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RUNNING HEAD: Benefits of Talking about the College Transition

Benefits of Talking about the College Transition:

Exploring Growth through Cognitive Processing

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Abstract

An experimental study was conducted to examine the effects of a cognitive processing manipulation on stress-related growth. Previous work has shown relations between writing about traumatic events and health benefits. In this study, we wanted to examine the effects of cognitive processing on stress-related growth. Thirty college freshmen were randomly assigned to speak about their thoughts and feelings about their transition to college (cognitive processing) or to talk about trivial topics. Each participant spoke into a tape recorder for 15 minutes for three sessions within a 10-day period and completed an electronic questionnaire about benefits and adjustment to college one month later. Cognitive processing was not only manipulated but also measured with a linguistic software program (LIWC) that analyzed the content of the talking sessions. It was hypothesized that students instructed to engage in cognitive processing would report more benefits than those instructed to talk about trivial issues because benefit finding is facilitated by cognitive processing. It also was hypothesized that among students in the cognitive processing condition, those who used the most cognitive processing words would show the most benefits. Results showed college adjustment increased significantly for students in the cognitive processing group compared to the trivial writing group, and benefit finding increased for both groups over time. We found that participants who used more words that expressed anxiety, sadness, insight, and inhibition were more likely to experience benefit finding, while those who used more anger words were less likely to receive benefits from the disclosure. We also found that the cognitive processing manipulation interacted with the perceived stress of adjusting to college to predict several outcomes.

Benefits of Talking about the College Transition:
Exploring Growth through Cognitive Processing

When a traumatic event occurs, the world ceases to make sense to a person. This leads to personal distress as the world seems unjust and confusing. In an effort to restore order to the world and to their lives, people try to make sense of the event and understand why the tragedy occurred. Traumatic events are not only associated with psychological distress, however. Positive changes may result as individuals try to adapt and cope with the trauma. This can be done through a process of positive reinterpretation and rebuilding or restructuring (Tedeschi & Calhoun, 2004). The positive changes that result from negative experiences have been referred to as stress-related growth, perceived benefits, positive adjustment, adversarial growth, benefit-finding, and post-traumatic growth (Linley & Joseph, 2004). In this paper, we will use the term benefit-finding to reflect positive changes that result from stressful life events.

Benefit finding includes all possible positive consequences from the traumatic event. Research has shown that benefit finding occurs after a wide range of traumatic events, including sexual assault, cancer, heart attacks, bereavement, fires, and combat (Davis, Nolen-Hoeksema, & Larson, 1998; Dunlap, 2006; Frazier, Conlon, & Glaser, 2001; Holland, Currier, Neimeyer, 2006; Monson et al, 2006; Sears, Stanton, & Danoff-Burg, 2003). Common domains of benefit finding are appreciation of life and changed sense of priorities, more intimate relationships with others, greater sense of personal strength, recognition of new possibilities for one’s life, and spiritual development (Tedeschi & Calhoun, 1996).

Benefit finding is different from simply adjusting well to an event. When benefit finding occurs, individuals are in an improved state compared to the state that they were in prior to the event (Tedeschi & Calhoun, 2004). They have not just overcome the distress that the event has caused, but see some aspect of themselves or the world in a more positive way. However, benefit finding does not mean that an individual does not experience any negative implications from the trauma. The benefits and improvement that occur can coexist with the distress from the traumatic life event, suggesting that benefit finding and distress can occur simultaneously (Tomich & Helgeson, 2004).

Benefits have been measured in a variety of different ways. Interviews have been conducted in which people who have faced stressful life events are asked open-ended questions, such as “tell me what your life is like these days,” and then positive changes are coded from these responses (Wortman, 2004). Sometimes, more direct question are asked, such as “how did you grow from your experience with cancer?” (Park & Cohen, 1993). Several close-ended inventories of growth have been developed, including The Posttraumatic Growth Inventory (PTGS; Tedeschi & Calhoun, 1996), the Stress-Related Growth Scale (SRGS; Park et al, 1996), and the Perceived Benefits Scale (McMillan & Fischer, 1998). Each of these scales list possible benefits, such as “I am less anxious” or “I am more religious,” and each scale measures the different domains of growth on a 5 to 7-point rating scale. Individuals indicate the extent to which these benefits have occurred since the trauma. The PTGS has 21 items which comprise five subscales: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life (Tedeschi & Calhoun, 1996). The SRGS is a 50-item unidimensional scale (Park et al,

1996). The PBS has 30 positive change items that comprise 8 subscales and includes 8 negative change items (McMillan & Fischer, 1998).

One concern with self-report measures of growth is that reports are not valid. During interviews, people might mention positive life changes or exaggerate benefits to convince others or themselves that they are coping well (McFarland & Alvaro, 2004). Close-ended measures may give people the idea that they are supposed to have benefited from the event. The perception of growth from a traumatic event is not the same as genuine change (Park & Fenster, 2004). Individuals may falsely report growth to buffer themselves from the threat of mortality and to promote the belief that life is indeed meaningful (Davis & McKearney, 2003). Because individuals desire their lives to be significant and worthwhile, growth measures might not measure real growth but reflect a strategy of self-protection to buffer oneself from the negative effects of the trauma. This self protection is a stage of working through the growth process and not the desired end result of true growth (Davis & McKearney, 2003)

It is difficult to determine whether reports of growth are valid. One way to examine the validity of growth reports is to see if reports can be corroborated by significant others. A significant other is somebody in an individual’s close social network who was present in the life of the person when the traumatic event occurred. One can ask a significant other how an individual has changed or grown following the trauma and compare these reports with the individual's self-report. Research utilizing significant others thus far has found conflicting results. Some research has shown little correlation between reported growth between individuals and their spouses, family members, or close friends (MaFarland & Alvaro, 2000). On the other hand, Parks and

Blumberg (2002) found a significant correlation between significant other reports and growth reported by individuals.

There are limitations to significant other reports. One limitation is that change within an individual might not be visible to those around them, even significant others. Another limitation is that the relationship between a significant other and the individual might influence the extent of corroboration. Parks and Blumberg (2002) found that the correlation between significant other reports and reports by the person who had undergone the stressor was stronger when their relationship was closer. Furthermore, significant others also might be likely to exaggerate growth reports because they want to believe the trauma occurred for a purpose.

A second way to examine the validity of growth reports is to compare changes in a domain over time that is likely to represent growth. This is done by measuring an individual's status on a dimension before the event and after the event to see if the person has changed on that dimension. For example, measuring how religious a person is prior to a trauma and then measuring their religiosity following the trauma allows real growth of religiosity to be assessed. This kind of comparison necessitates a longitudinal design, as the domain must be measured either prior to the event and after the event or over some time frame so that change is likely to occur. In this way, one can compare reports of growth to objective changes in a domain in which one is likely to report growth.

