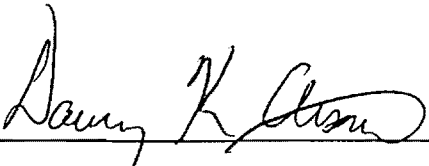


The Effect of Rumination on Beliefs About Adjustment  
to Future Negative Life Events  
by

Simani Mohapatra Price

Thesis Submitted to the Faculty of Virginia  
Polytechnic Institute & State University  
in Partial Fulfillment of the Requirements  
for the Degree of Master of Science in  
Applied-Experimental Psychology

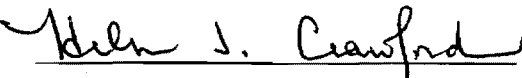
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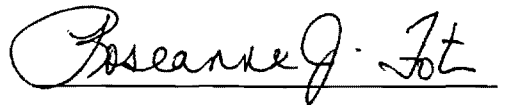
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December, 1993

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THE EFFECT OF RUMINATION ON BELIEFS ABOUT ADJUSTMENT  
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by

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(ABSTRACT)

Do people become more optimistic about future adjustment to negative life events after rumination? Past research using a "top of the head" paradigm indicates that people estimate they would adjust more poorly for severe events and better for mild negative events than their peers. Selective focus (i.e., differential accessibility of information about assets and liabilities for coping) has been provided as an explanation for this effect, which is counter to research on "optimistic bias". Martin and Tesser's (1989) rumination model was applied to beliefs about one's comparative adjustment to negative life events. One hundred twenty undergraduate subjects were asked to imagine experiencing a Severe (HIV+) or Mild (Herpes) negative event at some future time, then to designate items

on a reaction time task as either an Asset or Liability in coping with the with the event. The reaction time task and subsequent comparative adjustment ratings were made either immediately, after a delay that allowed for rumination, or after a delay without an opportunity for rumination. A thought-listing analysis of the audiotaped ruminations revealed that, as predicted, subjects became more optimistic over time. They initially discussed liabilities in coping with the Severe event but gradually considered assets. Comparative adjustment ratings for the Severe event were not significantly different than for the Mild event, even in the Rumination Absent condition. It was suggested that temporarily making assets for coping accessible through the reaction time task had the same effect on comparative adjustment ratings as did problem solving through rumination. The reaction time data provided convergent evidence regarding selective focus and complimented a thought-listing paradigm used in previous studies.

## ACKNOWLEDGMENTS

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# **The Effect of Rumination on Beliefs About Adjustment to Future Negative Life Events**

## **Introduction**

Traumatic events often force people to reexamine their life and question certain assumptions held prior to the event. The search for a meaningful perspective on, or rationale for, the occurrence of a traumatic event is thought to play an integral role in adjustment (Becker, 1973; Benner, Roskies, & Lazarus, 1980; Bulman & Wortman, 1977; Moos & Tsu, 1977; Silver, Wortman & Klos 1982; Jannoff-Bulman, 1992). Ruminating about the meaning of a negative life event, according to these authors, can serve as a way to restore equilibrium to people's lives. Rumination allows people to integrate their previous assumptions about life so as to continue to function and not be overwhelmed by possibilities of future negative life events.

One major assumption or illusion that most people have is an optimistic bias in beliefs about the comparative (self vs. other) likelihood of future life events (for a review, see Taylor & Brown, 1988). People tend to believe positive events are more likely to happen to them and negative events are less likely to happen to them compared to similar others (Weinstein, 1980). However, even people who believe that traumatic events are less likely to happen to them realize

that such events can occur. One way people might maintain an optimistic bias in the face of this knowledge is to exaggerate their ability to cope with the occurrence of negative events should they occur. The literature on beliefs about likely future adjustment to negative life events, however, provides mixed results. That is, optimistic bias does not necessarily extend to comparative adjustment beliefs for all negative life events. In some cases (e.g., loved one breaks a bone in a car accident), people expect to adjust better than others, and in other cases (e.g., murder of a loved one), people expect to adjust worse than others (Axsom, Blanton, Leary, & Price, 1993). Selective focus has been offered as an explanation for the mediation of this pattern (Axsom et al., 1993; Gerrard, Gibbons, & Warner, 1991; Weinstein, 1980). The idea is that people focus selectively on factors that improve their own chances of achieving positive outcomes and ignore that others may have just as many factors in their favor. Selective focus can also help explain why people expect to adjust worse than others. For certain events, people may focus primarily on their liabilities for coping with an event and ignore that others may have just as many liabilities.

One feature shared by all of these studies is their reliance on "top of the head" ratings of adjustment. That is, subjects are asked to make immediate judgements about

their ability to adjust (or event likelihood) compared to similar others. But it is at least possible that people's reactions upon greater reflection about an event will be different from their initial thoughts. Thus, it becomes important to examine rumination and its influence on adjustment beliefs.

The major goal of this thesis is to evaluate the role rumination plays in beliefs about the comparative likelihood of adjustment. If rumination is used as a way to problem-solve, it should restore people's initial optimistic bias, even for negative events for which subjects initially thought they would not adjust as well as others. However, rumination could have the opposite effect. That is, it could make accessible all the activities that would be disrupted in people's lives by the trauma and thereby polarize their initial thoughts about not adjusting well compared to others.

### Rumination Literature

Rumination appears to be a pervasive phenomenon and is often thought of as a natural occurrence following traumatic life events (Ingram, 1984; Sarason, Potter, & Sarason, 1986). Rumination can take many forms and includes problem-solving, anticipation, and intrusive thinking (Martin & Tesser, 1989). One negative consequence of rumination was suggested in a study by Pennebaker, Hughes and O'Heeron

(1987) that demonstrated that rumination following a negative life event was associated with the inhibition of self-disclosure. However, Horowitz (1976) suggested that intrusive thoughts facilitate the assimilation of new and old information after a trauma. Thus, positive outcomes are also thought to be associated with the rumination process. Although rumination is frequently discussed in the trauma literature, a comprehensive theory of rumination has only recently been developed (Martin & Tesser, 1989), and few experimental studies have closely examined it.

Martin and Tesser (1989) have developed a theory of rumination based on the assumption that people's thoughts and actions are directed by goals. Their theory postulates that failure to attain an important goal initiates two processes related to rumination: passive activation of goal-related information in memory (i.e., spreading activation) and motivationally driven activation of goal-related information (Zeigarnik, 1927; 1938). Intrusive thoughts relating to the goal would constitute passive activation of goal-related information. A conscious effort to problem-solve to attain the goal would constitute a motivationally driven activation of goal-related information. Thus, rumination can be seen as encompassing both automatic and controlled processes. Goals that are not met or disrupted will likely make people ruminate not just about the goal

itself but also the sub-goals or items that are perceived to be related to the primary goal. When a goal is blocked, one response is to repeat the same behavior with greater intensity. If this fails, the second stage associated with the nonattainment of the goal is the search for alternate instrumental means to attain the goal (i.e., problem solving). The third ruminative stage is end-state thinking. This occurs when people have difficulty in finding instrumental behaviors that will return them to the goal. At this point, people consider the goal objectives themselves and the feelings associated with them. During this stage the goal can be abandoned or compromised in some way (Martin & Tesser, 1989) (see Figure 1).

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Insert Figure 1 here

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One way negative life events are threatening to people is through the disruption of familiar organized behavior sequences (Millar, Tesser & Millar, 1988). Traumatic or threatening life events, by definition, disrupt normal behavior. The loss of a close friend, for example, would likely disrupt most people's normal behavior or sequence of activities. One way losing a close friend is disruptive to people is because of all the activities they shared with that person. If people want to continue those activities,

they would have to find someone else or consider some alternate activities. To the extent that no alternatives are available to complete the sequence or activity, ruminative thought will be more likely to occur (Millar et al., 1988). Thus, if there are no other close friends and no substitute activities available, the greater the likelihood that rumination about the loss of the close friend would continue.

Imagining a negative life event will likely activate various thoughts about the disruption of activities in people's lives. The need to find meaning in events by construing their personal significance in cognitive and affective terms has been proposed as a fundamental and universal motive (Becker, 1973; Frankl, 1963; Marris, 1986). Because most people's predilection is to be optimistic about future events, self-relevant negative life events present a problem. Rumination makes accessible all the activities that are disrupted because of the negative life event. This could make people even more distressed the more time they spend ruminating about the event. However, if the goal is to problem-solve, people will attempt to integrate their previous assumptions prior to the negative life event in some way, for example by finding personal meaning in the event.

This study will examine the effect of rumination on

beliefs about adjustment to future negative life events. For some of these events, people tend to be very optimistic about their ability to adjust compared to similar others. For other events, people appear less optimistic about their ability to adjust compared to similar others. It is to this optimism literature we now turn.

### Optimism Literature

The optimism literature suggests that having an optimistic outlook on life and about the future can be highly adaptive under many circumstances. For example, Taylor and Brown (1988) report that people who respond to negative feedback with a positively inflated sense of self, an exaggerated belief in personal control, and an unduly optimistic view of the future are happier and more productive than people who have a more accurate perception of the world and themselves. Most people believe that their future will be more positive than other people's futures. The terms "unrealistic optimism" and "optimistic bias" have been used because, on average, groups of people report that their life will be more positive than similar others. This reflects a bias because not all members of a sample can be above average (e.g., not everyone has a bright future). People seem very aware of their assets and strengths and less aware of their flaws and weakness (Taylor & Brown, 1988). This bias occurs both in an absolute sense and when

comparing ourselves to others. Taylor and Brown (1988) categorize unrealistic optimism for future events as one of three major positive illusions (along with overly positive views of the self and greater perceived control over environmental occurrences than can be justified).

Optimistic bias in beliefs about the comparative (self vs. other) likelihood of future life events has been examined extensively. Weinstein (1980), for example, in an often-cited study, had college students estimate how much their own chances of experiencing a range of positive and negative events differed from the chances of their same-sex peers. Unrealistic optimism was exhibited for both positive and negative life events under two conditions. First, the event had to be perceived as controllable, that is, the person could do something to influence the outcome. Second, subjects must have some degree of commitment or emotional investment in the outcome. Weinstein (1980) concluded that when these conditions are met, people make social comparisons with someone who does little or nothing to improve his/her prospects for a positive outcome (i.e., downward comparisons). This explanation for the mediation of optimistic bias effects has been termed selective focus (Axsom et al., 1993; Gerrard, Gibbons, & Warner, 1991; Weinstein, 1980). The idea is that people focus selectively on factors that improve (decrease) their own chances of achieving positive (negative) outcomes and ignore that others may possess just as many factors.

