.06) than those in the neutral (M=69.42, SD= 20.55), or sad mood condition (M=46.17, SD= 29.63).

Mood, Stop-Rules, and the Catastrophic Interview

A 3x2 Factorial Analysis of Variance was conducted to assess degree to which mood (positive, negative, neutral) & stop rules (AMA, FL) influence the number of Catastrophic Rumination Interview steps. There was a significant main effect for mood, F(2, 149) = 6.299, p = .002, η^2 =.078. In particular, based on post hoc analyses, significant differences were found between the mean number of catastrophizing steps in the negative mood condition (M= 7.63, SD= 3.86) when compared to the neutral (M= 5.59, SD= 3.38) and positive mood (M= 5.38, SD= 3.78) conditions. There were no significant differences found between the neutral and positive mood induction conditions. Further, there was a main effect for stop rule F(1,149) = 16.356, p < .001, η^2 = .099. In particular, more steps were reported in the AMA (M= 7.33, SD= 4.05) condition when compared to the FL condition (M=5.04, SD= 3.13) However, there was no significant interaction between mood and stop rules F(2,149)= 1.127, p = .327, η^2 = .015.

Trait Rumination

A hierarchical multiple regression was conducted to test the hypothesis that trait rumination predicts variance in the CIP steps after controlling experimentally manipulated variables in the study (i.e., stop rules and mood). Stop rules and mood were entered in the first step of the regression equation, followed by trait rumination in the second step.

The first step was significant, and the addition of trait rumination equation led to a significant improvement in the model, $\Delta R^2 = .07$, F (9.62), $p < .01$. Further, the final model was significant, $R = .40$, F (8.99), $p < .01$, and all predictor variables were significant and unique predictors of CIP steps: stop rules, $\beta = .30$, $p < .001$, sad mood, $\beta = .26$, $p = .003$, and trait rumination, $\beta = .18$, $p = .015$. Multicollinearity was not a concern (VIF= 1.00 for stop rules, 1.00 for mood, and .971 for rumination). Overall, trait rumination accounted for a small but significant amount of variance in CIP after accounting for the experimentally manipulated variables (i.e., mood and stop rules).

Correlations with Depression and Beliefs about Rumination

Pearson correlation coefficients were examined to explore additional predictors of scores on the CIP. A significant association was found, between CIP and DASS scores, $r(151) = .23$, $p = .005$ indicating a small but positive association between these two variables. In particular, higher levels of depression and anxiety were associated with a greater number of steps on the CIP. The associations between the CIP and PBRS and the NBRS were non-significant. (see table 3).

Discussion

The purpose of the current study is to add to the small number of studies that have focused on the applicability of the MAIH to depressive rumination. In particular, mood induction and stop rules were manipulated before completing a depressive rumination CIP task.

As predicted, the first hypothesis was supported, as participants in the negative mood condition produced the highest number of CIP steps. The results suggest that negative mood may be associated with increased perseveration. Further, these results are consistent with previous research in this area in which mood is related to an increased number of steps on a depressive rumination task (Chan et al., 2013; Watkins & Mason, 2002). For example, results are consistent with Chan et al. (2013), where differences were found in mood between the clinically depressed and non-depressed patients. However, the current study differs from the one previous rumination study in which depressed mood was inducted. In particular, in Hawksley and Davey (2010), participants in the depressed mood condition depressed mood produced more steps compared to the positive mood group, but only when combined with the goal-guided (AMA) stop rule.

In line with the first hypothesis, the second hypothesis was also supported. In particular, participants assigned to the AMA stop rule produced significantly more steps for their depression on the CIP when compared to participants in the FL stop rule condition. Results are consistent with one of the three studies pertaining to depressive rumination and the mood-as-input hypothesis (Chan et al., 2013). Hawksley and Davy (2010) did not find a main effect for stop rules; Watkins and Mason (2002) found a near significant main effect for stop rule.