Finally, a third way to address the validity of growth reports is to focus on a mechanism by which growth is likely to occur. One such mechanism is cognitive processing (Tedeschi & Calhoun, 1996). True benefit finding, as opposed to illusory benefit finding, should result from serious reflection on the traumatic event. The process

of actively engaging in reflection on thoughts and feelings about a traumatic event is referred to as cognitive processing. This is a way for individuals to develop their own narratives for understanding and coming to terms with the trauma. It also helps individuals form insights to make sense of the traumatic event and restore order into their lives. Thus, one way to examine whether growth reports are valid is to determine whether they were preceded by cognitive processing.

Cognitive processing of traumatic events has most often been studied in the context of a writing paradigm. In one of the first studies in this area, Pennebaker, Kiecolt-Glaser, and Glaser (1988) had participants write anonymous essays about traumatic and trivial events for 20 minutes during four different sessions scheduled on consecutive days. Participants in the traumatic event condition were instructed to focus on the facts and feelings that surrounded the trauma. Results showed that participants who wrote about traumatic events were significantly less likely to attend their university health center 3 months after writing and reported fewer illnesses than participants who wrote about trivial matters. Replicate studies (Lutgendorf, Antoni, Kumar, & Schneiderman, 1994 ; Pennebaker, Colder, & Sharp, 1990) have shown the same health benefits from writing among university students, including decreases in negative mood, increases in academic performance, and increases in cellular-immune system function.

The writing paradigm also has been shown to be effective among non-university students. For instance, patients with asthma and rheumatoid arthritis were randomly assigned to write about their most stressful life event or about trivial topics (Smyth, Stone, Hurewitz, & Kaell, 1999). After 4 months, those participants who had written about the stressful life event showed improvements in lung function and overall disease

activity when compared to controls. Another study had Holocaust survivors write about the trauma of living through the Holocaust or write about trivial topics (Pennebaker, Barger, & Tiebout, 1989). Those who wrote about living through the Holocaust demonstrated less physical symptoms and physician visits than survivors who wrote about trivial events. Thus, the writing paradigm has been shown to be effective in increasing health benefits across a wide range of stressful life events.

It appears that cognitive processing is one mechanism by which these writing studies lead to health benefits. Several studies have tried to manipulate cognitive processing through the writing instructions with the intention of showing more health benefits when the instructions facilitated cognitive processing. For example, Pennebaker and Beall (1986) manipulated cognitive processing by randomly assigning participants to write about a trivial event, a traumatic event focusing on the facts, a traumatic event focusing on the emotions surrounding the event, or a traumatic event focusing on the emotions and facts surrounding the event. They hypothesized that individuals who wrote about traumatic events would have both short and long term improvements in health because divulging inhibited thoughts would lead to a decrease in stress which would have positive health benefits. Results showed that participants who wrote about traumatic events and who expressed both facts and emotions had the fewest health center visits and reported the least number of illnesses 6 months after writing. This may be due to the fact that cognitive processing requires the disclosure of information and emotions in order to truly work through the event (Calhoun & Tedeschi, 1998). That is, individuals' health is improved when they are able to engage actively in thinking about both the emotions and the facts surrounding the trauma.

Cognitive processing not only has been linked to health outcomes but also has been linked to benefit-finding. Illrich and Lutgendorf (2002) randomized students into one of three groups. The groups were instructed to focus on emotional expression (participants' deepest feelings about a traumatic event), cognitive processing and emotions (participants' facts, deepest feelings, and cognitive processing of a traumatic event), or trivial topics (media events involving loss and trauma). Each participant wrote for 10 minutes at least twice a week for one month. Results showed that the PTGS scale increased significantly from before to after the writing sessions only among the group that focused on cognitive processing and emotions. Furthermore, participants in the emotions only group reported significantly more illnesses than participants in the cognitive processing and emotions group. This study suggests that individuals must engage in both emotional expression and cognitive processing in order for benefit-finding to occur.

Another way to determine if cognitive processing is the mechanism responsible for health benefits and growth is to analyze the words participants used while writing or talking about traumatic events to see if cognitive processing words (e.g., therefore, ought, cause) correspond to outcomes. Pennebaker, Mayne, and Francis (1997) reviewed six of the previous disclosure studies to analyze the content for cognitive processing words (e.g. "because," "should," and "maybe"). To analyze the written essays, they created a computer program called Lingustic Inquiry and Word Count (LIWC) which scans the essays and counts the number of words that fall under the category of cognitive processing. The total word count is then used to create a percentage of cognitive processing words that each participant used in his or her essay. Using this software,

cognitive processing predicted less distress one year following the trauma for men who had lost their partner to AIDS as well as predicted better health behavior for students who had used more causal words in their writing. Thus, they concluded that individuals who expressed the most cognitive processing words during their writing were most likely to have better physical health. Further analysis of traumatic writing by Pennebaker (1993) has shown that cognitive processing words (e.g., because, why, reason) and a higher proportion of negative emotion words (e.g., sad, hate, hurt, guilty) in 15-20 minute writing sessions over 5 consecutive days were positively related to benefits in health several months later. Another study was conducted with HIV-seropositive men who had recently experienced an AIDS-related bereavement (Bower, Kemeny, Taylor, & Fahey, 1998). The men were interviewed to assess their cognitive processing and ability to find meaning following the bereavement. The men who engaged in more cognitive processing as determined by using LIWC on the transcribed interviews were more likely to find meaning from the loss, have less rapid declines in CD4 T cell levels and had lower rates of AIDS-related mortality after a two and three year follow-up than the men who engaged in less cognitive processing.

The Present Study

The overall goal of the present study was to examine whether cognitive processing is linked to growth. Whereas much of the previous research has focused on the implications of cognitive processing for health outcomes, we focus on a different outcome that is relevant to health—stress-related growth, reasoning that genuine growth should emerge from cognitive processing. Previous research also has examined language in the context of the writing paradigm, whereas we examine language in the context of a

talking paradigm. We would argue that talking about a trauma ought to produce the same results. Both writing and talking require organization and integration of thoughts, analysis of events, and a methodical approach (Lyubomirsky, Sousa, & Dickerhoof, 2006). Murray and Segal (1994) found that talking about a traumatic event into a tape-recorder for 20 minutes on four different days led to the same benefits as writing about a traumatic event. Furthermore, students who were randomly assigned to writing or talking about their worst experience for 15 minutes on three consecutive days reported increased life satisfaction and increases in mental and physical health 4 weeks after their disclosure compared to those randomly assigned to only think about their worst experience (Lyubomirsky, Sousa, Dickerhoof, 2006).