Weinstein (1980) provided some preliminary evidence for

the selective focus explanation by manipulating subjects' awareness of the factors that other people consider when estimating their chances of experiencing various events. In this study, Weinstein (1980) had college students make written lists of the factors that increase or decrease the chances of specific events happening to them. Some subjects were then given copies of lists generated by others and asked to make comparative judgments of the likelihood of experiencing negative life events. Weinstein hypothesized that exposing subjects to other people's lists would decrease optimistic bias. Results indicated that providing information about the attributes and actions of others reduced optimistic bias for negative events, but did not eliminate it completely. One explanation might be that subjects saw themselves as similar to these students but continued to use inaccurate images of others when making comparative judgements overall for negative events. In the case of positive events, simply listing factors that influence their own chances for positive outcomes decreased optimism, but providing information about others had no additional effect (Weinstein, 1980). It could be that for future positive events people do not engage in any comparison at all as they do for negative events. If people believe that negative events are more likely to happen to

others and positive events are more likely to happen to them, prototypes for persons with negative events might be better developed and more accessible than for positive events. Weinstein (1980) suggested that people's first thoughts about their future may not be same as their later, more reflective conclusions. However, he did not explore this explanation in his research. Thus, as noted above, one purpose of this study is to consider people's more reflective conclusions when they are given the opportunity to ruminate.

Gerrard et. al. (1991) also explored people's tendency to underestimate their likelihood of negative events. When people assess their likelihood of negative events, they tend to focus on their preventive behaviors because, as Gerrard et al. assume, these behaviors are more salient and more accessible. Because people have less access to information about others' preventative behaviors, they underestimate the frequency and effectiveness of this behavior. To test this hypothesis, Gerrard et al. asked half their subjects to review their sexual and contraceptive histories and current behaviors prior to estimating their own and others' vulnerability to unplanned pregnancy. Results indicated that reviewing contraceptive and sexual behavior decreased perceived vulnerability among those who considered pregnancy to be most undesirable and among those who thought that

their preventive efforts were controlling the risk. They concluded that the strength of the motivation to avoid pregnancy (perceived undesirability of pregnancy) determines whether review affects perceived vulnerability. This is similar to the downward comparison explanation provided by Weinstein (1980). As noted earlier, Weinstein (1980) also concluded that optimistic bias occurs when subjects have some commitment or emotional investment in the outcome. Thus, there is a motivational component to both Gerrard and Weinstein's explanations of selective focus.

Another way to maintain an optimistic bias is to exaggerate one's ability to adjust or cope with the occurrence of negative life events should they occur. Even people who believe that traumas are less likely to happen to them realize such events do occur. Axsom et al. (1993) conducted a series of studies that found that optimistic bias does not necessarily extend to beliefs about one's comparative adjustment to all negative life events. The more severe the event, the worse subjects expected to adjust compared to other same-sex students. Three factors appeared to moderate ratings of comparative adjustment, familiarity with the event, severity of the event, and normative recovery speed (social desirability of quick recovery) associated with the event. Of these dimensions, severity was the best predictor of adjustment. A likely determinant

of event severity is degree of perceived control over the adjustment process. Although perceived control over the occurrence of the event was not found to be reliably related to predicted comparative adjustment, perceived control over the adjustment process itself was (Axsom et al, 1993). The lower the ratings of perceived control over the adjustment process, the higher the rating of severity of the event and the lower the expected comparative adjustment rating.

Axsom et al. (1993) provided further evidence for the selective focus explanation which was consistent with their earlier finding of differential adjustment in relation to event severity. They had subjects list assets and liabilities for coping with four negative life events, two severe (testing HIV positive, murder of a loved one) and two mild (contracting a treatable form of herpes, breaking a bone in a car accident). To avoid ambiguity in classifying responses, subjects were also asked to indicate whether each factor they listed was an asset or liability for adjustment. Subjects listed significantly more liabilities for severe events than for mild events. This suggests that when people consider how they would cope with a negative life event, their assets are not invariably what come to mind, especially for severe events. Axsom et al (1993) also examined the first item listed by subjects as another indication of differential accessibility of assets and

liabilities. For mild events, assets were much more likely to be listed first, but for severe events, liabilities were as likely as assets to be mentioned first. Axsom et al. (1993) speculated that people may make comparative estimates (i.e., vs. peers) in an egocentric manner that emphasizes first their own assets and/or liabilities for dealing with a trauma, then reach conclusions about their peers by regressing estimates of others toward some less extreme, hypothetical mean. Depending on the accessibility of knowledge about one's assets and liabilities, self-estimates may be greater than for peers (e.g., if assets are relatively more accessible than liabilities, as perhaps for mildly negative events) or worse (e.g., if liabilities are relatively more accessible than assets, as perhaps for severely negative events). This is different from the social comparison explanation provided by Weinstein (1980) and by Gerrard et al. (1991). Essentially, seemingly social comparisons may actually be more egocentric, with the social comparison subsequent to, rather than prior to, the person's initial judgement. Axsom et al. (1993) note that subjects rarely reported having any specific person or persons in mind when they made their comparisons. This suggests that one's own assets and liabilities associated with an event may drive the information processing rather than any explicit comparison with others. The difference in two

emphasis in the selective focus explanation can be thought of in terms of a social focus and a self focus (See Figure 2).

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Insert Figure 2 here

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### Purpose of Study

There are two main goals of this thesis. One goal, as previously noted, is to look at the effects of rumination on comparative adjustment judgements. In life, people often have an extended opportunity to ruminate, to make comparisons and judgements with others. What happens over time when people have an opportunity to ruminate about their likely adjustment to negative life events? Will people continue to focus selectively on their assets for mild events and liabilities for severe events? Do people's initial thoughts become even more polarized? This would imply that the items that are initially accessible for making ratings of comparative adjustment would determine the direction of subsequent thoughts. There is some research to suggest that rumination can polarize initial thoughts (Tesser, 1978). However, if rumination serves as a way to "work through" a problem, then people's initial thoughts may not necessarily polarize later ones. In fact, if rumination is indeed a problem-solving technique, it may lead people to

the opposite conclusion as compared to their initial thoughts. Specifically, if people are pessimistic initially about their ability to cope with severe events, rumination may make people more optimistic over time. However, if people are positive initially about their ability to cope with an event (e.g., mild events), there is, in a sense, nothing to "work through." Thus, the inclination to be optimistic may prevail and people's initial thoughts may become even more polarized. It is hypothesized that rumination will serve to make assets more accessible over time for both severe and mild events. Although it is predicted that the accessibility of assets will increase with rumination for both events, they increase for different reasons, depending on the nature of the event and the initial thoughts associated with the event.

A second goal of this thesis is to explore further the notion of selective focus on optimistic bias by replicating our previous findings on accessibility of assets and liabilities in adjustment. However, in this study we will use a reaction time methodology instead of thought-listings as used in our prior research to provide convergent data.

Accessibility is defined here as "the ease or speed with which a given stimulus input is coded in terms of a given category under varying conditions" (Bruner, 1957). Accessibility is operationalized as response time for the

designation of items presented as assets or liabilities in coping with the event. The assumption is that subjects should respond quicker to items similar to what they are already thinking about. Thus, reaction time serves as an indicator of current thought processes. Reaction time as a measure of accessibility in rumination has been used previously (Martin, Tesser, & McIntosh, in press). In a decision-making experiment, Martin et al. had all subjects reach a lower order goal of making money for a company. However, only some subjects attained a higher order goal of making money through their intelligence. Subjects were later given a word recognition task on the computer. Two of the words (intelligent and smart) were related to the higher-order goal of demonstrating intelligence. It was hypothesized that the more subjects were ruminating about the goal of intelligence, the quicker subjects would be at recognizing words related to intelligence. Results revealed that those subjects who did not meet their goal were quicker to respond to the target words than those who did meet their goal. Subjects did not differ in the speed with which they recognized business-related or control words. Reaction time as a measure of accessibility has been used previously (Andersen, Spielman & Bargh 1992; Bargh, 1984; Higgins & King, 1981; Markus, 1977). For example, using a reaction time paradigm, Andersen et al.(1992) found that depressives

processed negative information much more quickly than nondepressives and were more likely to see ambiguous information as negative compared to nondepressives.

Because, as Andersen et al.(1992) suggest, individual differences in dispositional optimism and depression can effect the way we perceive the world, the Beck Depression Inventory (BDI; Beck, 1976) and the Life Orientation Test (LOT; Scheier & Carver, 1985) were included in this study for exploratory purposes. It was hypothesized that people that are depressed will likely find liabilities in coping more accessible than people who are not depressed. Similarly, people that are optimistic might find assets more accessible than people who are not optimistic.

To summarize, if assets in coping are more accessible, then subjects should display faster response times to assets compared to liabilities. If subjects are ruminating about liabilities in coping, then response times should be faster to liabilities compared to assets.

### Design

A 3 (Rumination Opportunity: Absent, Present, Present with Distraction) x 2 (Event Severity: Mild, Severe) x 2 (Coping Resources: Assets, Liabilities) design was used, with Rumination Opportunity and Event Severity as between-subject variables and Coping Resources as the within-subject variable. Subjects in the Rumination Present condition had

an opportunity to ruminate aloud about a target event for four minutes. Subjects in the Rumination Present with Distraction condition were involved in an unrelated computer task for the four minutes. The Rumination Present with Distraction condition served as the control condition to assess whether time alone was a factor. Subjects in the Rumination Present and Present with Distraction conditions were audiotaped during the four minutes and were provided with a reaction time task after the delay. Subjects in the Rumination Absent condition received the reaction time task immediately. After the reaction time measure, subjects completed a questionnaire that included comparative adjustment questions.

### Predictions

#### Anticipated Future Comparative Adjustment:

- 1) Subjects' comparative adjustment estimates should be more favorable to the self for the mild event compared to the severe event (i.e., main effect for Event Severity). This is a replication of our previous studies (Axson et al., 1993).
- 2) Subjects' comparative adjustment estimates should be more favorable to the self when a Rumination Opportunity is Present than when it is Absent or Present with Distraction (i.e., main effect for Rumination Opportunity). This is based on the assumption that rumination serves as a problem-

solving technique.

Reaction Time: A three way interaction is predicted between Event Severity, Rumination Opportunity and Coping Resources (Asset/Liability), the details of which follow.

1) For the Mild event, response times should be quicker for assets compared to liabilities. Items should also be more likely to be designated as assets than liabilities. This is a conceptual replication of our previous findings (using a thought-listing paradigm) for the inclination to be optimistic about adjustment to mild events.

