PERFORMANCE ON WRITTEN PROBLEM-SOLVING TASKS AS A FUNCTION OF EMOTIVE VERSUS NON-EMOTIVE WRITTEN SELF DISCLOSURE.

BY

KENT W. SOMERS

A Thesis
presented to the Faculty of Graduate Studies
in Partial Fulfilment of the Requirements
for the Degree of

DOCTOR OF PHILOSOPHY

Department of Psychology
University of Manitoba
Winnipeg, Manitoba

November 19, 1997

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

*****

COPYRIGHT PERMISSION PAGE

PERFORMANCE ON WRITTEN PROBLEM-SOLVING TASKS AS A FUNCTION OF EMOTIVE VERSUS NON-EMOTIVE WRITTEN SELF DISCLOSURE

BY

KENT W. SOMERS

A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirements of the degree of

DOCTOR OF PHILOSOPHY

ACKNOWLEDGMENTS

A large number of people have earned my gratitude for their role in the production of this dissertation. At the top of the list, I am thankful for the practical wisdom and the unfailing support that David Martin has provided as advisor and friend. I am grateful to the members of my committee, Drs. Gerry Sande, Michael Stambrook, and Donald Stewart, for their insight and steadfast support provided over a very long period of time. I am grateful to Dr. James Pennebaker, whose work inspired this project, and who graciously agreed to serve as external examiner for the Oral Defense. I thank Richard Carreiro, who participated on my committee until his retirement in 1994. I am also indebted to Dr. Edward Johnson for his contributions of sage advice and practical assistance.

For the time they donated to assist me with many practical demands of this project, am grateful to David Koulton, Lisa Garlinsky, Sean Robson, John Bergmann, Naomi Popeski, David Darning, and Jamie Zuckewich. For little more than thanks, they contributed invaluably.

Bob and Carole Barber have been unwavering, unquestioning, and abundant with their support, and they have my enduring gratitude.

Thank you for waiting, Kate, Malcolm, and Noah. I'm done with the computer; let's play.

I cannot express sufficient gratitude to you, Anne. You accepted a load yoked to mine yet encouraged me with my load. You have proven that there is no limit to your faith, your hope, your endurance; that is love. For that and more, I give my love and my life to you, and with it, my thanks.

Abstract

Evidence indicates that significant physiological changes and improvements in status of health occur consequent to relatively brief episodes of disclosure of distressing experiences. These health-related benefits occur unintentionally; they do not appear to occur because of deliberate actions taken to change the status of one's health. Two experiments examined the hypothesis that emotional self-disclosure also leads to improved cognitive processing of verbal information. It was hypothesized that individuals who write in an emotionally expressive manner about their own personal experiences of trauma would perform better on verbal problem-solving tasks than would individuals who write without emotional expression about a trivial topic. In Experiment One, male and female subjects participated in five experimental sessions. For the first three sessions, subjects spent thirty minutes writing about either (a) their thoughts and feelings regarding the most traumatic event(s) they had experienced (Disclosure condition), or (b) an objective, factual description of their activities of the past 24 hours (Control condition). At the fourth and fifth sessions, subjects completed a variety of verbal problem-solving tasks. A multivariate analysis of variance of the seven verbal problems with the writing assignment as a between-subjects independent variable was not statistically significant. A significant result on one task analyzed with an analysis of variance was consistent with the hypothesis that test differences would reveal superior performance for Disclosers versus Controls on verbal problem-solving tasks and therefore was investigated further in the second experiment. In Experiment Two, male and female subjects completed a written vocabulary test, the Revised Repression-Sensitization Scale (Byrne,

Barry, & Nelson, 1963), wrote for thirty minutes in a Disclosure or Control condition, and then immediately completed two verbal problem-solving tasks. Despite controlling for differences in written language ability, significant differences between Disclosers and Controls were not evident on the two problem-solving tasks. The Revised R-S Scale demonstrated only limited utility in predicting disclosure. Results are discussed particularly with regard to implications for future research in this area.

TABLE OF CONTENTS

LIST OF TABLES

Introduction

Self-disclosure is the reporting of one's awareness of the status or history of one's own thoughts, emotions, and behaviours. It typically occurs as oral reporting of information about oneself to another person. Self-disclosure is a valuable part of interpersonal relating which promotes the development of social relationships (Cozby, 1973). Disclosure increases others' awareness of one's circumstances and emotional status and, as such, increases the likelihood of receiving support from others. One important setting in which self-disclosure occurs is in psychotherapy (Jourard, 1971; Rogers, 1961; Truax & Carkhuff, 1965). The purpose of self-disclosure in psychotherapy is not to develop a reciprocal interpersonal relationship; rather, it is to increase a client's awareness and understanding of his or her own beliefs, emotional reactions, and behaviours (Ridley, 1984).

Self-disclosure generates information about the self which can be a commodity of exchange in interpersonal relationships and which adds to an individual's knowledge and understanding of the self. There appear to be at least two other important effects of self-disclosure as well. First, evidence suggests that health benefits, as indexed by improved self-reports of health, decreased use of medical services, and heightened immune responses, can result from even brief episodes of disclosing personal experiences of trauma (Pennebaker, 1985, 1990; Pennebaker & Susman, 1988). Second, evidence suggests that disclosure of personal experiences of trauma leads to changes in thinking processes (Pennebaker, 1990), such that thinking is facilitated in processes such as problem-solving. This suggests that self-disclosure can generate

information about the self but may also alter the way that one thinks about the information that one has at one's disposal.

Pennebaker and his associates (e.g., Pennebaker & Beall, 1986; Pennebaker, Kiecolt-Glaser, & Glaser, 1988) have not defined the term *trauma* as used in the previous paragraph. The individuals who disclosed details of personal traumatic experiences and who subsequently evinced improved health had not been selected on the basis of medical or psychiatric criteria which defined them as members of a clinical population. Rather, the paradigm used by these researchers had undergraduate students reporting "the most distressing or unpleasant event(s)" of their own lives. Subjects defined their experiences as having been traumatic on the basis of their own subjective distress; objective criteria were not used. This sampling suggests that the beneficial consequences of emotive self-disclosing are not limited to a population of individuals who, from a psychotherapeutic perspective, might be expected to benefit from such disclosure. Rather, these results may occur with a broad range of individuals when distressing experiences are disclosed to others (Pennebaker, 1990).

Developing a relationship with another person requires one to report personal information to that other person, but one can gain insight about oneself without disclosing to another person. One can record thoughts, feelings, and actions in a journal and gain insight as a result of writing expressively. Pennebaker and his associates frequently operationalized self-disclosure as writing an essay about oneself (e.g., Pennebaker & Beall, 1986; Pennebaker, Colder, & Sharp, 1990; Pennebaker, Kiecolt-Glaser, & Glaser, 1988). It may be that, to benefit from self-disclosure, one must make the disclosure to another person; it

may be that Pennebaker's subjects benefited from writing because they anticipated that their essays would be read by another person at a later time. However, it appears that health benefits can occur when self-disclosures are written privately and are not explicitly shared with another person.

The following discussion will serve two functions. First, the research summarized in the previous paragraphs will be reviewed in closer detail. Second, a rationale and procedure will be presented for two studies which were conducted to further investigate effects of written self-disclosure. Rich in implications, the research by Pennebaker and his associates has primarily addressed physical and physiological dependent measures. The two experiments to be reported investigated the impact of written self-disclosure on cognitive information processing.

Self-Disclosure and Self Knowledge

The research to be reviewed in the following section will support three main points. First, self-disclosure is important in interpersonal relationships; individuals benefit indirectly from their self-disclosures by establishing or maintaining social supports. Second, an individual who self-discloses may benefit directly by generating information about him- or herself. This statement is important in light of the third point to be presented: evidence indicates that individuals do not always have conscious awareness of the cognitive or environmental antecedents to their own behaviour.

Self-disclosure in interpersonal relationships. Self-disclosure can certainly have social value. Self-disclosure is cited in processes of liking, social approval, trust, and intimacy. Early research (cf. Cozby, 1973; Jourard, 1971) explicitly attended to parameters of disclosure, including

situation dynamics, personality characteristics, and specific behaviours, which either increased or inhibited disclosing behaviour. The inhibition of disclosure can be a matter of personal discretion and can be a healthy, functional process (Kelly & McKillop, 1996; Kempler, 1987). For example, homosexual men who test positive for HIV antibodies are more likely to disclose their health status to other homosexual men, who are perceived to respond in a more helpful manner than relatives and other colleagues (Hays, McKusick, Pollack, & Hilliard, 1993). Fear of disrupting relationships, desire to keep others from worrying, or fear of censure can limit the degree of disclosing and thus inhibit social functioning (Doster & Nisbett, 1979; Hays et al., 1993). Self-presentation strategies typically vary so as to make the most favorable impression on an audience; people tend to present themselves positively to strangers but modestly to their friends (Tice, Butler, Muraven, & Stillwell, 1995).

Self-disclosure and information about the self. Aside from the social benefits of self-disclosure, disclosure can benefit the individual by generating information about the self. Jourard (1971) suggested that individuals tend to identify with stereotypical roles, such as those defined by their professions, by their social status, or from within their families, and may not attend to ongoing thoughts, feelings, and behaviours. As such, one can become "alienated" from oneself, having limited awareness of the cognitive or environmental factors that motivate one's own behaviour. Jourard (1971) suggested that as one reveals personal information to others, one becomes more aware of this information oneself.

Like Jourard, Bowers (1987) argued that we learn about ourselves much as another person might learn about us -- by observing our own behaviour (including verbal behaviour) and inferring the meaning behind it. This type of evaluation represents a process of what Bowers termed *second-order consciousness*. Whereas *first-order consciousness* describes the simple awareness of stimuli which impinge on an individual, second-order consciousness involves the ability to reason, to categorize, and to be critical of one's observations. Self-disclosure can be a source of information about oneself which becomes available for consideration; however, insight and understanding require intentional effort to be achieved. Becoming aware of the factors that may influence behaviour does not ensure our understanding of how those factors influence our behaviour. Similarly, Jourard (1971) suggested that one must be prepared to consider that the definitions that one has of oneself may be flawed or incomplete; only then can new information be incorporated into a new definition of the self.

An important function of self-disclosure, then, is that it can increase the accuracy of self-knowledge. One can assess one's own capabilities and personal resources; one may also identify erroneous or dysfunctional thoughts (Beck, Rush, Shaw, & Emery, 1979; Ostell, 1991). This knowledge can serve to better equip the individual to respond effectively to challenging or threatening situations that arise (D'Zurilla, 1986; Lazarus & Folkman, 1984). This knowledge may also serve as an appraisal of one's limitations and point to the appropriateness of seeking assistance from others (Larson & Chastain, 1990).

Cognitive processes outside of reportable awareness. Individuals can gain information about themselves through self-disclosure. This statement presupposes that individuals can be unaware of some aspects of their own thoughts and actions. There is mounting empirical evidence to suggest that individuals may not accurately recognize the antecedents of their own thoughts or behaviours (Bowers, 1987). The discussion will turn briefly to a consideration of some of this evidence.

Marcel (1983) defined consciousness as the ability to observe one's own mental and physical behaviours and to base intentional action on those observations. He argued that the information that is represented in consciousness is somewhat independent of the perceptual processes that occur as antecedents to conscious experience. As such, one can respond to information in a meaningful way without being able to report on the nature of that information. He defended his argument with a series of studies using visual masking. He first showed subjects an extremely brief (in the order of tens of milliseconds) presentation of a printed word which was then replaced with a meaningless graphic pattern. The pattern masked the presented word; that is, it ensured that subjects could not recognize what the presented word was. Subjects were then shown a short series of printed letters. The time that it took subjects to decide whether or not the letters represented a real English word decreased if the word was related in meaning to the masked, unrecognized word presented previously. For example, subjects did not recognize the words PALM or BOOK which were presented briefly and were then masked. However, subjects' decision that HAND was a real English word occurred more rapidly when it followed the presentation of the word PALM than when it followed the presentation of the word

BOOK. It appears that the meaningful relationship between the words PALM and HAND facilitated subjects' recognition of the word HAND. It follows, therefore, that subjects must have processed the meaning of the word PALM although they could not recognize that word. Reportable awareness was not required for this processing to occur. As well, reportable awareness did not occur automatically as a consequence of this processing of meaning (Fowler, Wolford, Slade, & Tassinary 1981; Marcel, 1983).

Nisbett and Wilson (1977) argued that the ability to examine one's own thoughts and behaviours does not necessarily lead to an accurate understanding of the contingencies among internal (cognitive) events, external events, and behaviour. To demonstrate this, they had subjects evaluate four ostensibly different stockings to determine the best product. Subjects made their choices and attributed their selection to their evaluation of physical characteristics of the stockings. The stockings were, in fact, identical products, and subjects tended to prefer the stocking on the furthest right side of the display. Subjects did not recognize either of these facts. Nisbett and Wilson argue that these individuals clearly developed a preference, a reportable cognition, but did not recognize the basis of their preference, which was essentially a response bias unrelated to the differential qualities of the stockings. Individuals can be aware of their own thoughts and behaviours without an accurate understanding of the antecedents to those thoughts and behaviours.

The occurrence of cognitive processes and behaviours outside of subjects' reportable awareness has been widely reported. It appears in literature on self-deception (Sackheim & Gur, 1978, 1979; Taylor &

Brown, 1988), distorted judgment of contingencies by non depressed persons as compared to depressed persons (Alloy & Abramson, 1979), use of limited heuristics in judgment of probability (Tversky & Kahneman, 1973; Kahneman & Tversky 1972), motivated forgetting (Glucksberg & King, 1967; Glucksberg & Ornstein, 1969; Martin, Hawryluk, Berish, & Dushenko, 1984), and implicit memory (Graf & Schacter, 1985, 1987; Hasher & Zacks, 1979; Jacoby & Kelley, 1987; Jacoby & Witherspoon, 1982; Schacter & Graf, 1986; Tulving, Schacter, & Stark, 1982). These studies indicate that cognitive processing can occur without conscious awareness or intent. These processes are not pathological, although processes which occur outside of reportable awareness could contribute to dysfunctional behaviour. These processes appear to be normal occurrences in individuals who are members of the general population.

Summary: Self-disclosure and self-knowledge. The discussion in this section has stated that one profits socially by self-disclosing and that, by disclosing personal information and deliberately appraising and evaluating the information that becomes available, one can gain accurate knowledge about one's own motives and behaviour. This is valuable because evidence indicates that, otherwise, individuals can be unaware of the antecedents to their own beliefs and behaviours.

Inhibition, Self-Disclosure, and Physical Health

There is evidence to suggest that disclosure of distressing personal experiences can result in physiological changes which benefit one's health. These health-related benefits appear to occur unintentionally; that is, individuals who have disclosed experiences of trauma have later reported enjoying health benefits while at the same time reporting the absence of deliberate, strategic efforts to change the status of their

health (e.g., increasing exercise, modifying diet, or abstaining from smoking). These individuals were not taking advantage of insights obtained through self-disclosure to effect these health-related changes. Their health appeared to benefit from self-disclosure through a process other than intentional change.

Pennebaker (1985; 1990; Pennebaker & Hoover, 1986) presents empirical evidence in a series of studies which builds the argument that inhibiting the verbal expression of personally traumatic material is damaging to one's physical health. Conversely, expressing inhibited traumatic material privately or publicly appears to benefit an individual's health by stopping the inhibition of immune system functioning. This evidence will be presented in the following discussion. The first point to be made is that stopping a behaviour from occurring (where that behaviour could reasonably be expected to occur) requires physiological work. Conversely, stopping this inhibition of behaviour reduces physiological work. The second point to be presented is that personal traumas are associated with long term health problems. Moreover, the most detrimental effects to health seem to occur when the trauma is not reported to others. The third point is the conclusion that self-disclosure of personal traumas leads to significant improvements in health. These improvements are indexed by self-reports of symptoms experienced, number of hospital visits, and immune system responses.

The term *inhibition* is used extensively throughout the following discussion. Pennebaker and Hoover (1986) note that the term has a history of controversy but has been used as a construct to explain a wide variety of mechanisms in psychological research, including pain reception, Pavlovian conditioning, and psychodynamic processes. They

use this term to broadly denote processes in which an event does not occur which would otherwise occur except for the action of another (inhibiting) event.

Inhibition and physiological changes. Pennebaker and Chew (1985) tested the proposition that the inhibition of behaviour can lead to short term physiological changes. Their investigation builds on evidence reviewed by Fowles (1980) which links the inhibition of behaviour with increased electrodermal activity. Pennebaker and Chew had subjects choose one of five words from a list. Subjects were then instructed to respond either "Yes" or "No" to five inquiries from an experimenter, "Is the word [____]?" Subjects did this once, providing accurate feedback to the experimenter. After this, they were instructed to say "No" to each of the experimenter's inquiries and to refrain from making a nonverbal indication of the word they had chosen. This is known as a *guilty knowledge test*. During this time, changes in skin conductance levels were monitored. These researchers found that, in the time interval of 2 to 4 seconds after each subject was deceptive (reported "No" to the word that had actually been selected), skin conductance level increased. Pennebaker and Chew concluded that inhibiting a veridical response was associated with increased physiological work as indicated by increases in skin conductance level.

Pennebaker, Hughes and O'Heeron (1987) hypothesized that, if increased skin conductance was associated with inhibition, stopping the inhibition of a particular behaviour should decrease skin conductance. They had individual undergraduate students speak into a tape recorder on two separate topics. These topics were traumatic events they had experienced and a trivial, pre-assigned topic. While each subject spoke,

heart rate, blood pressure, and skin conductance level were continuously measured. To varying degrees, subjects did disclose personally revealing information when asked to do so. Some subjects rated themselves, and were rated by independent judges, as having disclosed less personal, less stressful material than others did. Subjects also varied in the degree to which they had previously discussed their distressing experiences with others. Subjects who revealed personal material that had not been shared with others prior to this occasion had lower skin conductance levels while reporting than subjects who revealed less personal, less stressful material. All subjects experienced elevated heart rate and blood pressure when they were asked to disclose, regardless of the degree of disclosure. Both heart rate and blood pressure decreased after disclosing. Heart rate and blood pressure were not elevated when subjects discussed the trivial topic.

Pennebaker et al. (1987) explained their results by referring to Fowles (1980). Fowles's review suggested that blood pressure and heart rate are associated with physiological arousal and are not associated with behavioural inhibition. Electrodermal activity appears to be associated with inhibition. Subjects experienced physiological arousal when disclosing personal information but did not when speaking on a trivial topic. This was evidenced by differences in heart rate and blood pressure when measured while subjects spoke on the different topics. Subjects whose discussions were highly personally revealing evidenced less inhibition than those subjects who revealed relatively little. This was evidenced by a drop in skin conductance level following emotional, revealing disclosure. For Pennebaker et al.'s subjects, disclosing deeply personal, emotion-laden material was somewhat distressing or

physiologically arousing. Not disclosing such information when presented an opportunity to disclose involved similar physiological arousal plus it involved the physiological work that comes about from inhibiting making the disclosure.

Pennebaker et al.'s (1987) evidence suggests that, just as inhibition of verbal behaviour is associated with increased skin conductance levels (Pennebaker & Chew, 1985), disinhibition in the form of self disclosure can decrease skin conductance levels. Both studies assume the tenet that increased skin conductance level indicates increased physiological work. The implication which begins to unfold is that keeping distressing information secret requires physiological effort that is not required when that information is expressed. Over time, this physiological effort may manifest as decreased immunocompetence and increased illness (Selye, 1976).

Trauma and health compromise. The second point in the argument being presented is that the experience of severe personal traumas is correlated with increased long-term health problems (Bunce, Larsen, & Peterson, 1995; Pennebaker & Hoover, 1986; Pennebaker & O'Heeron, 1984; Silver, Boon, & Stones, 1983). Pennebaker (1990) indicates that he pursued this particular question after his early research correlated high frequency of distressing physical symptoms with reports of traumatic sexual experience (such as rape or molestation) prior to the age of 17. Four hundred male and female college students responded to a questionnaire. Responses were divided on the basis of frequency of distressing physical symptoms. Of respondents categorized as high in symptomatology, 14.4% reported traumatic sexual experience; of respondents low in symptomatology, only 2.5% reported these

experiences. Pennebaker and Hoover (1986) surveyed an undergraduate population and found that respondents who had experienced sexual trauma, parental divorce, or death of a loved one were more likely to report a high frequency and wide variety of physical symptoms than respondents who had not experienced these events. The caveat in considering these studies is that the results describe correlations between variables and as such do not connote a causal relationship between early experiences of trauma and present health.

Other studies have reported significant relationships between sexual trauma and health problems. Silver et al. (1983) reported that female survivors of childhood incest tended to search for meaning regarding their trauma. To the extent that survivors lack a sense of meaning regarding their experience, they may recurrently ruminate about it and remain hyperaroused by stimuli reminiscent of the trauma (Greenberg, 1995; van der Kolk, 1989). Silver et al. (1983) found that this distress included physical distress, evident in significant elevations of items endorsed on the 90 item Symptom Checklist (SCL-90). Kilpatrick, Resick, and Veronen (1981) addressed the connection between traumatic experience and health status more directly in a longitudinal study of rape survivors. At one, six and twelve months after their trauma, survivors experienced several negative symptoms. They reported symptoms related to Somatization (from the Derogatis Symptom Checklist 90, Revised, or SCL-90-R) and reported less vigor-activity, more tension-anxiety, and more fatigue-inertia (from the Profile of Mood States, or POMS). They reported significantly more of these symptoms than did a comparison group of control subjects. These two studies

provide further evidence to support the thesis that traumatic experiences are related to the report of significant health difficulties.

Beyond the thesis that trauma leads to impairment of health, Pennebaker and Hoover (1986) suggested that trauma is especially deleterious to health when it has not been reported to others. They reported the results of a survey given to an undergraduate class of 75 students. Thirty-nine respondents indicated that they had experienced a significant trauma in the past, including having been sexually victimized, having had parents divorce, or having had a person close to them die. Significant differences in the age of respondents at the time of occurrence of the traumatic event or in the presence of current social supports were not evident. As a group, survivors of trauma reported more frequent and severe symptoms of illness than did a control group. Pennebaker and Hoover analyzed their results further by categorizing subjects into groups on the basis of the type of trauma survived. These authors found that survivors of sexual trauma reported more physical symptoms and reported seeking health care more frequently than did survivors of either death or divorce. They also found that survivors of sexual trauma were less likely than other trauma survivors to have confided in others about the traumatic event. Intrigued by this result, Pennebaker and Hoover recategorized subjects on the basis of having experienced trauma and on whether or not they had confided in others about their trauma. Survivors of trauma -- without distinguishing type of trauma -- who did not confide in others reported significantly more frequent and severe illnesses and more frequent visits to health care providers than did trauma survivors who had told others of their traumatic experience(s). These researchers interpreted their data as

suggesting that the inhibition of confiding by survivors of trauma is an important variable in the etiology of those individuals' illness and distress.

One caution in interpreting this latter result is that Pennebaker and Hoover (1986) do not report the percentage of the group who had Not Confided which was made up by survivors of sexual trauma. Thus, their reporting does not explicitly rule out that the Not Confided group was over-represented by survivors of sexual trauma, who, as was also reported, appear to be the least likely of the survey respondents to have told others of their trauma. One damaging aspect of sexual trauma is that the fear or shame evoked in its recounting make victims more reluctant to open up to others (Kilpatrick, et al., 1981; Silver, et al., 1983).

The research linking health status with the occurrence of sexual (or, presumably, other types of) trauma allows only tentative conclusions to be drawn. By necessity, this research is correlational or, at best, quasi-experimental. The effects of trauma on health cannot be tested directly in an experimental procedure with random sampling and assignment; such a procedure would be an obvious violation of ethics. The evidence reviewed in this section suggests that trauma can lead to compromised health, and inhibition of disclosure of trauma exacerbates health problems.

Self-disclosure and health. If the inhibition of disclosure results in deficits in health, removing this inhibition should be expected to relieve the individual of those deleterious health effects (Pennebaker, et al., 1987). Evidence to support this statement will be reviewed in the following section.

Pennebaker and Beall (1986) asked generally healthy undergraduate students to write about traumatic experiences for fifteen minutes on each of four consecutive days. Writing was selected as a medium of expression to reduce the effects of social feedback. Subjects were assigned to write about their experiences in three different ways to investigate different aspects of disclosure. One group of subjects discussed the emotions evoked by a traumatic personal experience without discussing the event itself. The second group of disclosers wrote about the event objectively without reference to their feelings about it. The third group described both the event and the emotions it evoked. Subjects in a control condition wrote on pre-assigned, trivial topics, such as describing their shoes. Pennebaker and Beall predicted that disclosing subjects, relative to control subjects, would have fewer symptoms of illness and would visit health care providers less frequently in the months following their disclosures.

When instructed to, subjects disclosed personal information about their traumatic experiences and produced more personal, revealing essays than control subjects did. Subjects tended to report information that they had not previously discussed with others. Disclosers' moods after each session of writing were more negative than were control subjects' moods. This difference in mood suggests that writing about traumatic experiences was distressing and evoked feelings about that experience.

Four months after the writing sessions, Pennebaker and Beall's two groups of disclosers who had discussed their emotions reported fewer health complaints than controls and objective disclosers did. Additionally, these researchers contacted the University health centre six months after the writing sessions. This information revealed that the one

group of subjects who disclosed both details of a traumatic event and their feelings visited the centre significantly fewer times than did the subjects in the three other conditions. Differences between groups prior to the experiment on the health measures and on the number of health care visits were not significant. Pennebaker and Beall's (1986) subjects appeared to benefit from their self-disclosure. The benefits in health were dependent on the reporting of emotional material. The strongest effects on health were found when subjects wrote on both their emotional reactions and their recounting of traumatic events.

Pennebaker and Beall's (1986) findings support the proposition that disinhibiting the expression of traumatic memories leads to better physical health. This study alone is not definitive. Group sizes in the writing conditions were small and the results may not generalize to the general population. Subjects were debriefed following the writing session; this may have created a bias which accounted for differences in health care usage. Other researchers have had difficulty replicating these results. Murray, Lamnin, and Carver (1989) found trends in their data that were consistent with Pennebaker and Beall's findings, but significant effects on health care usage were not found. Greenberg and Stone (1992) found a significant effect of disclosure on health care usage but found that it was related to the severity of the subjective distress that a subject reported regarding a traumatic experience. Further research using this methodology will be required to determine the variables influencing health following self-disclosure.