The third hypothesis regarding the interaction between mood and stop rules on catastrophic interview steps was not supported. Prior studies found a significant interaction between mood and stop rules (Chan et al., 2013; Hawksley & Davey, 2010; Watkins & Mason,

2002); however a significant interaction was not found in the current study. It is important to address why the results of this study were not consistent with previous literature. A difference in the current study is noted in the happy group paired with the FL stop rule. Theory predicts that task persistence is likely in the happy and FL condition and previous studies have found that this group tended to engage in higher levels of CIP steps. In contrast, the current study found that this group exhibited particularly low CIP steps. One interpretation is that the happy/FL condition was asked to engage in a mood-incongruent task (i.e., depressive rumination task). Participants will not feel like continuing to engage in a mood congruent task, and therefore discontinue the task after only a few steps. Differences between the current and previous studies may also be due to nuances that are not necessarily reflected in description of the procedures from previous studies, which may have influenced replication. Overall, more replication is needed to resolve this discrepancy.

The fourth hypothesis which concentrated on trait rumination was supported. In particular, a hierarchical multiple regression was performed to test that trait rumination was a predictor of variance in the CIP after controlling for mood and stop rules. Of the three prior studies investigating depressive rumination and the mood-as-input hypothesis, one study used trait rumination, but did not focus on both variables in the MAIH. While Chan et al. (2013) found that trait rumination predicted CIP steps; the current study was the first to examine trait rumination in relation to both components of the CIP. Overall, beyond mood and stop rules, preexisting trait rumination predicted variability in the CIP task, indicating that the natural tendency to engage in rumination is an additional relevant variable in a basic perseveration task.

In reference to the fifth hypothesis, it was hypothesized that the CIP would be correlated with depression and general anxiety symptoms, and beliefs about rumination. Based on bivariate

correlations, the hypothesis was partially supported. The CIP presented a weak yet significant correlation with depression and general anxiety symptoms. These results provide additional evidence for the relevance to the CIP as a valid measure of depression and anxiety. In contrast, the relation between CIP and positive and negative beliefs about rumination was not supported. Although it is possible that an association does not exist amongst these variables, it is also possible that the CIP, as a single item measure, lacks the stability and validity to detect small effect sizes.

The current study adds to the limited research on the applicability of the MAIH to depressive rumination. In addition to being the first study to induce a positive, negative, or neutral mood through the use of movie clips, this was only the second study to focus on the role of trait rumination on perseveration.

Limitations of the Current Study

It is pertinent to note the possible limitations to the current study. The first limitation to this study, and the more general use of this paradigm, relates to the ecological validity of the CIP. The structured setting of the interview lacks ecological validity in that the findings may not generalize to rumination which occurs in real world settings (Davey, Startup, MacDonald, Jenkins, & Patterson, 2005). The second possible limitation is derived from the generalizability of the sample. More specifically, the use of a college student sample may not be representative of the community. Further, the sample was non-clinical and a majority of the participants were female. Third, the CIP may be influenced by experimenter bias as the experimenter is aware of the assigned condition of the participant. To address this issue, Chan et al. (2013) proposed an automated format of the CIP to reduce experimenter bias. The fourth limitation is the self-report nature of the questionnaires. A majority of the measures in the study were based on self-report.

The personal nature of the questionnaires may lead to biases, including both under and over-reporting of symptoms.

Conclusion

In summary, the current study provides a contribution to the research literature on depressive rumination. In particular, this study adds to a small body of research on the applicability of the MAIH to depressive rumination. Although this study provides support of the relevance of the MAIH to depressive rumination, differences were found between the current study and previous research. In particular, a non-significant interaction between mood and stop rules was found, which appears to be driven by particularly low scores on the Happy/FL condition, suggesting that individuals who are happy and use a FL stop rule minimize rumination. Consequently, perhaps modifying the stop rule from AMA to FL may reduce rumination in clinical populations.