2) For the Severe event, response times should be quicker for liabilities compared to assets in the Rumination Absent and Present with Distraction conditions. Items should also be more likely to be designated as liabilities than assets in these two conditions. This is also a conceptual replication of our previous findings (using thought-listings) for the inclination to be pessimistic about the adjustment to severe events.

3) Response times for assets should be quicker than or equivalent to liabilities in the Rumination Present condition. Items should also be as likely to be labeled assets or liabilities in the Rumination Present condition. This should occur if rumination serves as a problem-solving technique, making assets in adjustment more accessible regardless of event severity.

Thought-Listing (Audiotaped) (Only applicable in Rumination Present and Present with Distraction conditions) An interaction between Event Severity and Rumination Time Interval is predicted, as detailed below.

1) For the Mild event, subjects in the Rumination Present condition should initially discuss assets in coping, and should continue to discuss primarily assets for the entire four minutes.

2) For the Severe event, subjects in Rumination Present condition should initially discuss liabilities (or a balance of liabilities and assets) in coping. Over the course of the four minutes, subjects should begin to discuss more assets. This should occur if rumination serves as a problem-solving technique.

3) As a check on the manipulation, for the Rumination Present with Distraction condition, there should be no discussion of event-related information, if the distraction task is effective.

## **Method**

### Subjects

Subjects were 120 students (72 female and 48 male) recruited from the psychology subject pool who received one hour's credit for participation. All subjects were right-handed, and were run individually.

### Design

A 3 (Rumination Opportunity: Absent, Present, Present with Distraction) x 2 (Event Severity: Mild, Severe) x 2 (Coping Resources: Assets, Liabilities) design was used. Rumination Opportunity and Event Severity were between-subject variables, and Coping Resources was the within-subject variable.

### Procedure

The study was advertised as "Future Events" and requested only subjects that were right-handed. The study was described as taking less than an hour and as requiring subjects to imagine future events, answer questions on a computer and complete questionnaires. There was no indication of the type of future event (i.e., positive or negative).

Subjects were randomly assigned to one of six conditions and block randomized by gender. Upon arrival, subjects were asked to imagine that a negative life event, either testing HIV positive (severe) or contracting a treatable form of herpes (mild) happened to them in the future. These two events were chosen from past research (Axsom et al., 1993) as adequately representing high and low severity events.

In the Rumination Absent condition, subjects were first asked to imagine that the target event had happened to them in the future and were given the reaction time measure

immediately. The reaction time task required subjects to designate whether each of 14 items presented was an asset or liability for coping with the event, by pushing A or L as designated by two specially marked keys on the computer keyboard. Coping or adjusting to the event was defined as "returning to good mental and physical health, being able to carry out role responsibilities effectively (e.g., as a spouse, worker, student), maintaining a realistic appraisal of the situation, and not being overcome by emotions." An asset (liability) was defined as anything that would make making coping better (worse). The fourteen items for each event, 7 representing probable assets and 7 representing probable liabilities, were chosen based on pilot ratings.<sup>1</sup> Order of presentation of assets and liabilities were counterbalanced.

In the Rumination Present condition, subjects were also asked to imagine that the target event had happened to them in the future. Subjects were then provided with four minutes to ruminate about the event<sup>2</sup> and were asked to state aloud their thoughts, which were recorded (prior consent given). The experimenter told the subjects that she needed to make copies of the questionnaires that they would complete later and left the room during the four minute interval. When the experimenter returned, subjects were given the reaction time task.

The Rumination Present with Distraction condition was similar to the Rumination Present condition except that, during the four minute interval, subjects engaged in a computer-assisted behavior modification task. After asking subjects to imagine a future event, the experimenter indicated that she needed to make copies of the questionnaires that they would complete later. To save time, subjects were told to begin the behavior modification task. At this point, the experimenter left the room for the four minute interval. The behavior modification task required subjects to label behaviors as cooperative, aggressive, or neutral, and to determine what techniques to employ. Subjects were asked to think aloud and were audiotaped during this time. After working on this task for four minutes, the experimenter returned and presented the reaction time task.

The following events and factors were presented in the reaction time measure. As noted above, these factors were chosen from pilot testing. Order of presentation of assets and liabilities was counterbalanced and there were two different orders of stimulus presentation used.

Mild Event-Contracting a treatable form of herpes: social support, medical treatment, acceptance from self, appreciate life more, can still have a sex life, noticing sign of improvement, knowing that you can live a normal life, public

ridicule, chronic illness, changes life as it was, telling each new lover, fear of infecting others, constantly taking medication, contacting every person I've been with.

Severe Event-Testing HIV positive: family support, living for today, financial security, good medical treatment, educating other's on HIV, speaking to a person with AIDS, becoming an AIDS research participant, public ridicule, family suffering, not being as active, knowing you will die, fear of infecting others, contacting every person I've been with, increased insurance premiums.

Subjects had an opportunity to practice pressing the keys on the computer and were encouraged to take their time reading the instructions presented on the computer prior to beginning the reaction time task. The reaction time task portion of the study took approximately 5 minutes. After completing the reaction time measure, subjects in all conditions were administered an Adjustment Questionnaire, Self-other Questionnaire, Life Orientation Test (Scheier & Carver, 1985), and the Beck Depression Inventory (Beck, 1967), in that order (see below).

Finally, subjects were debriefed on the purpose of the study and asked not to discuss the experiment with other students.

#### Apparatus and Materials

Computer. An IBM pc was used to present the reaction time

stimuli and record reaction time responses of subjects in milliseconds.

Adjustment Questionnaire. The Adjustment Questionnaire asked subjects to rate how they would cope with the target event (testing HIV+ or contracting a treatable form of herpes) compared to same-sex VA Tech students. Coping or recovery from an event was defined in the questionnaire as "returning to good mental and physical health. Being able to carry out role responsibilities effectively (e.g., as a spouse, worker, student) and maintain a realistic appraisal of the situation and not be overcome by emotion." The scale used was a nine point Likert-type scale with the following anchors 1 (9) = I would cope much worse (better) than OTHER SAME SEX STUDENTS AT VA TECH. Eight other questions about the target event were also asked. The following represents a summary of each additional question with their anchors:

- 1) Severity: 1 (7) = not at all (extremely) severe
- 2) Disruptiveness: 1 (7) = not at all (extremely) disruptive
- 3) Familiarity: 1 (7) = not at all (extremely) familiar
- 4) Previous thought: 1 (7) = not thought about it at all (thought about it a great deal)
- 5) control over adjustment: 1 (7) = would have no (complete) control over adjustment
- 6) Personal experience: (1) Have not experienced, nor do I know anyone else who has (2) Have not experienced, but know

acquaintances who have (3) Have not experienced, but know close friends who have (4) Have experienced

7) Social desirability: 1 (7) = others will think it is desirable for me to take time to (quickly) recover from the news

8) Likelihood of having the event: 1 (7) = less (more) likely than other same sex students at VA Tech

For the Rumination Present and Present with Distraction conditions, this questionnaire also asked subjects to estimate the percentages and types of thoughts they had after being asked to imagine the target event and prior to receiving the reaction time task. This question was not asked to the Rumination Absent condition as there was no four minute interval between being asked to imagine the event and the reaction time task (See Appendix A).

Self-Other Questionnaire. A Self-Other Questionnaire asked subjects to rate how they would cope with nine additional future negative events compared to same-sex students at Virginia Tech. Coping was similarly defined as in the Adjustment Questionnaire (see above). The scale was a nine point Likert-type scale with the following anchors 1 (9) = I would cope much worse (better) than OTHER SAME SEX STUDENTS AT VA TECH. One of these events was the target event the subject did not receive (e.g., if a subject was assigned to imagine testing HIV+ for the Event Severity manipulation,

the Self-Other Questionnaire asked about contracting a treatable form of herpes). The other eight events in the questionnaire were: loved one murdered, injured in an earthquake, kicked out of school for an honor code violation, experience a heart attack before age forty, diagnosed with gum problems, loved one breaks a bone in car accident, drop out college, contract AIDS. The other eight events have been used in prior research to represent varying levels of event severity (See Appendix B).

Life Orientation Test. Subjects were administered the Life Orientation Test (LOT; Scheier & Carver, 1985), a twelve-item scale measuring dispositional optimism. The rationale for including this was that individual differences in optimism might influence ratings of comparative adjustment. The LOT contains eight statements, four of them phrased in an optimistic direction and four of them phrased in a pessimistic direction. There are four filler items. LOT was scored by summing items (4=Strongly Agree 3=Agree 2=Neutral 1=Disagree 0=Strongly Disagree), with higher scores indicating greater optimism. Scheier and Carver (1985) report a Cronbach's alpha of .76 and a 4-week test-retest reliability of .76 for a sample of college students. The LOT has been primarily tested in the college population, and norms for undergraduates are currently the only ones available. The LOT is positively correlated with

Rosenberg's Self Esteem Scale (Rosenberg, 1965; Females=.60, Men=.33) and negatively correlated with the Beck Depression Inventory (Beck, 1967; Females= -.57, Males= -.40) (See Appendix C).

Beck Depression Inventory. Finally, subjects were administered the Beck Depression Inventory (Beck, 1967). The revised BDI is a 21-item multiple choice self-report measure of depression. Our version of the BDI had 20 questions because we omitted the question relating to suicide. The items on the BDI assess the cognitive, affective, behavioral, and somatic aspects of depression (Hammen & Padesky, 1977). The BDI has been validated for use with several populations, including undergraduates (Hammen, 1980). Subjects rate each item from 0 to 3 in terms of intensity. Scores are classified in the following way: 0-9 Normal, 10-15 Mild Depression, 16-19 Mild to Moderate Depression, 20-29 Moderate to Severe Depression, 30-63 Severe Depression. The BDI was included because past research has indicated that individual differences in depression are related to self-esteem and to comparative adjustment scores. People with higher levels of depression report lower levels of self-esteem and lower comparative adjustment scores (Axsom et al., 1993). People with higher levels of depression also process negative information more quickly and are more likely to see ambiguous information as

negative (Bargh & Tota, 1988; Anderson, Spielman, & Bargh, 1992). Thus, we might expect that people who score higher on the BDI would be respond quicker to liabilities and have lower adjustment scores overall (See Appendix D).