The stressful event that we examined was the traumatic event of moving to college. College freshmen were randomly assigned to one of two conditions—a control group that was asked to speak on trivial topics and a cognitive processing group that was asked to explore their thoughts and emotions about coming to college. Both groups were asked to talk about their topic into a tape recorder for 15 minutes for three days within a 10-day period. It was hypothesized that students instructed to engage in cognitive processing would report more benefits than those instructed to talk about trivial issues because benefit finding is facilitated by cognitive processing. We also measured cognitive processing using the LIWC within the group instructed to engage in cognitive processing so that we could directly link cognitive processing to growth. We hypothesized that the students in the cognitive processing condition who engaged in more cognitive processing would have increased benefits relative to those who engaged in less cognitive processing.

Method

Participants

Thirty first-year undergraduate college students (13 female, 16 male, and 1 undisclosed) participated as part of a course requirement for their psychology course and received $20 for participation in all four sessions of the study. Participants were randomly assigned to two different groups: disclosure (*n*=15) or trivial (*n*=15).

Procedure

The experiment was conducted during the fall semester of 2006. On the initial day of the experiment, participants were told they would be required to complete three talking sessions with a 10-day period and an online questionnaire one month after the talking sessions. Each participant was ensured that the talking would be anonymous and confidential. After agreeing to participate, participants were left alone to complete a packet of questionnaires, including a mood questionnaire. .

Participants were then asked by the experimenter to speak into a tape recorder for 15 minutes about a specific topic. The participants in the control condition were told to speak about trivial topics such as the description of the room (first session), all of their shoes (second session), or everything in their closet at home (third session). The participants in the disclosure condition were given the following instructions:

> "During today's session, we want you to let go and talk about your very deepest thoughts and feelings about coming to college. You might want to talk about your emotions and thoughts about leaving your friends or your parents, about issues of adjusting to the various aspects of college such as roommates, thoughts about your future, or even about your feelings of who you are or what you want to become. It is important that you really let go and dig down to your very deepest emotions and thoughts and explore them. We are particularly interested in understanding how you have tried to make sense of this situation and what you tell yourself about it to help you deal with it. If the situation you're describing does not yet make sense to you, or it is difficult

> to deal with, describe how you are trying to understand it, make sense of it, and deal with it and how your feelings may change about it.

Both groups were told to talk continuously for the entire time and told that if they ran out of things to say, they should repeat what they have already said. After the tape recorder was turned on, the experimenter left the participant alone in the room for 15 minutes to talk. After the 15 minutes of talking, the experimenter returned and administered a second mood questionnaire for the participant to complete.

Sessions 2 and 3 took place within 10 days of the first session. Both sessions began by having participants complete a mood questionnaire, then included the same instructions for talking, and ended with a final mood questionnaire. At the end of session 3, participants completed additional questionnaires. After one month, participants were e-mailed an online survey to complete electronically.

Measures

Demographics were measured at the first session (Time 1 [T1]). Mood was measured at the start of every session and immediately following each session (T1, T2, T3). Benefit finding, health outcomes, and perceived stress were measured at the beginning of T1, the end of T3, and during T4. Adjustment to college was measured at the beginning of T1 and during T4. The internal consistencies reported below are from time 1 measurements.

Demographics. Participants were asked how far in miles the college was from their hometown, how long it takes to travel to college from their hometown driving, how many people the student knew on campus before moving, and the number of friends prior to college who are attending the same college.

Benefit finding. The Stress Related Growth Scale (SRGS) was administered (Roesch, Rowley, & Vaughn, 2004) with respect to coming to college. This scale includes 29 items developed specifically for college students, each of which is rated on a 3-point scale ranging from 0 (not at all) to 2 (a great deal). Items describe how participants have grown since coming to college (e.g., "Because I came to college I rethought how I wanted to live my life"). There are three subscales, affective growth (α = .86), religious growth (α = .89), and increase in maturity (α = .93), as well as a total SRG score (α = .85).

Second, benefit-finding was measured by having participants rate themselves on several dimensions that we thought would be likely to change after coming to college. Participants completed two subscales of the Big Five (Goldberg, 1992), specifically conscientiousness and openness. In addition, we developed our own 6-item measure of autonomy, which consisted of the words "autonomous," "independent," and "introspective." Participants were asked to rate each of these characteristics on a 9-point scale ranging from 1 (inaccurate) to 9 (accurate). The internal consistencies were good: autonomy (α = .77), conscientiousness (α = .82), and openness (α = .76).

Participants also were asked two questions about benefit finding from coming to college. The first question was "To what extent have you been able to gain a new perspective about coming to college?" Participants responded on a 5-point Likert-type scale (1 = not at all, 5 = a lot). The second question was "Overall, how positive or negative has your transition to college been?" Participants responded on a 5 point Likert-type scale (1 = all negative, 5 = all positive).

Adjustment to college. To measure adjustment to college, the 19-item College Adjustment Test (CAT; Pennebaker, Colder, & Sharp, 1990) was used. Participants responded to each item on a 7-point scale ranging from 1 (not at all) to 7 (a great deal). The CAT examines the degree to which students have experienced thoughts and feelings about coming to college within the previous week (e.g., "worried about how you will perform academically" and "liked your classes"). The total score (α =.83) is a summation of three subscales: CAT negative, CAT positive, and CAT homesickness. CAT negative measures general negative affect about coming to college (.e.g. "worried about the way you look" and "felt anxious or nervous"). CAT positive measures general positive affect or optimism about coming to college (e.g., "liked your social life" and "felt optimistic about your future in college). CAT home sickness measures how much students feel homesick (e.g. "missed your home" and "felt lonely").

Health outcomes 4. First, we administered the Impact of Event Scale (IES, Horowitz, Wilner, & Alvarez, 1979) which reflects intrusive and avoidant thoughts about a stressor, in this case coming to college. The IES is a 15-item scale in which participants rate their reactions to coming to college on 6-point scales ranging from 0 (not at all) to 5 (often). There are two subscales: avoidance (α = .81) and intrusion (α = .87).

Second, we measured physical symptoms with the Cohen and Hoberman Inventory of Physical Symptoms scale (CHIPS; Cohen & Hoberman, 1983). This questionnaire (α = .81) asks participants to rate the degree to which they have experienced each of 33 physical symptoms (e.g., dizziness, headache, trouble sleeping) on a 5-point scale ranging from 1 (not at all) to 5 (a lot) within the past two weeks.

Third, we measured personal satisfaction with life using the satisfaction with life scale (SWLS) (α = .86; Diener, Emmons, Larsen, & Griffen, 1985). Ratings were on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree) in order to access global life satisfaction .

Fourth, participants were asked to complete a health review sheet asking how many times they had been sick within the past three months. For each illness, participants rated whether they experienced 15 illness symptoms (e.g., sore throat, cold sores), whether they received medical help, and the number of days the illness limited normal activity (Orts et al., 1995). The sum of the illnesses was used to comprise a total illness score over the past three months.