It appears that self-disclosure can diminish detrimental health effects of a current and ongoing distressing situation. Mendolia and Kleck (1993) had subjects watch a three-minute video depicting violent

injuries while constantly measuring subjects' skin conductance, heart rate, and skin temperature as indices of physiological arousal. After each subject viewed the video individually, they talked to an experimenter for two minutes about the video. Half of the subjects were instructed to report their emotional reactions during the video while the other half described the sequence of events in the video, reporting the factual content without reporting their emotions. Subjects watched the video again immediately after talking to the experimenter. Subjects who had reported their emotional reactions to the video evidenced greater physiological arousal (increased skin conductance levels, reduced skin temperatures) during the second viewing of the video than did subjects who had reported factually. Groups had not differed significantly prior to talking to the experimenter. Mendolia and Kleck then had a second group of subjects view the distressing video and talk to an experimenter, reporting either their emotional reactions or the sequence of events in the video. This time, however, subjects viewed the video a second time after a delay of 48 hours. After the second viewing, subjects who had previously reported their emotional reactions to the first video viewing evidenced less arousal (indexed by higher skin temperature) and reported greater positive affect than did subjects who had reported factually after the first video viewing. Subjects were again asked to talk to an experimenter about the video after the second viewing, but no restrictions were placed on the kind of reporting made. At this second opportunity to talk about the video, subjects who had previously reported their emotional reactions were rated by independent judges as talking more about their feelings, experiencing less difficulty describing

reactions, more animated, and less tense than their fact-reporting counterparts.

Mendolia and Kleck (1993) concluded that talking about one's emotional reactions to a stressful event initially caused heightened physiological distress, but that after 48 hours, distress at re-exposure to that stressor decreased. These levels of arousal were relative to those experienced by individuals who talked about the same stressful event but who did not discuss their own emotional reactions to that event. Investigating one's own emotional reactions to a stressful event appears to reduce physiological arousal to re-exposure to that event.

Pennebaker, Colder, and Sharp (1990) also present evidence that self-disclosure can help individuals to avoid detrimental health effects of a current and ongoing distressing situation. They argued that the beginning of college is a particularly stressful time for individuals. It is a time of numerous, varied, and novel demands. At the same time, individuals may not be able to rely on the social supports which had been available to them while they were at home or in high school. These authors hypothesized that if subjects confronted their feelings about attending college, they would not inhibit their distressing feelings. If subjects were not inhibiting feelings over a period of a number of months, they would have fewer health problems than subjects who inhibited their feelings about college. To test this hypothesis, Pennebaker et al. (1990) had first year undergraduate students write about their thoughts and feelings about entering college. Subjects wrote for twenty minutes on each of three consecutive days during either the first, fifth, ninth, or fourteenth week of classes. Regardless of the time of year of writing, subjects who wrote about their feelings, as compared

to subjects who wrote on trivial topics, made fewer visits to health care providers in the four months following their disclosure.

In contrast to studies reporting beneficial effects of disclosing long-withheld secrets, (e.g., Pennebaker & Beall, 1986), Mendolia and Kleck (1993) and Pennebaker et al. (1990) report benefits that appear to occur when individuals report current and ongoing distress. The critical feature of disclosure appears to be the reporting of one's personal emotional experience. Additionally, it has been suggested that individuals who disclose incidents of personal trauma experience, past or current, enjoy improved health relative to individuals who apparently continue to inhibit disclosure of distressing experiences (Pennebaker & Susman, 1988).

The health benefits which have been reported by the studies cited in the discussion so far are either relatively non-specific, including health indicators such as the number of visits to health care facilities or self-reports of symptoms of illness, or are implied by decreases in physiological arousal. Compelling evidence of the role of self-disclosure on health also comes from investigations that have measured changes in human immune system functioning following written self-disclosure. Pennebaker, Kiecolt-Glaser, and Glaser (1988a) had generally healthy undergraduate students write about traumatic experiences for twenty minutes on each of four consecutive days. Subjects instructed to self-disclose did so. They produced essays which were rated by themselves and by judges blind to condition as more personal and more revealing of emotion than the trivial essays written by subjects in the control condition. After each session of writing, self-disclosing subjects reported more negative mood and higher levels of physical symptoms (such as

headache, pounding heart, tense muscles) than did subjects who wrote on trivial topics. Pennebaker et al. found that self-disclosing subjects evidenced a decrease in number of visits to the local student health centre in the six weeks post-writing relative to the four months prior to the study. They made fewer visits to health care facilities than the writers of trivial essays. All of these findings replicate Pennebaker and Beall's (1986) findings. Self-reports of health-related behaviours, such as frequency of cigarette smoking, consumption of alcohol and caffeinated beverages, usage of aspirin and sleeping pills, and strenuous exercise were not significantly different between disclosing and control conditions. Thus, it appears that intentional changes in health-related behaviours do not account for improved health.

Pennebaker et al. (1988a) hypothesized that their disclosing subjects would experience health benefits at the level of cellular immune-system functioning. Blood samples were drawn from all subjects at three separate times: prior to writing essays, immediately following the fourth session of writing, and six weeks later. Samples were tested for lymphocyte (white blood cell) response to stimulation by substances which are foreign to the body (mitogens), a measurement known as *blastogenesis*. An Analysis of Variance of blastogenic data collected revealed a significant Condition (Disclosure vs. Control) X Day (baseline, immediate post-writing, six weeks post-writing) interaction; samples from subjects who wrote about their traumatic experiences evidenced greater response to mitogens over time than did samples from control subjects. Furthermore, post hoc analyses suggested that subjects who had previously "actively held back in discussing with others" the material that they disclosed in their writing had the greatest

response to mitogens. The extent of mitogen response decreased to the extent that subjects had discussed their experiences with others previously.

Interpretation of these results has been challenged. Neale, Cox, Valdimarsdottir, and Stone (1988) questioned Pennebaker et al.'s statistical analyses and interpretation of the data and asserted that an interpretation of causality between brief episodes of disclosure and immunocompetence should be avoided. Pennebaker, Kiecolt-Glaser, and Glaser (1988b) responded to the questions raised by Neal et al. They re-analyzed their blastogenic data with a covariance analysis suggested by Neale et al. and found a stronger effect than previously reported. They also provided an accounting for effects (apparent decrease in mitogen response over time in control subjects) which Neale et al. interpreted as artifactual. Consequently, Pennebaker et al. (1988b) come away from the argument remaining "cautiously optimistic" (p. 639) about the relationship between emotionally expressive writing and immunocompetence.

Further support for this optimism comes from more recent reports by Esterling, Antoni, Fletcher, Margulies, and Schneiderman (1994) and Petrie, Booth, Pennebaker, Davison, and Thomas (1995). Esterling et al. (1994) noted that the Epstein-Barr virus is a latent pathogen carried by most adults which can be activated by stressful life events. These researchers had subjects express, verbally or in writing, either their emotional reactions to stressful events or a trivial topic during three weekly 20 minute sessions. Blood samples were drawn at baseline and after these sessions. Participation in emotionally disclosing writing or speaking produced a significant decrease in Epstein-Barr virus antibody

titers as compared to participation in the control condition, indicating enhanced immune control over the latent virus.

Petrie et al. (1995) had subjects write about either traumatic experiences or a control topic for an unreported length of time on each of four days of writing. Blood samples were drawn at the completion of the four days of writing, immediately after which subjects were given a hepatitis B vaccination. Blood was again collected prior to one- and four-month booster vaccinations and a six-month follow-up appointment. While blood concentrations of hepatitis B antibodies increased from baseline at each of one-, four-, and six-months post-inoculation for all subjects, subjects who had been in the disclosing writing condition had higher concentrations of antibodies than did controls at each post-inoculation sampling. The evidence suggests that immunological response to the hepatitis B vaccine was enhanced by emotional disclosure.

The evidence reviewed suggests that relatively brief episodes of emotional self-disclosure impact on physiological arousal, self-reports of health, usage of health care, and immunocomptence. Collectively, these results are an exciting step suggesting a linkage between cognition, emotion, and the maintenance of physical health. The results must be considered to be tentative, awaiting further replication and clarification of the relationships between these -- and perhaps other -- variables.

Summary: Inhibition, self-disclosure, and physical health. Research evidence indicates that stopping a behaviour from occurring requires physiological work. Evidence further suggests that inhibiting disclosure of personal trauma is associated with long-term health problems. Disclosing traumatic experiences leads to significant

improvements in health, indexed by self-reports of symptoms experienced, number of visits for health care provision, and immune system responses. The methodology of having subjects participate in relatively brief, repeated episodes of written self-disclosure is a promising means of furthering this investigation.

Future research in this area will need to investigate the processes involved in emotional disclosure, which appears to be an important process affecting cognition and physiological functioning. This appears to be true both in the expression of previously inhibited personal knowledge or in the response to current and ongoing stress. Consideration of a broader range of dependent measures of physical health and health-related behaviour than has already been reported is likely to bring this research closer to identifying the action of these processes. Although it is a truism of research, it must be said: more work in the area is needed.

Cognitive Changes Following Self-Disclosure

To this point in the discussion it has been argued that self-disclosure can benefit the disclosing individual by generating information about him- or herself. The discussion has also argued that self-disclosure can have another profound effect on an individual evident in changes in physical health. This effect can occur without an individual's intent to change or awareness of changing (Pennebaker et al., 1988a).

Changes may occur in knowledge about the self, but it has been suggested that changes in cognitive processing occur during and following self-disclosure. Pennebaker et al. (1988a) speculate that confronting distressing memories allows the individual to better understand the causes and effects of a traumatic event, which eliminates

need for inhibition. Although physiological concomitants of inhibition and disclosure have been described, the cognitive events involved in the disinhibition of verbal emotional expression have not. Inhibition may prevent certain memories from being consciously recalled or cause one to neglect environmental cues, both of which would impinge on the quality of one's reasoning.

Just as changes in physiological functioning following emotive self-disclosure have been reported, changes in cognitive processing should be expected to occur. The physiological changes which have been reported have not relied on an individual's conscious intention to change health-related behaviours (Pennebaker et al, 1988a). It should be expected that cognitive changes would occur which are also unrelated to a strategic, effortful process of self-discovery, social comparison, or receipt of social support (Pennebaker & Beall, 1986). For example, Mendolia and Kleck (1993) reported that subjects who disclosed their emotional reaction to a distressing video expressed themselves two days later with less difficulty, more animation, and less tension than did a control group who had described the same video only in factual, nonemotive terms. These terms suggest a facilitation in thought and expression following disclosure of emotional reactions to a novel stressor. These authors suggest that the "psychological processes for talking about highly self-relevant, inhibited traumatic events may differ from processes involved in talking about novel stressors" (p. 291). While this suggestion may prove to be accurate, Pennebaker (1990) also reports observing cognitive changes in subjects who write about their own past experiences of trauma. He notes that subjects who write with emotional expression about traumatic experiences develop a "change in

perspective," (p. 106) such that "they are able to stand back and consider the complex causes of the event and their own mixed emotions" (p. 106). His observations suggest that his subjects generate information about their mental status from self-disclosing but then are able to process the information in a qualitatively different way.

It seems likely that changes occur in the quality of an individual's thinking following episodes of emotionally expressive self-disclosure. These changes likely go beyond the immediate gain of having generated information about oneself. The changes are likely to manifest as facilitated ability to problem-solve. These predictions can be inferred from reported observations of researchers who primarily have investigated physical health effects following emotive self-disclosure. For example, Pennebaker et al.(1990) report a statistical trend suggesting that the Grade Point Averages of disclosing undergraduate students, after controlling for Scholastic Aptitude Test scores, were more likely to be maintained from first to second term than were GPAs of control subjects. Given the evidence compiled to document the health-related changes following emotive self-disclosure, investigation of the changes which occur in thinking following self-disclosure is an intriguing endeavour.

Problem-solving. The practical expression of thinking, the "internal manipulation of symbols in order to process information" (Martin, 1991, p. 294), is problem-solving. Problem-solving is the process of generating a solution to a situation or event which is undesirable and requires change. Problem-solving is a significant factor determining successful coping with stressful life events (D'Zurilla, 1986). In D'Zurilla's model, *problem orientation* refers globally to the individual's cognitive, emotional, and behavioural motivational set when challenged

by environmental demands. Problem orientation reflects one's expectations and appraisal of what will likely occur in the situation based on past experiences and observations. *Problem-solving skills* in D'Zurilla's model include recognizing and defining a problem, generating possible solutions, deciding on a course of action, and evaluating the implementation and outcome of this solution. Level of social problem-solving ability has been found to significantly predict depression or dysphoria in college students (Lakey, 1988; Wierzbicki, 1984; D'Zurilla & Sheedy, 1991).

The effectiveness of one's problem-solving can vary. As previously noted in the discussion, researchers investigating the effects of self-disclosure on indices of health suggest that changes in thinking also occur consequent to emotive disclosure. Presumably, inhibition of emotionally charged knowledge interferes with problem-solving, while emotional expression which ends the inhibition leads to facilitation of thinking processes. Research indicates that the quality of thinking can vary as a function of a variety of factors. These factors include anxiety, perceptual set, and self-deception. A brief review of relevant literature follows.

Anxiety can either facilitate or hinder problem-solving; a curvilinear relationship exists between these variables. A moderate amount of anxiety can actually facilitate performance, as the individual becomes aroused, alert, and motivated. However, intense anxiety interferes with problem solving. For example, Glucksberg (1962) supplied subjects with a box of matches, candles, and thumbtacks and instructed them to mount the candles on the wall. This problem requires novel, unusual use of the materials; the problem is solved by tacking the

matchbox to the wall with the candle mounted on or in it. Glucksberg heightened the anxiety of some subjects by raising the stakes of the situation; he told subjects that they would win $20 (a sizable amount of money in 1962) for correct solution of the problem. This group of subjects fared more poorly in solving the problem than did a comparison group of subjects to whom no reward was offered. It appears that the raised stakes, and increased anxiety, hindered problem-solving. It may be that problem-solving which requires creative, novel responses is particularly vulnerable.

Perceptual set can interfere with problem-solving. A *set* is "a well-learned predisposition about how to perform a specific task or perceive a particular situation" (Martin, 1991, p. 142). A set represents a summary of one's experience comprehending and responding to any number of situations. This summary functions as a general rule guiding perception and action. A set can be facilitative to problem solving to the extent that one's set is consistent with an effective problem-solving strategy and "automates" the enactment of the strategy. However, a set is unlikely to include novel, creative responses which may be required to find a solution to a new problem. Acting on the basis of the set may interfere with recognizing new perspectives of the problem or generating a list of alternative responses to address the situation. Dunker (1945) noted that individuals can adhere rigidly to a set regarding the normal or appropriate use of objects and referred to this as *functional fixedness*. One's expectations regarding the use of an object can limit the ways that one puts that object to use in a practical situations, potentially impinging on effective problem-solving.

Self-deception can hinder problem-solving when the individual remains unaware of his or her internal status or status of the situation and does not consider all the information which is at least potentially available. Self-deception occurs when an individual holds two contradictory beliefs at the same time, is unaware of one of them, and the lack of awareness is motivated (Sackeim & Gur, 1978). Individuals can also maintain a consistent bias to their perception, for example, tending to disregard negative events while overestimating the likelihood of positive outcomes or events (Alloy & Abramson, 1979). E. Johnson (1995) found that subjects with a high propensity for self-deception performed more poorly on an anagram solution task than did typically non-self-deceptive subjects after both experienced a failure experience with unsolvable problems. E. Johnson, Vincent, and Ross (in press) note that high self-esteem which is based on accurate appraisal of positive attributes or experiences is a predictor of effective coping with a failure experience. However, individuals with self-deceptive, falsely inflated high self-esteem are vulnerable to failure experiences. Consequent to a failure, they evince poorer problem solving (anagram solution and word construction using the letters in the word "buttermilk") than do individuals who are not self-deceiving. This research suggests that self-deception has a negative impact on problem solving after an unambiguously threatening event.

Clearly, to the extent that novel, unusual responses to problematic situations help to generate a viable solution, creativity is an asset in problem-solving. D. Johnson (1972) suggests that a solution to a problem can be considered to be creative if it is appropriate to the situation, useful, reflects ingenuity, has breadth of applicability, and is

novel or uncommon. A creative response can incorporate both divergent and convergent thinking (Guilford, 1967), such that a range of possible options, including unusual options, are considered but are applied in a way that is effective, efficient, and appropriate. Certainly a great deal of subjectivity enters into determining whether or not any particular response is creative.

In light of the previous discussion, self-disclosure may be expected to facilitate problem-solving to the extent that it (a) decreases anxiety about traumatic events, (b) breaks established sets, and/or (c) decreases self-deception. Moreover, self-disclosure may assist in the generation of a range of responses to a problematic or distressing situation which then become "grist for the mill" of a creative problem-solving process. As indicated earlier in this section, the problem-solving one engages in as a coping response to distressing life events can be of great importance for the individual.

Levels of thinking. A number of researchers have reported dichotomies of cognitive processing styles or states which can describe an individual's current level of intellectual functioning. Pennebaker, Czajka, Cropanzano, Richards, Brumbelow, Ferrara, Thompson, and Thyssen (1990) draw a distinction between what they refer to as *low level thinking* and *high level thinking*. Low level thinking is characterized by a narrow temporal and conceptual perspective, lack of self-reflection, and lack of awareness of feelings. High level thinking is characterized as thinking which is self-reflective, aware of emotion, cognizant of a broad spectrum of information, and conceptually abstract. This distinction is similar to Bowers's (1987) contrasting of first order consciousness and second order consciousness, as noted earlier in the discussion.

Langer (1989; Langer & Piper, 1987) uses the terms *mindlessness* in contrast to *mindfulness* to describe a similar dichotomy. Mindlessness is a distinct, molar style of thinking in which the individual responds to environmental cues in automatic, stereotypic ways. When mindless, an individual acts according to rules or categories which have been learned but which are not questioned or criticized. Mindfulness is described as a general style of thinking in which the individual actively evaluates his or her environment. The individual's intention is to understand distinctions between, and categorical similarities among, pieces of information about oneself and one's environment. These dichotomies are similar in describing two general styles of thinking or reasoning, one of which is narrow, concrete and stereotypic and the other of which is broad, abstract, and creative. For simplicity in the following discussion, these distinctions will be referred to as "level of thinking," which can present as either low or high.

Pennebaker, Czajka, et al. (1990) suggest that level of thinking can vary according to the physiological and cognitive state of the individual. They gave subjects instructions that unpleasant noises presented either could or could not be stopped. Subjects then wrote essays which were rated by independent, condition-blind judges. Subjects who believed that they had control over stopping the noise wrote essays which revealed higher level of thinking than did individuals who were told that the unpleasant noises were uncontrollable. Lower levels of thinking were induced when individuals were led to believe that they lacked control over an unpleasant environmental event. It appears that the global quality of one's thinking can vary; that is, it can decrease in quality when an individual is distressed.

While there may be an adaptive function to adopting a more limited style of thinking while enduring immediate, uncontrollable aversive events, generally one would expect an individual to cope more effectively with distressing events when employing a high level of thinking. A high level of thinking, as it has been defined, should manifest as effective problem-solving which occurs at least partially due to a consideration of a range of available information including one's own personal reactions. Although some evidence exists to indicate that a higher level of thinking can be induced through intervention (Langer & Piper, 1987), there does not appear to be any direct empirical evidence to indicate an influence of emotive self-disclosure of personal trauma on problem-solving ability.

Summary: Cognitive changes following self-disclosure. Researchers studying the impact of emotional self-disclosure on health have incidentally noted cognitive changes in their subjects (Mendolia & Kleck, 1993; Pennebaker & Beall, 1986). Pennebaker (1990) suggests that insightful, emotional self-disclosure induces high levels of thinking. As such, individuals should benefit from self-disclosure because higher level thinking is enabled; they should be better prepared to identify and solve problems that they encounter. At this time, however, empirical evidence is needed to support the validity of this thesis.

The thesis evaluated in the two experiments reported here is that emotive self-disclosure leads to improved performance of tasks which require verbal problem solving. In both experiments, subjects wrote essays either disclosing personal experiences of trauma or describing a more trivial topic, after which written problems were presented. In Experiment One, subjects wrote on their topic for three consecutive days,

and completed seven problem-solving tasks on the fourth consecutive day and then again one week after that fourth session. In Experiment Two, subjects wrote on their topic on only one occasion, immediately after which they completed a pair of word problems. In this latter experiment, ability with English language was taken into consideration in evaluating the problem solving, and a personality dimension, Repression-Sensitization, was considered as a factor predicted to impact on self-disclosure.

EXPERIMENT ONE

In research conducted by Pennebaker and his associates (1985, 1990) on the health impact of emotive self-disclosure, *inhibition* has been posited as a mechanism to explain physiological changes concomitant with, and consequent to, relatively brief episodes of disclosure. Verbal disclosure represents *disinhibition*. The concept implies that cognitive resources involved in stopping behaviour as part of an inhibitory process become available following self-disclosure. It follows that individuals who have disclosed previously inhibited personal traumas should have more cognitive resources available to them, or be more oriented to approaching and addressing problems, than do non-disclosing individuals. Research subjects who disclose their traumatic experiences therefore should be expected to perform better on tests of problem solving than do subjects who relate trivial information lacking emotional content.

The available literature on disclosure does not suggest which measures of cognitive processing would be the most valid operationalization of the changes in level of thinking following emotive disclosure. For the present studies, measures were selected which were

presumed to be sensitive to changes in cognitive states or styles rather than indexing more stable intellectual abilities or traits. Additionally, objective problem-solving tasks were used rather than considering individuals' subjective solutions to their own personal dilemmas. The intention of this was to produce evidence of facilitation of problem-solving ability following self-disclosure which was independent of the self-knowledge which might be generated from that self-disclosure.

The research paradigm used by Pennebaker and Beall (1986) and Pennebaker et al. (1988) were models for the design of Experiment One. Subjects were randomly assigned to write about personal material which they identified as personally traumatic or distressing or to write about a less emotionally revealing topic. Writing has been used in the two studies cited above and has been found to be comparable to psychotherapy in evoking expressions of emotion (L'Abate, 1991; Murray, et al., 1989). After three consecutive days of writing, subjects completed problem-solving measures at a fourth and fifth session.

Hypotheses

It was expected that (1) the subjects who were instructed to write about their own traumatic experiences (Disclosers) would produce essays which were more personal and more revealing of emotion than were essays by the subjects who were instructed to write about a trivial topic (Control). It was anticipated that (2) Disclosers' ratings of their emotions immediately after essay writing would indicate more negative emotions than would Controls' ratings. These findings regarding the essay writing represent a validity check of the procedures.

It was hypothesized that (3) Disclosers' performance on the group of cognitive tests presented would exceed that of Controls. This reflects the more general hypothesis that self-disclosure enables a heightened level of thinking or problem-solving. No specific predictions were made for any one of the seven tasks presented to subjects.

Method

Overview

Procedures were based on those outlined by Pennebaker and Beall (1986) and Pennebaker et al. (1988). Subjects participated in five experimental sessions, four of which were on consecutive days, the fifth session occurring one week following the fourth session. For three sessions, subjects spent thirty minutes writing about either (a) the most traumatic event(s) they have experienced, or (b) a trivial topic: objectively and emotionlessly describing their activities in the past 24 hours. At the fourth and fifth sessions, one week apart, subjects completed measures of cognitive functioning.

Subjects

104 undergraduate students (58 female and 46 male) were recruited from Introductory Psychology classes at the University of Manitoba and participated in at least one of five experimental sessions. Subjects consented to participate after being informed that the experiment might require them to write about extremely personal material and after assurances that any written material would remain confidential. Subjects received credit toward their final grade in their Introductory Psychology course in exchange for their participation.

Of the 104 subjects who began the procedures, 82 subjects (45 female and 37 male) completed all five experimental sessions. Three Control subjects (2 female and 1 male) were included in most analyses, having missed only one day of writing each. Nineteen other subjects were excluded from analyses, either (1) because of absence from one or more days of the procedure (9 female and 4 male) or (2) because they identified themselves as having English as neither their first language

nor as the primary language of their schooling (2 female and 4 male). Average age of female subjects was 23.9, average age of male subjects was 21.9.

Among the 19 subjects excluded from analyses, there did not appear to be systematic differences relevant to the current hypotheses. Of the Males in the Control condition, one was excluded because of language of origin and two did not complete procedures. Of the Males in the Disclosure condition, three were excluded because of language of origin and two did not complete procedures. Of the Females in the Control condition, one was excluded because of language of origin and six did not complete procedures. Of the Females in the Disclosure condition, one was excluded because of language of origin and three did not complete procedures. One possible bias may be represented by the six Female Control subjects who did not complete procedures. While the Control condition was ostensibly less threatening than the Disclosure condition, these particular subjects may have found the procedures to be overly intrusive or, conversely, overly mundane. Informal evaluation of their ratings of their essays did not shed significant light on subjects' reasons for discontinuing their participation.

Procedure

Subjects participated individually in the writing procedures and participated in groups for the cognitive testing. The only exception to random assignment to a writing condition (Disclosure or Control) was an attempt to have an equivalent ratio of male and female subjects represented in each condition. That is, when a subject was excluded for not meeting attendance or language criteria as noted above, a new subject was assigned to participate in that subject's condition.

At each of the three days of writing, scheduled on consecutive days Tuesday, Wednesday, and Thursday, subjects participated individually. They completed their writing in one of four sound-proofed rooms, each of which was furnished with a table, two chairs (including one for the experimenter placed at the table opposite the subjects' chair), a desk lamp with 60 Watt bulb, a box of facial tissues, pad of lined paper, and two pens. Subjects were told that they would not be required to submit the essays that they wrote should they feel the content was too personal or revealing, though it was stated that their writing was important for this research project. Only one subject declined to submit her essay; she was later excluded from analyses because of absence on other days. All materials collected were labeled by each subject with a unique eight character code. Each subject generated his or her code using the following formula: "F" for female or "M" for male; last two letters of the city or town where he or she was born; last two letters of mother's name; last digit of year of birth; two digits indicating date of birth (01 to 31). No duplication of codes occurred between subjects. Subjects were informed that their writing would be anonymous and that no attempt would be made to link their identity with their essays.