Audiotaped thought-listings. Audiotaped recordings were available for each of the 40 subjects in the Rumination Present and the Rumination Present with Distraction conditions. Two raters independently assessed audiotapes. Rater One was blind to the hypotheses and coded all the tapes. Rater Two (the author) coded a sub-sample of these tapes (10%). The overall reliability of the two raters was high enough so as to use Rater One's coding (see below). The following items were coded for each subject:

- 1) Asset or liability designation for the first thought.
- 2) For each one minute interval, frequency of assets, liabilities, event-related information that cannot be identified as either asset or liability, and non-event related information.
- 3) For each one minute interval, seconds spent discussing assets, liabilities, event-related information that cannot be identified as either asset or liability, and non-event related information.
- 4) How optimistic the subject sounded (5-point scale) for each one minute interval.
- 5) How distressed the subject sounded (5-point scale) for

each one minute interval.

Agreement between the two raters, expressed as percent agreement or as a correlation coefficient, is as follows:

- 1) Agreement on first thought designation: 90%
- 2) Correlation for total number of resources: Assets=.89  
Liabilities=.90 Event-Related Other=.97
- 3) Correlation for total time spent discussing resources:  
Assets=.99 Liability=.96 Events=.99
- 4) Correlation for distress ratings: .74
- 5) Correlation for optimism ratings: .82

## Results

### Manipulation Checks

The manipulation check for perceived event severity showed a main effect for Severity,  $F(1,108) = 47.22$ ,  $p < .001$ . The Severe event (Testing HIV+,  $M = 6.1$ ) was seen as significantly more severe than the Mild event (Contracting a treatable form of herpes,  $M = 4.3$ ). Event disruptiveness and perceived control over adjustment are other indicators of event severity. There was a main effect of Severity for disruptiveness,  $F(1,108) = 20.28$ ,  $p < .001$ . The Severe event ( $M = 6.0$ ) was seen as significantly more disruptive than the Mild event ( $M = 4.9$ ). There was also a main effect of Severity for control over adjustment,  $F(1,108) = 7.00$ ,  $p < .01$ . Adjustment to the Mild event was seen as more controllable ( $M = 5.0$ ) compared to the Severe event

( $M = 4.5$ ). These findings are consistent with predictions and with previous research.

Content analysis of the audiotapes in the Rumination Present with Distraction condition was included as a manipulation check to determine if subjects were adequately distracted. There were no target event items stated aloud by subjects in this condition, and thus the tapes were not analyzed further. Another indication of whether subjects were adequately distracted was the self-reported percentages of types of thoughts during the four minute interval. As expected, the Rumination Present with Distraction condition had greater Unrelated thoughts than the Rumination Present condition. Also as predicted, subjects in the Rumination Present condition reported more thoughts on adjustment to the target event compared to the Rumination Present with Distraction condition. However, the majority of subjects in the Rumination Present with Distraction condition reported thoughts that were target-event related. This finding was not predicted and is counter to results of the tape analysis in the Rumination Present with Distraction condition. In fact, subjects in the Rumination Present with Distraction condition indicated that they thought about Unrelated events for only 22.0% of the time. The rest of the time they reported that they had thoughts about the target event or about adjusting to other problems in the past (see Table 1).

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Insert Table 1 here

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### Comparative Adjustment

The comparative adjustment question was analyzed using a 3 (Rumination Opportunity: Absent, Present, Present with Distraction) x 2 (Event Severity: Severe, Mild) analysis of variance. Because there was also a main effect for Gender, this variable was included in comparative adjustment analyses.

It was hypothesized that there would be main effects for Event Severity and Rumination Opportunity. However, there was no significant effect for Rumination Opportunity or Event Severity or their interaction, for the comparative adjustment question. The lack of a significant effect for Event Severity even in the Rumination Absent condition was particularly surprising. This condition is the most similar to previous studies (Axson et al, 1993) which have found consistent differences in regard to comparative adjustment by Event Severity (see Table 2). Possible reasons for this finding are provided in the discussion section. As noted earlier, there was a main effect for Gender,  $F(1,108) = 5.35, p < .03$ . Males reported significantly higher comparative adjustment scores ( $M = 6.4$ ) than females ( $M = 5.7$ ).

Subjects also estimated comparative adjustment for the other target event, that is, the target event that the subject did not receive (e.g., if a subject was assigned to imagine testing HIV+ for the Event Severity manipulation, the Self-Other Questionnaire asked about comparative adjustment to contracting a treatable form of herpes). Here, there was a main effect for Event Severity  $F(1,108) = 38.70, p < .001$ . Subjects reported that (vs. peers) they would adjust significantly better to the Mild event ( $M = 5.7$ ) than the Severe event ( $M = 3.7$ ; see Table 2). This finding is consistent with prior research, and interestingly, represented a "top of the head" estimate more similar to prior research (e.g., unlike the Rumination Opportunity Absent ratings discussed above, no reaction time task preceded this rating).

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Insert Table 2 here

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### Reaction Time

The reaction time data were analyzed using a 3 (Rumination Opportunity: Absent, Present, Present with Distraction) x 2 (Event Severity: Severe, Mild) x 2 (Coping Resources: Asset, Liability) mixed factorial analysis of variance.

Coping Resource Designation. The data were initially analyzed to determine what items subjects designated as assets and liabilities. Because there were no order or gender effects, results were collapsed across these conditions. It was hypothesized that subjects in the Mild Event condition would be more likely to designate coping resources as assets than liabilities, and that the Rumination Present condition would have more coping resources designated as assets than liabilities compared to the other two conditions regardless of Event Severity. There was a main effect for Coping Resources. Subjects were more likely to designate an item as an asset ( $M = 8.0$ ) than a liability ( $M = 6.0$ ),  $F(1, 114) = 61.69, p < .01$ . All three conditions had significantly more items designated as assets than liabilities. There was also a significant Rumination Opportunity by Coping Resource interaction,  $F(1, 114) = 3.44, p < .04$ . As seen in Table 3, subjects in the Rumination Present and Present with Distraction conditions were more likely to designate an item as an asset than a liability compared with subjects in the Rumination Absent condition. A post hoc test indicated that the Rumination Present with Distraction condition had significantly more assets and fewer liabilities than the Rumination Absent condition. The Rumination Present condition did not significantly vary from the other two

conditions.

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Insert Table 3 here

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Response Latency. The reaction time data were then analyzed by speed. There was no order effect. There was a main effect for gender; thus, we included gender in subsequent analyses. Females responded quicker ( $\underline{M} = 1.97$ ) than males ( $\underline{M} = 2.28$ ),  $\underline{F}(1, 106) = 11.78$ ,  $p < .001$ . Gender did not interact with any other variable. An 3-way interaction was expected between Event Severity, Rumination Opportunity and Coping Resources (refer to predictions in Introduction, p. 18). Results indicated a significant interaction for Event Severity by Coping Resources,  $\underline{F}(1, 106) = 4.24$ ,  $p < .05$ . A post-hoc test indicated that Liabilities were significantly faster for the Severe Event ( $\underline{M} = 2.19$ ) compared to the Mild Event ( $\underline{M} = 2.35$ ), whereas Asset reaction time did not differ according to event severity. This interaction qualified a main effect for Coping Resources; subjects responded significantly quicker overall to Assets ( $\underline{M} = 1.97$ ) compared to Liabilities ( $\underline{M} = 2.22$ ),  $\underline{F}(1, 106) = 24.54$ ,  $p < .01$  (see Table 4).

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Insert Table 4 here

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### Audiotaped Thought-Listings

Another route to examining the process of selective focus is through thought-listings. The audiotope analyses provided a window into the types of thoughts people considered and how these thoughts changed as a function of time. Audiotapes were analyzed only for the Rumination Present condition by the number of assets and liabilities, and the time spent discussing each. Thoughts were analyzed by a 4 (Time: Min1, Min2, Min3, Min4) x 2 (Coping Resource: Asset, Liability) X 2 (Event Severity: Severe, Mild) mixed factorial analysis of variance. Coping Resources and Time were the within-subject variables and Event Severity was the between-subject variable. There were no gender effects for the thought-listings; data were collapsed across these variables.

It was hypothesized that subjects in the Severe condition would initially discuss liabilities in coping but would begin to talk more about assets over the course of the four minutes if rumination served as a problem-solving technique. It was also predicted that subjects in the Mild condition would initially discuss assets in coping and would continue to primarily discuss assets throughout the four minutes.

First Coping Resource. As predicted, there was a significant Event Severity effect for whether the first item

was designated an asset or a liability. The Mild event was significantly more likely to have an Asset (75%) as the first thought and the Severe event was much more likely to have a Liability (70%), Chi-square (2) = 12.26,  $p < .03$ . A few (7.5%) of the subjects reported the first thought as an Event related thought that could not be categorized as an asset or a liability.

Number of Assets and Liabilities Discussed. There was a main effect for Coping Resources,  $F(1, 38) = 10.15$ ,  $p < .01$ . The number of Assets ( $M = .66$ ) was greater than the number of Liabilities ( $M = .44$ ). There was a main effect for Time,  $F(3,114) = 3.30$ ,  $p < .05$ . A post-hoc test indicated that subjects were more likely to discuss Coping Resources overall in Minute 1 ( $M = 1.6$ ) compared to Minute 4 ( $M = .7$ ),  $t(39) = 5.67$ ,  $p < .01$ .

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Insert Table 5 here

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The number of assets and liabilities as a percentage of the total number of coping resources discussed was also examined. The denominator was composed of the number of assets, liabilities, event-related, and non-event related coping resources discussed. There was a main effect for Coping Resources,  $F(1,26) = 16.75$ ,  $p < .01^3$ . Assets represented a higher percentage of Coping Resources (38%)

overall compared to Liabilities (23%). There was a main effect for Time  $F(3, 78) = 4.65, p < .01$ . There were more Coping Resources discussed in Minute 1 (37%) compared to Minute 4 (22%). These effects were qualified by a 3-way interaction between Event Severity, Coping Resources and Time,  $F(3,78) = 3.56, p < .05$ . Post hoc tests indicated the following. As predicted, the percentage of Liabilities was greater for the Severe event (48%) than the Mild event (20%) in Minute 1,  $t(38) = -2.80, p < .01$ . For the Mild event, there was a higher percentage of Assets (49%) than Liabilities (21%),  $t(19) = 2.44, p < .05$  in Minute 1. By the fourth minute, the Mild Event continued to have a higher percentage of Assets (58%) than Liabilities (14%). This was also the case for the Severe Event, the percentage of Assets (41%) was greater than Liabilities (10%) (see Figure 3).