Finally, participants were asked how many health center visits they had made and how many days they had been sick in the past two weeks.

Mood. Participants completed the Profile of Mood States to assess how they were currently feeling (Usala & Hertzog, 1989). The scale consisted of 27 items that comprised 4 subscales: anger (α = .76), anxiety (α = .83), depression (α = .91), and vigor (α = .86). Each item is rated on a 5-point scale ranging from 1 (not at all) to 5 (very much).

Previous disclosure. Participants were asked how many people they have talked to about coming to college. They were also asked how much they had discussed the difficulties of coming to college on a 5-point scale ranging from 1 (not at all) to 5 (a lot).

Perceived stress. On a 5-point scale ranging from 1 (not at all) to 5 (a lot), participants were asked how stressful the move to college was. .

Content Analyses of Talking

To analyze the words used in the talking sessions, we used the Linguistic Inquiry and Word Count (LIWC; Francis & Pennebaker, 1992; Pennebaker & Francis, 1996) computer program. All talking sessions were transcribed into text files, and the LIWC program was used to compile counts of words in the following categories: cognitive mechanisms, insight, negative emotions, anxiety, anger, sadness, and inhibition. The cognitive mechanism dictionary was used to measure the use of words that indicate insight and causation (e.g., realize, understand, because). Examples of words that fell into the other categories we examined are shown in Table 1.

Results

Check on Random Assignment

Prior to conducting our formal data analysis, we checked to ensure that random assignment to groups was effective. Independent t-tests showed that there were no group differences on the number of people participants had talked to about the difficulties of coming to college, how stressful college has been, people known on campus prior to coming to college or number of friends known at college prior to moving. However, there was a group difference on the number of people the participants had previously talked to about the challenges and difficulties of starting college, t (28) = 10.40, $p < .05$. By chance, the disclosure group scored higher on previous disclosure (M = 7.00) than the control group (M = 4.13). Therefore, we controlled for the extent to which participants talked about the transition to college in all analyses.

Correlations Among Benefit-Finding Measures

At each wave of assessment, the total SRG was correlated with the item asking whether participants had gained a new perspective (T1 r = 0.46, p = .01; T2 r = 0.38, p =

.04; T3 $r = 0.62$, $p < .01$). However, the total SRG was not related to the single item asking whether participants perceived the transition as positive or negative. Nor was there a relation between the new perspective item and the perceived transition item.

We also examined whether the SRG benefit-finding scale was related to changes in the domains in which we expected college students to grow. The SRG total scale was not related to changes in conscientiousness, autonomy, or openness to experience at either T3 or T4.

Group Differences on Benefit-Finding

We conducted analyses of covariance on the objective indicators of growth, the overall benefit-finding scale, its subscales, and the two benefit-finding single items. The means on all items for the two groups are shown in Table 2. There were no significant differences between the disclosure condition and control condition on any of the benefit finding indicators. All *p*'s were greater than .10.

Because we did not find any condition effects on the objective indicators of change, we examined whether the objective indicators of growth changed over the course of the study. There were no changes on autonomy, conscientiousness, or openness between T1 and T3 or between T1 and T4. However, there was a trend toward a change over time in the SRG total score, $F(2, 26) = 3.07$, $p = .06$. Benefit-finding increased over time for both groups: T1 ($M = .68$), T3 ($M = .71$), T4 ($M = .86$). Unfortunately, this change was not affected by our cognitive processing manipulation.

Group Differences in Mood

Even though the focus of the study was on benefit-finding, we also examined whether talking about a stressor influenced health outcomes. First, we examined mood

with a 2 (condition) by 3 (session) by 2 (pre-post) repeated measures analysis of covariance. For anxiety, there was a main effect of session, $F(2, 26) = 6.64$, $p = .005$, a main effect of pre-post writing, $F(1, 27) = 20.65$, $p < .001$, an interaction between session and pre-post, $F(2, 26) = 8.91$, $p = .001$, and a very weak trend toward a three-way interaction involving condition, session, and pre-post, $F(2, 26) = 1.89$, $p = .17$. Because the three-way interaction is of the most interest to our study, we display it in Figure 1a. At T1, the disclosure group decreased in anxiety more than the control group, while there appeared to be little difference between the post-anxiety scores for the two groups at T2. At T3, the control group increased in anxiety while the disclosure group decreased slightly in anxiety. The pattern of this interaction, albeit weak, was consistent with our hypothesis.

For anger, there was a main effect of session, $F(2, 26) = 5.25$, $p = .01$ and a trend toward an interaction between session and pre-post, $F(2, 26) = 2.57$, $p = .10$, as shown in Figure 1b. There was some decline in anger at T1, no change in anger during T2, and a slight increase in anger at T3. There was no three-way interaction involving condition, session, and pre-post. That is, the changes in anger were not affected by condition.

For depression, there was a main effect of session, $F(2, 26) = 10.45$, $p < .001$, a main effect of pre-post writing, $F(1, 27) = 7.03$, $p = .013$, and an interaction between session and pre-post, $F(2, 26) = 3.72$, $p < .05$. As shown in Figure 1c, there is a decrease in depression for the disclosure and control groups in T1, but no changes in depression for either group during T2 or T3. There were no effects involving condition.

Group Differences on Health Outcomes

We examined group differences on health outcomes with analyses of covariance. These findings are shown in Table 3. No group differences were found for satisfaction with life, physical symptoms, intrusions, or avoidance at T3 or T4. There also were no group differences on infectious illnesses or health center visits at T3 or T4. There was a significant group difference on the overall CAT score which was only administered at T4, F (2, 26) = 9.42, p = .005. Participants in the control condition reported worse overall adjustment to college than participants in the disclosure condition. Among the three subscales of the CAT, there was a marginal difference on negative affect, F (2, 26) = 3.99, p = .06. As shown in Table 2, participants in the control condition reported more negative affect associated with coming to college than participants in the disclosure condition.

Group Differences in Cognitive Processing

We examined group differences in cognitive processing with independent t-tests on the LIWC categories described in the method section. These findings are shown in Table 4. There was a significant group difference on cognitive mechanisms, t (28) = -8.62, $p < .01$, such that the disclosure group used significantly more cognitive mechanisms than the control group. Similarly, there was a significant group difference on insight, t (28) = -8.62, $p < .01$, such that the disclosure group used significantly more insight words than the control group. There were significant group differences in negative emotion, t (28) = -6.70, $p < .01$, including the specific components of anxiety, t (28) = -6.04, $p < .01$, and sadness, t (28) = -3.94, $p < .01$, such that the disclosure group expressed more negative emotions, anxiety, and sadness than the control group. There were no significant group differences on anger or inhibition words.