Instructions were repeated on each day of writing. Following general instructions, subjects were given a short questionnaire to assess both positive and negative affect. Subjects were then given a lined 8.5 inch by 11 inch note pad and a pen and instructed to begin writing about their topic until the experimenter returned. Subjects in the trauma disclosure condition were instructed as follows:

> "During each of the next three days, I want you to write about the most traumatic and upsetting experiences of your entire life. You can write on different topics each day or on the same topic for all four days. The important thing is that you really let go and explore your deepest thoughts and feelings. Ideally, whatever you write about should deal with events or experiences that you have not talked about in detail with others. Don't worry about your spelling or grammar, or if you're writing in complete sentences; try to write continuously for the next thirty minutes." (adapted from Pennebaker, et al., 1988, p. 240).

Subjects in the control condition were assigned to write as follows:

> "During each of the next three days, I want you to write about what you have done in the previous 24 hours. Your description should be as detailed as possible. As well, you should try to write about events which have occurred without writing about your feelings about them or your thoughts or opinions about them. Try to write as objectively as you can. Don't worry about your spelling, or even if you are writing in complete sentences; try to write continuously for the next thirty minutes." (adapted from Pennebaker, et al., 1988, p. 240).

The experimenter returned to the subject thirty minutes later to deliver a post-writing questionnaire and a large manila envelope labeled

with the subject's appointment time and the date. Subjects completed the questionnaire and sealed their essay in the manila envelope. To control for contamination between conditions, subjects were asked to refrain from discussing their participation in the study with others in Introductory Psychology. Subjects were informed that the fourth and fifth sessions would be conducted by a second experimenter in another location and that they would attend with other subjects from this same experiment. They were not explicitly informed that they would not be writing again .

On the fourth and fifth day of the experiment, Friday following the Thursday session of writing and the Friday one week later, subjects were tested in groups. Group sizes ranged from 2 to 8 subjects. These procedures were presented by a second experimenter who was blind to the conditions to which subjects had been assigned. The second experimenter introduced himself to the subjects as an experimenter involved in the same, ongoing study. Subjects were informed that they would not be required to do any writing. Subjects were given the positive and negative affect questionnaire. After completion of this questionnaire, the cognitive measures were presented to the subjects. When these tasks were completed on the fourth session, subjects were excused with reminders to attend the following week. When these tasks were completed on the fifth session, subjects completed a post-experimental questionnaire and were debriefed as to the manipulations, measures, and expected findings of the experiment. Although no distress resulting from the experiment was reported to the second experimenter by a subject, subjects were offered the opportunity to speak individually with the researcher to ask questions or express concerns about their

participation. Subjects were notified of a number of counselling opportunities available to them both on and off campus.

Measures

Pre- and post-writing questionnaires. The pre- and post-writing questionnaire used was the Positive and Negative Affect Schedule, or PANAS (Watson, Clark, & Tellegen, 1988). The 20 different mood descriptors of the scale (e.g., hostile, excited, active) were selected on the basis of factor analysis as highly reliable markers of high negative affect or high positive affect and were printed on a single page. After completing their essay each day, subjects rated, on a second page, the extent to which the essay they wrote was personal, revealed emotions, was stressful to do, and had content which they infrequently shared with others ("Overall, how much have you told other people about what you wrote today?"). Ratings were made on seven point Likert-type scales anchored by the statements *not at all* (1) and *a great deal* (7).

Cognitive tasks. Each test was printed on a single 8.5 inch by 11 inch sheet of paper. At the bottom of each page a colour word was printed (i.e., "BLUE, " "ORANGE," and five others). Seven sheets, the seven tests, were enclosed in a manila envelope. The envelope was arranged in front of each subject open toward them with the bottom portion of the pages extending, such that the colour word was visible but the task, printed on the upper portion of the page, was not. Subjects completed the time-limited tasks under the direction of the experimenter. A colour was named, to orient the subject to that page, the time allowed was announced, and subjects were asked to begin. Subjects then removed the sheet corresponding to the colour which was named, read the instructions and performed the task to the best of their abilities; no

further instructions, explanations, or examples were provided. Labeling of the seven tasks was varied such that order of presentation of the tasks could be counterbalanced across subjects.

Two versions of each of seven different tasks were presented to subjects. Version A of each measure was presented as a set of measures, and version B of each measure also was presented as a set. Presentation of version A or version B at session four was counterbalanced across subjects, and, for each subject, the alternate version was presented at session five. Order of presentation of measures was counterbalanced between subjects to eliminate systematic bias inherent in the measures.

(1) Subjects filled in a grid with six letter words. The words required for each space are associated with three words given for each space as clues. The grid is arranged such that production of one word provides a word stem (i.e., the first or last three letters) as a clue for completing the subsequent word or words. In total, 27 words can be produced. Subjects were scored on the total number of words produced (adapted from Shortz, 1991).

(2) Subjects listed similarities between two items; two versions were completed:

> (A) "List as many similarities as you can think of between MILK and MEAT. Number your responses. TIME LIMIT 3 MINUTES. "
>
> (B) "List as many similarities as you can think of between AIR and WATER. Number your responses. TIME LIMIT 3 MINUTES."

Subjects were scored on total number of similarities listed minus duplications of responses, incorrect responses (e.g., "both have 5

letters"), or relationships other than similarity (e.g., "water is found in air").

(3) Subjects completed the Object Uses Test. The Object Uses Test (OUT) is a task in which the subject is requested to generate as many possible uses as can be thought of for a simple item such as a brick or a paper clip. It is described as a task which demands divergent thinking; subjects must strive to think flexibly to generate ideas and think creatively to identify novel or uncommon uses (Lindauer, 1990). Though associated with literature on creativity (Mednick, 1962), generation of novel uses has been cited as a useful measure of mindfulness versus mindlessness (Langer & Piper, 1987).

Two versions of this test were used:

(A) "List as many possible uses as you can think of for a newspaper. Number your responses. TIME LIMIT 3 MINUTES. "

(B) "List as many possible uses as you can think of for a key. Number your responses. TIME LIMIT 3 MINUTES."

Subjects were scored on total number of uses listed minus duplications of responses.

(4) Subjects completed two versions of an abstract task much like the Object Uses Test:

(A) "List as many possible things as you can think of that are difficult. Number your responses. TIME LIMIT 5 MINUTES. "

(B) "List as many possible things as you can think of that require care. Number your responses. TIME LIMIT 5 MINUTES."

Subjects were scored on total number of responses listed minus duplications of responses.

(5) Subjects solved anagrams. Anagram solution -- reconstructing English words which have had the letters randomly rearranged -- has been used extensively as a task in memory research, but has also been used as a generic problem task in research on creativity (e.g., Shaw & Conway, 1990), problem-solving in agoraphobia (e.g., Brodbeck & Michelson, 1987), and mood-effects on problem-solving (Kavanagh, 1987). Anagram solution is a task which is widely used in cognitive psychology research, taps general verbal-lexical abilities of word production and evaluation, and is easily administered.

Five each of five, six, and seven letter anagrams were used to provide a range of difficulty. Subjects completed the anagrams in any order and were allowed to write out permutations before recording their responses. Subjects were scored on number of items solved within a five minute time limit.

(6) Subjects completed a speculative question; two versions were completed (adapted from Peel, 1971):

> (A) "Suppose that universal free education through to the postgraduate University level, or its equivalent, in all fields were made widely available in Canada. What might be consequences of this? List as many possible consequences as you can think of. Number your responses. TIME LIMIT 5 MINUTES. "
>
> (B) "Suppose the sale and consumption of alcohol became prohibited in Canada. What might be consequences of this?

List as many possible consequences as you can think of. Number your responses. TIME LIMIT 5 MINUTES."

Subjects were scored on total number of responses listed minus duplications of responses.

(7) Subjects performed a word search for words hidden in a two dimensional matrix of letters. Two versions were completed. Subjects were scored on total number of words found.

Scoring of cognitive measures was performed by an independent judge who was unaware of the hypotheses of the study and by the experimenter who acted as second judge and who was unaware during scoring of subjects' assignments to experimental conditions. For measures 2, 3, 4, and 5 described above, a simple key, based on a subsample of responses, was developed to assist judges with scoring. Inter-scorer reliabilities on these measures, indexed by Pearson correlations, were as follows: measure 2, version A, r=.89, version B, r=.66; measure 3, version A, r=.61, version B, r=.78; measure 4, version A, r=.98, version B, r=.94; and measure 6, version A, r=.93, version B, r=.95. Inter-scorer reliabilities on measures 1, 5, and 7 ranged from r=.97 to 1.00. All inter-scorer reliabilities were significant at $p < .001$. On measure 2, version B and measure 3, version A, lower correlations (r=.66 and r=.61 respectively) reflect differences that arose in judges' interpretation and scoring of subjects' responses to these tasks. Specifically, judges disagreed at times on the scoring of responses as being either repetitious (with repetitions of a unique response receiving no score) or unique (with each response receiving a score). Disagreements in scoring were resolved by discussion leading to consensus between the two judges.

Analyses

Three classes of variables were analyzed: (1) those dealing with the essays themselves, including content and subjects' impressions of their own writings; (2) responses to the essays in terms of self-rated mood; and (3) performance on cognitive tasks presented at the fourth and fifth sessions.

Data from three Control subjects (2 female and 1 male) were included in most analyses although these subjects missed one day of writing apiece. Data from four other subjects -- the four post-essay questions from a single day of writing each from two Male Control subjects and two Female Control subjects -- were missing due to experimenter error. The remaining data from these subjects were included in analyses; however, analyses which compared subject responses to the four post-essay questions across days of the week excluded these subjects altogether. This is reflected both in reported cell sizes and in degrees of freedom in repeated measures analyses of variance.

Content of Essays

As Pennebaker and Beall (1986) and Pennebaker et al. (1988) reported, subjects disclosed highly personal and upsetting experiences when asked to do so. Topics of essays included experiences of physical or sexual abuse (40% of subjects reporting this as the major theme in one or more essay), ending of a romantic relationship (32%), death of a friend (26%) or parent (12%), and accident or significant illness (10%). Topics ranged widely and also included issues such as dealing with a parent's mental illness, struggles with bulemia, guilt about abortion, and conflicts with the law. While female subjects represented 36% of

respondents writing about experiences of physical or sexual abuse, most topics were presented by both male and female respondents.

Mean scores for number of words, number of literal emotion words, number of positive emotion words, number of negative emotion words, and first-person pronouns produced in the essays of the Male and Female subjects in the Control and Disclosing conditions are charted in Table 1. Separate 2 X 3 X 2 (writing Condition X Day of the Week X Sex) repeated measures Analyses of Variance (ANOVAs) with writing Condition (Control, Disclosure) and Sex (Male, Female) as between-subjects independent variables and Day of the Week (Tuesday, Wednesday, Thursday) as a within-subjects independent variable were used to evaluate these five variables, revealing a number of significant effects, which are summarized in Table 2.

An interaction effect between the essay writing Condition and the Day of the Week, $F(2, 77)=6.22$, $p=.003$, suggests that Controls wrote an increased amount in their essays over the three days of writing. Disclosers, meanwhile, wrote the most on Wednesday (the second day of writing) and the least on Thursday (the third day of writing).

Disclosers, consistent with instructions, generally used more literal emotion words than did Controls, evident in a main effect for Condition, $F(1, 80)=72.20$, $p<.001$, and they used more negative emotion words, main effect $F(1, 78)=71.92$, $p<.001$. Interaction effects revealed that Female Disclosers used more literal emotion words, $F(1, 78)=4.79$, $p=.032$, including more negative emotion words, $F(1, 78)=5.63$, $p=.020$, than did Male Disclosers or Control subjects.

Disclosers used more personal pronouns than Controls did, evident in a main effect for Condition, $F(1, 78)=8.85$, $p=.004$. In a

Table 1: Parameters of essays: Means, standard deviations (in parentheses), and ranges of scores by Day of writing, writing Condition, and Sex of subject.

	Control		Disclosing	
Tuesday	Number of words		Number of words	
	Male n=22	466.5 (152.1) Range: 215 to 761	Male n=16	460.0 (164.0) Range: 235 to 740
	Female n=20	454.1 (124.7) Range: 244 to 721	Female n=26	575.9 (165.0) Range: 254 to 809
	Number of emotion words		Number of emotion words	
	Male n=22	1.3 (2.6) Range: 0 to 11	Male n=16	4.0 (2.8) Range: 0 to 10
	Female n=20	0.6 (1.0) Range: 0 to 3	Female n=26	6.5 (4.2) Range: 0 to 18
	Number of positive words		Number of positive words	
	Male n=22	0.5 (1.0) Range: 0 to 4	Male n=16	0.4 (0.6) Range: 0 to 2
	Female n=20	0.2 (0.4) Range: 0 to 1	Female n=26	1.1 (1.7) Range: 0 to 5
	Number of negative words		Number of negative words	
	Male n=22	0.8 (2.0) Range: 0 to 9	Male n=16	3.6 (2.6) Range: 0 to 9
	Female n=20	0.4 (0.7) Range: 0 to 2	Female n=26	5.4 (4.3) Range: 0 to 18
	Number of self references		Number of self references	
	Male n=22	38.7 (17.6) Range: 4 to 67	Male n=16	40.0 (19.7) Range: 2 to 87
	Female n=20	38.5 (23.0) Range: 3 to 83	Female n=26	62.1 (24.5) Range: 18 to 120

...continued

Table 1, Continued: Parameters of essays: Means, standard deviations (in parentheses), and ranges of scores by Day of writing, writing Condition, and Sex of subject.

	Control		Disclosing	
Wednesday	Number of words		Number of words	
	Male n=22	476.9 (155.0) Range: 186 to 842	Male n=16	506.3 (168.9) Range: 275 to 801
	Female n=21	475.8 (130.3) Range: 224 to 679	Female n=26	611.1 (124.8) Range: 396 to 808
	Number of emotion words		Number of emotion words	
	Male n=22	0.5 (1.2) Range: 0 to 4	Male n=16	5.1 (4.3) Range: 0 to 15
	Female n=21	0.8 (2.0) Range: 0 to 8	Female n=26	6.4 (3.6) Range: 1 to 15
	Number of positive words		Number of positive words	
	Male n=22	0.3 (1.0) Range: 0 to 4	Male n=16	0.9 (2.3) Range: 0 to 6
	Female n=21	0.7 (1.5) Range: 0 to 6	Female n=26	1.0 (1.4) Range: 0 to 5
	Number of negative words		Number of negative words	
	Male n=22	0.2 (0.5) Range: 0 to 2	Male n=16	3.8 (3.3) Range: 0 to 10
	Female n=21	0.2 (0.5) Range: 0 to 2	Female n=26	5.5 (3.6) Range: 0 to 14
	Number of self references		Number of self references	
	Male n=22	40.8 (20.8) Range: 8 to 89	Male n=16	48.6 (27.4) Range: 3 to 108
	Female n=21	38.8 (19.5) Range: 4 to 69	Female n=26	65.0 (20.6) Range: 34 to 113

...continued

Table 1, Continued: Parameters of essays: Means, standard deviations (in parentheses), and ranges of scores by Day of writing, writing Condition, and Sex of subject.

	Control		Disclosing	
Thursday	Number of words		Number of words	
	Male n=21	525.3 (163.6) Range: 206 to 905	Male n=16	455.1 (144.1) Range: 259 to 680
	Female n=20	504.71 (130.6) Range: 248 to 742	Female n=26	555.2 (131.4) Range: 286 to 818
	Number of emotion words		Number of emotion words	
	Male n=21	1.2 (2.4) Range: 0 to 8	Male n=16	3.8 (4.1) Range: 0 to 17
	Female n=20	0.7 (1.2) Range: 0 to 4	Female n=26	6.2 (4.8) Range: 0 to 21
	Number of positive words		Number of positive words	
	Male n=21	0.5 (1.1) Range: 0 to 4	Male n=16	0.7 (1.4) Range: 0 to 5
	Female n=20	0.3 (0.8) Range: 0 to 3	Female n=26	0.6 (0.9 Range: 0 to 4
	Number of negative words		Number of negative words	
	Male n=21	0.8 (1.4) Range: 0 to 5	Male n=16	3.1 (3.2) Range: 0 to 12
	Female n=20	0.4 (0.8) Range: 0 to 3	Female n=26	5.6 (4.7) Range: 0 to 21
	Number of self references		Number of self references	
	Male n=21	45.9 (23.5) Range: 8 to 96	Male n=16	40.8 (22.4) Range: 3 to 93
	Female n=20	39.2 (20.9) Range: 4 to 73	Female n=26	54.8 (16.0) Range: 18 to 84

Table 2: Parameters of essays: Summary of Repeated Measures ANOVA results

Number of words	
Condition	n.s.
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	$F(2, 77)=6.22$, $p=.003$
Condition X Sex	$F(1, 78)=4.36$, $p=.040$
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.
Number of emotion words	
Condition	$F(1, 78)=67.37$, $p<.001$
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	$F(1, 78)=4.79$, $p=.032$
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.
Number of positive words	
Condition	n.s.
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	n.s.
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.
Number of negative words	
Condition	$F(1, 78)=71.92$, $p<.001$
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	$F(1, 78)=5.63$, $p=.020$
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.
Number of self references	
Condition	$F(1, 78)=8.85$, $p=.004$
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	$F(2, 77)=4.02$, $p=.022$
Condition X Sex	$F(1, 78)=6.96$, $p=.010$
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.

significant interaction between writing Condition and Day of the Week. Controls appeared to use more personal pronouns over the three days of writing while Disclosers appeared to use fewer on Thursday than they had on Tuesday or on Wednesday, $F(2, 79)=4.02$, $p=.022$. Female Disclosers consistently used more personal pronouns than did Male Disclosers or Male or Female Control subjects, evident in a Condition by Sex of subject interaction, $F(1, 78)=6.96$, $p=.010$. These objective measures are consistent with an interpretation that subjects completed their written essays as they were instructed to do, though Female Disclosers produced longer essays with more emotional words and self-references than did Male Disclosers.

Subjects' Ratings of Essays

Subjects' post-writing ratings of essay content as personal, emotional, and stressful, and the degree to which content had not been disclosed to others, were compared in four separate 2 X 3 X 2 (writing Condition X Day of session X Sex) repeated measures ANOVAs with writing Condition (Control, Disclosure) and Sex of subject as between-subjects independent variables and Day of the Week (Tuesday, Wednesday, Thursday) as a within-subjects independent variable. It was anticipated that analyses would show that Disclosing subjects, who had written personally traumatic material, would rate their essays as more personal, more revealing of emotion, more stressful to write, but perhaps no less frequently reported to others than would Control subjects. Significant main effects of writing Condition on subjects' ratings of their essays as personally revealing ($F(1, 74)=74.44$, $p<.001$), expressive of real emotions ($F(1, 74)=131.40$, $p<.001$), and as stressful to write ($F(1, 74)=41.08$, $p<.001$) support these predictions (see Table 3 for means and

Table 3: Subjects' ratings of essays, Tuesday to Thursday: Means, Standard Deviations (in parentheses), and Ranges of scores by Day of writing, writing Condition, and Sex of subject.

	Control		Disclosing	
Tuesday	Revealing		Revealing	
	Male n=21	2.8 (1.8) Range: 1 to 6	Male n=16	4.7 (1.3) Range: 3 to 7
	Female n=20	1.7 (1.0) Range: 1 to 5	Female n=26	5.2 (1.6) Range: 2 to 7
	Real emotions		Real emotions	
	Male n=21	2.2 (1.6) Range: 1 to 6	Male n=16	5.3 (1.6) Range: 2 to 7
	Female n=20	2.0 (1.2) Range: 1 to 5	Female n=26	5.7 (1.2) Range: 3 to 7
	Stressful		Stressful	
	Male n=21	2.0 (1.2) Range: 1 to 5	Male n=16	2.9 (1.5) Range: 1 to 6
	Female n=20	1.7 (1.2) Range: 1 to 6	Female n=26	4.2 (2.0) Range: 1 to 7
	Told Previously		Told Previously	
	Male n=21	2.9 (1.7) Range: 1 to 7	Male n=16	3.4 (2.4) Range: 1 to 7
	Female n=20	3.1 (2.0) Range: 1 to 7	Female n=26	2.9 (1.2) Range: 1 to 5

...continued

Table 3, Continued: Subjects' ratings of essays, Tuesday to Thursday: Means, Standard Deviations (in parentheses), and Ranges of scores by Day of writing, writing Condition, and Sex of subject.

	Control		Disclosing	
Wednesday	Revealing		Revealing	
	Male n=22	2.8 (1.8) Range: 1 to 7	Male n=16	5.2 (1.8) Range: 2 to 7
	Female n=20	2.0 (1.3) Range: 1 to 5	Female n=26	5.5 (1.6) Range: 2 to 7
	Real emotions		Real emotions	
	Male n=22	2.3 (1.6) Range: 1 to 6	Male n=16	5.9 (1.4) Range: 3 to 7
	Female n=20	2.3 (1.5) Range: 1 to 6	Female n=26	5.7 (1.3) Range: 3 to 7
	Stressful		Stressful	
	Male n=22	1.6 (0.8) Range: 1 to 3	Male n=16	3.1 (1.5) Range: 1 to 6
	Female n=20	1.5 (1.4) Range: 1 to 7	Female n=26	4.1 (1.7) Range: 1 to 7
	Told Previously		Told Previously	
	Male n=22	3.0 (1.4) Range: 1 to 6	Male n=16	3.3 (1.9) Range: 1 to 7
	Female n=20	3.0 (1.7) Range: 1 to 7	Female n=26	2.7 (1.4) Range: 1 to 6

...continued

Table 3, Continued: Subjects' ratings of essays, Tuesday to Thursday: Means, Standard Deviations (in parentheses), and Ranges of scores by Day of writing, writing Condition, and Sex of subject.

	Control		Disclosing	
Thursday	Revealing		Revealing	
	Male n=20	3.0 (1.9) Range: 1 to 7	Male n=16	5.1 (1.7) Range: 2 to 7
	Female n=20	2.3 (1.4) Range: 1 to 5	Female n=26	5.3 (1.8) Range: 1 to 7
	Real emotions		Real emotions	
	Male n=20	2.1 (1.7) Range: 1 to 7	Male n=16	5.7 (1.4) Range: 3 to 7
	Female n=20	2.2 (1.3) Range: 1 to 5	Female n=26	5.5 (1.4) Range: 2 to 7
	Stressful		Stressful	
	Male n=20	1.7 (0.9) Range: 1 to 5	Male n=16	2.8 (2.0) Range: 1 to 7
	Female n=20	1.3 (0.6) Range: 1 to 3	Female n=26	4.4 (1.8) Range: 1 to 7
	Told Previously		Told Previously	
	Male n=20	2.7 (1.2) Range: 1 to 4	Male n=16	2.8 (1.9) Range: 1 to 7
	Female n=20	3.3 (2.0) Range: 1 to 7	Female n=26	2.8 (1.8) Range: 1 to 7

Table 4: Subjects' ratings of essays, Tuesday to Thursday: Summary of Repeated Measures ANOVA results.

Revealing	
Condition	$F(1, 74)=74.44$, $p<.001$
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	$F(1, 74)=5.16$, $p=.026$
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.
Real emotions	
Condition	$F(1, 74)=131.40$, $p<.001$
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	n.s.
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.
Stressful	
Condition	$F(1, 74)=41.08$, $p<.001$
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	$F(1, 74)=6.31$, $p=.014$
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.
Told Previously	
Condition	n.s.
Day of the Week	n.s.
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	n.s.
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.

Table 4 for summaries of repeated measures ANOVAs). Significant interaction effects indicate that Female Disclosers report that their essays were more personally revealing ($F(1, 74)=5.16$, $p=.026$) and stressful to write ($F(1, 74)=6.31$, $p=.014$) than was reported by Male Discloser or Male or Female Control subjects. Disclosers were no more or less likely than Controls to have told others of the content of their essays prior to writing about it. Given the different topics of writing, however, there may be two different meanings for the lack of significant difference in these scores from the two groups. Disclosers were instructed to write historically about themselves and to include affective and factual material, giving preference to material which had not been reported to others. Mean scores indicate that Disclosing subjects had some tendency to write about previously unreported material though they did not write exclusively about unreported material. Control subjects were instructed to write about "the last 24 hours" without noting their affect or opinions. Their ratings -- the extent to which they told others about the content of their essays -- regard very recent events within a restricted time frame ("the last 24 hours") which were less stressful to write about than material produced by Disclosing subjects. Controls had less time to report to others regarding their topics and less affect was attached to writing about it. It appears likely that Control subjects and Disclosing subjects had different reasons for similar degrees of reporting of their essay topics to others.

Subject Ratings of Affect

Subjects' ratings of positive items from the PANAS were summed to form a Positive Affect score (PA) while ratings of negative items were summed to form a Negative Affect score (NA). Because PA and NA are

identified in the literature as being independent factors, scores were analyzed separately in two 2 X 3 X 2 X 2 (Writing Condition X Day of session X Pre- vs. Post writing X Sex) repeated measures ANOVAs with two between-subjects variables (Condition and Sex) and two within-subjects variables (Day and Pre-Post). Means and summaries of analyses of PA are presented in Tables 5 and 6 respectively, and means and summaries of analyses of NA are presented in Tables 7 and 8 respectively. It was anticipated, as has been found in previously reported research (Murray, et al., 1989; Pennebaker & Beall, 1986), that a significant interaction effect would be found such that subjects who disclose personally traumatic material report feeling more negative after writing than do Control subjects.

PA did not differ as a function of writing Condition, but decreased after writing, $F(1, 78)=16.78$, $p<.001$, and generally decreased over the week, $F(2, 77)=34.45$, $p<.001$, for both Controls and Disclosers (Table 6). These changes were also evident in a significant Pre- vs. Post-essay by Day of the Week interaction effect, $F(2, 77)=3.64$, $p=.031$. A four-way interaction, Condition by Day of the Week by Pre- vs. Post essay by Sex was significant, $F(2, 77)=3.21$, $p=.046$. The meaning of this interaction term is uncertain: it may reflect influences such as the relatively large decrease in PA from pre- to post-essay on Tuesday for the Control Males or the decreasing change in PA over the week for Disclosing Females.

NA scores were higher for Disclosing subjects, $F(1, 78)=9.87$, $p=.002$, and were higher after writing versus prior to writing for both Control and Disclosing subjects, $F(1, 78)=17.35$, $p<.001$. In addition to these two main effects, a significant Condition by Pre-Post interaction effect indicated consistently higher NA Post-writing for Disclosing

Table 5: Positive Affect Ratings (PA), Tuesday through Thursday: Means, Standard Deviations (in parentheses), and Ranges of scores by Day of writing, writing Condition, and Sex of subject.