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Insert Figure 3 here

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Seconds Spent Discussing Assets and Liabilities. There was a main effect for Event Severity,  $F(1,38) = 4.78, p < .04$ . Subjects spent more time overall discussing coping resources for the Severe event ( $M = 3.3$ ) than the Mild event ( $M = 2.3$ ). There was also a main effect for Time,  $F(3,114) = 15.62, p < .01$ . A post hoc test indicated that subjects

spent more time overall discussing coping resources in the first minute ( $\underline{M} = 8.7$ ) than the fourth minute ( $\underline{M} = 2.1$ ),  $\underline{t}(19) = 4.49$ ,  $p < .01$ . These effects were qualified by a 3-way interaction between Event Severity, Coping Resource and Time,  $\underline{F}(3,114) = 2.66$ ,  $p < .06$ . Post hoc tests indicated the following. For the Mild event, the time spent discussing Assets in the first minute was greater ( $\underline{M} = 5.3$ ) than the time spent in the fourth minute ( $\underline{M} = 1.0$ ),  $\underline{t}(19) = 4.3$ ,  $p < .01$ . As predicted, subjects in the Severe condition spent more time discussing Liabilities in the first minute ( $\underline{M} = 5.8$ ) compared to the fourth minute ( $\underline{M} = .7$ ),  $\underline{t}(19) = 4.11$ ,  $p < .001$ . Also for the Severe event, the time spent discussing Assets for the fourth minute was significantly greater ( $\underline{M} = 3.4$ ) than the time spent discussing Liabilities ( $\underline{M} = .7$ ) (see Table 6).

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Insert Table 6 here

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The percent of time spent discussing assets and liabilities as a percentage of the total time spent discussing coping resources was also examined. The denominator was composed of the time spent discussing assets, liabilities, event-related and non-event related coping resources. There was a main effect for Coping Resources,  $\underline{F}(1,26) = 21.96$ ,  $p < .01^4$ ; the percentage of time

spent discussing Assets (37%) was higher than Liabilities (25%). There was an interaction between Event Severity and Coping Resources,  $F(1, 26) = 6.02, p < .03$ . These effects were qualified by a 3-way interaction between Event Severity, Coping Resources and Time,  $F(3, 78) = 4.05, p < .01$ . Post hoc tests indicated the following. As predicted, subjects in the Severe condition spent more time discussing Liabilities (47%) than subjects in the Mild condition (22%) in Minute 1,  $t(38), = -2.3, p < .03$ . By Minute 4, the time spent discussing Assets was greater for the Severe event (47%) than the Mild event (16%),  $t(26) = -2.56, p < .02$  (See Figure 4).

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Insert Figure 4 here

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Optimism and distress ratings. For each one-minute interval, the rater assessed subjects' optimism and distress. Data were analyzed by a 2 (Event Severity: Severe, Mild) x 4 (Time: Min 1 Min 2 Min 3 Min 4) mixed factorial analysis of variance, with Event Severity as the between-subject variable and distress and optimism ratings the respective within-subject variables.

There was main effect for distress ratings,  $F(3,78) = 3.22, p < .03$ . A post hoc test indicated that the second minute had a higher distress rating ( $M = 4.0$ ) than the

fourth minute ( $M = 3.6$ ). There were no effects for the optimism ratings.

### Individual Differences

The Life Orientation Test and the Beck Depression Inventory were used to examine if individual differences on these dimensions had any effect on subjects' responses.

Dispositional Optimism. A reliability check revealed a Chronbach's Alpha of .79 for this sample on the Life Orientation Test. Overall, our sample deviated less than one standard deviation from the norms for college students on the LOT. The norms for the LOT are as follows: Males,  $M = 21.03$  and  $sd = 4.56$ ; Females,  $M = 21.41$  and  $sd = 5.22$  (Scheier & Carver, 1985). For our sample, males had a mean of 20.49 and females had a mean of 19.89. A median split was done, with scores of less than 20 designated as Low Optimism and scores of 20 or more as High Optimism. There was no gender effect and thus the data were collapsed across this variable.

Comparative Adjustment and Event Ratings. There was an Optimism main effect for comparative adjustment estimates,  $F(1,108) = 7.35$ ,  $p < .01$ . High Optimism subjects (vs. Low) had higher predicted adjustment scores ( $M = 6.3$  vs. 5.5). For perceived event severity, there was also an optimism main effect,  $F(1,108) = 4.16$ ,  $p < .05$ . As expected, High Optimism subjects rated the target event as less severe than

Low Optimism subjects ( $M = 4.9$  vs.  $5.7$ ).

Reaction Time. A 3 (Rumination Opportunity: Absent, Present, Present with Distraction) x 2 (Event Severity: Severe, Mild) x 2 (Coping Resources: Asset, Liability) x 2 (LOT: Group 1 Group 2) analysis of variance was used. There was an interaction between Optimism and Coping Resources,  $F(1, 106) = 5.13, p < .03$ . Subjects with higher optimism scores were overall quicker to respond to Assets across the four minutes ( $M = 1.95$ ) than Liabilities ( $M = 2.3$ ), while subjects with low optimism were similar for Assets ( $M = 2.01$ ) as for Liabilities ( $M = 2.11$ ). There were no effects on the audiotaped thought-listings.

Beck Depression Inventory. A reliability check revealed a Chronbach's Alpha of .82 for this sample on the BDI. A median split was done with scores of less than 7 designated as Low Depression and scores 7 or more as High Depression. There was a Depression main effect for predicted comparative adjustment,  $F(1, 108) = 4.35, p < .04$ . As expected, High Depression (vs. Low) had a lower predicted comparative adjustment score ( $M = 5.7$  vs.  $6.3$ ). There was also a Depression main effect for perceived event severity,  $F(1, 108) = 7.04, p < .01$ . High Depression subjects (vs. Low) perceived the target event as more severe ( $M = 5.6$  vs.  $4.8$ ). There were no effects for the BDI on the reaction time or thought-listing measures.

There was a Gender main effect  $F(1, 108) = 4.54$ ,  $p < .04$ . Females reported higher depression ( $M = 8.4$ ) than males ( $M = 6.1$ ).

### Discussion

The goals of this study were first, to determine if rumination leads to problem-solving or polarization of initial thoughts and, second, to provide convergent evidence for selective focus using a reaction time task. One variable that might indicate if rumination was used as a problem-solving technique is comparative adjustment ratings. It was predicted that subjects who had an opportunity to ruminate about a negative life event would be the most optimistic about their ability to adjust compared to similar others. However, analyses indicated no evidence of differences in predicted comparative adjustment by Rumination Opportunity or Event Severity. This finding is discrepant from previous research, which has repeatedly found differences in comparative adjustment ratings according to Event Severity. Adjustment estimates in the present study were generally much higher in comparison to previous studies (Axson et al., 1993). One possible explanation is that the placement of the adjustment questionnaire after the reaction time measure influenced the results. By having subjects designate items on the reaction time measure as an asset or liability in coping, we may have

made assets artifactually more accessible for all subjects. Overall, subjects were more likely to designate items on the reaction time as an asset than a liability and were quicker to respond to assets. This might represent an optimistic bias on the part of subjects to make ambiguous information more positive. Thus, the recent accessibility of assets through the reaction time task may have made subjects more optimistic when making comparative adjustment ratings. The reaction time measure can be thought of as a type of guided rumination. If the reaction time measure did indeed influence adjustment ratings, then omitting the reaction time measure in a follow-up study should provide different results. We are currently in the process of exploring this explanation further.

In examining the reaction time data, there was an interaction between Rumination Opportunity and Coping Resource designation (asset/liability). Subjects in the Rumination Present and Present with Distraction conditions were more likely to designate an item as an asset than a liability compared to the Rumination Absent condition. We had expected that the Rumination Absent condition would be similar to the Rumination Present with Distraction condition. One explanation is that there is something unique about time alone that served to make assets more accessible. This suggests that a conscious effort to

problem-solve as in the Rumination Present condition is not necessary to become more optimistic. However, we do not know from this study the unique characteristics of time that served to facilitate the accessibility of assets.

An alternate explanation is that the Present with Distraction condition did not adequately distract subjects regarding the target event. There is some evidence to support this. Although there was no mention of the target event on the tapes in the Rumination Present with Distraction condition, subjects on the comparative adjustment questionnaire self-reported thinking about the target event. In fact, 21.8 % of the subjects in the Present with Distraction condition reported thinking about future adjustment to the target event, 11.5% reported thinking about other related thoughts to the target event, 17.8% reported thinking about adjustment to other problems in the past, 27.7 % reported thinking about the disruptiveness of the event, and only 22% reported thinking about unrelated thoughts. It appears that the distractor task was not completely effective in the Rumination with Distraction condition. Thus, subjects continued to ruminate about the target event and had intrusive thoughts about the event. If we consider the Rumination with Distraction condition as representing a more passive type of ruminating process as described by the Martin and Tesser model (1989),

these results are not all that surprising. The passive type of processing in their model describes the rumination process as the activation of goal-related information in memory (i.e., spreading activation). Thus, passive processing may have allowed subjects in the Rumination Present with Distraction condition to be more optimistic about their likely adjustment and to designate items as assets more often than liabilities in the reaction time task.

Regarding the speed of reaction time, subjects responded overall quicker to assets than liabilities. This supports the notion of optimistic bias. There was an interaction between Event Severity and Coping Resources (asset/liability). Subjects responded quicker to Liabilities for the Severe Event compared to the Mild Event. This provides convergent evidence for selective focus and the differential accessibility of liabilities for the severe event. This is similar to previous research where subjects were more likely to list liabilities with the severe event.

The thought-listings on the audiotapes in the Rumination Present condition revealed interesting results with regard to the process of rumination. These set of analyses are especially important because they are not contaminated by the reaction time measure. As predicted, the first Coping Resource discussed for the Severe Event was

generally a Liability and the first mentioned for the Mild event was generally an Asset. Subjects were more likely to mention Liabilities than Assets in the first minute for the Severe Event. This also provides convergent evidence for selective focus in differential accessibility of assets versus liabilities by Event Severity. If rumination did serve as a problem-solving technique, subjects should begin to discuss more assets over the course of the four minutes, particularly for the Severe event. Results revealed that subjects in the Severe event did discuss more assets and fewer liabilities by the fourth minute.