Stress as a Moderator Variable

One reason that we might not have found many condition effects on benefit finding or health outcomes is that some people were not all that stressed by the transition to college. Thus, we examined whether the stress associated with the transition moderated the condition effects on outcomes. Here we used regression analysis to predict the outcomes. We entered the baseline level of the outcome and previous disclosure on the first step, condition and perceived stress on the second step, and the interaction between condition and perceived stress on the third step. For benefit finding, the only significant condition by stress interaction was on T3 openness (beta = 0.96, $p < .05$). As shown in Figure 2a, perceived stress was not associated with openness for those in the disclosure group, whereas perceived stress was associated with more openness for those in the control group. We would have predicted that the disclosure group would have greater openness than the control group under conditions of high stress, but just the opposite appeared.

The interaction between condition and perceived stress also predicted two T3 health outcomes: intrusion (beta = -.71, $p = .06$) and avoidance (beta = -1.12, $p < .05$). As shown in Figures 2b and 2c, there appears to be a buffering effect of condition on intrusive and avoidant thoughts about the transition to college when perceived stress is high. Perceived stress was related to greater intrusions and greater avoidance among the control group, but was not related to intrusions and avoidance among the disclosure group. Thus, it appears that those who perceived the transition as more stressful benefited from the cognitive processing manipulation in terms of intrusions and avoidance. At T4, condition and perceived stress interacted to predict one of the same

two health outcomes: avoidance (beta = -1.10, $p < .05$). The pattern of the interaction is similar to that shown in Figure 2c.

Links of Cognitive Processing and Emotion Language to Outcomes

Although we found few effects of our disclosure manipulation on benefit-finding or health outcomes, we did find condition effects on the words used, as measured by the LIWC software. Thus, we took the opportunity to examine the relations of cognitive processing and emotion language indices to benefit-finding and health outcomes for those participants assigned to the disclosure condition. We used partial correlation analyses so that we could control for the baseline level of the outcome.

Table 5 shows the correlations between the LIWC content coding words and benefit finding measures. Neither cognitive mechanisms nor insight words were related significantly to any of the measures of benefit-finding. Negative emotions and anxiety were positively related to an increase in religiosity at T3, but not at T4. The use of sadness words was positively related to an increase in autonomy at T3 but not at T4. The use of anger words showed some trends toward declines in some categories of benefits. The use of inhibition words also showed some trends toward declines on some categories of benefit-finding but was marginally related to an increase in the overall SRG benefit-finding score at T4. Among the three subscales of the SRG, inhibition was significantly related to an increase in maturity and an increase in affective growth at T4.

Correlations between the LIWC categories and health outcomes are displayed in Table 6. Although cognitive mechanisms were not related to the overall CAT adjustment scale, they were marginally related to more positive affect, significantly related to more negative affect, and marginally related to being more homesick. Similarly, insight words

were not related to the overall CAT scale but were positively related to the experience of both positive affect and negative affect associated with the transition to college. Insight words were also significantly related to a greater satisfaction with life at T4. Although the overall negative emotion index was not significantly related to any health outcome, anxiety words were positively related to satisfaction with life at T4 and anger words were negatively related to satisfaction with life at T4. Sadness words were related to the positive affect subscale of the SRG at T4 but not T3. Inhibition was significantly related to more infectious illnesses at T4 only.

Discussion

The first goal of the study was to examine whether disclosing about the adjustment to college experience would enhance benefit-finding. After the third session and at one month follow up, the disclosure group did not report more benefits on any of our measures compared to the control group. Instead, both groups reported an increase in benefits over time. There are several explanations for these findings. First, there may have been experiences outside of the laboratory that led to growth in both groups—experiences that were more powerful than our brief manipulation. Most college freshmen had reported already talking about the challenges and difficulties of coming to college, suggesting that students had already engaged in some cognitive processing prior to participating in the study. Thus, both groups of students might have already construed benefits from the transition to college before the study started.

Alternatively, more time may be needed before benefits can be realized. One month might not have been a sufficient period of time for participants to experience true growth. Change and growth as a result of a stressful life event may require more than

one month. The time constraints of conducting this study allowed us to follow people for only one month. In the future, allowing a longer period of time might allow for true benefits to be recognized.

Third, it may be that some of the benefits reported by our participants were authentic and some were illusory. One way to distinguish the two would be to compare participants who reported high benefits and engaged in cognitive processing with participants who reported high benefits but did not engage in cognitive processing. The latter group might be vulnerable to social desirability constraints and report benefits to either try to please the experimenter or because they believe they are supposed to have grown. This would lead to these benefits being illusory. On the other hand, the group that engaged in cognitive processing and reported benefits would have true growth. One could then compare the domains of objective growth between the groups to support this distinction. We did not have enough participants in our study to distinguish between the two groups. In the future, it would be beneficial to try to distinguish between authentic and illusory benefits.

We also examined whether disclosing about the adjustment to college experience would lead to changes in health as previous studies have found. The only evidence that we found to support the benefit of the disclosure manipulation was on the overall adjustment to college index. Students who were in the disclosure group reported higher scores on our overall adjustment to college measure one month after the study compared to the control group. The adjustment measure contains three subscales: positive affect or optimism, negative affect, and homesickness. The only subscale that was affected by our manipulation was the negative affect subscale. Students in the disclosure group who

talked about the transition to college reported that they experienced less negative affect associated with the transition compared to those who talked about trivial issues. This is the only piece of evidence that we found to support the health benefits of verbal disclosure.

Unlike previous research, we did not find an effect of disclosure on any index of physical health. We examined both self-reports of illness and self-reports of how many health center visits students made. Self-reports of illness may not be reliable. Some students might have forgotten that they had an illness or might not have wanted to admit that they had been sick. People also vary in what they consider to be an illness and have different thresholds for noticing symptoms, resulting in some people omitting and exaggerating illnesses and their symptoms. Health center visits also may not be a very good reflection of health as many students fail to go to the doctor when they are sick because of time, money, misconception about doctors, and various other reasons. By contrast, other students might go to the health center when they are not really sick because they need an excuse for missing class or are overreacting to their symptoms. Thus, neither measure is an ideal indicator of health. A better health measure would include an in-person physical exam following reports of illness.

We recognized that one reason that we might have found few effects of our disclosure manipulation on benefit-finding and health has to do with the fact that this experience was not stressful for everyone. In order to have engaged in cognitive processing, students must have found the move to college to be traumatic. We hypothesized that engaging in talking about something stressful would lead to benefit finding, so we inserted a survey question asking how stressful the transition to college

was for each student. When we separated the groups into high and low perceived stress, we found only one effect on benefit finding: openness. Unfortunately, the students who perceived the college transition as stressful did not benefit from speaking about it, but slightly decreased in openness, while the controls who found the college transition stressful were the ones who improved in openness. This was opposite to our hypothesis that students who talked about something stressful would increase in benefits. However, the hypothesis was supported for two health outcomes. Students who found the college transition stressful and disclosed about it had fewer intrusive and avoidant thoughts about the stressor of coming to college compared to their control counterparts. This is evidence that our cognitive processing manipulation may buffer one from the stress associated with the transition to college. We might have found more stress by condition effects if we had a larger number of participants, but breaking down the conditions into high and low stress further reduced the sample size.