	Control		Disclosing	
Tuesday	Pre-essay PA		Pre-essay PA	
	Male n=22	27.8 (5.9) Range: 11 to 36	Male n=16	26.5 (7.4) Range: 12 to 36
	Female n=20	28.4 (7.2) Range: 18 to 43	Female n=26	28.1 (5.2) Range: 16 to 38
	Post-essay PA		Post-essay PA	
	Male n=22	24.6 (7.4) Range: 10 to 36	Male n=16	25.0 (9.6) Range: 13 to 42
	Female n=20	25.9 (7.8) Range: 13 to 41	Female n=26	24.0 (6.5) Range: 10 to 36
Wednesday	Pre-essay PA		Pre-essay PA	
	Male n=22	23.8 (7.9) Range: 10 to 35	Male n=16	23.4 (9.1) Range: 13 to 40
	Female n=21	24.8 (8.2) Range: 14 to 43	Female n=26	22.2 (5.9) Range: 10 to 33
	Post-essay PA		Post-essay PA	
	Male n=22	22.9 (7.7) Range: 11 to 35	Male n=16	22.3 (8.3) Range: 10 to 35
	Female n=21	21.8 (7.7) Range: 11 to 41	Female n=26	23.0 (7.4) Range: 10 to 41
Thursday	Pre-essay PA		Pre-essay PA	
	Male n=21	22.5 (7.8) Range: 10 to 37	Male n=16	19.6 (8.1) Range: 12 to 39
	Female n=20	23.0 (8.8) Range: 13 to 43	Female n=26	22.3 (5.7) Range: 13 to 30
	Post-essay PA		Post-essay PA	
	Male n=21	21.6 (10.2) Range: 1 to 37	Male n=16	19.1 (8.6) Range: 11 to 39
	Female n=20	20.2 (8.0) Range: 10 to 41	Female n=26	21.0 (7.4) Range: 11 to 36

Table 6: Positive Affect Ratings (PA), Tuesday through Thursday: Summary of Repeated Measures ANOVA results

Condition	n.s.
Day of the Week	$F(2, 77)=34.45$, $p<.001$
Pre-Post	$F(1,78)=16.78$, $p<.001$
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Pre-Post	n.s.
Condition X Sex	n.s.
Day of the Week X Pre-Post	$F(2, 77)=3.64$, $p=.031$
Day of the Week X Sex	n.s.
Pre-Post X Sex	n.s.
Condition X Day of the Week X Pre-Post	n.s.
Condition X Day of the Week X Sex	n.s.
Condition X Pre-Post X Sex	n.s.
Day of the Week X Pre-Post X Sex	n.s.
Condition X Day of the Week X Pre-Post X Sex	$F(2, 77)=3.21$, $p=.046$

Table 7: Negative Affect Ratings (NA), Tuesday through Thursday: Means, Standard Deviations (in parentheses), and Ranges of scores by Day of writing, writing Condition, and Sex of subject.

	Control		Disclosing	
Tuesday	Pre-essay NA		Pre-essay NA	
	Male n=22	14.6 (5.6) Range: 10 to 32	Male n=16	14.0 (2.9) Range: 10 to 20
	Female n=20	14.1 (2.4) Range: 11 to 19	Female n=26	15.6 (4.3) Range: 10 to 25
	Post-essay NA		Post-essay NA	
	Male n=22	14.1 (6.4) Range: 10 to 35	Male n=16	16.2 (5.4) Range: 10 to 31
	Female n=20	11.0 (1.7) Range: 10 to 17	Female n=26	20.0 (7.1) Range: 10 to 35
Wednesday	Pre-essay NA		Pre-essay NA	
	Male n=22	12.8 (4.8) Range: 10 to 29	Male n=16	12.1 (4.1) Range: 10 to 26
	Female n=21	12.2 (3.1) Range: 10 to 21	Female n=26	13.8 (3.9) Range: 10 to 24
	Post-essay NA		Post-essay NA	
	Male n=22	13.0 (3.9) Range: 10 to 23	Male n=16	16.7 (6.7) Range: 10 to 34
	Female n=21	12.2 (3.0) Range: 10 to 21	Female n=26	18.4 (7.2) Range: 10 to 34
Thursday	Pre-essay NA		Pre-essay NA	
	Male n=21	13.0 (4.3) Range: 10 to 26	Male n=16	12.3 (3.4) Range: 10 to 21
	Female n=20	12.9 (6.0) Range: 10 to 35	Female n=26	13.9 (5.5) Range: 10 to 33
	Post-essay NA		Post-essay NA	
	Male n=21	13.9 (5.4) Range: 10 to 27	Male n=16	16.3 (5.4) Range: 10 to 30
	Female n=20	12.5 (5.3) Range: 10 to 31	Female n=26	18.7 (7.9) Range: 10 to 38

Table 8: Negative Affect Ratings (NA), Tuesday through Thursday: Summary of Repeated Measures ANOVA results

Condition	$F(1,78)=9.87$, $p=.002$
Day of the Week	$F(2, 77)=3.28$, $p=.043$
Pre-Post	$F(1,78)=17.35$, $p<.001$
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Pre-Post	$F(1,78)=28.28$, $p<.001$
Condition X Sex	n.s.
Day of the Week X Pre-Post	$F(2, 77)=4.10$, $p=.020$
Day of the Week X Sex	n.s.
Pre-Post X Sex	n.s.
Condition X Day of the Week X Pre-Post	n.s.
Condition X Day of the Week X Sex	n.s.
Condition X Pre-Post X Sex	n.s.
Day of the Week X Pre-Post X Sex	n.s.
Condition X Day of the Week X Pre-Post X Sex	n.s.

subjects, $F(1, 78)=28.28$, $p<.001$. A significant Day of the Week effect on NA, $F(2, 77)=3.28$, $p=.043$, indicated variation of NA scores over the three days of writing, with the lowest NA scores reported on Wednesday. It appears from a significant Pre- to Post essay by Day of the Week interaction, $F(2, 77)=4.10$, $p=.020$, that the lowest mean NA scores were prior to writing on Wednesday across writing Conditions and Sexes. NA increased after essay writing to mean levels which were similar across Conditions, Sexes, and Days of the Week.

Thus, consistent with predictions, Disclosing subjects report more distressing feelings (NA) after writing their essays than do Controls. The two groups report similar decrease of positive emotions (PA) after writing and over the course of three days of writing, but do not significantly differ on ratings of PA.

Additional analyses were conducted to compare initial mood ratings from Tuesday, Wednesday and Thursday sessions with mood ratings from the first and second Friday sessions; means and summaries of analyses are presented in Tables 9 and 10 respectively. Initial ratings of PA, including the Pre-writing ratings from Tuesday to Thursday, did not differ significantly between Control and Disclosing conditions. PA varied significantly over the course of the week, from Tuesday to Friday Two, $F(4, 75)=18.43$, $p<.001$, decreasing from Tuesday to Thursday but increasing to similar levels on both Friday sessions. Initial ratings of NA, including the Pre-writing ratings from Tuesday to Thursday, also did not differ significantly between Control and Disclosing conditions. NA varied significantly over the course of the week, from Tuesday to Friday Two, $F(4, 75)=5.13$, $p=.001$, decreasing from Tuesday to Wednesday but increasing to similar levels on Thursday and both Friday sessions.

Table 9: Positive Affect (PA) and Negative Affect (NA) Ratings, Friday One and Friday Two: Means, Standard Deviations (in parentheses), and Ranges of scores by writing Condition and Sex of subject.

	Control		Disclosing	
Friday One	PA		PA	
	Male n=22	24.5 (6.7) Range: 10 to 38	Male n=16	25.1 (8.5) Range: 12 to 37
	Female n=21	24.0 (8.3) Range: 13 to 44	Female n=26	23.5 (6.1) Range: 12 to 34
	NA		NA	
	Male n=22	12.7 (4.1) Range: 10 to 27	Male n=16	12.4 (2.9) Range: 10 to 21
	Female n=21	13.8 (8.7) Range: 10 to 50	Female n=26	13.3 (3.5) Range: 10 to 20
Friday Two	PA		PA	
	Male n=22	24.7 (8.0) Range: 10 to 39	Male n=16	24.1 (8.9) Range: 12 to 40
	Female n=21	23.3 (8.9) Range: 11 to 43	Female n=26	23.4 (4.6) Range: 12 to 39
	NA		NA	
	Male n=22	12.2 (2.9) Range: 10 to 20	Male n=16	12.3 (3.7) Range: 10 to 25
	Female n=21	11.5 (2.3) Range: 10 to 19	Female n=26	13.3 (4.6) Range: 10 to 29

Table 10: Positive Affect (PA) and Negative Affect (NA) Ratings, Friday One and Friday Two: Summary of Repeated Measures ANOVA results

Positive Affect	
Condition	n.s.
Day of the Week	$F(4, 75)=18.43$, $p<.001$
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	n.s.
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.
Negative Affect	
Condition	n.s.
Day of the Week	$F(4, 75)=5.13$, $p=.001$
Sex	n.s.
Condition X Day of the Week	n.s.
Condition X Sex	n.s.
Day of the Week X Sex	n.s.
Condition X Day of the Week X Sex	n.s.

Performance on Cognitive Tasks

Because it was not known a priori to what degree the cognitive tasks were correlated, scores from the seven cognitive tasks were analyzed with a 2 X 2 X 2 multivariate analysis of variance (MANOVA) with writing Condition and Sex of subject as between-subjects independent variables and Session (i.e., the first session of cognitive testing versus the second) as a within-subjects independent variable. Because the order of presentation of version A of the seven measures and version B of the measures was counterbalanced between subjects to eliminate systematic biases inherent in the measures, scores on each measure were transformed into Z-scores. This transformation allowed comparison of performances on the two different versions of each measure. Statistical significance found ($p<.001$) in Bartlett's test of sphericity indicated that it was appropriate to reject the hypothesis of independence of variables. Means for the seven cognitive performance measures for Friday One are presented in Table 11, while means for Friday Two are presented in Table12. A summary of results of MANOVA and repeated measures ANOVAs is presented in Table 13.

The hypothesis that test differences would reveal superior performance for Disclosers versus Controls on cognitive tasks was not supported by the MANOVA. This analysis revealed only a statistically significant difference between subject's performance on the group of word problems on the first and second Friday testing sessions, $F(7, 74)=3.53$, $p=.003$. Test performance was generally stronger for all subjects on the second Friday of testing relative to performance on the first Friday of testing.

Table 11: Cognitive performance variables presented on Friday One: Means, standard deviations (in parentheses), and ranges of scores by writing Condition and Sex of subject.

	Control		Disclosing	
Measure 1:	Male	n=22	Male	n=16
	Version A	5.4 (6.4)	Version A	4.1 (4.7)
		Range: 0 to 21		Range: 0 to 13
	Version B	4.5 (4.9)	Version B	4.1 (4.5)
		Range: 0 to 15		Range: 0 to 11
	Female	n=21	Female	n=26
	Version A	5.0 (7.0)	Version A	2.5 (3.5)
		Range: 0 to 19		Range: 0 to 12
	Version B	4.1 (3.8)	Version B	6.2 (5.6)
		Range: 0 to 12		Range: 0 to 16
Measure 2:	Male	n=22	Male	n=16
	Version A	7.0 (1.9)	Version A	4.1 (1.8)
		Range: 4 to 11		Range: 2 to 7
	Version B	4.5 (2.1)	Version B	6.1 (1.6)
		Range: 2 to 7		Range: 4 to 9
	Female	n=21	Female	n=25
	Version A	6.9 (2.4)	Version A	6.0 (2.7)
		Range: 4 to 11		Range: 3 to 13
	Version B	3.6 (1.7)	Version B	4.5 (2.1)
		Range: 1 to 7		Range: 0 to 8
Measure 3:	Male	n=22	Male	n=16
	Version A	8.2 (3.6)	Version A	8.3 (4.4)
		Range: 3 to 14		Range: 3 to 17
	Version B	5.3 (2.8)	Version B	6.1 (2.0)
		Range: 2 to 11		Range: 3 to 10
	Female	n=21	Female	n=26
	Version A	7.3 (1.9)	Version A	6.1 (2.1)
		Range: 4 to 10		Range: 4 to 12
	Version B	4.3 (3.0)	Version B	5.3 (3.1)
		Range: 1 to 12		Range: 1 to 11
Measure 4:	Male	n=22	Male	n=16
	Version A	12.4 (4.0)	Version A	14.4 (5.2)
		Range: 7 to 18		Range: 6 to 22
	Version B	15.3 (5.8)	Version B	19.1 (5.9)
		Range: 7 to 27		Range: 12 to 29
	Female	n=21	Female	n=26
	Version A	13.7 (5.9)	Version A	13.0 (5.9)
		Range: 7 to 25		Range: 6 to 24
	Version B	15.7 (6.2)	Version B	15.5 (5.8)
		Range: 7 to 26		Range: 7 to 30

...continued

Table 11, Continued: Cognitive performance variables presented on Friday One: Means, standard deviations (in parentheses), and ranges of scores by writing Condition and Sex of subject.

	Control		Disclosing	
Measure 5:	Male	n=22	Male	n=16
	Version A	3.9 (3.5)	Version A	2.9 (1.1)
		Range: 0 to 10		Range: 1 to 4
	Version B	4.3 (2.1)	Version B	3.0 (0.9)
		Range: 2 to 8		Range: 1 to 4
	Female	n=21	Female	n=26
	Version A	5.3 (2.3)	Version A	4.8 (3.0)
		Range: 0 to 9		Range: 0 to 10
	Version B	3.0 (1.3)	Version B	4.1 (2.1)
		Range: 1 to 5		Range: 2 to 8
Measure 6:	Male	n=22	Male	n=16
	Version A	7.5 (2.7)	Version A	7.3 (2.4)
		Range: 4 to 13		Range: 5 to 10
	Version B	8.8 (3.2)	Version B	10.0 (3.4)
		Range: 4 to 15		Range: 5 to 13
	Female	n=21	Female	n=26
	Version A	6.1 (3.7)	Version A	7.3 (1.7)
		Range: 2 to 14		Range: 5 to 9
	Version B	8.2 (2.3)	Version B	9.3 (3.5)
		Range: 5 to 12		Range: 4 to 18
Measure 7:	Male	n=22	Male	n=16
	Version A	4.3 (2.7)	Version A	3.9 (2.7)
		Range: 0 to 9		Range: 1 to 9
	Version B	13.3 (6.0)	Version B	13.6 (5.7)
		Range: 1 to 25		Range: 6 to 21
	Female	n=21	Female	n=26
	Version A	5.5 (2.1)	Version A	5.4 (2.8)
		Range: 1 to 8		Range: 1 to 11
	Version B	11.5 (5.1)	Version B	12.1 (5.2)
		Range: 4 to 22		Range: 3 to 18

Table 12: Cognitive performance variables presented on Friday Two: Means, standard deviations (in parentheses), and ranges of scores by writing Condition and Sex of subject.

	Control		Disclosing	
Measure 1:	Male	n=22	Male	n=16
	Version A	7.5 (7.1) Range: 0 to 21	Version A	8.8 (6.2) Range: 1 to 20
	Version B	10.5 (6.8) Range: 4 to 27	Version B	8.5 (6.2) Range: 1 to 18
	Female	n=21	Female	n=26
	Version A	6.6 (6.5) Range: 0 to 19	Version A	7.4 (5.6) Range: 1 to 21
	Version B	5.5 (3.7) Range: 0 to 14	Version B	7.3 (7.1) Range: 0 to 25
Measure 2:	Male	n=22	Male	n=16
	Version A	5.2 (1.6) Range: 2 to 8	Version A	6.6 (1.3) Range: 5 to 8
	Version B	5.7 (2.5) Range: 2 to 12	Version B	4.8 (2.4) Range: 0 to 8
	Female	n=21	Female	n=26
	Version A	4.4 (1.9) Range: 0 to 7	Version A	5.5 (1.6) Range: 3 to 9
	Version B	5.8 (2.8) Range: 2 to 11	Version B	4.8 (1.9) Range: 2 to 8
Measure 3:	Male	n=22	Male	n=16
	Version A	8.5 (2.7) Range: 5 to 15	Version A	8.6 (1.8) Range: 6 to 12
	Version B	5.9 (2.1) Range: 3 to 9	Version B	4.9 (2.4) Range: 1 to 9
	Female	n=21	Female	n=26
	Version A	8.5 (2.6) Range: 5 to 13	Version A	9.0 (4.0) Range: 4 to 16
	Version B	6.3 (3.5) Range: 1 to 12	Version B	5.2 (2.4) Range: 2 to 11
Measure 4:	Male	n=22	Male	n=16
	Version A	13.1 (7.1) Range: 5 to 29	Version A	16.4 (4.2) Range: 12 to 25
	Version B	14.5 (5.4) Range: 6 to 26	Version B	17.8 (6.1) Range: 10 to 27
	Female	n=21	Female	n=26
	Version A	11.5 (4.1) Range: 8 to 23	Version A	13.3 (6.0) Range: 0 to 22
	Version B	16.3 (7.2) Range: 5 to 31	Version B	15.3 (6.0) Range: 9 to 29

...continued

Table 12, Continued: Cognitive performance variables presented on Friday Two: Means, standard deviations (in parentheses), and ranges of scores by writing Condition and Sex of subject.

	Control		Disclosing	
Measure 5:	Male	n=22	Male	n=16
	Version A	5.3 (2.4)	Version A	3.9 (4.1)
		Range: 2 to 14		Range: 0 to 11
	Version B	4.2 (2.5)	Version B	3.6 (1.5)
		Range: 0 to 8		Range: 2 to 6
	Female	n=21	Female	n=26
	Version A	4.2 (2.4)	Version A	4.3 (2.6)
		Range: 0 to 7		Range: 0 to 9
	Version B	5.4 (1.6)	Version B	4.8 (2.1)
		Range: 3 to 8		Range: 2 to 8
Measure 6:	Male	n=22	Male	n=16
	Version A	7.1 (2.5)	Version A	7.5 (1.9)
		Range: 3 to 12		Range: 5 to 11
	Version B	9.6 (2.5)	Version B	11.0 (4.1)
		Range: 5 to 13		Range: 5 to 17
	Female	n=21	Female	n=26
	Version A	5.7 (1.8)	Version A	8.8 (4.2)
		Range: 3 to 9		Range: 4 to 20
	Version B	7.9 (2.1)	Version B	8.5 (3.1)
		Range: 5 to 11		Range: 4 to 14
Measure 7:	Male	n=22	Male	n=16
	Version A	6.1 (3.4)	Version A	5.5 (3.0)
		Range: 0 to 10		Range: 0 to 10
	Version B	12.0 (5.5)	Version B	11.4 (4.0)
		Range: 5 to 23		Range: 6 to 19
	Female	n=21	Female	n=26
	Version A	5.5 (1.5)	Version A	6.5 (2.9)
		Range: 4 to 9		Range: 0 to 10
	Version B	9.8 (3.2)	Version B	12.3 (4.8)
		Range: 6 to 16		Range: 5 to 21

Table 13: Cognitive performance variables presented on Friday One and Friday Two: Summary of MANOVA and Repeated Measures ANOVA results

MANOVA with seven performance variables	
Condition	n.s.
Session (First versus Second Friday)	$F(7, 74)=3.53$, $p=.003$
Sex	n.s.
Condition X Session	n.s.
Condition X Sex	n.s.
Session X Sex	n.s.
Condition X Session X Sex	n.s.
Repeated Measures ANOVAs of individual performance variables	
Measure 1	
Condition	n.s.
Session	$F(1,81)=32.96$, $p<.001$
Sex	n.s.
Condition X Session	n.s.
Condition X Sex	n.s.
Session X Sex	n.s.
Condition X Session X Sex	n.s.
Measure 2	
Condition	n.s.
Session	n.s.
Sex	n.s.
Condition X Session	n.s.
Condition X Sex	n.s.
Session X Sex	n.s.
Condition X Session X Sex	n.s.
Measure 3	
Condition	n.s.
Session	$F(1,81)=4.19$, $p=.044$
Sex	n.s.
Condition X Session	n.s.
Condition X Sex	n.s.
Session X Sex	$F(1,81)=4.07$, $p=.047$
Condition X Session X Sex	n.s.

...continued

Table 13, Continued: Cognitive performance variables presented on Friday One and Friday Two: Summary of Repeated Measures ANOVA results

Measure 4	
Condition	n.s.
Session	n.s.
Sex	n.s.
Condition X Session	n.s.
Condition X Sex	n.s.
Session X Sex	n.s.
Condition X Session X Sex	n.s.
Measure 5	
Condition	n.s.
Session	$F(1,81)=6.35$, $p=.014$
Sex	n.s.
Condition X Session	n.s.
Condition X Sex	n.s.
Session X Sex	n.s.
Condition X Session X Sex	n.s.
Measure 6	
Condition	$F(1,81)=4.08$, $p=.047$
Session	n.s.
Sex	n.s.
Condition X Session	n.s.
Condition X Sex	n.s.
Session X Sex	n.s.
Condition X Session X Sex	n.s.
Measure 7	
Condition	n.s.
Session	n.s.
Sex	n.s.
Condition X Session	n.s.
Condition X Sex	n.s.
Session X Sex	n.s.
Condition X Session X Sex	n.s.

Performance on the cognitive tasks was probed further with individual 2 X 2 X 2 repeated measures ANOVAs with writing Condition and Sex of subject as between-subjects independent variables and Session (i.e., the first session of cognitive testing versus the second) as a within-subjects independent variable. On one task, the speculative "suppose" questions (measure 5, version A, "Suppose free education..." and version B, "Suppose prohibition of alcohol..."), Disclosers produced more responses than were produced by Controls, $F(1, 81)=4.$, $p=.047$, as hypothesized. On Friday One, Disclosers produced scores of 7.3 (S.D.=1.9) and 9.6 (S.D.=3.3) on version A and version B respectively as compared to Controls' scores of 6.9 (S.D.=3.2) and 8.5 (S.D.=2.7) on those same tasks. Likewise, on Friday Two, Disclosers produced scores of 8.2 (S.D.=3.4) and 9.5 (S.D.=3.7) on version A and version B respectively as compared to Controls' scores of 6.4 (S.D.=2.3) and 8.8 (S.D.=2.4) on those same tasks.

Individual repeated measures ANOVAs also yielded significant Session (Friday One vs. Friday Two) effects in the absence of writing Condition effects, including Measure 1, $F(1,81)=32.96$, $p<.001$, Measure 3, $F(1,81)=4.19$, $p=.044$, and Measure 5, $F(1,81)=6.35$, $p=.014$. A significant Session by Sex interaction effect was found with Measure 3, $F(1, 81)=4.07$, $p=.047$, such that Male subjects performed better than Females on this task on Friday One, though differences were not apparent at Friday Two.

Additional Exploratory Analyses

Of data collected, objective essay measurements, subjects' ratings of their essays, and subjects' ratings of their affect both prior to and following the essay writing have been consistent with hypotheses of the

study. However, findings from the cognitive performance tasks provide little support for the hypothesis that emotionally expressive writing about personal experiences of trauma facilitates problem-solving. As additional exploratory analyses, correlations among variables were measured within each of 2 X 2 (writing Condition X Sex of subject) experimental cells. Thus, separate correlation matrices were generated for Male Controls, Female Controls, Male Disclosers, and Female Disclosers.

Given the large number of variables present in the study, summary variables were created to be entered into the correlation matrices. These variables were created to represent the four primary categories of dependent variables, that is, (1) objective measurement of the essays, (2) subjects' ratings of the essay content, (3) subjects' ratings of affect, and (4) cognitive performance.

To represent objective measurement of the essays, a variable Number of Words was created, summing total number of words written in essays from Tuesday, Wednesday, and Thursday sessions. Number of Emotional Words summed total number of literal emotion words included in the essays written Tuesday, Wednesday, and Thursday.

To represent subjects' ratings of the essay content, a variable Degree of Disclosure was created, summing subjects' essay ratings "personally revealing," "real emotions", and "stressful to write." Higher ratings on these items is theoretically consistent with greater disclosure. From this sum, rating of "told to others" was subtracted. Disclosure of material which has not previously been disclosed is an important element in Pennebaker's discussion of the role of inhibitory processes in disclosure and health (e.g., Pennebaker & Beall, 1986). Information

which has not been disclosed to other has presumably been inhibited, and benefit comes from the disinhibition represented by self-disclosure. Therefore, lower ratings of "told to others" contributes to greater Degree of Disclosure. Values from ratings taken during each of the Tuesday, Wednesday, and Thursday sessions were then summed.

To represent subjects' ratings of affect across the three days of essay writing when pre- and post-essay measurements were taken (therefore excluding measurement of affect taken on the Friday sessions), pre-essay ratings were subtracted from post-essay ratings to create Change in Affect variables for PA and NA. Values from ratings taken during each of the Tuesday, Wednesday, and Thursday sessions were then summed.

To represent subjects' performances on problem solving tasks, scores from the seven cognitive performance variables presented at the first Friday testing session and the seven cognitive performance variables presented at the second Friday testing session were summed to form a single Cognitive Performance variable.

The correlation coefficients and levels of significance for Male Controls, Female Controls, Male Disclosers, and Female Disclosers are presented in Tables 14 to 17 respectively. For Male Controls, Degree of Disclosure in the essays covaried significantly with changes in NA (r=.60, p=.006) and covaried inversely with PA (r=-.60, p=.005) over the week of writing; the greater the Degree of Disclosure, generally the greater the change to more negative mood. However, as previously reported, Control subjects generally rated their essays as being less personally revealing, indicating less emotion, and being less stressful to write than did Disclosers. For Male Controls, neither Change in Affect nor Degree of

Table 14: Pearson product-moment correlation coefficients and significance levels: Within cell correlations for male controls (n=22)

	Cognitive Performance	Change in NA	Change in PA	Disclosure	Emotion words
Number of words	.4057 p=.068	.0067 p=.977	.1036 p=.655	-.1233 p=.615	.3138 p=.166
Emotion words	.2088 p=.364	.0929 p=.689	-.3250 p=.151	.1489 p=.543	
Disclosure	-.2009 p=.409	.6031 p=.006	-.6120 p=.005		
Change in PA	.0327 p=.888	-.1387 p=.549			
Change in NA	-.1709 p=.459				

Table 15: Pearson product-moment correlation coefficients and significance levels: Within cell correlations for female controls (n=21)

	Cognitive performance	Change in NA	Change in PA	Disclosure	Emotion words
Number of words	-.0156 p=.949	.1456 p=.552	-.2310 p=.341	.1887 p=.468	.1999 p=.412
Emotion words	-.0603 p=.806	-.2551 p=.292	-.0216 p=.930	.4783 p=.052	
Disclosure	-.2793 p=.278	.3005 p=.241	-.2039 p=.432		
Change in PA	-.1582 p=.518	-.0351 p=.886			
Change in NA	-.6489 p=.003				

Legend

Number of words: Total number of words written in the essay, summed across Tuesday, Wednesday, Thursday

Emotion words: Total number of literal emotion words included in the essay, summed across Tuesday, Wednesday, Thursday

Disclosure: Degree of disclosure, summing subjects' essay ratings "personally revealing," "real emotions", and "stressful to write," and subtracting rating of "told to others;" summed across Tuesday, Wednesday, Thursday.