Table 1
Participants who reported being diagnosed with any of the following mental health disorders

Diagnoses	N (Percent)
No Diagnosis	111(71.6)
Depression	13 (8.4)
Depression and Generalized Anxiety Disorder	11 (7.1)
Generalized Anxiety Disorder	5 (3.2)
Post-Traumatic Stress Disorder	2 (1.3)
Post-Traumatic Stress Disorder and Depression	2 (1.3)
Post-Traumatic Stress Disorder, Depression, and Generalized Anxiety Disorder	2 (1.3)
Obsessive Compulsive Disorder , Depression, and Generalized Anxiety Disorder	2 (1.3)
Obsessive Compulsive Disorder and Depression	1 (0.6)
Obsessive Compulsive Disorder and Borderline Personality	1 (0.6)
Depression and Social Phobia	1 (0.6)
Depression, Generalized Anxiety Disorder, and Borderline Personality	1 (0.6)
Generalized Anxiety Disorder and Attention Deficit Hyperactivity Disorder	1 (0.6)
Specific Phobia and Bipolar Disorder	1 (0.6)
Schizophrenia	1 (0.6)

Table 2
Means and standard deviations of mood ratings before and after the mood induction

	Anxiety		Sadness		Happiness	
	Pre-induction	Post-induction	Pre-induction	Post-induction	Pre-induction	Post-induction
Negative mood	32.45(26.20)	38.01(27.70)	23.38(23.25)	46.37(30.13)	66.06(23.17)	46.17(29.63)
Positive mood	27.62(25.69)	12.82(17.08)	13.93(16.69)	7.39(10.26)	65.77(23.53)	79.67(19.06)
Neutral mood	34.84(28.79)	33.40(30.85)	18.14(23.25)	19.07(23.40)	70.09(18.89)	69.21(20.69)

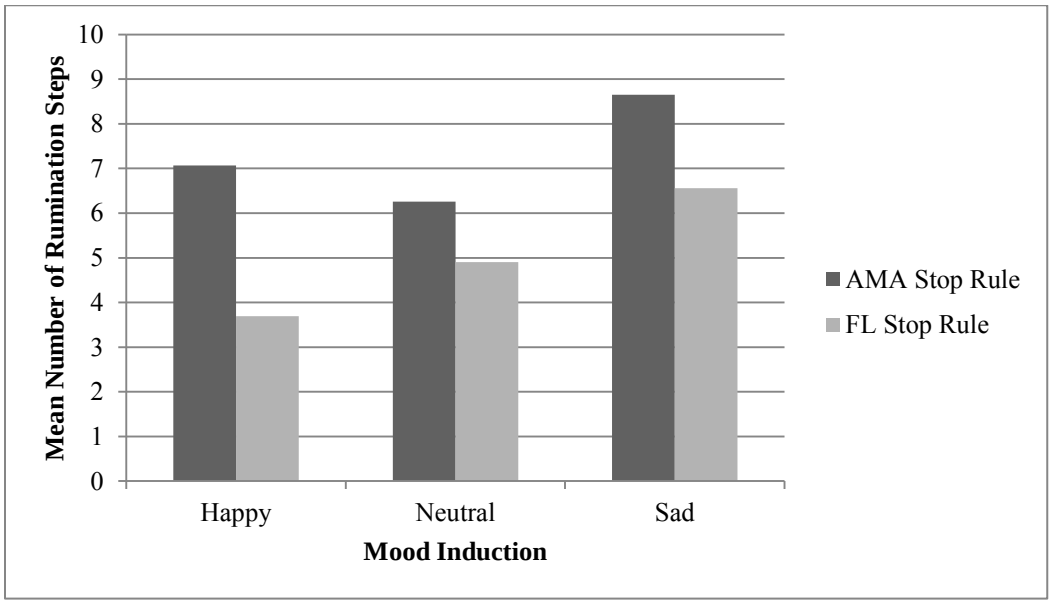

Figure 1. Mean number of rumination steps produced by the happy, neutral, and sad mood inductions under each stop rule condition.