In examining the length of time spent discussing assets and liabilities, there was an interaction between Time, Event Severity and Coping Resources. As expected, there was much more time spent discussing Liabilities in the Severe event than in the Mild event for the first minute. This partially parallels our reaction time data for differential accessibility of liabilities for the Severe event compared to the Mild event. By the fourth minute, subjects in the Severe Event condition discussed Assets for a longer time than for the Mild Event. There was no evidence of polarization; subjects in the Mild Event condition did not discuss more assets over the course of the four minutes. However, this could be because subjects in this condition simply could not think of anymore assets and stopped talking

altogether. For the Severe event, subjects began discussing liabilities initially rather than assets, thus there were many more assets that they did not initially consider. Subjects in the Severe event condition were more likely to talk for the entire four minute interval compared to the Mild event condition. The results of the tapes provides the strongest evidence for rumination as a problem-solving technique.

There does appear to be some evidence that people processed the two types of events differently. The Mild event appeared to have been processed more automatically than the Severe event. Mild event subjects did not greatly increase the number of assets or liabilities over the course of the four minutes; they just did not talk as long compared to Severe event subjects. Additional evidence that subjects processed the Mild event more automatically is provided by the self-reported percentages of types of thoughts. For the Mild event, subjects had more thoughts about adjustment to other problems in the past than for the Severe event. This suggests that subjects for the Mild event did not think as much about the target event. This is consistent with the theory of rumination which suggests that people are more likely to ruminate about events that are more disruptive. Clearly, testing HIV+ is more disruptive to people's lives than contracting a treatable form of herpes. The

manipulation check also verified that subjects thought that testing HIV+ was seen as more disruptive. Also, in a sense, their goal of being optimistic was met earlier for the Mild event, and thus they did not have to continue along the sequence of rumination.

### Individual Differences

Individual differences in dispositional optimism and depression did predict comparative adjustment estimates and Coping Resources on the reaction time task. As expected, individuals with higher optimism scores had higher adjustment estimates and were quicker to Assets than Liabilities. Similarly, individuals with higher depression were likely to have lower adjustment estimates. However, these were main effects and did not interact with any other variable.

### Alternate Hypothesis

The positive effects of rumination may not be determined by conscious problem-solving at all. It could be that making assets more accessible in the reaction time task is just as beneficial as consciously trying to problem-solve. Although there was evidence for problem-solving in the thought-listings on the audiotapes, this did not translate into higher adjustment ratings. One possible explanation is that at least in the short term there is no difference in whether people consciously try to find meaning

in a negative life event and whether assets in coping are made accessible temporarily, in predicting adjustment. However, in the long term, there might be a difference in adjustment. We might expect that people who try to find some meaning in a negative life event and actively problem-solve would be better adjusted over the course of time than people who make a "top of head" prediction about their likelihood of adjustment.

#### Future Direction

As an initial step toward clarifying these results, the effects of the reaction time measure on comparative adjustment ratings are being examined. As noted earlier, we are currently replicating the Rumination Present and Absent conditions without the reaction time measure. Another way to explore the effect of rumination is to measure adjustment to the target event at a later date. Thus, we might expect that subjects in Rumination Present condition would have higher adjustment ratings than subjects in the Rumination Absent condition who were provided merely with the reaction time task. This would provide evidence as to the long term effects of rumination in the adjustment process.

#### Summary

We did find evidence that rumination can serve as way to problem-solve. We also found some evidence of selective focus in the reaction time task consistent with our previous

research. However, we did not find any clear evidence that problem-solving through rumination was any more useful in predicting adjustment than making assets accessible with the reaction time task. This study provided an initial attempt to understand experimentally the process of rumination but suggests more questions than it provides answers. Future studies need to explore what constitutes rumination and what are its long term effects.

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Table 1

Self-reported Percentages of Types of Thoughts During  
the Four Minute Interval for Present and Present with  
Distraction Condition

Types of Thoughts	Rumination Opportunity			
	Present		Present w/Distraction	
	Mild	Severe	Mild	Severe
Adjustment to target event	28.5	34.7	21.5	21.1
Total Mean %	31.6*		21.2	
Other event-related thoughts	15.3	16.3	12.0	11.0
Total Mean %	15.8		11.5	
Adjustment to other problems in the past	16.9**	7.8	22.3**	13.2
Total Mean %	12.3		17.8	
Disruptiveness of event	29.7	37.4	26.1	29.3
Total Mean %	33.5		27.7	
Other unrelated thoughts	9.8	7.5	18.4	25.5
Total Mean %	8.7		22.0*	

\*p < .05 Significant difference in types of thought by Rumination Opportunity

\*\* Main effect for Event Severity. Mild events had more thoughts about adjustment to other problems in the past than the Severe event. Mild Event:  $\bar{M} = 19.6$ ; Severe Event:  $\bar{M} = 10.5$ .  $F(1, 72) = 3.97$ ,  $p < .05$ .

Table 2

Comparative Adjustment Ratings for Target and Non-target Events

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Rumination Opportunity

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	Absent		Present		Present w/Distr.	
	Herpes	HIV+	Herpes	HIV+	Herpes	HIV+
Target Event	6.3	5.8	6.1	6.1	6.2	5.5
Non-targ. Event	5.6	4.4	6.0	3.2	5.6	3.4
Non-targ. event Severity Main Effect	HIV+ = 3.7*		Herpes = 5.7			

---

\*p < .01 Subjects indicated that they (vs. peers) would adjust much better to the non-target event if it was herpes than HIV+.

Table 3

Mean Number of Assets and Liabilities Designated on Reaction Time by Rumination Opportunity and Event Severity

Rumination Opportunity						
Coping Resource	Absent		Present		Present w/Distracton	
	Mild	Severe	Mild	Severe	Mild	Severe
Asset	7.7	7.5	8.4	7.8	8.4	8.5
Total Mean	7.6*		8.1		8.4	
Liab.	6.3	6.6	5.6	6.3	5.7	5.6
Total Mean	6.4		5.9		5.6	

\*  $p < .05$  The Rumination Absent condition had significantly fewer items that were designated as assets than the Rumination Present and Present with Distracton conditions.

Table 4

Mean Response Latency in Seconds of Assets and Liabilities on Reaction Time by Rumination Opportunity and Event Severity

Rumination Opportunity						
		Absent		Present		Present w/Distracton
Coping Resource	Mild	Severe	Mild	Severe	Mild	Severe
Asset	2.00	2.01	2.02	1.87	1.98	1.97
Overall Means	Mild: 2.00		Severe: 1.95			
Liab.	2.42	2.14	2.28	2.08	2.34	2.08
Overall Means	Mild: 2.35		Severe: 2.19*			

-----  
 \*p < .05 Liabilities were faster in the severe event compared to the mild event.

Table 5

Mean Number of Assets and Liabilities Discussed on the  
Audiotape for Each One Minute Interval by Event Severity

		Min 1		Min 2		Min 3		Min 4	
Coping Resource		Mild	Sev	Mild	Sev	Mild	Sev	Mild	Sev
Asset	1	.8	.8	.7	.4	.7	.3	.7	
Mean Assets		.9	.7	.5	.3	.5			
Liab.		.4	.9	.6	.7	.2	.4	.2	.2
Mean Liab.		.7	.6	.3	.2	.2			

Table 6

Mean Number of Seconds Spent Discussing Assets and Liabilities on the Audiotape for Each One Minute Interval by Event Severity

	Min 1		Min 2		Min 3		Min 4	
Coping Resource	Mild	Sev	Mild	Sev	Mild	Sev	Mild	Sev
Asset	5.3	4.0	3.0	2.8	1.5	2.5	1.0	3.4*
Mean Assets	4.7		2.9		2.0		2.2	
Liab.	2.5	5.8**	3.0	4.8	.8	2.3	1.2	.7
Mean Liab	4.2		3.9		1.6		1.0	

\*p < .01 Time spent discussing Assets in the fourth minute for the Severe event was significantly greater than the time spent on Liabilities.

\*\*p < .01 Time spent discussing Liabilities in the first minute for the Severe event was significantly greater than for the fourth minute.