Change in PA: Change in Positive Affect from prior to post- writing, summed across Tuesday, Wednesday, Thursday

Change in NA: Change in Negative Affect from prior to post- writing, summed across Tuesday, Wednesday, Thursday

Cognitive performance: Sum of scores from seven cognitive performance variables presented Friday One and seven cognitive performance variables presented Friday Two.

Table 16: Pearson product-moment correlation coefficients and significance levels: Within cell correlations for male disclosers (n=16)

	Cognitive Performance	Change in NA	Change in PA	Disclosure	Emotion words
Number of words	.5329 p=.034	.1978 p=.463	.2645 p=.322	.2569 p=.337	.1671 p=.536
Emotion words	-.2669 p=.318	.0406 p=.881	-.0186 p=.945	.2515 p=.347	
Disclosure	.0934 p=.731	.2718 p=.309	-.1064 p=.695		
Change in PA	.1564 p=.563	-.0177 p=.948			
Change in NA	.0606 p=.824				

Table 17: Pearson product-moment correlation coefficients and significance levels: Within cell correlations for female disclosers (n=26)

	Cognitive Performance	Change in NA	Change in PA	Disclosure	Emotion words
Number of words	.3381 p=.098	-.1030 p=.617	-.1066 p=.604	.1088 p=.597	-.0319 p=.877
Emotion words	-.1737 p=.406	.4037 p=.041	.3156 p=.116	.2109 p=.301	
Disclosure	.2263 p=.277	.4748 p=.014	.0824 p=.689		
Change in PA	-.1590 p=.448	.2588 p=.202			
Change in NA	-.0328 p=.876				

Legend

Number of words: Total number of words written in the essay, summed across Tuesday, Wednesday, Thursday

Emotion words: Total number of literal emotion words included in the essay, summed across Tuesday, Wednesday, Thursday

Disclosure: Degree of disclosure, summing subjects' essay ratings "personally revealing," "real emotions", and "stressful to write," and subtracting rating of "told to others;" summed across Tuesday, Wednesday, Thursday.

Change in PA: Change in Positive Affect from prior to post- writing, summed across Tuesday, Wednesday, Thursday

Change in NA: Change in Negative Affect from prior to post- writing, summed across Tuesday, Wednesday, Thursday

Cognitive performance: Sum of scores from seven cognitive performance variables presented Friday One and seven cognitive performance variables presented Friday Two.

Disclosure were related to objective measures of the written essay or Cognitive Performance.

For Female Controls, greater Cognitive Performance was associated with decreased NA from pre- to post-essay, r=-.65, p=.003. This may be a simple reflection of instructions to obtain high scores on the Cognitive Performance tasks in contrast with the low NA reported by Control subjects who wrote on (ostensibly) less threatening topics than did Disclosers. However, because these variables correlate significantly, it raises questions about the interaction of mood and cognitive performance for Female writers of Control content.

For Male Disclosers, Cognitive Performance covaried significantly with Number of Words written in the essays, r=.53, p=.034. The more that was written, though not associated with use of emotional words, Degree of Disclosure, or changes in affect, the greater the performance on the group of problem-solving tasks.

For Female Disclosers, Change in Negative Affect covaried significantly and positively with Number of Emotional Words used (r=.40, p=.041) and Degree of Disclosure (r=.47, p=.014). This relationship suggests that as Female Disclosers expressed themselves emotionally in their essays, and reported doing so in their self-ratings, their self-rated Negative Affect also increased.

Within the Male and Female Disclosure correlation matrices, there is interesting evidence which pertains to the hypotheses of interest. While Female Disclosers appear to be writing emotionally, reporting that they are disclosing, and, covarying significantly with those factors, experiencing more negative affect, it does not significantly correlate with Cognitive Performance. Male Disclosers did not demonstrate this pattern

of disclosure, self-report and affect, and yet, the more that they wrote in their essays, in terms of sheer volume, the better they did in terms of Cognitive Performance. These results suggest that Males and Females may disclose in different ways, and may benefit differently from their disclosures in terms of its effect on cognitive problem-solving processes.

Discussion: Experiment One

Consistent with expectations, it appears that essays were written by subjects as they were directed, and that their reactions to writing either self-disclosing material or more trivial material was evident in their self reports of affect. However, results largely do not support the primary hypothesis of interest, that self-disclosure leads to facilitated cognitive functioning evident in the execution of verbal problem solving tasks. A significant result on one task was consistent with this hypothesis; however, given the number of tasks presented and analyzed with univariate statistical methods, there is some probability that differences in means on that task do not reflect real differences in ability (i.e., Type I error). Conversely, a difference in means on this task, favouring the hypothesis, suggested that further investigation into the role of self-disclosing on a speculative thinking task was warranted.

EXPERIMENT TWO

Experiment Two was conducted in an attempt to replicate the findings of Experiment One regarding the differential performance of subjects on a speculative problem-solving task as a function of the kind of writing they were asked to do. In this second study, three significant changes were implemented to the procedures of Experiment One.

First, subjects participated in only one session of self-disclosing or trivial writing, during which they wrote for 30 minutes. Presentation of

the word problems occurred immediately after writing. It was hypothesized that cognitive-based effects of self-disclosing writing would be more immediate and potent than could be demonstrated 24 hours, or 8 days, later.

Second, an attempt was made to control for individual differences in writing ability as subjects approached the written problem solving tasks. An adapted version of the Wechsler Adult Intelligence Scale, Revised (Wechsler, 1981) Vocabulary subtest was presented, in which subjects wrote responses to a subset of items presented both visually on the printed page and orally. These protocols were scored according to guidelines outlined by Wechsler (1981), and the scores entered as a covariate in analyses of the dependent measures.

The third change in procedure from Experiment One was the inclusion of a measure of individual differences along the dimension of Repression-Sensitization. Work by Pennebaker and his associates has provided a model for the current studies; one theoretical underpinning of that paradigm is the concept of "inhibition." Pennebaker and Hoover (1986) suggest that long term inhibition of behaviour is associated with increased physiological arousal in response to threat. Pennebaker et al. (1988) found that self-report of prior inhibition (reports of having written about material that had been actively held back from discussion with others) was associated with particularly large gains in immune functioning among disclosing subjects. A relatively stable pattern of behaviour associated with avoidance of threat stimuli has been termed *repression* (Byrne, 1961). A contrasting pattern of behaviour for managing threatening stimuli is to approach the threat and enhance one's awareness of it, which has been termed *sensitization*. The

discussion will turn at this point to review the Repression-Sensitization dimension before presenting the procedures for Experiment Two.

Repression-Sensitization

Byrne (1961) suggests that individuals have a characteristic style of responding to threatening, anxiety-evoking stimuli, and that a continuum exists between two contrasting patterns of behaviours. At one extreme of this continuum is a pattern of behaviours in which avoidance is used to escape anxiety. Avoidance may be accomplished by denying or minimizing threat, failing to verbalize feelings of anxiety, or failing to consider the consequences of the threat which is present. This pattern of behaviour has been termed *repression* (Bell & Byrne, 1978). At the other extreme of responding to anxiety-evoking stimuli is the tendency to approach the threat through rumination, obsessive worry, and intellectualization. As opposed to the pattern of behaviour associated with repression, this behaviour pattern includes maintaining a heightened awareness of the threatening stimuli, freely verbalizing feelings of anxiety or distress, and attempting to gain control over the threat by anticipating potential consequences. This pattern of behaviour has been termed *sensitization* (Bell & Byrne, 1978).

This continuum of behaviour has been of research interest since the 1940's and 50's, when individual differences in perceptual defense behaviour were initially noted and described in terms of this dichotomy. Born out of this initial paradigm of investigation was the Repression-Sensitization (R-S) Scale (Byrne, 1961). Byrne noted that a relationship existed between differential perceptual threshold scores for threatening stimuli and a range of other behaviours, including rate of recall of failure experiences, expression of sexuality and hostility on a sentence-

completion task, and frequency of aggressive themes in Thematic Apperception Test items. He therefore viewed the Repression-Sensitization continuum as corresponding to meaningful behaviour, and he set about developing a measurement instrument which was easily administered, reliable, and valid.

Byrne (1961) built on a previous body of research conducted with the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinsey, 1951), which identified correlations between MMPI scales and behaviours described as sensitizing or repressive. The six MMPI scales most closely associated with repressive and sensitizing behaviours had previously been combined as a measure of repression-sensitization (Altrocchi, Parsons, & Dickoff, 1960). However, use of the intact MMPI scales meant that items contributing to more than one of the six scales were scored more than once and thus were given relatively greater weight than other items. Moreover, some items were included in both "repressing" scales and "sensitizing" scales, scoring in both directions at once. These measurement flaws were remedied by Byrne (1961), who used the 182 items comprising these six scales, excluding repetitions of items and items scored inconsistently, to form the R-S Scale. This list of items was further refined by Byrne, Barry, and Nelson (1963). They conducted an item analyses of the R-S Scale, and then retained in the Revised R-S Scale 127 items (plus buffer items) which most closely correlated with the total R-S score derived from a normative group. This resulting scale was found to have a .94 coefficient of internal consistency and .82 coefficient of stability over a three-month period.

Bell and Byrne (1978) reviewed evidence supporting the face validity of the Revised R-S Scale, predictive validity with clinically

observed defensive behaviour, and association of the Revised R-S Scale scores to measured differences on perceptual defense tasks. Face validity of the scale was suggested by the high concurrence of scores among judges instructed to score the scale as they believed a Repressor would (Tempone, 1964). Carroll (1972) reported that R-S scores from a group of inpatients were significantly correlated with independent psychiatric ratings of repressive-sensitizing defenses as observed in patients' verbalizations. This suggests that the scale taps into a pattern of behaviours which are observable by others. Finally, Bell and Byrne (1978) noted that individuals identified as extreme Repressors and Sensitizers with the scale perform differentially, consistent with expectations, on a range of perceptual defense procedures. Thus the Revised R-S Scale correlates with the procedures from which research interest in the Repression-Sensitization dimension originally arose.

The Revised R-S Scale has been found to be highly correlated with measures of anxiety (Bell & Byrne, 1978; Slough, Keinknecht, & Thorndike, 1984), and as such has also been characterized as being a direct measure of psychopathology and has been criticized for having insufficient discriminant validity in the measurement of coping styles (Budd & Clopton, 1985; Miller, 1987). That the scale indexes psychopathology is perhaps to be expected given its historical derivation from MMPI scales. The Revised R-S Scale may function as an index of two factors, one being anxiety and psychopathology and the other being defensive style (Budd & Clopton, 1985). Watson and Clark (1984) suggest that differences in defensive style play a noncentral role in the broader construct of Negative Affectivity. However, evidence supports the utility of the scale in explaining variance in symptom reporting. Linden,

Paulhus, and Dobson (1986) note that the Repression-Sensitization scale explained a significant proportion of the variance in physical symptom reports, with Repressors reporting fewer psychological and physical symptoms than Sensitizers, consistent with expectations.

Personality correlates and behaviours associated with the Repression-Sensitization dichotomy have also been documented, and are summarized by Bell and Byrne (1978). Repression-Sensitization is positively related to scores on Rotter's (1966) Locus of Control Scale, such that Sensitizers tend to make attributions to external control of their behaviour. Sensitizers tend to be less well adjusted than are Repressors on the basis of correlations with personality measures of sociability, sense of well-being, self-control, tolerance, and achievement. Sensitizers tend to be more self-critical than are Repressors. They also tend to report a greater frequency of illness, use of medication, and contact with a physician. Sensitizers tend to develop disorders with psychological components, while repressors tend to be more frequently diagnosed with purely physical ailments (Bell & Byrne, 1978).

The Sensitizer profile outlined by Bell and Byrne (1978) suggests poorer adjustment and greater distress among Sensitizers than among Repressors. However, these authors note behaviour concomitants of the repressive style which could impinge on functioning. Repressors respond to threat with greater physiological arousal, as indexed by heart rate and galvanic skin response (GSR), than do Sensitizers; however, at the same time Repressors verbally report less anxiety about the situation than do Sensitizers (Scarpetti, 1973). Repressors generally have less to say about unpleasant visual stimuli than do Sensitizers (Carroll, 1972). Repressors appear to maintain less reportable awareness of threatening

cues and are less likely to incidentally learn and then recall threatening peripheral stimuli (Bell & Byrne, 1978). A repressive coping style has been found to be a premorbid predictor of cancer-proneness among male patients of a Veterans Association hospital (Dattore, Shontz, & Coyne, 1980).

Repression-Sensitization: Summary. Pennebaker et al. (1988) found that subjects' self-reports of actively holding back personal material from discussion with others was associated with particularly large gains in immune functioning among disclosing subjects. A relatively stable pattern of avoidance of threatening material has been termed repression, while characteristic approach and enhancement of one's awareness of threat has been termed sensitization (Bell & Byrne, 1978).

On the basis of documented differences between individuals identified as Repressors and those identified as Sensitizers, one could expect differential responses by these two groups to the tasks in the study at hand. First, it was expected that Repressors would simply write less than Sensitizers when instructed to complete a self-disclosing essay. To the extent that they were asked to disclose emotionally revealing material, it was expected that Repressors would rate their disclosures as having been previously disclosed less frequently than would Sensitizers. However, individuals described as Repressors stand to benefit from self-disclosure to the extent that they attend to information or internal emotional states that they otherwise would have tended to avoid. They were therefore expected to outperform Sensitizers on the word problems presented to them.

Experiment Two: Hypotheses

It was expected that (1) the subjects who were instructed to write about their own traumatic experiences (Disclosers) would again produce essays which were more personal and more revealing of emotion than were essays by the subjects who wrote about trivial topics (Control). It was anticipated that (2) Disclosers' ratings of their emotions immediately after essay writing would indicate more negative emotions and fewer positive emotions than would Controls' ratings. These findings regarding the essay writing represent a validity check of the procedures.

It was hypothesized that (3) Disclosers' performance on a written problem-solving task presented immediately after one 30 minute session of writing would exceed that of Controls. Differences in performance were expected to be evident after controlling for written language ability by including a measure of written language ability as a covariate in analyses. This prediction was intended to reflect the general hypothesis that written, emotive self-disclosure facilitates problem solving, and would replicate the one finding from Experiment One which was consistent with predictions.

It was further hypothesized that, among subjects in the Disclosing condition only, (4a) individuals identified as Repressors from their scores on the Revised Repression-Sensitization Scale (Byrne, et al., 1963) would write less and (4b) use fewer literal emotion words than would individuals identified as Sensitizers on the scale. It was expected that (4c) Repressors, more so than Sensitizers, would tend to rate their writing as expressing content previously undisclosed to others. Finally, (4d) Repressors were expected to benefit from disclosing such that their performance on two written problem-solving tasks, controlling for written language ability, would exceed that of Sensitizers.

Method

Overview

Subjects participated in one experimental session of two hours duration. Subjects initially completed measures of mood, the Revised Repression-Sensitization Scale (Byrne, et al., 1963) , and a written vocabulary test. Subjects then spent thirty minutes writing about (a) the most traumatic event(s) they have experienced, or (b) their activities in the past 24 hours, written as an objective, emotionless description. After a second measurement of mood, subjects provided written answers to two speculative word problems.

Subjects

Undergraduate students were recruited from Introductory Psychology classes at the University of Manitoba; a total of 131 students (70 female and 61 male) participated in a two-hour experimental session. Subjects consented to participate after being informed that the experiment might require them to write about extremely personal material and after assurances were given to them that any written material would remain confidential. Subjects received credit toward their final grade in their Introductory Psychology course in exchange for their participation. Subjects were not excluded during recruitment on the basis of their first language.

Of the 131 subjects who participated, data from 101 subjects (51 female and 50 male) were included in analyses. The 30 subjects who were excluded from analyses identified themselves as not having learned English by age 4 years and did not have English as the primary language of their schooling (19 female and 11 male). The average age of female subjects was 20.8, while the average age of male subjects was 20.0.

Procedure

Subjects participated in groups which ranged in size from 7 to 19 people. Groups of subjects were randomly assigned to a writing condition (Disclosure or Control), so that the entire group of subjects at any one session wrote in the same condition. Assignment of a group to a writing condition alternated between sessions. The only exception to random assignment was recruitment of a final group of subjects (19 of whom attended) assigned to the Control condition in an attempt to have an equivalent number of male and female subjects in each of the two writing conditions.

On their arrival at the experiment session, subjects were seated at separate tables. Tables were partitioned with white cardboard dividers placed on the table-tops such that, seated, subjects' views of others in front, back, and to the side of them were obscured. Printed experimental materials were stacked face-down on each desk, and a pen and lined 8.5 inch by 11 inch pad of paper were provided.

Subjects were greeted, reminded that the experiment might require them to write about extremely personal material, and then given assurances that any written material would remain confidential. Following general instructions, subjects were given a short questionnaire to assess both positive and negative affect, completed a questionnaire measuring Repression-Sensitization, and completed written definitions of English words. After a brief break, subjects were instructed to begin writing about their topic until the experimenter returned.

Subjects in the trauma disclosure condition were instructed as follows:

> "During the next thirty minutes, I want you to write about the most traumatic and upsetting experience or experiences of your entire life. You can write about a single topic or about a number of topics. The important thing is that you really let go and explore you deepest thoughts and feelings. Ideally, whatever you write about should deal with events or experiences that you have not talked about in detail with others. Don't worry about your spelling, or even if you are writing in complete sentences. Try to write continuously for the 30 minutes." (adapted from Pennebaker, et al., 1988, p. 240).

Subjects in the control condition were given the following instructions:

> "During the next thirty minutes, I want you to write about what you have done in the previous 24 hours. Your description should be as detailed as possible. As well, you should try to write about events which have occurred without writing about your feelings about them or your thoughts or opinions about them. Try to write as objectively as you can. Don't worry about your spelling, or even if you are writing in complete sentences. Try to write continuously for the 30 minutes." (adapted from Pennebaker, et al., 1988, p. 240).

After 30 minutes, subjects were instructed to place the pages they had written in a 9 inch by 12 inch manila envelope. Subjects again completed the positive and negative affect questionnaire.

Subjects then completed two word problems printed on separate 8.5 inch by 11 inch pages. Order of presentation was counterbalanced among subjects, and each task had a time limit of 5 minutes.

When these tasks were completed, subjects completed a post-experimental questionnaire and were debriefed as to the manipulations, measures, and expected findings of the experiment. Although no distress resulting from the experiment was reported to the experimenter by a subject, subjects were offered an opportunity to speak individually with the researcher to ask questions or express concerns about their participation. Subjects were notified of a number of counselling opportunities available to them both on and off campus.

Measures

Pre- and post-writing questionnaires. The pre- and post-writing questionnaire used was the Positive and Negative Affect Schedule, or PANAS (Watson, Clark, & Tellegen, 1988). After completing their essay, subjects also rated the extent to which the essay they wrote was personal, revealed emotions, was stressful to do, and had content which they infrequently shared with others ("Overall, how much have you told other people about what you wrote today?"). Ratings were made on seven point Likert-type scales anchored by the statements *not at all* (1) and *a great deal* (7).Ratings were made on seven point Likert-type scales anchored by the statements *not at all* (1) and *a great deal* (7).

Revised Repression-Sensitization Scale. Byrne et al.'s (1963) scale includes 127 scorable items and 55 buffer items, for a total of 182 items.

The items are presented under the heading "Health and Opinion Survey." The scale is scored such that higher scores indicate a defensive style of sensitization while lower scores indicate repression.

Vocabulary items. To measure ability with written English language, 12 items from the Vocabulary subtest of the Wechsler Adult Intelligence Scale, Revised (Wechsler, 1981) were presented to subjects. Items were printed on two pages, with 6 words per 8.5 inch by 11 inch sheet of paper, spaced to allow room for subjects' written responses. Words were also presented orally by the experimenter at the rate of one word every 45 seconds. This pace allowed virtually all subjects to complete writing a response and was based on a previous pilot procedure. Subject responses to each item were scored according to criteria provided by Wechsler (1981), and scores were summed to form a composite score. No attempt was made to convert this score to a Scaled Score, given the divergence of procedures from formal test protocol and thus limited applicability of the published norms.

Problem-solving tasks. Two tasks were printed on separate 8.5 inch by 11 inch sheets of paper. Subjects completed the time-limited tasks under the direction of the experimenter. The five minute time limit was announced, and subjects were asked to begin the task by turning it over from the top of the pile of tasks sitting on their desks. Subjects read the instructions and performed the task to the best of their abilities; no further instructions, explanations, or examples were provided. Order of presentation of the tasks was counterbalanced among subjects by varying the order of the tasks within the packets of materials at subject's tables. Half of the packets prepared for subjects presented task A (described below) first while the other half presented task B first.

Subjects completed two speculative questions (adapted from Peel, 1971):

> (A) "Suppose that universal free education through to the postgraduate University level, or its equivalent, in all fields were made widely available in Canada. What might be consequences of this? List as many possible consequences as you can think of. Number your responses. TIME LIMIT 5 MINUTES. "
>
> (B) "Suppose the sale and consumption of alcohol became prohibited in Canada. What might be consequences of this? List as many possible consequences as you can think of. Number your responses. TIME LIMIT 5 MINUTES."

Subjects were scored on total number of ideas listed minus duplications of responses.

Scoring of the two measures were performed by two independent judges (one graduate student and one undergraduate student), each of whom scored one measure exclusively. These judges were unaware of the condition assignments of individual subjects. The experimenter served as a second judge for both measures and was blind to the condition assignments of individual subjects. A key, based on the sample of responses, was developed to assist judges with scoring. Inter-scorer reliabilities on the two measures, indexed by Pearson correlations, were, for version A, r=.80, and for version B, r=.77. Both inter-scorer reliabilities were significant at $p < .001$. Disagreements in scoring were resolved by consensus between the two scorers of the item in question.

Analyses

Four classes of variables were analyzed: (1) those dealing with the essays themselves, including content and subjects' impressions of their own writings; (2) responses to the essays in terms of self-rated mood; (3) performance on cognitive tasks, controlling for vocabulary; and (4) differences in writing and problem-solving as a function of Repression and Sensitization.

Content of Essays

As in Experiment One, and as reported by Pennebaker and Beall (1986) and Pennebaker et al. (1988), subjects disclosed highly personal and upsetting experiences when asked to do so. Topics of essays included experiences of physical or sexual abuse (26% of subjects), ending of, or conflict within, a romantic relationship (10%), death of a friend (10%) or parent (10%), accident or significant personal illness (8%), and illness of a significant other (10%). Topics again ranged widely and included issues such as dealing with parental conflict, suffering racial discrimination, participation in military conflict, and conflicts with the law. While female subjects represented 20% of respondents writing about experiences of physical or sexual abuse, most topics were presented by both male and female respondents.

Mean scores for number of words and number of emotion words produced in the essays of the male and female Control and Disclosing groups are charted in Table 18. Separate 2 X 2 analyses of variance (ANOVAs), with writing Condition (Control and Disclosure) and Sex of subject as between-subjects independent variables, were used to evaluate these means. Summary of ANOVAs are presented in Table 19.

Table 18: Parameters of essays: Means, Standard Deviations (in parentheses), and Ranges of scores by writing Condition and Sex of subject.

Control		Disclosing	
Number of words		Number of words	
Male n=25	574.1 (134.1) Range: 329 to 838	Male n=25	545.1 (159.4) Range: 278 to 816
Female n=25	657.5 (160.8) Range: 352 to 931	Female n=26	611.1 (182.0) Range: 194 to 969
Number of emotion words		Number of emotion words	
Male n=25	1.4 (1.8) Range: 0 to 5	Male n=25	13.6 (8.4) Range: 3 to 35
Female n=25	2.6 (4.3) Range: 0 to 18	Female n=26	16.6 (10.1) Range: 5 to 37

Table 19: Parameters of essays: Summary of ANOVA results

Number of words	
Condition	n.s.
Sex	$F(1, 97)=5.47$, $p=.021$
Condition X Sex	n.s.
Number of emotion words	
Condition	$F(1, 97)=88.58$, $p<.001$
Sex	n.s.
Condition X Sex	n.s.

Disclosers and Controls did not differ significantly on number of words written in their essays. However, Female subjects wrote more than Male subjects, $F(1, 97)=5.47$, $p=.021$. Consistent with instructions, Disclosers generally used more literal emotion words than did Controls, $F(1, 97)=88.58$, $p<.001$. There was no significant main effect or interaction effect of Sex of subject on number of emotion words used in the essays. These objective measures suggest that subjects generally completed their written essays as they were instructed to do.

Subject Ratings of Essays

Subjects' post-writing ratings of essay content as personal, emotional, and stressful, and the degree to which content had not been previously disclosed to others, were compared in a 2 X 2 ANOVA with writing Condition and Sex of subject as between-subjects independent variables. It had been anticipated that analyses would show that subjects who disclosed personally traumatic material would rate their essays as more personal, more revealing of emotion, and more stressful to write, though perhaps not less frequently reported to others than would Controls. The comparison of means supports these predictions (Table 20 lists means; Table 21 summarizes ANOVA results).

Disclosers rated their essays as more personally revealing ($F(1, 97)=102.49$, $p<.001$), expressive of real emotion ($F(1, 97)=149.62$, $p<.001$), and stressful to write ($F(1, 97)=96.24$, $p<.001$) than did Control subjects.

As reported in Experiment One, Disclosers were no more or less likely than Controls to have told others of the content of their essays prior to writing about it. Again, there may be two different meanings for similar scores from the two groups. Disclosers were instructed to write

Table 20: Subjects' ratings of essays: Means, Standard Deviations (in parentheses), and Ranges of scores by writing Condition and Sex of subject.