Table 3
Correlation Matrix of Study Measures

Variable	DASS	PSWQ	RRS	PBRS	NBRS	CIP
DASS	-					
PSWQ	.689**	-				
RRS	.663**	.594**	-			
PBRS	.473**	.452**	.595**	-		
NBRS	.503**	.413**	.651**	.315**	-	
CIP	.227*	.193*	.205*	.078	.096	-

Note: DASS= Depression Anxiety Stress Scales, PSWQ= Penn State Worry Questionnaire, RRS= Ruminative Response Scale, PBRS= Positive Beliefs about Rumination Scale, NBRS= Negative Beliefs about Rumination Scale, CIP= Number of steps iterated on the Catastrophic Interview Procedure *p<.05, **p<.001

Appendix A: Catastrophic Rumination Interview Process

Instructions: On the first line please indicate one thing that makes you feel depressed most at this point in time.

*After you have done so, inform the researcher and wait for further instructions.

Current main issue:

_____

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

H. _____

I. _____

J. _____

K. _____

L. _____

M. _____

N. _____

References

Borkovec, T.D., Robinson, E., Pruzinsky, T., & DePree, J.A. (1983). Preliminary exploration of worry: Some characteristics and processes. *Behaviour Research and Therapy, 21*, 9-16.

Brown, T.A., Chorpita, B.F., Korotitsch, W., & Barlow, D.H. (1997). Psychometric properties of the depression anxiety stress scales in clinical samples. *Behaviour Research and Therapy, 35*, 79-89.

Chan, J.C., Davey, G.C., & Brewin, C.R. (2013). Understanding depressive rumination from a mood-as-input perspective: Effects of stop-rule manipulation. *Behavior Research Therapy, 51*(6), 300-306.

Dash, S.R., & Davey, G.C. (2012). An experimental investigation of the role of negative mood in worry: The role of appraisals that facilitate systematic information processing. *Journal of Behavioral Therapy and Experimental Psychiatry, 43*, 823-831.

Davey, G.C., & Levy, S. (1998). Catastrophic worrying: Personal inadequacy and a perseverative iterative style as features of the catastrophizing process. *Journal of Abnormal Psychology, 107*(4), 576-586.

Davey, G.C. & Wells, A. (2006). *Worry and its psychological disorders: Theory, assessment and treatment.* Chichester, UK: Wiley.

Davey, G.C., Field, A.P., & Startup, H.M. (2003). Repetitive and iterative thinking in psychopathology: Anxiety-reducing consequences and a mood-as-input mechanism. In R. Menzies & P. de Silva (Eds). *Obsessive compulsive disorders: theory, research and treatment* (pp. 79-99). Chichester, UK: Wiley.

Davey, G.C., Startup, H.M., MacDonald, C.B., Jenkins, D., & Patterson, K. (2005). The use of "as many as can" versus "feel like continuing" stop rules during worrying. *Cognitive Therapy and Research, 29*(2), 155-169.

Egan, S.J., Wade, T.D., Safran, R. (2011). Perfectionism as a transdiagnostic process: a clinical review. *Clinical Psychology Review, 31*(2), 203-212.

Fresco, D.M., Frankel, A.N., Mennin, D.S., Turk, C.L., & Heimberg, R.G. (2002). Distinct and overlapping features of rumination and worry: The relationship of cognitive production to negative affective states. *Cognitive Therapy and Research, 26*(2), 179-188.

Gladstone, G., & Parker, G. (2003). What's the use of worrying? Its function and its dysfunction. *Australian & New Zealand Journal of Psychiatry, 37*(3), 347-354.

Goring, H.J., & Papageorgiou, C. (2008). Rumination and worry: Factor analysis of self-report measures in depressed participants. *Cognitive Therapy and Research, 32*, 554-566.

Hawksley, J., & Davey, G.C. (2010). Mood-as-input and depressive rumination. *Behaviour Research and Therapy, 48*, 134-140.

Just, N. & Alloy, L.B., (1997). The response styles theory of depression: tests and an extension of the theory. *Journal of Abnormal Psychology, 106*, 221-229.

Lam, D., Smith, N., Checkley, S., Rijsdijk, F., & Sham, P. (2003). Effect of neuroticism, response style and information processing on depression severity in a clinically depressed sample. *Psychological Medicine, 33*(3), 469-479.

Lovibond, S.H., & Lovibond, P.F. (1995). *Manual for the depression anxiety stress scales*. (2nd Ed). Sydney: Psychology Foundation.