The second goal of the study was to link cognitive processing as reflected in the language used in the disclosure condition to benefits and health outcomes. Previous studies have examined language in the context of written disclosure, but this is the first study (to our knowledge) that has examined language in the context of verbal disclosure. First, we examined whether the disclosure condition engaged in more cognitive processing and emotional expression than controls. Using the LIWC software, we found that the disclosure group used more cognitive processing words than controls. In addition, the disclosure group used more negative emotion words—specifically more words that suggested anxiety and sadness—than controls. Thus, we can conclude that the

task of talking about coming to college was effective in getting students to actively think about the process, engage in cognitive processing, and explore negative emotions.

Next, we examined whether the language used—cognitive processing and emotional expression—was related to benefits and health outcomes. There was no clear relation of cognitive processing words to benefit finding. However, cognitive processing words did show some relations to health outcomes. Specifically, students had greater satisfaction with life when they used insight and cognitive mechanism language to talk about their transition to college. Students who used more cognitive processing language did not have higher overall college adjustment but seemed to have experienced more changes in the adjustment process. Cognitive processing language was related to higher scores on the experience of both positive affect and negative affect associated with the transition to college. It makes sense that both positive and negative affect would increase because working through a stressor entails thinking about the positive and negative implications of moving to college.

Negative emotion language was associated with benefit finding and health outcomes, but these relations were not consistent across the specific categories of anxiety, anger, and sadness. Anxiety and sadness language in writing was rarely associated with outcomes but the relations that did emerge suggested greater health benefits and greater benefit finding. On the other hand, students who used anger words were less likely to report growth and reported a decrease in satisfaction with life. The difference in the pattern of findings for the negative emotion words could be due to the fact that experiencing sadness and anxiety while talking about something traumatic reflects a release of the emotions and a working through the event, whereas experiencing anger is

still allowing oneself to dwell on the trauma. Not until a person has worked through a stressful event will he or she observe the benefits.

Inhibition revealed few relations to outcomes. Students who expressed more inhibition words showed some evidence of more benefit finding but also were more likely to report infectious illnesses. Students who used more inhibition words may have been frustrated by the experiment because they were not accustomed to talking about something that is difficult for them. As a result, they might have found the experiment too stressful and held back from exploring the transition to college, resulting in worse health.

This study had several strengths. First, the study was longitudinal. This provided us with the opportunity to measure objectively how students grew as a result of talking about something traumatic. Most previous studies have relied on self-reports of growth, but we were able to measure certain attributes prior to the study and at intervals throughout the study to see if change had occurred. This also allowed us to examine whether there were long-term benefits from the disclosure manipulation. Second, the study used a very concrete event to examine growth with the intention of eliciting cognitive processing. Many previous studies have asked people to recall a stressor, with the result being that the stressor is not the same for all participants in the study. Holding the stressor constant is a strength of the study.

There also were several limitations of the study. One major limitation of this study was the small number of participants. The fact that we only had 15 participants in each condition could have lowered our power to detect significant group differences. A second limitation has to do with the nature of the stressor. The transition to college was

not stressful for everyone, meaning that some students did not see the stressor as a traumatic event. If the transition to college was not traumatic for students, then they would not benefit from discussing it. This could explain why there were so few effects of the manipulation. A related limitation is that the study took place anywhere from a few weeks to two months after the school year started, so the stress could have dissipated by the time the study started for some participants. It would have been ideal to have the first session for all participants take place within the first week of students arriving on campus. Not only would stress have been higher at this time, but there would have been less opportunity for students to talk about the transition with others.

A third limitation of the study is that the control group did not always find the task of talking about their trivial topics to be trivial. In fact, many of the participants thought the task was annoying. This was evidenced by the fact that anger did not decrease between the start and end of the first session for the trivial group as it did for the disclosure group. In fact, by the third session anger slightly increased from the start to the end for the control group. We were surprised by these findings because this kind of manipulation has been used in many writing studies. Perhaps it is more difficult to talk than to write about trivial topics. It would be better for future research to provide the control group with a task that is more benign.

In sum, we found that disclosing about the transition to college does not always lead to benefits in students. We did find that talking about the transition to college increased overall adjustment to college one month later. When the event is perceived as more stressful, health benefits were more likely to occur. Although the disclosure manipulation did not lead to many health outcomes, the disclosure manipulation did

encourage cognitive processing and the expression of emotion. The effects of using cognitive processing words, emotion words, and inhibition words were mixed, however, making it less clear how language is related to health. There was some suggestion that expressions of anger were associated with worse health while expressions of sadness and anxiety were associated with better health. Future research should distinguish between real and illusory growth by examining which participants used cognitive processing words as an indicator of authentic growth.

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Table 1

Examples of Words from the LIWC Dictionary

LIWC Category	Example Words
Cognitive Mechanisms	because, confess, depends, hence, ponder, questioned
Negative Emotions	depress, disaster, miss, punish, threaten, uncomfortable
Anxiety	frantic, hesistant, inadequate, nervous, overwhelm, panic
Anger	assault, cruel, hate, kill, lied, punish
Sadness	agony, alone, crushed, grave, pity, sorrow
Inhibition	block, constrain, prevent, quit, restrain, wait
Insight	determine, examine, found, relate, reveal, think

Table 2

Adjusted Means for the Disclosure and Control Conditions on Benefit Finding Outcomes

	Disclosure	Control	*p*
Benefit-Finding Measure			
Autonomy T3	6.71	6.55	n.s.
Autonomy T4	6.36	6.51	n.s.
Conscientiousness T3	6.28	6.53	n.s.
Conscientiousness T4	6.60	6.48	n.s.
Openness T3	6.65	6.05	n.s.
Openness T4	7.05	5.97	n.s.
SRG Total T3	0.80	0.55	n.s.
SRG Total T4	0.85	0.86	n.s.
Affective Growth T3	0.89	0.61	n.s.
Affective Growth T4	0.88	1.04	n.s.
Religious Growth T3	0.47	0.15	n.s.
Religious Growth T4	0.52	0.44	n.s.
Mature Growth T3	1.05	0.89	n.s.
Mature Growth T4	1.16	1.06	n.s.
Gained a New Perspective T3	3.07	3.20	n.s.
Gained a New Perspective T4	3.07	3.31	n.s.
Positive/Negative View T3	3.93	3.60	n.s.
Positive/Negative View T4	3.64	3.36	n.s.