Control		Disclosing	
Revealing		**Revealing**	
Male	2.9 (1.6)	Male	5.3 (1.4)
n=25	Range: 1 to 6	n=25	Range: 3 to 7
Female	2.1 (1.1)	Female	5.7 (1.8)
n=25	Range: 1 to 4	n=26	Range: 2 to 7
Real emotions		**Real emotions**	
Male	2.6 (1.7)	Male	5.6 (1.3)
n=25	Range: 1 to 7	n=25	Range: 2 to 7
Female	2.1 (1.3)	Female	6.0 (1.2)
n=25	Range: 1 to 6	n=26	Range: 3 to 7
Stressful		**Stressful**	
Male	1.4 (0.7)	Male	4.1 (2.0)
n=25	Range: 1 to 3	n=25	Range: 1 to 7
Female	1.4 (0.8)	Female	4.4 (1.8)
n=25	Range: 1 to 4	n=26	Range: 1 to 7
Told Previously		**Told Previously**	
Male	3.5 (1.7)	Male	3.4 (1.9)
n=25	Range: 1 to 7	n=25	Range: 1 to 7
Female	3.0 (1.7)	Female	3.5 (1.8)
n=25	Range: 1 to 6	n=26	Range: 1 to 7

Table 21: Subjects' ratings of essays: Summary of ANOVA results

Revealing	
Condition	$F(1, 97)=102.49$, $p<.001$
Sex	n.s.
Condition X Sex	$F(1, 97)=3.93$, $p=.050$
Real emotions	
Condition	$F(1, 97)=149.62$, $p<.001$
Sex	n.s.
Condition X Sex	n.s.
Stressful	
Condition	$F(1, 97)=96.24$, $p<.001$
Sex	n.s.
Condition X Sex	n.s.
Told Previously	
Condition	n.s.
Sex	n.s.
Condition X Sex	n.s.

Disclosers and Controls did not differ significantly on number of words written in their essays. However, Female subjects wrote more than Male subjects, $F(1, 97)=5.47$, $p=.021$. Consistent with instructions, Disclosers generally used more literal emotion words than did Controls, $F(1, 97)=88.58$, $p<.001$. There was no significant main effect or interaction effect of Sex of subject on number of emotion words used in the essays. These objective measures suggest that subjects generally completed their written essays as they were instructed to do.

Subject Ratings of Essays

Subjects' post-writing ratings of essay content as personal, emotional, and stressful, and the degree to which content had not been previously disclosed to others, were compared in a 2 X 2 ANOVA plausible that Control subjects and Disclosing subjects could have had different reasons for producing similar ratings of prior disclosure.

Subject Ratings of Affect

Subjects' ratings of positive items from the PANAS were summed to form a Positive Affect score (PA) and ratings of negative items were summed to form a Negative Affect score (NA). Because PA and NA are identified in the literature as being independent factors, scores were analyzed separately in 2 X 2 X 2 (Writing Condition X Pre- vs. Post writing X Sex) repeated measures ANOVAs with two between-subjects variables (Condition and Sex) and one within-subjects variable (Pre- and Post- writing). It was anticipated, as had been found in previously reported research and in Experiment One, that a significant interaction effect would be found such that subjects who disclosed personally traumatic material would report feeling more negative after writing than would control subjects.

Table 22: Positive Affect Ratings (PA): Means, Standard Deviations (in parentheses), and Ranges of scores by writing Condition and Sex of subject.

Control		Disclosing	
Pre-essay PA		Pre-essay PA	
Male	26.4 (7.3)	Male	27.3 (8.0)
n=25	Range: 14 to 39	n=25	Range: 13 to 47
Female	23.2 (5.3)	Female	28.0 (6.1)
n=25	Range: 15 to 35	n=26	Range: 15 to 37
Post-essay PA		Post-essay PA	
Male	23.8 (9.2)	Male	23.8 (7.6)
n=25	Range: 11 to 47	n=25	Range: 13 to 45
Female	21.8 (8.4)	Female	23.2 (7.0)
n=25	Range: 11 to 46	n=26	Range: 14 to 34

Table 23: Positive Affect Ratings (PA): Summary of Repeated Measures ANOVA results

Condition	n.s.
Pre-Post	$F(1, 97)=16.58$, $p<.001$
Sex	n.s.
Condition X Pre-Post	n.s.
Condition X Sex	n.s.
Pre-Post X Sex	n.s.
Condition X Pre-Post X Sex	n.s.

Table 24: Negative Affect Ratings (NA): Means, Standard Deviations (in parentheses), and Ranges of scores by writing Condition and Sex of subject.

Control		Disclosing	
Pre-essay NA		Pre-essay NA	
Male n=25	14.1 (3.2) Range: 11 to 23	Male n=25	14.2 (4.4) Range: 10 to 23
Female n=25	14.6 (4.7) Range: 10 to 29	Female n=26	13.7 (4.0) Range: 10 to 22
Post-essay NA		Post-essay NA	
Male n=25	13.0 (3.5) Range: 10 to 23	Male n=25	17.6 (5.7) Range: 13 to 45
Female n=25	11.9 (2.1) Range: 10 to 18	Female n=26	21.3 (9.9) Range: 10 to 38

Table 25: Negative Affect Ratings (NA): Summary of Repeated Measures ANOVA results

Condition	$F(1,97)=16.59$, $p<.001$
Pre-Post	$F(1, 97)=8.17$, $p=.005$
Sex	n.s.
Condition X Pre-Post	$F(1,97)=34.83$, $p<.001$
Condition X Sex	n.s.
Pre-Post X Sex	n.s.
Condition X Pre-Post X Sex	$F(1, 97)=5.09$, $p=.026$

Consistent with this prediction, significant effects were found with respect to both PA and NA. PA again decreased after writing, $F(1, 97)=16.58$, $p<.001$ for both Controls and Disclosers (means are listed in Table 22; Table 23 summarizes ANOVA results); no other effects on PA were apparent.

NA increased after writing relative to an initial rating, $F(1, 97)=8.17$, $p=.005$, for both Controls and Disclosers (see Table 24 for means; Table 25 summarizes ANOVA results). A significant main effect meant that NA scores were higher for Disclosing subjects as compared to Controls, $F(1,97)=16.59$, $p<.001$. A significant Condition by Pre- and Post-writing interaction effect was apparent such that Disclosing subjects reported significantly more NA after writing, $F(1,97)=34.83$, $p<.001$, as predicted. Additionally, a significant three way (Condition by Pre- and Post-writing by Sex) interaction effect also occurred; ratings of NA by Disclosing female subjects were highest after writing, while the ratings by female subjects in the Control writing condition were lowest; this effect was significant, $F(1, 97)=5.09$, $p=.026$. Differences between Controls and Disclosers on NA measured prior to writing were not significant.

Consistent with predictions, Disclosing subjects, particularly Females, reported more distressing feelings (NA) after writing than did Controls, while ratings of positive emotions (PA) decreased for all subjects after writing the assigned essays.

Performance on Cognitive Tasks

Performances on the two cognitive tasks presented to subjects were analyzed with individual 2 X 2 analyses of covariance (ANCOVA) with writing Condition and Sex of subject as the independent variables and

Table 26: Vocabulary measure: Means, standard deviations (in parentheses), and ranges of scores by writing Condition and Sex of subject.

Control		Disclosing	
Vocabulary		Vocabulary	
Male	12.4 (4.3)	Male	13 (4.2)
n=25	Range: 3 to 21	n=25	Range: 7 to 24
Female	11.2 (3.9)	Female	12.0 (3.7)
n=25	Range: 4 to 17	n=26	Range: 5 to 19

Table 27: Vocabulary measure: Summary of ANOVA results

Condition	n.s.
Sex	n.s.
Condition X Sex	n.s.

Table 28: Cognitive performance measures: Means, standard deviations (in parentheses), and ranges of scores by writing Condition and Sex of subject.

Control		Disclosing	
"Education" Question		"Education" Question	
Male n=25	6.2 (2.0) Range: 3 to 12	Male n=25	5.8 (1.6) Range: 3 to 9
Female n=25	5.9 (2.1) Range: 0 to 9	Female n=26	5.6 (2.0) Range: 1 to 11
"Alcohol" Question		"Alcohol" Question	
Male n=25	4.8 (1.9) Range: 2 to 9	Male n=25	4.5 (2.0) Range: 2 to 8
Female n=25	4.4 (2.0) Range: 1 to 8	Female n=26	3.9 (2.2) Range: 0 to 8

Table 29: Cognitive performance measures: Summary of ANCOVA results

"Education" Question	
Condition	n.s.
Sex	n.s.
Condition X Sex	n.s.
Vocabulary task as covariate	$F(1,96)=5.3$, $p=.023$
"Alcohol" Question	
Condition	n.s.
Sex	n.s.
Condition X Sex	n.s.
Vocabulary task as covariate	n.s.

score on the written vocabulary measure entered as covariate. No significant difference on the vocabulary task was evident as a function of Writing Condition or Sex of the subject in a prior evaluation with an ANOVA (Tables 26 and 27 present means and summary of ANOVA results, respectively).

Means for performance of the problem-solving tasks for Male and Female subjects in the Control and Disclosure conditions are presented in Table 28. Table 29 summarizes the results of the ANCOVA; no statistically significant differences were found on either of the two speculative "suppose" questions. On the "Education" question, score on the written vocabulary measure was significant as a covariate, $F(1,96)=5.35$, $p=.023$, as such accounting for a statistically significant portion of variability in "Education" scores. Score on the written vocabulary measure was not a significant covariate in analysis of the "Alcohol" question.

Repression-Sensitization

It had been predicted that Disclosing subjects identified as "Repressors" on the Revised Repression-Sensitization Scale (RSS) would write less, use fewer literal emotion words in their writing, rate their essays as expressing more previously undisclosed content, and would perform better on problem-solving tasks, controlling for language ability, than would individuals identified as "Sensitizers." Mean RSS scores were initially analyzed as a dependent variable in a 2 X 2 (writing Condition X Sex of subject) ANOVA to see if differences pre-existed among the groups defined by the other independent variables of interest; means are listed in Table 30, while a summary of ANOVA results is listed in Table 31. Unexpectedly, a significant main effect was found for

Table 30: Revised Repression-Sensitization Scale scores: Means, standard deviations (in parentheses), and ranges of scores by writing Condition and Sex of subject.

Control		Disclosing	
RSS		RSS	
Male n=25	53.7 (17.0) Range: 24 to 92	Male n=25	44.9 (20.7) Range: 10 to 87
Female n=25	53.2 (18.5) Range: 6 to 88	Female n=26	41.0 (23.7) Range: 12 to 97

Table 31: Revised Repression-Sensitization Scale scores: Summary of ANOVA results

Condition	$F(1, 97)=10.32$, $p=.002$
Sex	n.s.
Condition X Sex	n.s.

writing Condition, $F(1, 97)=10.32$, $p=.002$. Disclosers had lower scores on the RSS than did Controls; as such, Disclosers endorsed fewer items on the RSS and as such would tend to be identified with a Repressor defensive style. Control subjects endorsed more items on the RSS and as such would tend to be identified with a Sensitizer defensive style. It is important to highlight that the RSS was completed prior to the essay writing and so causality cannot be implied. Subjects did not differ on RSS scores as a function of Sex of subject as either a main effect or an interaction.

To preserve Repression-Sensitization as a continuous variable, rather than convert it to a categorical variable (e.g., Low RS vs. High RS), evaluation of the essay parameters, subject ratings of their essays, mood measures, and performance measures were evaluated using multiple regression analyses. Repression-Sensitization (RS), writing Condition, Sex of subject, and their interactions, along with Vocabulary were entered with the criterion variable into each regression equation. A stepwise procedure was used, wherein each independent variable is entered into the regression equation and assessed for its ability to predict the criterion variable. Variables were removed from the equation on the basis of diminished predictive power given the entry of another predictor into the equation (Tabachnick & Fidell, 1983). The results of these analyses are presented in Table 32.

Among the regression analyses conducted, numerous outcomes are consistent with results from previously conducted analyses. For example, number of essay words was predicted by Sex of subject, which is consistent with a significant ANOVA result reported earlier in which mean number of words written in the essays differed for Male and Female

Table 32: Multiple regression statistics for predicting essay parameters, essay ratings, mood ratings and cognitive performance variables from writing Condition, Sex of subjects, Repression- Sensitization, and Vocabulary as predictor variables.

	Beta	T	p	R-square	df	F	p
Essay Parameters							
Number of Words (Model)				.05	1,99	5.44	.022
Sex	.23	2.33	.022				
Number of Emotion Words (Model)				.50	2,98	49.41	.000
Condition	.62	8.14	.000				
Sex by Condn by RS	.19	2.47	.015				
Essay Ratings							
Revealing (Model)				.50	1,99	100.11	.000
Condition	.71	10.00	.000				
Real (Model)				.60	1,99	148.82	.000
Condition	.77	12.20	.000				
Stressful (Model)				.55	2,98	60.44	.000
Condition	.62	8.53	.000				
Sex by Cond'n by RS	.25	3.48	.001				
Told (Model)							
- no variables entered							
Mood Ratings							
Pre-Essay PA (Model)				.04	1,99	4.56	.035
Condition	.21	2.14	.035				
Post-Essay PA (Model)							
- no variables entered							
Pre-Essay NA (Model)				.10	1,99	10.73	.002
RS	.31	3.28	.002				
Post-Essay NA (Model)				.37	2,98	29.27	.000
Sex by RS	-.65	-4.87	.000				
Sex by Cond'n by RS	.99	7.44	.000				
Cognitive Performance Variables							
"Education" (Model)				.05	1,99	5.44	.022
Vocab	.22	2.33	.022				
"Alcohol" (Model)							
- no variables entered							

subjects. Likewise, writing Condition was a significant predictor for number of emotion words, and the ratings of the essays as revealing, addressing real emotions, and stressful to write. As well, the only independent variable which made significant contributions to the prediction of the "Education" task was the Vocabulary measure.

RS contributed significantly to the prediction of four dependent measures. To aid in the interpretation of its relationship with these dependent variables, RS was transformed into a three level categorical variable. Thirty-four subjects scoring between 6 and 39 on the RS were categorized as Low RS or Repressors. Thirty-one subjects scoring from 39 through to 56 were categorized as Moderate RS. Thirty-six subjects scoring from 57 through to 97 were categorized as High RS or Sensitizers. Means for number of emotion words, stressfulness of the essay writing, Pre-essay NA and Post-essay NA are broken down by writing Condition, Sex of subjects, and three levels of RS in Table 33.

RS interacted with the variables Condition and Sex to add significantly to prediction of number of emotion words included in the essays written. Among Female Disclosers, Sensitizers appeared to use more emotional words in their essays than did Male Disclosers, an effect which is in the direction predicted from hypotheses. Disclosers as a group wrote more emotional words than Controls did.

RS interacted with the variables Condition and Sex to add significantly to prediction of ratings of the degree of stressfulness to write the essays. Among Female Disclosers, Repressors appeared to rate themselves as having experienced less stress in composing their essays than did Moderates or Sensitizers; again, this is consistent with stated hypotheses. Male Disclosers categorized as Moderate had higher ratings

Table 33: Dependent measures predicted by RS in multiple regression analysis : Means and standard deviations (in parentheses), and ranges of scores by writing Condition, Sex of subject, and RS coded as a three level categorical variable.

	Control		Disclosing	
Number of Emotion words in essay				
Male	RS		RS	
	Low (Repressor), n=5	2.8 (2.3)	Low (Repressor), n=11	13.7 (8.8)
	Moderate, n=9	0.67 (1)	Moderate, n=7	14.3 (10.5)
	High (Sensitizer), n=11	1.3 (2.0)	High (Sensitizer), n=7	12.7 (6.3)
Female	RS		RS	
	Low (Repressor), n=4	1.3 (1.3)	Low (Repressor), n=14	16.3 (9.8)
	Moderate, n=9	3.3 (4.1)	Moderate, n=6	13.3 (10.1)
	High (Sensitizer), n=12	2.6 (5.2)	High (Sensitizer), n=6	20.5 (11.1)
Essay Rated: Stressful				
Male	RS		RS	
	Low (Repressor), n=5	1.4 (0.5)	Low (Repressor), n=11	3.5 (1.9)
	Moderate, n=9	1.4 (0.5)	Moderate, n=7	5.0 (2.2)
	High (Sensitizer), n=11	1.5 (0.7)	High (Sensitizer), n=7	4.1 (2.0)
Female	RS		RS	
	Low (Repressor), n=4	1.3 (0.5)	Low (Repressor), n=14	3.4 (1.7)
	Moderate, n=9	1.2 (0.4)	Moderate, n=6	5.7 (1.2)
	High (Sensitizer), n=12	1.6 (1.0)	High (Sensitizer), n=6	5.7 (1.0)
Post-Essay NA				
Male	RS		RS	
	Low (Repressor), n=5	12.6 (3.6)	Low (Repressor), n=11	14.4 (5.1)
	Moderate, n=9	12.8 (2.9)	Moderate, n=7	19.1 (4.6)
	High (Sensitizer), n=11	13.3 (4.1)	High (Sensitizer), n=7	21.3 (5.1)
Female	RS		RS	
	Low (Repressor), n=4	12.8 (2.1)	Low (Repressor), n=14	18.5 (9.8)
	Moderate, n=9	11.4 (1.2)	Moderate, n=6	25.0 (11.0)
	High (Sensitizer), n=12	11.9 (2.6)	High (Sensitizer), n=6	24.3 (8.5)

Post-Essay NA	(Across writing Conditions)	
Male	RS	
	Low (Repressor), n=16	13.8 (4.6)
	Moderate, n=16	15.6 (4.9)
	High (Sensitizer), n=18	16.4 (5.9)
Female	RS	
	Low (Repressor), n=18	17.2 (8.9)
	Moderate, n=15	16.9 (9.6)
	High (Sensitizer), n=18	16.1 (7.9)

Pre-Essay NA	(Across writing Conditions)	
	RS	
Male and Female	Low (Repressor), n=34	12.6 (3.0)
	Moderate, n=31	14.2 (3.8)
	High (Sensitizer), n=36	15.5 (4.7)

of stressfulness of writing the essay than did Repressors or Sensitizers. As noted in previous analyses, Disclosers as a group rated the essay writing as more stressful than did Controls.

RS significantly predicted Pre-essay ratings of NA. Consistent with hypotheses, Sensitizers produced the highest ratings of NA prior to writing, with Repressors producing the lowest ratings of NA at that time.

RS interacted with the variables Condition and Sex to add significantly to prediction of Post-essay ratings of NA . Whereas Male Sensitizers gave higher ratings of NA after the essay writing than did Male Moderates, who in turn gave higher ratings of NA than did Repressors, Female Repressors produced higher ratings of NA than Female Moderates, who in turn gave higher ratings of NA than did Female Sensitizers.

Additional Exploratory Analyses

As in Experiment One, Disclosing subjects wrote more emotional words in their essays than did Control subjects, rated their essays as more personally revealing, indicative of real emotions, and stressful to write, and experience more negative affect after writing. However, findings from the cognitive performance tasks do not provide support for the hypothesis that emotionally expressive writing about personal experiences of trauma facilitates problem-solving. Additional exploratory analyses were again conducted: correlations among variables were measured within each of 2 X 2 (writing Condition X Sex of subject) experimental cells. Thus, separate correlation matrices were again generated for Male Controls, Female Controls, Male Disclosers, and Female Disclosers.

To again limit the number of variables in the correlation matrices, summary variables were created. To represent subjects' ratings of the essay content, a variable Degree of Disclosure was created, summing subjects' essay ratings "personally revealing," "real emotions", and "stressful to write;" from this sum, rating of "told to others" was subtracted. To represent change in negative and positive affect from initial measurement to post-essay measurement, pre-essay ratings were subtracted from post-essay ratings to create Change in Affect variables for PA and NA. Other variables were entered into the analysis without transformation, including Number of Words in the essays, Number of Emotion Words in the essays, Vocabulary, the "Education" and "Alcohol" performance measures, and RS.

The correlation coefficients and levels of significance for Male Controls, Female Controls, Male Disclosers, and Female Disclosers are presented in Tables 34 to 37 respectively. For Male Controls, Degree of Disclosure in the essays covaried significantly with Vocabulary (r=.41, p=.041) and changes in PA (r=.44, p=.028). For Male Controls, mean PA decreased (not significant) from pre- to post essay, so greater Degree of Disclosures is associated with lower PA. Greater Number of Words in the Essay is also associated with lower PA (r=.52, p=.008), though not with changes in NA. For this group, score on the "Alcohol" question increased with use of fewer emotional words; this was consistent with instructions given both to express few emotions in their essays but to give their best efforts on the cognitive performance tasks (r=-.44, p=.029). Increased score on the "Alcohol" question was associated with increase of NA (although increase in NA was not significant in comparisons of means).

Table 34: Pearson product-moment correlation coefficients and significance levels: Within cell correlations for male disclosers

	RSS Score	"Alcohol"	"Education"	Vocabulary	Change in NA	Change in PA	Disclosure	Emotion words
Number of words	.1143 p=.587	.4217 p=.036	.4607 p=.020	-.2663 p=.198	-.2990 p=.147	-.0053 p=.980	-.2398 p=.248	.4819 p=.015
Emotion words	-.0779 p=.711	.3368 p=.100	.2684 p=.195	-.1773 p=.397	-.1040 p=.621	-.1247 p=.553	-.1413 p=.501	
Disclosure	.2610 p=.208	-.2539 p=.221	-.1535 p=.464	-.3071 p=.135	.7163 p=.000	-.0273 p=.897		
Change in PA	.1316 p=.531	-.1601 p=.444	-.1743 p=.405	-.0489 p=.816	-.0972 p=.644			
Change in NA	.2469 p=.234	-.0771 p=.714	-.2803 p=.175	-.2906 p=.159				
Vocabulary	-.2619 p=.206	-.3299 p=.107	-.1359 p=.517					
"Alcohol"	.1757 p=.401	.4470 p=.025						
"Education"	.3384 p=.098							

n=25

Legend
Disclosure: Degree of disclosure, summing subjects' essay ratings "personally revealing," "real emotions", and "stressful to write," and subtracting rating of "told to others."
"Alcohol" : "Alcohol" dependent variable
"Education" : "Education" dependent variable
Change in PA: Change in Positive Affect from prior to post- writing
Change in NA: Change in Negative Affect from prior to post- writing
Vocabulary: Vocabulary measure
Number of words: Total number of words written in the essay
Emotion words: Total number of literal emotion words included in the essay.

Table 35: Pearson product-moment correlation coefficients and significance levels: Within cell correlations for female disclosers

	RSS Score	"Alcohol" "Education"		Vocabulary	Change in NA Change in PA		Disclosure Emotion words
Number of words	.1289 p=.530	.0347 p=.866	-.0384 p=.852	.3086 p=.125	.3040 p=.131	-.2108 p=.301	.3721 p=.061	.3570 p=.073
Emotion words	.3319 p=.098	.1046 p=.611	-.1741 p=.395	.0569 p=.782	.2149 p=.292	-.5743 p=.002	.3794 p=.056	
Disclosure	.5427 p=.004	.2587 p=.202	.2510 p=.216	.1419 p=.489	.6299 p=.001	-.5074 p=.008		
Change in PA	-.3105 p=.123	-.1109 p=.590	-.0180 p=.930	-.0789 p=.702	-.4052 p=.040			
Change in NA	.2583 p=.203	.0642 p=.755	.1050 p=.610	.1791 p=.381				
Vocabulary	.1544 p=.452	.5064 p=.008	-.1601 p=.435					
"Alcohol"	.0326 p=.874	.2969 p=.141						
"Education"	.0198 p=.923							

n=26

Legend
Disclosure: Degree of disclosure, summing subjects' essay ratings "personally revealing," "real emotions", and "stressful to write," and subtracting rating of "told to others."
"Alcohol" : "Alcohol" dependent variable
"Education" : "Education" dependent variable
Change in PA: Change in Positive Affect from prior to post- writing
Change in NA: Change in Negative Affect from prior to post- writing
Vocabulary: Vocabulary measure
Number of words: Total number of words written in the essay
Emotion words: Total number of literal emotion words included in the essay.

Table 36: Pearson product-moment correlation coefficients and significance levels: Within cell correlations for male controls

	RSS Score	"Alcohol" "Education"		Vocabulary	Change in NA Change in PA	Disclosure	Emotion words
Number of words	-.3868 p=.056	.0088 p=.967	-.0766 p=.716	.3189 p=.120	.1221 p=.561	.5179 p=.008	.2315 p=.266	.1392 p=.507
Emotion words	-.0271 p=.898	-.0160 p=.940	-.4379 p=.029	-.0637 p=.762	.3409 p=.095	.1267 p=.546	.0690 p=.743	
Disclosure	-.2959 p=.151	-.0399 p=.850	-.1732 p=.408	.4123 p=.041	.2235 p=.283	.4391 p=.028		
Change in PA	-.1041 p=.621	-.1604 p=.444	-.0243 p=.908	.3573 p=.080	-.0940 p=.655			
Change in NA	-.2732 p=.186	-.0773 p=.713	-.4663 p=.019	.0014 p=.995				
Vocabulary	-.3318 p=.105	.1678 p=.423	.1576 p=.452					
"Alcohol"	.0790 p=.707	.4201 p=.037						
"Education"	.1961 p=.347							

n=25

Legend
Disclosure: Degree of disclosure, summing subjects' essay ratings "personally revealing," "real emotions", and "stressful to write," and subtracting rating of "told to others."
"Alcohol" : "Alcohol" dependent variable
"Education" : "Education" dependent variable
Change in PA: Change in Positive Affect from prior to post- writing
Change in NA: Change in Negative Affect from prior to post- writing
Vocabulary: Vocabulary measure
Number of words: Total number of words written in the essay
Emotion words: Total number of literal emotion words included in the essay.

Table 37: Pearson product-moment correlation coefficients and significance levels: Within cell correlations for female controls

	RSS Score	"Alcohol" "Education"		Vocabulary	Change in NA Change in PA		Disclosure Emotion words
Number of words	.0411 p=.845	.1944 p=.352	.1415 p=.500	.0988 p=.638	.0740 p=.725	-.0405 p=.848	.2199 p=.291	.0715 p=.734
Emotion words	-.0205 p=.923	.0465 p=.825	-.5692 p=.003	-.2348 p=.259	.0314 p=.882	-.0776 p=.712	.2208 p=.289	
Disclosure	.1371 p=.513	-.2001 p=.338	-.2194 p=.292	-.2021 p=.333	-.0211 p=.920	-.4352 p=.030		
Change in PA	.2101 p=.314	.0789 p=.708	.0969 p=.645	.0739 p=.726	-.4614 p=.020			
Change in NA	-.1282 p=.541	.0861 p=.682	-.1995 p=.339	-.0695 p=.741				
Vocabulary	-.0181 p=.931	.4980 p=.011	.1687 p=.420					
"Alcohol"	-.0991 p=.638	.1688 p=.420						
"Education"	-.2582 p=.213							

n=25

Legend
Disclosure: Degree of disclosure, summing subjects' essay ratings "personally revealing," "real emotions", and "stressful to write," and subtracting rating of "told to others."
"Alcohol" : "Alcohol" dependent variable
"Education" : "Education" dependent variable
Change in PA: Change in Positive Affect from prior to post- writing
Change in NA: Change in Negative Affect from prior to post- writing
Vocabulary: Vocabulary measure
Number of words: Total number of words written in the essay
Emotion words: Total number of literal emotion words included in the essay.