Martin, L.L., & Davies, B. (1998). Beyond hedonism and associationism: A configural view of the role of affect in evaluation, processing, and self-regulation. *Motivation and Emotion, 22*, 33-51.

Martin, L.L., Ward, D.W., Achee, J.W., & Weyer, Jr., R.S. (1993). Mood as input: people have to interpret the motivational implications of their moods. *Attitudes and Social Cognition, 64*(3), 317-326.

McEvoy, P.M, Mahoney, A.J, & Moulds, M. (2010). Are worry, rumination, and post-even processing one and the same? Development of the repetitive thinking questionnaire. *Journal of Anxiety Disorders, 24*, 509-515.

Meeten, F., & Davey, G.C. (2012). Mood as input and perseverative worrying following the induction of discrete negative moods. *Behavior Therapy, 43*, 393-406.

Meyer, T.J., Miller, M.L., Metzger, R.L., & Borkovec, T.D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy, 28*, 487-495.

Miller, T. (2013, February 19). *Mufasa's Death The Lion King English* [Video file]. Retrieved from https://www.youtube.com/watch?v=OoBMWN7R5FI

Muris, P., Roelofs, J., Meesters, C., & Boomsma, P. (2004). Rumination and worry in nonclinical adolescents. *Cognitive Therapy and Research*, *28*(4), 539-554.

National Institute of Mental Health. (2013). *What is Depression?* Retrieved from http://www.nimh.nih.gov/health/topics/depression/index.shtml

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*, 569-582.

Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology, 109*(3), 504-511.

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and post-traumatic stress symptoms following a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology, 61*, 115-121.

Nolen-Hoeksema, S., Morrow, J., & Fredrickson, B.L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology, 102*, 20-28.

Nolen-Hoeksema, S., Wisco, B.E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science, 3*(5), 400-424.

Papageorgiou, C., & Wells, A. (2001). Metacognitive beliefs about rumination in recurrent major depression. *Cognitive & Behavioral Practice, 8*, 160-164.

Penney, A.M., Mazmanian, D., & Rudanycz, C. (2013). Comparing positive and negative beliefs about worry in predicting generalized anxiety disorder symptoms. *Canadian Journal of Behavioural Science, 45*(1), 34-41.

Roelofs, J., Huibers, M., Peeters, F., Arntz, A., & Os, J.V. (2010). Positive and negative beliefs about depressive rumination: A psychometric evaluation of two self-report scales and a test of a clinical metacognitive model of rumination and depression. *Cognitive Therapy Research*, *34*, 196-205.

Rottenberg, J., Ray, R.D., & Gross, J.J. (2007). Emotion elicitation using films. In J.A. Coan & J.J.B. Allen (Eds.), *The handbook of emotion elicitation and assessment*. New York: Oxford University Press.

Startup, H.M., & Davey, G.C. (2001). Mood as input and catastrophic worry. *Journal of Abnormal Psychology*, *101*(1), 83-96.

Startup, H.M., & Davey, G.C. (2003). Inflated responsibility and the use of stop rules for catastrophic worrying. *Behaviour Research and Therapy, 41*, 495-503.

The Lion King Songs. (2011, March 31). *The Lion King- Hakuna Matata (HD)* [Video file]. Retrieved from https://www.youtube.com/watch?v=xB5ceAruYrI

Van den Hout, M., Kindt, M., Luigjes, J., & Marck, C. (2007). Compulsive perseveration : empirical criticism on the mood-as-input model. *Behaviour Research and Therapy, 45*(6), 1221-1230.

Vasey, M., & Borkovec, T.D. (1992). A catastrophizing assessment of worrisome thoughts. *Cognitive Therapy and Research, 16*, 505-520.

Watkins, E., & Mason, A. (2002). Mood as input and rumination. *Personality and Individual Differences, 32*, 577-587.

Whitmer, A.J., & Gotlib, I.H. (2012). An attentional scope model of rumination. *Psychological Bulletin, 139*(5), 1036-1061.

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