Table 3

Adjusted Means for the Disclosure and Control Conditions on Health Outcomes

	Disclosure	Control	*p*
Health Measure			
Satisfaction with Life T3	3.92	3.35	n.s.
Satisfaction with Life T4	3.17	2.92	n.s.
Physical Symptoms T3	1.50	1.83	n.s.
Physical Symptoms T4	1.48	1.59	n.s.
CAT-Total T4	4.28	3.68	0.05
CAT-Positive T4	4.63	4.24	n.s.
CAT-Negative T4	3.57	4.66	0.06
CAT-Homesickness T4	4.21	4.45	n.s.
Intrusion T3	1.92	2.35	n.s.
Intrusion T4	2.08	2.28	n.s.
Avoidance T3	2.11	1.90	n.s.
Avoidance T4	2.01	2.04	n.s.
Infectious Illnesses T3	0.80	1.00	n.s.
Infectious Illnesses T4	3.03	3.56	n.s.
Health Center Visits T3	0.13	0.07	n.s.
Health Center Visits T4	0.14	0.14	n.s.

Table 4

Group Differences in Cognitive Processing

	Stress	Control	*p*
LIWC Category:			
Cognitive Mechanisms	6.45	2.84	< 0.01
Insight	1.97	0.56	< 0.01
Negative Emotions	0.97	0.34	< 0.01
Anxiety	0.36	0.25	< 0.01
Anger	0.14	0.08	n.s.
Sadness	0.19	0.09	< 0.01
Inhibition	0.12	0.11	n.s.

Table 5

Correlations between LIWC Words and Benefit Finding

Benefit Finding Measure	Cog. Mech	Insi	Neg. Emoti	Anxiet	Ang	Sad	Inhibi t-ion
Autonomy T3	0.29	0.21	0.34+	0.24	0.11	0.48*	0.11
Autonomy T4	-0.08	0.01	0.05	0.43+	-0.32	0.31	-0.03
Conscientious T3	-0.13	0.02	-0.13	0.11	-0.28+	0.04	-0.23
Conscientious T4	-0.10	0.17	-0.32	0.35	-0.55+	0.09	-0.45+
Openness T3	-0.08	0.04	0.03	0.21	-0.13	0.23	-0.21
Openness T4	-0.13	0.32	-0.16	0.28	-0.44+	0.37	-0.50+
SRG Total T3	0.01	0.02	-0.10	-0.21	-0.01	0.11	0.27
SRG Total T4	0.28	0.12	-0.08	-0.45+	0.33	-0.49+	0.54+
Affective T3	0.20	0.17	-0.18	-0.18	-0.02	-0.12	0.11
Affective T4	0.37	0.16	0.01	-0.23	0.24	-0.49+	0.57*
Religiousness T3	0.29+	0.30+	0.40*	0.44*	0.13	0.22	0.28
Religiousness T4	0.06	0.01	0.24	-0.01	0.33	-0.34	0.30
Mature T3	0.09	0.11	0.02	-0.01	-0.06	0.26	0.15
Mature T4	0.44+	0.37	0.02	-0.18	0.16	-0.11	0.60*
Perspective T3	0.07	0.01	0.08	-0.07	0.11	0.04	-0.20
Perspective T4	-0.11	0.15	0.23	0.45+	-0.36	0.41	-0.05
Pos/Neg View T3	0.08	0.20	0.14	0.14	0.06	0.15	0.07
Pos/Neg View T4	0.32	0.21	0.38	0.31	-0.19	0.51+	-0.30

Note: $^{+}$ $p < .15$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 6

Correlations between LIWC Words and Health Outcomes

Health Measure	Cog. Mech.	Insight	Neg. Emotion	Anxiety	Anger	Sad.	Inhibit-ion
SWLS T3	0.01	0.07	0.06	-0.04	0.03	0.17	-0.20
SWLS T4	0.54^{+}	0.60*	0.07	0.65*	-0.65*	0.40	-0.05
CHIPS T3	-0.14	-0.23	-0.21	-0.30^{+}	-0.09	-0.25	0.05
CHIPS T4	0.13	-0.28	0.09	0.02	0.30	-0.50^{+}	0.53^{+}
CAT Overall T4	-0.37	-0.20	-0.07	0.03	-0.03	0.25	-0.43^{+}
CAT Pos. T4	0.54^{+}	0.64*	0.09	0.27	-0.49^{+}	0.67*	-0.11
CAT Neg. T4	0.65*	0.66*	0.30	0.29	-0.01	0.40	0.25
CAT Homesick T4	0.54^{+}	0.24	-0.01	-0.09	0.02	-0.02	0.23
Intrusion T3	0.03	-0.03	0.06	-0.09	0.03	-0.01	-0.01
Intrusion T4	0.26	0.23	0.03	-0.15	0.38	-0.11	0.42

Avoidance T3	0.36	0.21	0.29	0.22	0.16	0.07	-0.02
Avoidance T4	0.09	-0.01	-0.02	-0.18	0.39	-0.20	0.49^{+}
Distress T3	-0.01	-0.10	0.06	-0.09	0.03	0.02	0.04
Distress T4	0.15	0.10	0.01	-0.18	0.40	-0.17	0.44^{+}
Infect Illnesses T3	0.05	0.04	0.02	-0.05	-0.01	-0.11	-0.29^{+}
Infect Illnesses T4	0.49^{+}	0.02	0.30	0.02	0.27	-0.25	0.56*
Health Center T3	-0.05	0.07	0.05	-0.07	-0.90	-0.03	0.10
Health Center T4	0.22	0.20	-0.30	-0.26	-0.01	0.09	-0.23