For Female Controls, Change in PA covaried inversely with Degree of Disclosure (r=-.44, p=.030); thus, as disclosure increased, PA decreased. Score on the "Alcohol" question was inversely related to number of emotional words used (r=-.57, p=.003), as was found with Male Controls. Again, this was consistent with instructions given both to express few emotions in their essays but to give their best efforts on the cognitive performance tasks. Increased score on the "Education" question was positively and significantly related to Vocabulary performance (r=.50, p=.011).

Among Male Disclosers, more emotional words were used as increased Number of Words were used in essays (r=.48, p=.015), consistent with instructions, though Males in the study wrote significantly less than Females. Degree of Disclosure was positively associated with an increase in NA after essay writing (r=.72, p<.000). As in Experiment One, the greater the number of words that Male Disclosers wrote in their essays, the better they did on both the "Education" (r=.42, p=.036) and the "Alcohol" (r=.46, p=.020) questions. Vocabulary was not significantly associated with any other variable in the matrix.

This relationship did not hold for Female Disclosers; of the two cognitive performance variables, only "Education" was associated with another variable, namely Vocabulary. Better performance on "Education" was associated with greater score on Vocabulary (r=.51, p=.008). As in Experiment One, greater Degree of Disclosure was associated with increase in NA post-writing (r=.63, p=.001). Additionally, for Female Disclosers in Experiment Two, Degree of Disclosure was associated with decrease in PA post-writing (r=-.51, p=.008). Number of

Emotional words used in the essay was not associated with Change in NA, as in Experiment One, but greater Number of Emotional words was associate with decrease in PA post-essay (r=-.57, p=.002). Degree of Disclosure was associated with RS (r=-.54, p=.004): greater self-rating of disclosure was made as RS increases; that is, as tendency to Sensitize increases, and tendency to Repress decreases, ratings of disclosure are higher.

As in Experiment One, within the Male and Female Disclosure correlation matrices, there is interesting evidence which pertains to the hypotheses of interest. Female Disclosers appear to be writing emotionally, reporting that they are disclosing, and, covarying significantly with those factors, experiencing less positive affect. As self-reported rating of disclosure increases, Female Disclosers experience more negative affect. None of these factors significantly correlate with the two measures of cognitive performance. Male Disclosers did not demonstrate this pattern of disclosure, self-report of Degree of Disclosure, and change in affect. However, as noted in Experiment One, the more that they wrote in their essays, in terms of sheer volume, the better they did in terms of both measures of cognitive performance. No significant relationship exists between either length of essay or cognitive performance and Vocabulary performance: thus, the correlation between Degree of Disclosure and the two cognitive performance variables is not an artifact of Vocabulary performance. These results again suggest that Males and Females may disclose in different ways, and may benefit differently from their disclosures in terms of impact on cognitive problem-solving processes.

Discussion

Two experiments were conducted to examine the general hypothesis that emotional self-disclosure leads to improved cognitive processing of verbal information. Previous evidence indicates that significant physiological changes and improvements in health status occur after relatively brief episodes of writing about personal experiences of trauma or distress. These health-related benefits appear to occur without deliberate action taken to change the status of one's health. It was hypothesized that individuals who write in an emotionally expressive manner about their own personal experiences of trauma would perform better on verbal problem-solving tasks than would individuals who write without emotional expression about a trivial topic. The following discussion will review the results of these two experiments, present possible explanations for the limited supporting data found for the hypotheses, and, with this, present strengths and limitations of these studies to guide future research in this area.

Hypothesis Testing in Experiment One

In Experiment One, male and female subjects participated in five experimental sessions. For the first three sessions, subjects spent thirty minutes writing essays about either (a) their thoughts and feelings regarding the most traumatic event(s) they had experienced (Disclosure condition), or (b) an objective, factual description of their activities of the past 24 hours (Control condition). At the fourth and fifth sessions, subjects completed a set of seven verbal problem-solving tasks.

Experiment One presented three hypotheses. The first two of these represented expectations regarding manipulation checks. These manipulation checks were to ensure that subjects were completing, and

reacting to, their essays in a manner similar to that reported in previous research on the effects of brief, expressive writing (cf. Pennebaker & Beall, 1986; Pennebaker et al., 1988).

The first hypothesis was that subjects in the Disclosing condition would write essays which were more personally revealing and indicative of real emotions than would Controls. Disclosers' essays were rated as significantly more personally revealing and indicative of real emotions , and stressful to write than were Control essays. Disclosers' essays also included more emotional words, particularly negative emotion words, and included more personal pronouns.

The second hypothesis was that Disclosers' ratings of their emotions immediately after writing would indicate more negative emotions than they had reported prior to writing and more negative emotions than were reported by Controls either prior to or following their writing. Subjects reported lower positive affect after writing the essays and generally lower positive affect over the course of the week; however, there was no differential report of positive affect on the basis of writing condition. Disclosers reported significantly more negative affect than Controls did, particularly in response to writing the essays, while subjects generally reported higher negative affect after writing the essays and generally higher negative affect over the course of the week.

The third, but most important, hypothesis of Experiment One was that Disclosers's performance on a group of seven verbal problem-solving tests presented at two sessions one week apart would exceed the performance of Control subjects. This superior performance was expected to reflect facilitated thinking arising from emotionally expressive self-disclosure. It was not supported by a multivariate

analysis which looked at the seven variables simultaneously. A multivariate effect was apparent such that subjects across writing conditions performed better on tasks on the second Friday of testing than they had on the first Friday. Given counterbalancing of order of presentation among subjects of two versions of each of the seven tasks, it can be argued that any systematic differences between the two versions of each task cannot account for the differences in performance from one presentation to the next. However, it is possible that subjects' familiarity with the tasks at the second sitting meant that less time was required in the reading and interpretation of instructions on each task, less time was required for orienting to the task demands, and that therefore more time was available for generating responses to test items. Univariate analyses produced one significant difference, on a task requiring subjects to speculate broadly about the impact of prohibiting alcohol or providing government funding of all post-secondary training. With a large number of tasks being analyzed using univariate statistical methods, there is a probability that differences in means on that task do not reflect real differences in ability and thus represent Type I error. Thus the result could not stand on its own as strong evidence to support the stated hypothesis. However, because the difference in means on this task favoured the hypothesis, inclusion of the task in a second experiment was certainly viewed as being warranted.

The data collected generally supported the first two hypotheses, such that subjects appeared to be writing, and reacting to, essays in a manner similar to that reported in previous research. However, the more important hypothesis, that disclosure would facilitate problem-solving, received only limited, tentative support.

Some additional observations are noteworthy. Disclosers' ratings of the degree to which they had told others of the content of their essays indicated that they were not exclusively reporting material which previously had gone unreported. This level of reporting is similar to the degree of previous reporting as rated by Pennebaker et al.'s (1988) disclosing subjects. In that study, subjects responded to a seven point Likert-type scale asking the degree to which they reported material which they previously held back. Mean response from Disclosers for that item was 4.58, as compared to ratings of "told previously" (and therefore reversed scaling) in Experiment One of 3.4 by Male Disclosers and 2.9 for Female Disclosers. Thus, in the present study, degree of previous disclosure, indexed by ratings of extent to which content of essays was told to others, is similar to that previously reported.

While reporting of previously undisclosed material is a critical element in an inhibition model of the salubrious effects of self-disclosure (Pennebaker, 1985; Pennebaker, 1990), Pennebaker et al. (1988) found that health centre visits decreased, subjective distress decreased, and immunological functioning improved for Disclosers and that exclusive reporting of previously withheld information was not required for disclosure to have this impact. Greenberg and Stone (1992) observed that differences in prior disclosure of trauma did not significantly predict long term health utilization and reports of physical symptoms. These authors reported that health benefits were in evidence for subjects who reported more severe traumas as compared to subjects reporting low-severity trauma or control subjects. Disclosure of previously unreported material may not be an essential factor for the salubrious effects of diclosure to occur.

A second observation is that several interaction terms in the analyses conducted on the essays written and subject ratings of the essays indicate that Females responded differently to the Disclosure condition than Males did. Female Disclosers wrote more and used more emotional words, including negative emotion words, in their essays than did Male Disclosers and rated their essays as more revealing and stressful to write than did Male Disclosers. While this did not result in group differences on the cognitive performance tasks, it does suggest a different process involved in the writing. For Female Disclosers, the process appears to have been somewhat more active and evocative of emotion than it was more Males, though the significance of this is not yet apparent in the context of the current studies.

A third observation comes from the within cell correlations, which offered some perspective on relationships among variables for each of the Male Control, Female Control, Male Discloser, and Female Discloser groups. Correlations suggest that Female Disclosers wrote emotionally and reported that they were disclosing, and, covarying significantly with these factors, were experiencing more negative affect. None of these variables correlated significantly with a variable summarizing cognitive performance. However, an intriguing correlation existed for Male Disclosers such that cognitive performance covaried with the amount that they wrote in their essays. For Male Disclosers, neither of these variables correlated with number of emotional words included in their essay, their ratings of the degree of self-disclosure or changes in positive or negative affect. As was noted earlier in this discussion, it appeared that Males and Females responded differently to the demands of the Disclosure condition. Correlational analyses suggest that Males may

have benefited from writing, but it may not have been a process involving, as Female Disclosers experienced, the reporting of explicit emotions and evocation of change in affect. These results are intriguing. Interpreted in a manner consistent with the hypothesis, they suggest that writing promoted problem solving in that more writing coincided, for Male Disclosers, with better problem solving. However, both variables may also have been subject to the influence of a third variable, such as verbal intelligence, such that more verbally capable Males produced longer essays and performed better on the performance measures than less verbally capable Males. This variable was not evaluated in the first study, but a measure of verbal ability (vocabulary) was included in analyses conducted in Experiment Two.

Hypothesis Testing in Experiment Two

In Experiment Two, male and female subjects completed a written vocabulary test, the Revised Repression-Sensitization Scale (RSS; Byrne, Barry, & Nelson, 1963), wrote for thirty minutes in a Disclosure or Control condition, and then immediately completed two verbal problem-solving tasks.

Experiment Two presented four hypotheses, the first three of which parallel those of Experiment One, and the latter of which represents a number of anticipated effects involving RSS. The first two of these hypotheses again represented expectations regarding manipulation checks. These manipulation checks were to ensure that subjects were completing, and reacting to, their essays in a manner similar to that reported in previous research on the effects of brief, expressive writing (cf. Pennebaker & Beall, 1986; Pennebaker et al., 1988).

The first hypothesis was that subjects in the Disclosing condition would write essays which were more personally revealing and indicative of real emotions than would Controls. Disclosers' essays were rated as significantly more personally revealing and indicative of real emotions , and stressful to write than were Control essays. Disclosers' essays also included more emotional words than Control essays did.

The second hypothesis was that Disclosers' ratings of their emotions immediately after writing would indicate more negative emotions than they had reported prior to writing and more negative emotions than were reported by Controls either prior to or following their writing. All subjects reported lower positive affect after writing the essays with no differential report of positive affect on the basis of writing condition. Disclosers reported significantly more negative affect than Controls did, particularly in response to writing the essays, while subjects generally reported higher negative affect after writing the essays. Female Disclosers reported significantly more negative affect than Male Disclosers or Controls.

The third and most important hypothesis of Experiment Two was that Disclosers's performance on two verbal problem-solving tests would exceed the performance of Control subjects, while controlling for the influence of verbal ability by including a vocabulary measure as a covariate in analyses. This hypothesis was not supported by the data which provided no evidence of differences between Disclosers and Controls on means for these measures.

The fourth hypothesis pertained to Repression-Sensitization, and was represented by a set of predictions. Because the Repression-Sensitization dimension pertains to individuals' typical styles of dealing

with threatening material, predictions were made with reference particularly to subjects in the Disclosing condition who were most explicitly, by instruction, dealing with threatening personal material. It was predicted that individuals identified as Repressors from their scores on the Revised Repression-Sensitization Scale (Byrne, et al., 1963) would write less and use fewer literal emotion words than would individuals identified as Sensitizers on the scale. It was expected that Repressors, more so than Sensitizers, would tend to rate their writing as expressing content previously undisclosed to others. Furthermore, Repressors were expected to benefit from disclosing such that their performance on two written problem-solving tasks, controlling for written language ability, would exceed that of Sensitizers.

In an initial analysis treating RS as a dependent variable in a 2 X 2 ANOVA with the independent variables writing Condition and Sex of subject, it was unexpectedly found that Disclosing and Control subjects' mean scores on the RSS differed significantly. Disclosers had significantly lower scores, tending toward Repression, while Controls' higher scores meant that they tended more toward Sensitization. It certainly would have been more desirable to have a more equal distribution of RSS scores within each condition. However, it would have been expected that any bias contributed by the greater representation of Repressors among the Disclosers would be to see a more exaggerated demonstration of the effects hypothesized, given that Repressors were expected to report less distress in their essays and self ratings but to benefit most from disclosure.

RSS scores were predictive of pre-essay Negative Affect for the whole sample of subjects. As predicted, Repressors reported less initial NA than was reported by Sensitizers.

RS was predictive of a number of interaction effects such that, interacting with Condition and Sex, number of emotion words, ratings of the essay writing being stressful, and post-essay Negative Affect ratings were significantly predicted. Moreover, means generated to interpret these effects generally demonstrate a pattern consistent with predictions. Thus, among Female Disclosers, Repressors used fewer emotion words than Sensitizers, though they used fewer than a comparison group who had moderate RSS scores. Repressors rated their essays as less stressful than Sensitizers did, particularly among Female Disclosers. Repressors reported less post-essay NA than did Sensitizers; this was true particularly among Male Disclosers.

Repression-Sensitization was not predictive of outcome on the cognitive performance tasks, though it was expected that Repressors would tend to benefit most (get higher scores) on these tasks following disclosure than would Sensitizers.

The RS dimension seemed to have limited utility in predicting the reactions of Males and Females when they are in a situation where they are to disclose personal traumatic information about themselves. RSS scores appeared to be most useful in predicting variables explicitly associated with threat or distress. That is, it predicted number of emotional words used by Female Disclosers in their essays but not their total number of words. It predicted Female Disclosers' ratings of stress after writing the essay but not their ratings of the essay as personally revealing, expressing real emotion, or containing content previously

undisclosed. It was predictive of Male Disclosers' ratings of post-essay NA, and more generally of pre-essay NA across Sexes and Conditions, but was not predictive of PA before or after writing. While Bell and Byrne (1978) chronicled a number of personality correlates and behaviours which research up to that time had associated with RS, the current sample suggests that applicability of RS is with criteria explicitly associated with threat or distress.

Within cell correlations were again calculated to investigate relationships among variables for each of the Male Control, Female Control, Male Discloser, and Female Discloser groups. As in Experiment One Female Disclosers' degree of disclosure covaryed significantly with increased negative affect and decreased negative affect, but cognitive performance was correlated only with verbal ability (vocabulary). An intriguing correlation from Experiment One existed for Male Disclosers in Experiment Two, such that the more that they wrote in their essays, the better they did on both cognitive performance tasks. For the Male Disclosers, neither of the cognitive performance variables correlated with number of emotional words included in their essay, their ratings of the degree of self-disclosure or changes in positive or negative affect. More importantly, neither the cognitive performance variables nor number of words in the essay correlated with the vocabulary measure. This suggests that the correlation between Degree of Disclosure and the two cognitive performance variables is not an artifact of Vocabulary performance. This pattern of relationships among variables appears to be consistent with the hypothesis that disclosure leads to facilitation of verbal problem-solving. Males and Females appeared to respond differently to the demands of the Disclosure condition, but neither group

evinced stronger performance on the cognitive measures than did Control subjects.

Accounting for Limited Support for the Hypotheses

While subjects in two experiments wrote essays as they were instructed to, and reacted to their writing with essay ratings and emotional ratings as they were expected to, Disclosers did not demonstrate performance on verbal problem-solving tasks which was superior to that of Controls. Two general explanations for the current lack of supporting data can be conceived. One is that the effect in question, the facilitation of problem solving after emotionally expressive writing about personal experiences of trauma, does not exist. Conversely, this effect may exist, but was not evident in the data presented because of limitations of the design. In addressing these explanations, future directions for research will be indicated.

One way to explain the lack of evidence which would indicate that emotive disclosure facilitates problem-solving is to suggest that no such effect occurs. Pennebaker and other researchers have identified significant physical effects and improved health of their subject populations consequent to relatively brief episodes of self-disclosure, and they have speculated on cognitive changes that accompany those health-related benefits (Mendolia & Kleck, 1993; Pennebaker & Beall, 1986; Pennebaker, 1990). Mendolia and Kleck (1993) reported that subjects who disclosed their emotional reactions to a distressing video later expressed themselves with less difficulty, more animation, and less tension than did a group of subjects who had described the same video in factual, nonemotive terms. This suggests a facilitation in thought and expression following disclosure of emotional reactions to a novel

stressor. Pennebaker (1990) also reported observing cognitive changes in subjects who write about a traumatic experience from the past. He noted that subjects who write with emotional expression about a traumatic experience develop the ability "to stand back and consider the complex causes of the event and their own mixed emotions" (p. 106). However, these reports do not present empirical support of facilitated thinking following emotional self-disclosure. It may be that the individual who emotionally self-discloses personal material, particularly that which previously has not been reported to others or acknowledged to the self, enjoys a physiological release and discovers information about his or her inner life but does so in the absence of qualitative changes to his or her thinking that would impact on other areas of his or her life.

While logically one cannot prove that an effect does not exist, dismissing the existence of an effect also leaves evidence, albeit anecdotal, without explanation. While neither of the current experiments presented reliable data demonstrating group differences on task performance as a function of disclosive versus non-disclosive writing, correlational data suggests that at least Male Disclosers may benefit from some form of disclosive writing. Male Disclosers and Female Disclosers appeared to express themselves in different ways, and benefit differently from their disclosure: the explanation which will result will not be simple. Moreover, the data generated add little to being able to explain cognitive benefits of self-disclosure. However, the data do keep alive the hypothesis that self-disclosure has cognitive benefits.

A more plausible explanation for the current lack of evidence in support of the hypothesis that emotive self-disclosure facilitates thinking is that a true effect exists which was not entirely evident in the two

experiments reported. This effect may not have been evident because of methodological variations from previously reported studies and limitations to the design which are apparent in retrospect.
It may also be that the true cognitive impact of emotive self-disclosure differs from that which was expected and operationalized in the studies which have been presented. The discussion will consider each of these potential reasons in turn.

Work by Pennebaker and his associates has generated intriguing evidence of a link between emotive self-disclosure and subsequent health of the individual (Pennebaker & Beall, 1986; Pennebaker et al., 1988; Pennebaker et al., 1990) and has also stimulated considerable research interest in the area (Greenberg & Stone, 1992; Mendolia & Kleck, 1993; Murray, et al., 1989; Murray & Segal, 1994; Petrie, et al., 1995). Efforts to replicate this paradigm have inconsistently demonstrated health effects following self-disclosure (cf. Murray et al., 1989) or have not found an effect attributable to reporting of previously inhibited personal material (Greenberg & Stone, 1992). It appears that replication of the effects reported by Pennebaker's lab is not a straightforward matter, but it is not possible, with the information available, to compare research settings to determine discrepancies in procedures. It remains plausible that the element or elements necessary for expression of health changes, or, by extension, cognitive changes following self-disclosure has or have not been identified. In the current study for example, Female Disclosers wrote longer essays with greater expression of emotion. However, in two experiments, cognitive performance by Male Disclosers covaried only with sheer volume of written output in the disclosive essay, and not with expression of emotion. While mood seems a plausible mediating variable

for cognitive performance (Murray, Sujan, Hirt, & Sujan, 1990; Kavanagh, 1987), emotional expression in disclosure may not be required for cognitive performance to be enhanced. Reliable future replications of Pennebaker's paradigm will depend on identifying essential variables involved and the mechanism by which change in health and cognition occur. These are missing from our current understanding of this effect.

Differences in the populations investigated may account for difficulties other researchers have had replicating Pennebaker's findings and the present lack of findings supporting the hypothesis of facilitated problem-solving following emotive self-disclosure. The distress experienced by individuals regarding traumatic experience tends to be greater with earlier age of occurrence of the trauma, varies depending on the type of trauma (e.g., sexual assault as compared to car accident), and is subject to mediating variables such as prior treatment (Burnam, Stein, Golding, Siegal, Soernson, Forsythe, & Telles, 1989; van der Kolk, Pelcovitz, Roth, Mandel, McFarlane, & Herman, 1996). In neither the current studies nor Pennebaker's studies were subjects identified for inclusion or exclusion on the basis of previously reported distress. It remains a possibility that the trauma history of the group of subjects studied would significantly impact outcomes of an experimental manipulation. While this invites speculation, the impact of population differences between the current studies and others reported before cannot be evaluated and as such cannot account for the current lack of expected findings. To the extent that Pennebaker's populations and that of the current studies were undergraduate students, it would appear that there is no particular reason to suspect that the populations differed significantly on dimensions relevant to the disclosure of trauma.

However, that having been said, the use of measures of trauma history as inclusion criteria would be an asset in future research.

The current experiments had a number of limitations which very likely impacted their ability to detect the effects of interest. First, no measures of physical health were included; while parameters of essay writing and subject ratings of their essays and their affect were evidence of partial replication of previous research, the longer term impact of this writing could not be evaluated or compared with that reported previously. Inclusion of health indices, along with measurements of self-report, affect, prior trauma experiences, verbal ability, and cognitive performance would likely be a valuable design. A design incorporating these variables would allow for a comparison with previously conducted research, test hypotheses further regarding cognitive functioning after self-disclosure, and test the hypothesis that both cognitive and health benefits resulted from a disinhibitory process.

A second limitation in both experiments was that measurement of the cognitive performance variables occurred after the primary experimental manipulation (the essay writing), and comparisons of cognitive performance were between groups. A repeated measures, within-subjects design with presentation of cognitive measures pre- and post-manipulation may decrease error variance and increase the likelihood of finding a significant effect.

A third concern about the current experiments is that the response ranges of the performance measures may have been too limited to detect differences between groups of subjects. Attenuated range may have resulted from subjects reaching a ceiling of performance on the tasks presented to them. Future research needs to identify a variable or

variables with a continuous range which is presented within a time frame such that a ceiling of performance is not reached. Additionally, other cognitive processes may be impacted by self-disclosure, such as ability to sustain attention or memory encoding. The impact of written self-disclosure on clinical variables, including anxiety or depression, would be important to ascertain.

A fourth concern is that the time frame for measuring cognitive performance may also have been too brief. In Pennebaker's research, health benefits were noted six weeks (Pennebaker, et al, 1988) to four months (Pennebaker & Beall, 1986) after disclosive writing. In Experiment One, the significant effect found with the speculative "suppose" questions was found on the second Friday of testing (2 X 2 Condition X Sex ANOVA, $F(1, 81)=4.90$, $p=.030$), but not on the First Friday, ($F(1, 81)=.80$, $p=.183$). In Experiment Two, subjects went almost immediately from self-disclosive writing into the cognitive performance tasks, and an effect of writing condition with the speculative "suppose" questions was not found. These results suggest that a passage of time may need to occur before measurable changes in cognition occur. Future research would do well to include a series of measurements over time, including longer term (1.5 to 6 months) measurement of cognitive performance post-disclosure. Pennebaker and his associates noted that disclosing subjects reported more negative affect immediately following disclosure but reported more positive affect than did Control subjects three months later (Pennebaker et. al., 1988); similarly, changes in intellectual processing may be small, subtle, and cumulative over time.

Concluding Comments

The impact of relatively brief episodes of self-disclosive writing on general health appears to have a reasonable body of evidence (Greenberg & Stone, 1992; Mendolia & Kleck, 1993; Murray, et al., 1989; Murray & Segal, 1994; Pennebaker & Beall, 1986; Pennebaker et al., 1988; Pennebaker et al., 1990; Petrie, et al., 1995). It is a task which can be performed without significant financial expense; there are few social contraindications. As such it could be promoted as a self-help strategy or as a valuable adjunct to counselling. The emotional benefits of written self-disclosure could conservatively be expected to include eventual increase of positive affect, although this happens after some delay after writing; immediate affect is significantly more negative after self-disclosive writing. An individual might also generate helpful information about the self, allowing for strategic change in behaviour.

It has not been established that self-disclosing writing facilitates the quality of one's problem-solving. Limited evidence suggests that this is so, but that evidence also suggests that individuals benefit in different ways from different kinds of writing. Writing which merely chronicles behaviour, without emotional expression, does not evoke the kind of emotion reported by Disclosers, who wrote about the most traumatic and distressing experience or experiences of their entire lives. This emotional expression, and resulting negative affect appears to be associated with higher levels of positive affect later in time (Pennebaker et. al., 1988). In the current studies, it appeared that Female Disclosers wrote in a manner that included use of emotional words and evoked an emotional response. This may be expected to later benefit this group in terms of increased positive affect. However, it appeared that the amount that

Male Disclosers' wrote, emotionally toned but rated as less distressing and evoking less emotion, was associated with increased performance on the cognitive tasks. It may be that an emotional benefit comes from emotional expression, though there is likely a time delay involved for this change to come about. Cognitive impact of self-disclosure may be greater or more immediate when the disclosure is less emotionally evocative or is more limited in scope. Thus, cognitive benefits of self-disclosure appear to be dependent on the timing of the self-disclosure and subsequent measurement of cognitive performance, may depend on the degree and nature of the self-disclosure, may benefit Males and Females differentially, perhaps due to reasons other than typical styles of emotional responding, and may vary according to the type of trauma reported and history of reporting that trauma. It is difficult to predict how self-disclosive writing would affect cognitive processing in other settings or with populations other than introductory students, including identified clinical populations. There is therefore much that can be done with future research.