Figure 1: Martin and Tesser's Model of Rumination

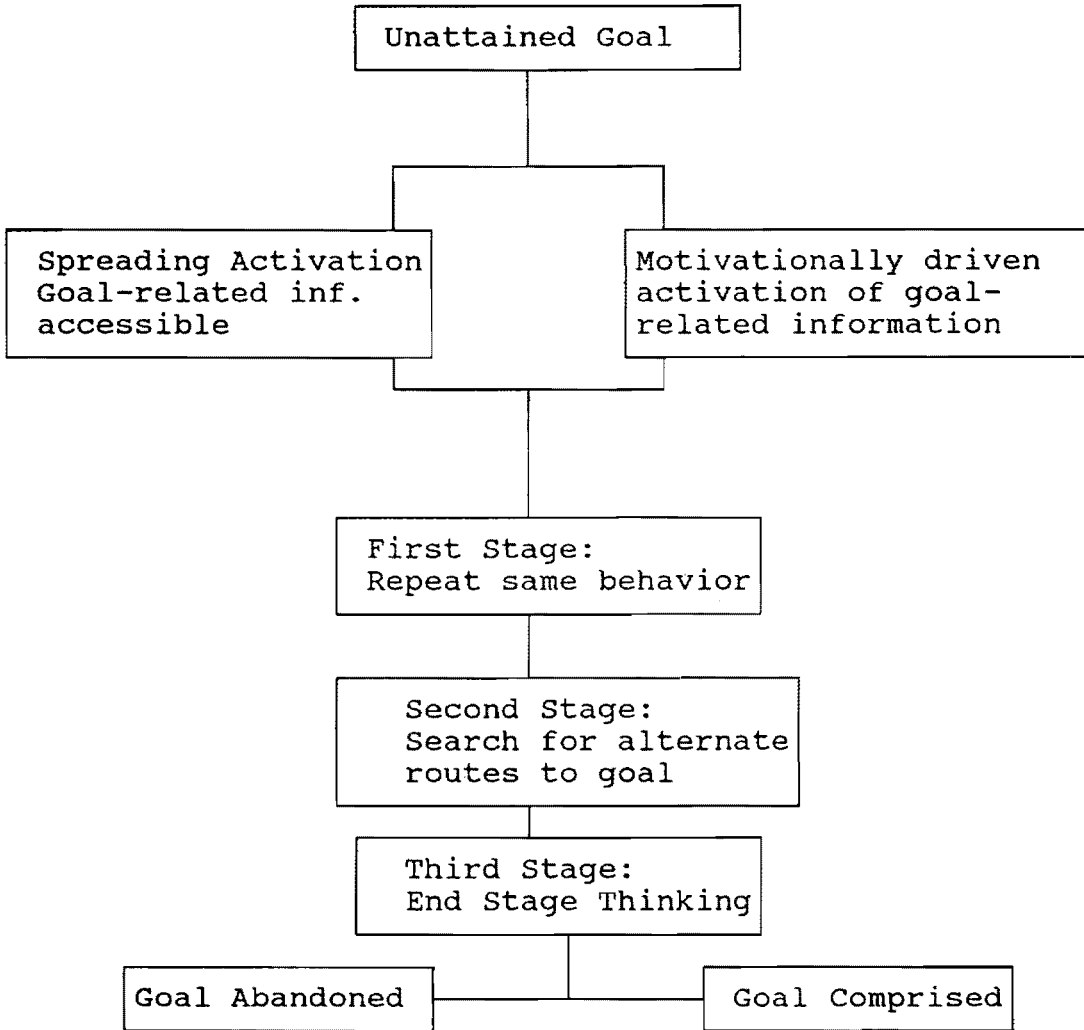
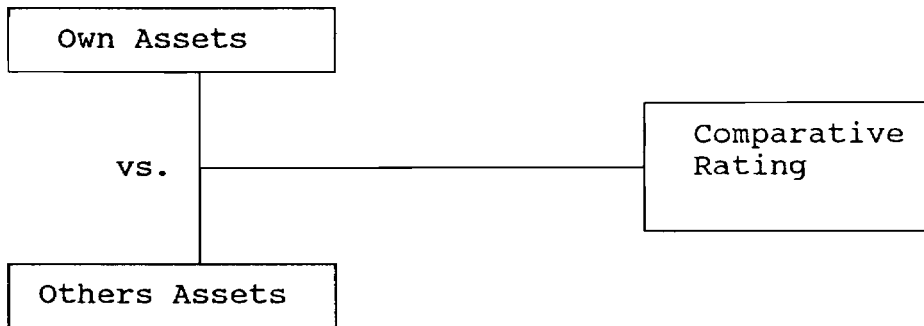
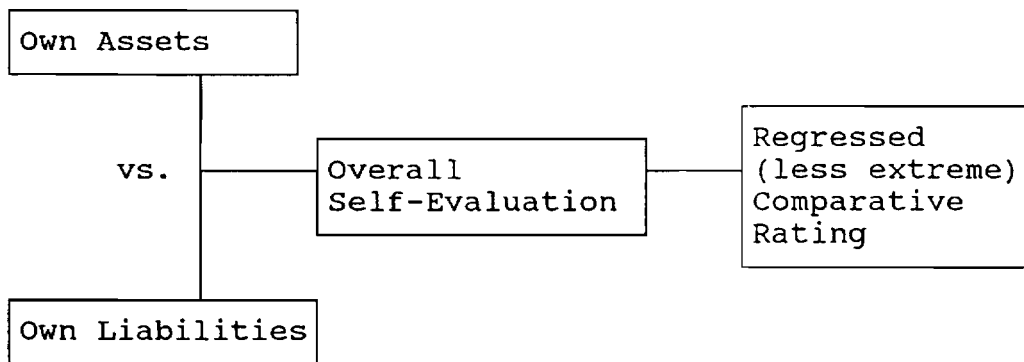


Figure 2: Two versions of Selective Focus

I. Social Focus

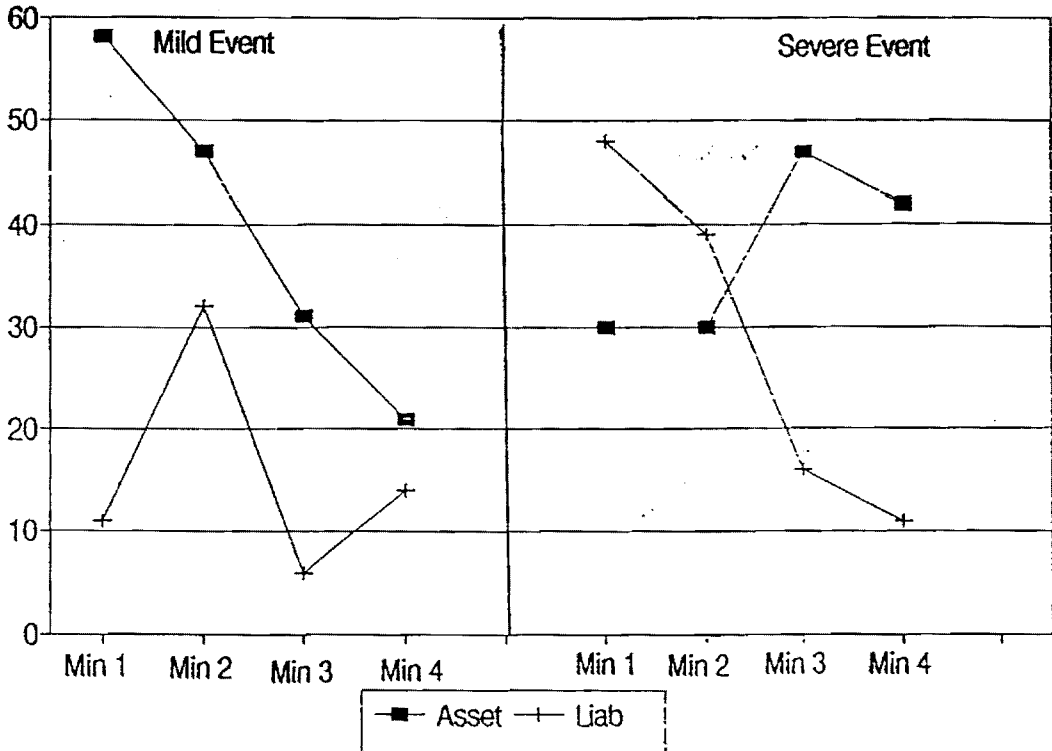


II. Self Focus



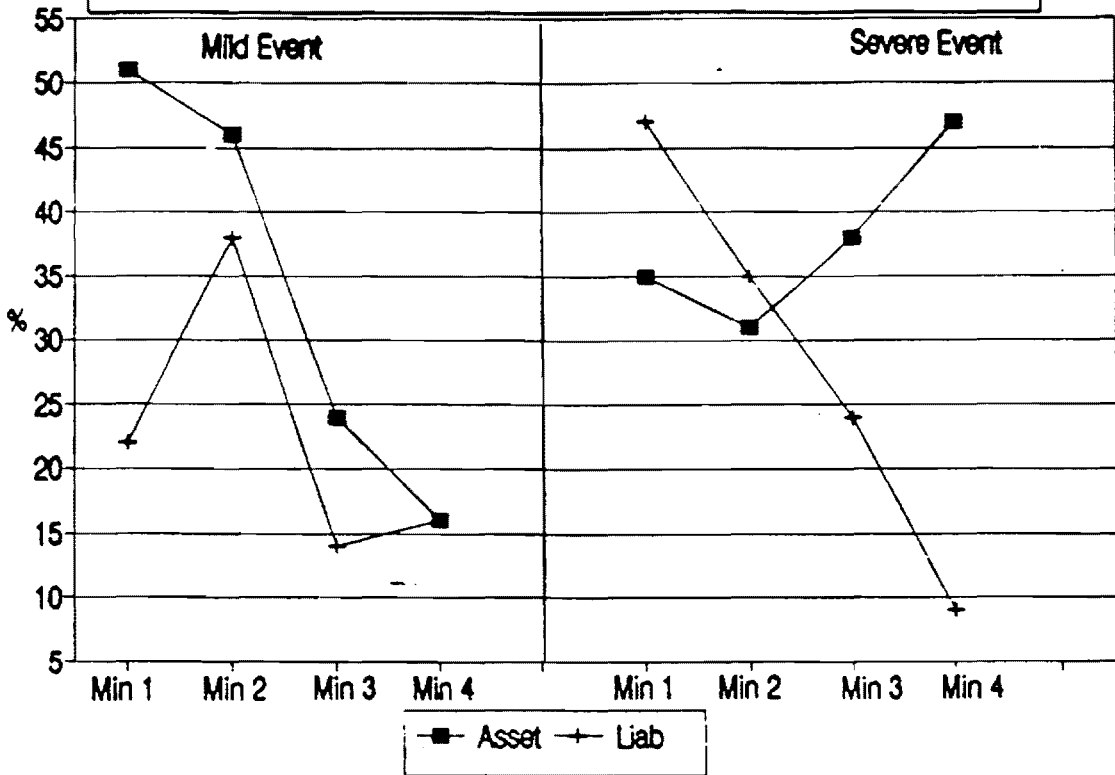
Mean Percentages of Assets and Liabilities for the Audiotape by Event Severity for Each One Minute Interval

Figure 3



Mean Percentages of Seconds Spent Discussing Assets and Liab.  
for the Audiotape by Event Severity for Each One Minute Interval

Figure 4



Appendix A

Comparative Adjustment Questionnaire

For this questionnaire please circle the ONE number that best describes your response. Please be as accurate and honest as you can. There are no correct or incorrect answers. All your responses will be held confidential.

1. Please imagine that you have tested HIV positive and then rate how you would cope, COMPARED TO OTHER SAME SEX STUDENT AT VIRGINIA TECH. Someone who is coping with an event has returned to good mental and physical health, is able to carry out role responsibilities effectively (e.g. as a spouse, worker, student), is able to maintain a realistic appraisal of the situation, and is not overcome by emotions.

1	2	3	4	5	6	7	8	9
I would cope much worse than OTHER SAME SEX STUDENTS AT VA TECH								I would cope much better than OTHER SAME SEX STUDENTS AT VA TECH

2. Stressful life events range in their severity so that some are devastating to an individual whereas others are merely nuisances. How severe do you think it would be for you if you tested HIV positive?

Not at all severe    1    2    3    4    5    6    7    Extremely severe

3. How disruptive would it be to your life if you tested HIV positive?

Not at all disruptive    1    2    3    4    5    6    7    Extremely disruptive

4. In general, before coming into this study, how much had you thought about what it would be like to test HIV positive?

1	2	3	4	5	6	7
I had not thought about it at all						I had thought about it a great deal

5. Events differ in the control people feel they could exert over the adjustment process if the event occurred. For some events people may feel they could exert a great deal of control over the nature and course of adjustment, whereas for other events people may feel they would have little control over the adjustment process (i.e. they can only let time run its course). If you tested HIV positive, to what degree do you believe you could exert control over the nature and course of your adjustment.