Note: $^{+}$ $p < .15$; * $p < .05$; ** $p < .01$; *** $p < .001$

Figure 1

Effects of Condition, Time, and Session on Mood

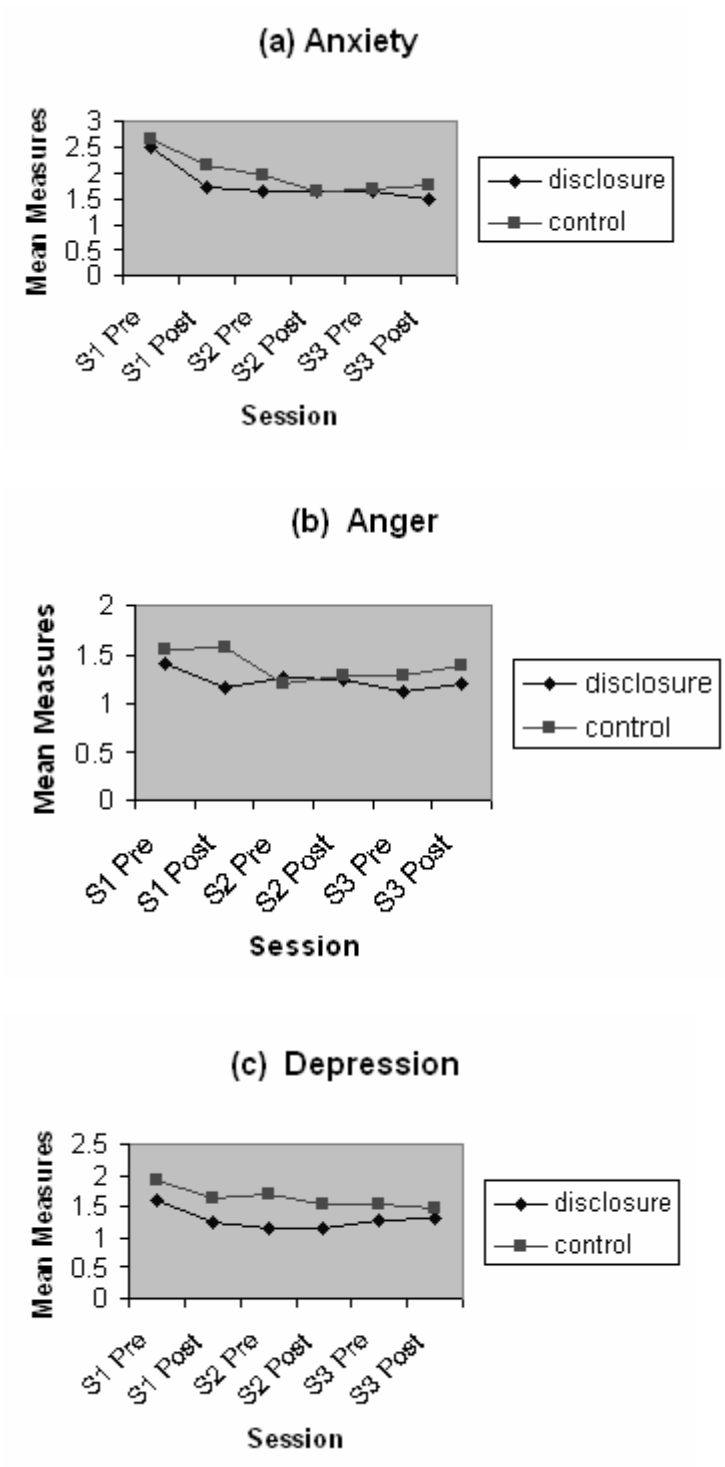
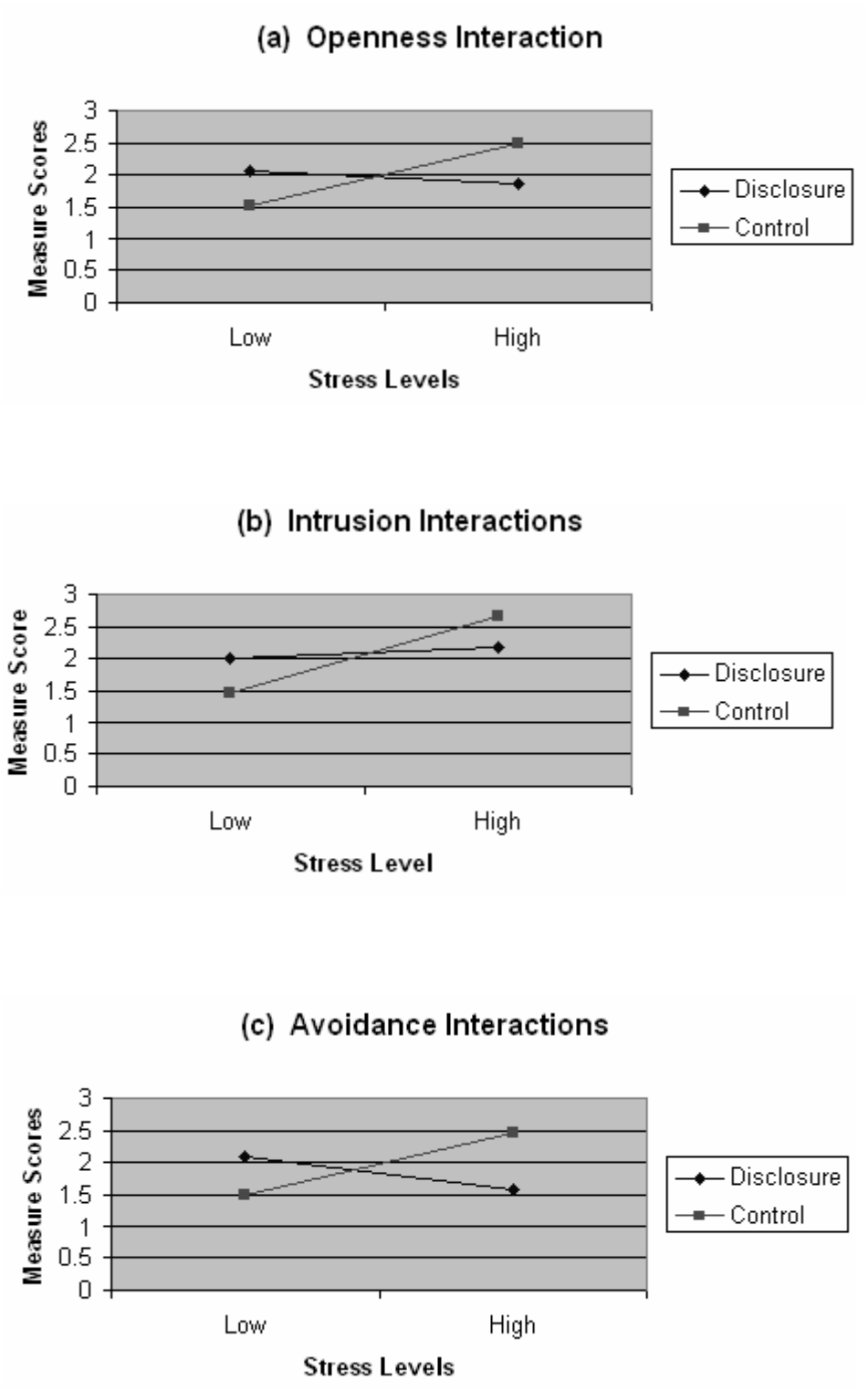


Figure 2

Stress as a Moderator of Condition Effects on Outcomes



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To whom it may concern:

This is to certify that on April 27, 2007, Ashley M. McMakin submitted an Honors Thesis entitled "Benefits of Talking about the College Transition: using cognitive processing to detect true growth" to the Psychology Department. This thesis has been judged to be acceptable for purposes of fulfilling the requirements to graduate with College Honors.

Sincerely,

Dr. Vicki Helgeson
Thesis Advisor

Dr. Michael Scheier
Head, Department of Psychology

Dr. Jay Devine
Dean, College of Humanities and Social Sciences