I would have no control over adjustment 1 2 3 4 5 6 7 I would have complete over adjustment

6. What has been your personal experience with testing HIV positive?

- 1) \_\_\_ Have not experienced, nor do I know anyone else who has
- 2) \_\_\_ Have not experienced, but know acquaintances who have
- 3) \_\_\_ Have not experienced, but know close friends who have
- 4) \_\_\_ Have experienced

7. In general, how well do you think you can understand what someone goes through when adjusting after testing HIV positive? This understanding could have been obtained from personal experience, observing others, watching T.V., reading books, etc.

not at all familiar 1 2 3 4 5 6 7 extremely familiar

8. For some events, others may react favorably if you seemed not to be bothered or unduly upset; but for other events, people may react unfavorably if they think you are "getting over it" too quickly. To what degree do you feel that OTHER PEOPLE would feel it is desirable for you to recover quickly from the news of testing HIV positive?

Others will think it is desirable for me to TAKE TIME to recover from the news 1 2 3 4 5 6 7 Others will think it is desirable for me to recover QUICKLY from the news



Appendix B

Self-Other Questionnaire

INSTRUCTIONS: For this questionnaire, we are interested in people's thoughts and feelings about other future events. You will be asked to imagine that each of the events described below has happened to you at some point in the future. You will then be asked to rate how you would cope with each of these events, COMPARED TO OTHER SAME SEX STUDENTS AT VIRGINIA TECH. Someone who is coping with an event has returned to good mental and physical health, is able to carry out role responsibilities effectively (e.g. as a spouse, worker, student), is able to maintain a realistic appraisal of the situation, and is not overcome by emotions. Please respond as accurately and as honestly as possible.

Please imagine that each of the following events has happened to you and then rate how you would cope, COMPARED TO OTHER SAME SEX STUDENT AT VIRGINIA TECH. Use the following scale, recording the one number (1-9) that best describes your answer on the space provided.

1            2            3            4            5            6            7            8            9

I would  
cope much  
worse than  
OTHER SAME  
SEX STUDENTS  
AT VA TECH

I would  
cope much  
better than  
OTHER SAME  
SEX STUDENTS  
AT VA TECH

FUTURE EVENTS:

1. You contract a treatable form of herpes. \_\_\_\_
2. A loved one is murdered. \_\_\_\_
3. You are injured in an earthquake. \_\_\_\_
4. You are kicked out of school for an honor code violation. \_\_\_\_
5. You experience a heart attack before age forty. \_\_\_\_
6. You are diagnosed with gum problems. \_\_\_\_
7. A loved one breaks a bone in a car accident. \_\_\_\_
8. You drop out of college. \_\_\_\_
9. You contract AIDS. \_\_\_\_

Appendix C

Life Orientation Test

## Life Orientation Test

Please circle the response that best indicates how much you agree with each of the following items. Please be as accurate and honest as you can, and try not to let your answers to one question influence your answers to other questions. There are no correct or incorrect answers.

1. In uncertain times, I usually expect the best.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-------------------	-------	---------	----------	----------------------

2. It's easy for me to relax.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-------------------	-------	---------	----------	----------------------

3. If something can go wrong for me, it will.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-------------------	-------	---------	----------	----------------------

4. I always look on the bright side of things.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-------------------	-------	---------	----------	----------------------

5. I'm always optimistic about my future.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-------------------	-------	---------	----------	----------------------

6. I enjoy my friends a lot.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-------------------	-------	---------	----------	----------------------

7. It's important for me to keep busy.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-------------------	-------	---------	----------	----------------------

8. I hardly ever expect things to go my way.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-------------------	-------	---------	----------	----------------------

9. Things never work out the way I want them to.  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree

10. I don't get upset too easily.  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree

11. I'm a believer in the idea that "every cloud has a silver lining."  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree

12. I rarely count on good things happening to me.  
Strongly Agree      Agree      Neutral      Disagree      Strongly Disagree

Appendix D

Beck Depression Inventory

On this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling the PAST WEEK, INCLUDING TODAY! Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. **Be sure to read all the statements in each group before making your choice.**

- 1 0 I do not feel sad.  
1 I feel sad.  
2 I am sad all the time and I can't snap out of it.  
3 I am so sad or unhappy that I can't stand it.
  
- 2 0 I am not particularly discouraged about the future.  
1 I feel discouraged about the future.  
2 I feel I have nothing to look forward to.  
3 I feel that the future is hopeless and that things cannot improve.
  
- 3 0 I do not feel like a failure.  
1 I feel I have failed more than the average person.  
2 As I look back on my life, all I can see is a lot of failures.  
3 I feel I am a complete failure as a person.
  
- 4 0 I get as much satisfaction out of things as I used to.  
1 I don't enjoy things the way I used to.  
2 I don't get real satisfaction out of anything anymore.  
3 I am dissatisfied or bored with everything.
  
- 5 0 I don't feel particularly guilty.  
1 I feel guilty a good part of the time.  
2 I feel quite guilty most of the time.  
3 I feel guilty all of the time.
  
- 6 0 I don't feel I am being punished.  
1 I feel I may be punished.  
2 I expect to be punished.  
3 I feel I am being punished.
  
- 7 0 I don't feel disappointed in myself.  
1 I am disappointed in myself.  
2 I am disgusted with myself.  
3 I hate myself.

- 8 0 I don't feel I am any worse than anybody else.  
 1 I am critical of myself for my weaknesses or mistakes.  
 2 I blame myself all the time for my faults.  
 3 I blame myself for everything bad that happens.
- 9 0 I don't cry any more than usual.  
 1 I cry more now than I used to.  
 2 I cry all the time now.  
 3 I used to be able to cry, but now I can't cry even though I want to.
- 10 0 I am not more irritated now than I ever am.  
 1 I get annoyed or irritated more easily than I used to.  
 2 I feel irritated all the time now.  
 3 I don't get irritated at all by the things that used to irritate me.
- 11 0 I have not lost interest in other people.  
 1 I am less interested in other people than I used to be.  
 2 I have lost most of my interest in other people.  
 3 I have lost all of my interest in other people.
- 12 0 I make decisions about as well as I ever could.  
 1 I put off making decisions more than I used to.  
 2 I have greater difficulty in making decisions than before.  
 3 I can't make decisions at all anymore.
- 13 0 I don't feel I look any worse than I used to.  
 1 I am worried that I am looking old or unattractive.  
 2 I feel that there are permanent changes in my appearance that make me look unattractive.  
 3 I believe that I look ugly.
- 14 0 I can work about as well as before.  
 1 It takes an extra effort to get started at doing something.  
 2 I have to push myself very hard to do anything.  
 3 I can't do any work at all.
- 15 0 I can sleep as well as usual.  
 1 I don't sleep as well as I used to.  
 2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.  
 3 I wake up several hours earlier than I used to and cannot get back to sleep.

- 16 0 I don't get more tired than usual.  
1 I get tired more easily than I used to.  
2 I get tired from doing almost anything.  
3 I am too tired to do anything.
- 17 0 My appetite is no worse than usual.  
1 My appetite is not as good as it used to be.  
2 My appetite is much worse now.  
3 I have no appetite at all anymore.
- 18 0 I haven't lost much weight, if any, lately.  
1 I have lost more than 5 pounds.  
2 I have lost more than 10 pounds.  
3 I have lost more than 15 pounds.  
I am purposely trying to lose weight by eating less.  
Yes\_\_\_ No\_\_\_
- 19 0 I am no more worried about my health than usual.  
1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.  
2 I am very worried about physical problems and it's hard to think of much else.  
3 I am so worried about my physical problems that I cannot think about anything else.
- 20 0 I have not noticed any recent change in my interest in sex.  
1 I am less interested in sex than I used to be.  
2 I am much less interested in sex now.  
3 I have lost interest in sex completely.

Appendix E

Examples of Coping Resources

## Examples of Coping Resources from Audiotapes

1) An asset was defined as anything that would make coping better.

"At least it is treatable"

"I am going to do whatever I can before I die"

"They are doing a lot of research on this now"

2) A liability was defined as anything that would make coping worse.

"How am I going to tell my parents!"

"This means that my girlfriend was cheating on me!"

"This is not good, it basically sucks!"

3) An event-related thought related to the target event but could not easily be categorized as an asset or liability.

"What would I do first?"

"I would be shocked as to how I got it"

"Do I know anyone who has this?"

4) A non-event related thought did not relate to the target event.

"I can't think of anything else to say"

"I am getting hungry"

"I hope she comes back soon"

## Footnotes

1. During pilot testing, subjects rated coping resources on a seven point scale as to the degree each resource represented an asset or a liability in coping with the event. Subjects also rated self-generated coping resources for each event. Coping resources with varying degrees of asset and liability designation from the pilot testing were included in the reaction time measure. Some of these items were strong assets and liabilities in coping, other items were ambiguous and more prone to interpretation by the subject. Coping resources were analyzed by using the subject designation of the item as an asset or liability and comparing the mean number of assets and mean number of liabilities for each subject.
2. Four minutes was chosen from pilot testing as approximating the time it took people to stop actively talking and thinking about the event.
3. The sample size for these set of analyses was 27 because some subjects stopped talking during the last two or three minutes.
4. The sample size for these set of analyses was 28 because some subjects stopped talking during the last two or three minutes.

## Vita

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*Teaching Assistant*, Department of Psychology, Virginia Tech, August 1993- present. Assist instructor for advanced social psychology.

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*Research Associate*, The Council of State Governments, September 1989-August 1991. Information dissemination to national organization of state officials. Preparation of national surveys and reports. Program development and marketing of state programs.

*Counselor*, Lexington Spouse Abuse Shelter, December 1986-December 1988; May 1991-August 1991. Crisis line counselor. Refer victims of domestic violence to appropriate agencies. Speak to community and professional groups on domestic violence.

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Construal processes of sexual harassment  
Effects of trauma

### Manuscript in Progress

Price, S. M. The Effect of Rumination on Beliefs About Adjustment to Future Negative Life Events. Master's Thesis, Virginia Tech. Blacksburg, Virginia.

### Publications

Axsom, D., Blanton, H. C., Watts, M. L. & Price, S. M. Beliefs about Unique Invulnerability to the Effects of Negative Life Events, Journal of Social and Clinical Psychology, 1993 (In Press).

Price, Simani M., California's Telecommuting Pilot Project, Innovations Report, The Council of State Governments, June, 1991.

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### Presentations

Price, S. M., Blanton, H., C., & Axsom, D. *Layers of Protection from the Treat of Traumatic Events*, Poster Presentation at the Southeastern Psychological Association in Atlanta, March 1993.

Price, S. M., Crawford, H. J., Plantier, M. E., Jones, E. P. *Attentional Correlates of Hypnotic Susceptibility*, Paper presented at the Society for Clinical and Experimental Hypnosis Washington, DC October, 1992.