References

Alloy, L.B. & Abramson, L.Y. (1979). Judgement of contingency in depressed and nondepressed students: Sadder but wiser? Journal of Experimental Psychology: General, 108, 441-485.

Altrocchi, J., Parsons, O.A., & Dickoff, H. (1960). Changes in self-ideal discrepancy in repressors and sensitizers. Journal of Abnormal Social Psychology, 61, 67-72.

Bell, P.A. & Byrne, D. (1978). Repression-Sensitization. In London, H. & Exner, J.E.Jr. (Eds.), Dimensions of Personality, pp. 449-485. New York: John Wiley & Sons.

Bowers, K.S. (1987). Revisioning the unconscious. Canadian Psychology, 28, 93-104.

Brodbeck, C. & Michelson, L. (1987). Problem-solving skills and attributional styles of agoraphobics. Cognitive Therapy and Research, 11, 593-610.

Budd, E.C., & Clopton, J.R. (1985). Meaning of the Repression-Sensitization Scale: Defensive style or self-report of symptoms of psychopathology. Journal of Clinical Psychology, 41, 63-68.

Bunce, S.C., Larsen, R.J., & Peterson, C. (1995). Life after trauma: Personality and daily life experiences of traumatized people. Journal of Personality, 63, 165-188.

Burnam, M.A., Stein, J.A., Golding, J.M., Siegal, J.M., Soernson, S.B., Forsythe, A.B., & Telles, C.A. (1989). Sexual assault and mental disorders in a community population. Journal of Consulting and Clinical Psychology, 56, 843-850.

Byrne, D. (1961). The Repression-Sensitization Scale: Rationale, reliability, and validity. Journal of Personality, 29, 334-349.

Byrne, D., Barry, J., & Nelson, D. (1963). Relation of the Revised Repression-Sensitization Scale to measures of self-description. Psychological Reports, 13, 323-334.

Cozby, P.C. (1973). Self-disclosure: A literature review. Psychological Bulletin, 79, 73-91.

Dattore,P.J., Shontz, F.C., & Coyne, L. (1980). Premorbid personality differentiation of cancer and noncancer groups: A test of the hypothesis of cancer proneness. Journal of Consulting and Clinical Psychology, 48, 388-394,

Doster, J.A. & Nisbett, J.G. (1979). Psychotherapy and self-disclosure. In J.G. Chelune (Ed.), Self-disclosure: Origins, patterns, and implications of openness in interpersonal relationships. San Francisco: Jossey-Bass.

Duncker, K. (1945). On problem solving. Psychological Monographs, 58, 1-114.

D'Zurilla, T.J. (1986). Problem-solving therapy: A social competence approach to clinical intervention. New York: Springer.

D'Zurilla, T.J. & Sheedy, C.F. (1991). Relation between social problem-solving ability and subsequent level of psychological stress in college students. Journal of Personality and Social Psychology, 61, 841-846.

Esterling, B.A., Antoni, M.H., Fletcher, M.A., Margulies,S., & Schneiderman, N. (1994). Emotional disclosure through writing or speaking modulates latent Epstein-Barr virus antibody titers. Journal of Consulting and Clinical Psychology, 62, 130-140.

Fowler C.A., Wolford, G., Slade, R., & Tassinary, L. (1981). Lexical access with and without awareness. Journal of Experimental Psychology: General, 110, 341-362.

Fowles, D.C. (1980). The three arousal model: Implications of Gray's two-factor learning theory for heart rate, electrodermal activity, and psychopathy. Psychophysiology, 17, 87-104.

Glucksberg, S. (1962). The influence of strength of drive on functional fixedness and perceptual recognition. Journal of Experimental Psychology, 63, 36-41.

Glucksberg, S. & King, L.J. (1967). Motivated forgetting mediated by implicit verbal chaining: A laboratory analog of repression. Science, 158, 517-519.

Glucksberg, S. & Ornstein, P.A. (1969). Reply to Weiner and Higgins: Motivated forgetting is not attributable to confounding original learning with retention. Journal of Verbal Learning and Verbal Behavior, 8, 681-685.

Graf, P. & Schacter, D.L. (1985). Implicit and explicit memory for new associations in normal and amnesic subjects. Journal of Experimental Psychology: Learning, Memory, and Cognition, 11, 501-518.

Graf, P. & Schacter, D.L. (1987). Selective effects of interference on implicit and explicit memory for new associations. Journal of Experimental Psychology: Learning, Memory, and Cognition, 13, 45-53.

Greenberg, M.A. (1995). Cognitive processing of trauma: The role of intrusive thoughts and reappraisals. Journal of Applied Social Psychology, 25, 1262-1296.

Greenberg, M.A. & Stone, A.A. (1991). Emotional disclosure about traumas and its relation to health: Effects of previous disclosure and trauma severity. Journal of Personality and Social Psychology, 63, 75-84.

Guilford, J.P. (1967). The nature of human intelligence. New York: McGraw-Hill.

Hasher, L. & Zacks, R.T. (1979). Automatic and effortful processes in memory. Journal of Experimental Psychology: General, 108, 356-388.

Hays, R.B., McKusick, L., Pollack, L., & Hilliard, R. (1993). Disclosing HIV seropositivity to significant others. AIDS, 7, 425-431.

Jacoby, L.L. & Kelley, C.M. (1987). Unconscious influences of memory for a prior event. Personality and Social Psychology Bulletin, 13, 314-336.

Jacoby, L.L & Witherspoon, D. (1982). Remembering without awareness. Canadian Journal of Psychology, 36, 300-324.

Johnson, D.M. (1972) Systematic introduction to the psychology of thinking. New York: Harper & Row.

Johnson, E.A. (1995). Self-deceptive coping: Adaptive only in ambiguous contexts. Journal of Personality, 63, 759-791.

Johnson, E.A., Vincent, N., & Ross, L. (in press). Self-deceptive versus "genuine" self-esteem in buffering the negative effects of failure. Journal of Research in Personality.

Jourard, S.M. (1959). Self-disclosure and other-cathexis. Journal of Abnormal and Social Psychology, 59, 428-431.

Jourard, S.M. (1971). The transparent self: Revised edition. New York: Van Nostrand Reinhold.

Kahneman, D. & Tversky, A. (1972). Subjective probability: A judgement of representativeness. Cognitive Psychology, 3, 430-454.

Kavanagh, D.J. (1987). Mood, persistence, and success. Australian Journal of Psychology, 39, 307-318.

Kelly, A.E. & McKillop, K.J. (1996). Consequences of revealing personal secrets. Psychological Bulletin, 120, 450-465.

Kempler, B. (1987). The shadow side of self-disclosure. Journal of Humanistic Psychology, 27, 109-117.

Kiecolt-Glaser, J.K. & Glaser, R. (1989). Psychoneuroimmunology: Past, present, and future. Health Psychology, 8, 677-682.

Kiecolt-Glaser, J.K. & Glaser, R. (1992). Psychoneuroimmunology: Can psychological interventions modulate immunity? Journal of Consulting and Clinical Psychology, 60, 569-575.

Kilpatrick, D.G., Resick, P.A., & Veronen, L.J. (1981). Effects of a rape experience: A longitudinal Study. Journal of Social Issues, 37, 105-122.

L'Abate, L. (1991). The use of writing in psychotherapy. American Journal of Psychotherapy, 45, 87-98.

Lakey, B. (1988). Self-esteem, control beliefs, and cognitive problem-solving skill as risk factors in the development of subsequent dysphoria. Cognitive Therapy and Research, 12, 409-420.

Langer, E. (1989). Minding matters: The consequences of mindlessness-mindfulness. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 22, pp. 137-173). Orlando: Academic Press.

Langer, E. & Piper, P. (1987). The prevention of mindlessness. Journal of Personality and Social Psychology, 53, 280-287.

Larson, D.G. & Chastain, R.L. (1990). Self-concealment: Conceptualization, measurement, and health implications. Journal of Social and Clinical Psychology, 9, 439-455.

Lazarus, R.S. & Folkman, S. (1984). Stress, appraisal, and coping. New York: Springer.

Lindauer, M.S. (1990). A failure to find an effect of perceptual set on creativity. Bulletin of the Psychonomic Society, 28, 33-36.

Maier, N.R.D. (1931). Reasoning in humans. Journal of Comparative Psychology, 12, 181-194.

Marcel, A.J. (1983). Conscious and unconscious perception: Experiments on visual masking and word recognition. Cognitive Psychology, 15, 197-237.

Martin, D.G. (1991). Psychology: Principles and applications. Scarborough, Ontario: Prentice-Hall.

Martin, D.G., Hawryluk, G.A., Berish, C., & Dushenko, T. (1984). Selective forgetting of aversive memories cued in the right hemisphere. International Journal of Neuroscience, 23, 169-176.

Mednick, S.A. (1962). The associative basis of the creative process. Psychological Review, 69, 220-232.

Mendolia, M. and Kleck, R. (1993). Effects of talking about a stressful event on arousal: Does what we talk about make a difference? Journal of Personality and Social Psychology, 64, 283-292.

Metcalfe, J. (1986). Premonitions of insight predict impending error. Journal of Experimental Psychology: Learning, Memory, and Cognition, 12, 623-634.

Miller, S.M. (1987). Monitoring and blunting: Validation of a questionnaire to assess styles of information seeking under threat. Journal of Personality and Social Psychology, 52, 345-353.

Murray, E.J., Lamnin, A.D., & Carver, C.S. (1989). Emotional expression in written essays and psychotherapy. Journal of Social and Clinical Psychology, 8, 414-429.

Murray, N, Sujan, H, Hirt, E.R., & Sujan, M. (1990). The influence of mood on categorization: a cognitive flexibility interpretation. Journal of Personality and Social Psychology, 59, 411-425.

Neale, J.M., Cox, D.S., Valdimarsdottir, H., & Stone, A.A. (1988). The relation between immunity and health: Comment on Pennebaker, Kiecolt-Glaser, and Glaser. Journal of Consulting and Clinical Psychology, 56, 636-637.

Newell, A. & Simon, H.A. (1972). Human problem solving. Englewood Cliffs, NJ: Prentice-Hall.

Nisbett, R. & Wilson, T. (1977). Telling more than we can know: Verbal reports on mental processes. Psychological Review, 84, 231-259.

Peel, E.A. (1971). The nature of adolescent judgment. London: Staples Press.

Pennebaker, J.A. (1985). Traumatic experience and psychosomatic disease: Exploring the roles of behavioural inhibition, obsession, and confiding. Canadian Psychology, 26, 82-95.

Pennebaker, J.A. (1990). Opening up: The healing power of confiding in others. New York: William Morrow.

Pennebaker, J.A. & Beall, S.K. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. Journal of Abnormal Psychology, 95, 274-281.

Pennebaker, J.A. & Chew, C.H. (1985). Behavioral inhibition and electrodermal activity during deception. Journal of Personality and Social Psychology, 49, 1427-1433.

Pennebaker, J.A., Colder, M., & Sharp, L.K. (1990). Accelerating the coping process. Journal of Personality and Social Psychology, 58, 528-537.

Pennebaker, J.A., Czajka, J.A., Cropanzano, R., Richards, B.C., Brumbelow, S., Ferrara, K., Thompson, R., & Thyssen, T. (1990). Levels of thinking. Personality and Social Psychology Bulletin, 16, 743-757.

Pennebaker, J.A. & Hoover, C.W. (1986). Inhibition and cognition: Toward an understanding of trauma and disease. In R.J. Davidson, G.E. Schwartz, & D. Shapiro (Eds.), Consciousness and self-regulation (Vol. 4, pp. 107-136). New York: Plenum.

Pennebaker, J.A., Hughes, C.F., & O'Heeron, R.C. (1987). The psychophysiology of confession: Linking inhibitory and psychosomatic processes. Journal of Personality and Social Psychology, 52, 781-793.

Pennebaker, J.A., Kiecolt-Glaser, J.K., & Glaser, R. (1988a). Disclosure of traumas and immune function: Health implications for psychotherapy. Journal of Consulting and Clinical Psychology, 56, 239-245.

Pennebaker, J.A., Kiecolt-Glaser, J.K., & Glaser, R. (1988b). Confronting traumatic experience and immunocompetence: A reply to Neale, Cox, Valdimarsdottir, and Stone. Journal of Consulting and Clinical Psychology, 56, 638-639.

Pennebaker, J.A. & Susman, J.R. (1988). Disclosure of traumas and psychosomatic processes. Social Science and Medicine, 26, 327-332.

Petrie, K.J., Booth, R.J., Pennebaker, J.W., Davison, K.P., & Thomas, M.G. (1995). Disclosure of trauma and immune response to a Hepatitis B vaccination program. Journal of Consulting and Clinical Psychology, 63, 787-792.

Ridley, C.R. (1984) Clinical treatment of the nondisclosing black client: A therapeutic paradox. American Psychologist, 39, 1234-1244.

Rogers, C.R. (1961). On becoming a person. Boston: Houghton Mifflin.

Sackheim, H.A. & Gur, R.C. (1978). Self-deception, self-confrontation, and consciousness. In G.E. Schwartz & D. Shapiro (Eds.), Consciousness and self-regulation: Advances in research and theory (Vol. 2, pp. 139-197). New York: Plenum.

Sackheim, H.A. & Gur, R.C. (1978). Self-deception, other-deception, and self-reported psychopathology. Journal of Consulting and Clinical Psychology, 47, 213-215.

Scarpetti, W. L. (1973). The repression-sensitization dimension in relation to impending painful stimulation. Journal of Consulting and Clinical Psychology , 40, 377-382.

Schacter, D.L. & Graf, P. (1986). Effects of elaborative processing on implicit and explicit memory for new associations. Journal of Verbal Learning and Verbal Behavior, 23, 593-611.

Selye, H. (1976). The stress of life. New York: McGraw-Hill

Shaw, G.A. & Conway, M. (1990). Individual differences in nonconsciuos processing: The role of creativity. Personality and Individual Differences, 11, 407-418.

Schortz, W. (1991) Will Shortz's best brain busters. New York: Time Books.

Silver, R.L., Boon, C., & Stones, M.H. (1983). Searching for meaning in misfortune: Making sense of incest. Journal of Social Issues, 39, 81-102.

Slough, N., Keinknecht, R.A., & Thorndike, R.M. (1984). Relationship of the Repression-Sensitization Scales to anxiety. Journal of Personality Assessment, 48, 378-379.

Swann, W.B. Jr. & Predmore, S.C. (1985). Intimates as agents of social support: Sources of consolation or despair? Journal of Personality and Social Psychology, 49, 1609-1617.

Tabachnick, B.G. & Fidell, L.S. (1983). Using multivariate statistics. New York: Harper & Row.

Taylor, S. & Brown, J. (1988). Illusion and well-being: A social psychological perspective on mental health. Psychological Bulletin, 103, 193-210.

Tempone, V.J. (1964). Extension of the repression-sensitization hypothesis to success and failure expreience. Psychological Reports, 15, 39-45.

Tice, D.M., Butler, J.L., Muraven, M.B., & Stillwell, A.M. (1995). When modesty prevails: Differential favorability of self-presentation to friends and strangers. Journal of Personality and Social Psychology, 69, 1120-1138.

Truax, C. & Carkhuff, R. (1965). Client and therapist transparency in the psychotherapeutic encounter. Journal of Counseling Psychology, 12, 3-9.

Tulving, E., Schacter, D.L., & Stark, H.A. (1982). Priming effects in word-fragment completion are independent of recognition memory. Journal of Experimental Psychology: Learning, Memory, and Cognition, 12, 336-342.

Tversky, A. & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. Cognitive Psychology, 5, 207-232.

van der Kolk, B.A. (1989). The compulsion to repeat the trauma: Re-enactment, revictimization, and masochism. Psychiatric Clinics of North America, 12, 389-411.

van der Kolk, B.A., Pelcovitz, D., Roth, S., Mandel, F.S., McFarlane, A., & Herman, J.L. (1996). Dissociation, somatization, and affect dysregulation: The complexity of adaptation to trauma. American Journal of Psychiatry, 153 (supplement), 83-93.

Watson, D. & Clark, L.A. (1984). Negative affectivity: The disposition to experience aversive emotional states. Psychological Bulletin, 96, 465-490.

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology, 54, 1063-1070.

Wechsler, D. (1981). WAIS-R manual: Wechler Adult Intelligence Test -- Revised. New York: Harcourt Brace Jovanich.

Wierzbicki, M. (1984). Social skills deficits and subsequent depressed mood in students. Personality and Social Psychology Bulletin, 10, 605-610.

Appendices

Appendix A: Experiment One, Consent to Participate

Consent to Participate in Experiment "Treherne"

As a participant in this experiment, "Treherne" I have been informed, and understand, that I will be asked to write about topics that may reveal personal information and that may be unpleasant or distressing.

I have been informed and understand that any material that I write will be treated as confidential. As such, this material will not bear my name or other identifying information and will be stored in a locked room accessed only by researchers associated with this project. I understand that my writings will be read for the purposes of this research, but will be read only by researchers in the project who are kept unaware of my identity. I understand that any scholarly reporting of this material will be in aggregate form, that is, any reporting will refer to groups and not to specific individuals.

I have been informed and understand that, as a participant in psychological research at the University of Manitoba, it is my right to withdraw from any experiment at any time should I find the procedures too unpleasant or too distressing; in such circumstances, I will inform the experimenter. I understand that I will not be penalized for doing so and will receive credit for the time I have contributed. I acknowledge that I have agreed, in principle, to participate in all of the five sessions which have been scheduled for me, and in doing so will earn five experimental credits to be applied to my final grade in Introductory Psychology.

_____ _____

Name Date

Appendix B: Experiment One, Tuesday Experiment Script

Treherne
TUESDAY Control and Disclosure PROCEDURES

Before the session:

Be sure that you have all of your supplies. The writing room should have:

- Two pads of paper on the desk
- two pens on the desk
- a box of tissues on the desk
- the lamp turned on, the overhead light off
- garbage or other materials off the floor and desktop.

Your should have:

- a file folder to shield your materials
- these instructions (!)
- CONSENT TO PARTICIPATE forms
- questionnaires
- Code name instruction sheet

Greeting the subject(s):

"Are you [subject's first name]?"
"My name is _____. Please follow me."

(a comment about the appearance of the hallway will reduce subjects' anxiety.)

"This is the room we'll be using. Are you claustrophobic?"

"These are soundproof rooms, which means that you will have a great deal of privacy, but they are pretty intimidating when you first see them.

Have subject place jacket and/or other materials on the floor behind chair.
Sit down opposite the subject.

Formal instructions:

"I'm going to be *reading* some instructions to you today.

"First off, thank you for agreeing to participate in this study. You are expected to attend all five sessions which you have already scheduled.

"I want you to know that as a subject in any psychology experiment at this University, you have the right to withdraw from any experiment at any time should you find that the procedures are upsetting or unpleasant for you.

"You may do this without penalty, which means that you would still receive credit for the time that you had put in.

"Should you find that the procedures become intolerable for you, please let me know, and you can be excused.

"If you do *not* attend a session and do *not* give notice, however, you may be penalized by losing all five credits.

"Be sure that you give notice ahead of time if you absolutely must miss a session.

* * *

"I also want you to know that for today, Wednesday and Thursday, you will be writing about information that is of a personal nature, and which may be unpleasant for you.

"What you write will be read by researchers with this project, but I want you to know that *I personally* will not be reading what you write.

"All the materials that you write on will be stored in one of these locked labs, and will be stored without any indication of your identity.

"Do you have any questions about what I've told you to this point?

[if not] "I would like you to read this Consent to Participate, which covers what I have told you, and, if you agree, sign and date it.

"This consent will be stored separately from other materials that you complete."

Give CONSENT TO PARTICIPATE form to subject for completion.

Thank subject and collect form.

"I'd like you to fill out this brief questionnaire now.

"Please read the instructions carefully. It should take you only a few minutes to complete."

Give pre-essay questionnaire to subject.
Remain with subject, but stay unobtrusive.

DOUBLE CHECK THAT YOU HAVE THE CORRECT INSTRUCTIONS FOR THIS SESSION.

(Creating an identification code)

"Before we continue further, we need to create a code so that you can label all the materials that you produce in this experiment.

"This code will link different pieces of data for the researchers.

"It will also protect your identity; that is, the code will be something other than your name or student number."

Give Code Name instructions, have subject complete.

"Your code will be eight digits long.

"You will using it to label all of your materials, so please keep this slip of paper with you.

"If you forget your code, let me know and we will reconstruct it.

"Please label this questionnaire with your code now."

Collect questionnaire.

"For each of the next three days, I will be leaving you alone in this room for approximately 30 minutes.

"When I return at the end of that 30 minutes, I will bring an envelope that you can seal your writing in, and I will have another brief questionnaire.

"At the end of each session, I would like you to submit your questionnaire and your writing.

"As I have said, what you write will be treated confidentially, and will be regarded only for the purposes of this research.

"Should you feel strongly at the end of any session that you do not want to submit your writing because of the material you have written, you will not be forced to leave it.

"Do you have any questions up to this point?"

(Put aside questions about the *content* of writing)

DISCLOSURE
READ SLOWLY AND DELIBERATELY:

"During each of the next three days, I want you to write about the most traumatic and upsetting experiences in your entire life.

"You can write on different topics each day or on the same topic for all three days.

"The important thing is that you really let go and explore you deepest thoughts and feelings.

"Ideally, whatever you write about should deal with events or experiences that you have not talked about in detail with others.

"Don't worry about your spelling, or even if you are writing in complete sentences; try to write continuously for the next thirty minutes.

"Do you have any questions?"

Repeat (portions of) instructions as needed. Make note of questions, your repeated instructions and other responses.

"Please begin writing. I will return in 30 minutes."

CONTROL
READ SLOWLY AND DELIBERATELY:

"During each of the next three days, I want you to write about what you have done in the previous 24 hours.

"Your description should be as detailed as possible.

"As well, you should try to write about events which have occurred without writing about your feelings about them or your thoughts or opinions about them.

"Try to write as objectively as you can.

"Don't worry about your spelling, or even if you are writing in complete sentences; try to write continuously for the next thirty minutes.

"Do you have any questions?"

Repeat (portions of) instructions as needed. Make note of questions, your repeated instructions and other responses.

"Please begin writing. I will return in 30 minutes."

Leave subject, but note to them that the door does NOT lock.

After 30 minutes of writing.

Take manila envelope, post-essay questionnaire into subject's room.

If the subject is not finished, instruct to finish sentence they are working on.

> **"I'd like you to fill out this questionnaire now. I'll leave you with it for about five minutes, and then I'll return."**

Leave subject for approximately 5 minutes.

When you return, check to see that subject has coded both the manila envelope and the questionnaire.

Ensure that subject seals envelope

(Closing)

> **"That is all that I need you to do today. Tomorrow, when you return here at [time], you will again be writing. We'll review the instructions at that time.**
>
> **"Do you have any questions or concerns about your participation here today?"**

Make note of any questions or concerns. For anything less than major problems, put off answering any questions until they are debriefed in the last session.

"Experimental credit will be assigned on the last day of your participation.

"Also at that time, an overview of this project will be presented and you can have your questions answered.

"Before you go, I have one very important request of you.

"This experiment will be taking place during this term and the next, and you are participating on more than one occasion.

"It is very important that you do not talk to others about your experiences in these procedures, especially others in your Introduction to Psychology class.

"Talking about this experiment changes others' experience in the experiment; it gives them special knowledge that you yourself did not have.

"Having pre-conceived ideas about an experiment can ruin an experiment -- and if that happens your time here will have been wasted.

"Therefore, I'm asking you not to talk with others about this experiment, at least until you receive feedback that the experiment is over.

"Can you agree to that?"

Thank subject; explain further if needed.

Dismiss subject. Say, as a reminder:

"See you tomorrow at [time]."

After the session, staple subject's materials together, i.e., envelope and two questionnaires -- keep consent forms separate.

Appendix C: Experiment One, Wednesday Experiment Script

Treherne
WEDNESDAY Control and Disclosing PROCEDURES

Before the session:

Be sure that you have all of your supplies. The writing rooms should have:
- Two pads of paper on the desk
- two pens on the desk
- a box of tissues on the desk
- the lamp turned on, the overhead light off
- garbage or other materials off the floor and desktop.

Your should have:
- a file folder to shield you materials
- these instructions (!)
- SRS_PRE questionnaires
- Code name forms

Greeting the subject:

"Hi, [subject's names]. I'm glad to see you again. Please follow me."

Have the subject place outerwear and/or other materials on the floor behind chair.

Formal instructions:

"I'd like you to fill out this brief questionnaire.

"Please read the instructions carefully.

"I'll leave you with it for a few minutes, and give you more instructions when you finish."

Give pre-essay questionnaires to subject.

Stay with subject, but remain unobtrusive.

DOUBLE CHECK THAT YOU HAVE THE CORRECT INSTRUCTIONS FOR THIS SESSION.

If subject does not code his/her questionnaire, respond:
"I'll get you to label this questionnaire with your name code, please."

If subject has forgotten name code, have them complete new form.
Collect questionnaire.

(Formal instructions)

"As we did yesterday, I will be leaving you alone in this rooms for approximately 30 minutes.

"When I return at the end of that 30 minutes, I will bring an envelope that you will seal your writing in, and I will have another brief questionnaire.

"At the end of each session, I would like you to submit your questionnaire and your writing.

"As I have said before, what you write will be treated confidentially, and will be regarded only for the purposes of this research.

"However, should you feel strongly at the end of any session that you do not want to submit your writing because of the material you have written, you will not be forced to leave it.

"Do you have any questions up to this point?"

(Put aside questions about the *content* of writing)

DISCLOSURE
READ SLOWLY AND DELIBERATELY:

"During the next 30 minutes, I want you to write about the most traumatic and upsetting experiences of your entire life.

"You can write on different topics today or the same topic or topics you wrote about yesterday.

"The important thing is that you really let go and explore your deepest thoughts and feelings.

"Ideally, whatever you write about should deal with events or experiences that you have not talked about in detail with others.

"Don't worry about your spelling, or even if you are writing in complete sentences.

"Try to write continuously for the next thirty minutes.

"Do you have any questions?"

CONTROL
READ SLOWLY AND DELIBERATELY:

"During each of the next three days, I want you to write about what you have done in the previous 24 hours.

"Your description should be as detailed as possible.

"As well, you should try to write about events which have occurred without writing about your feelings about them or your thoughts or opinions about them.

"Try to write as objectively as you can.

"Don't worry about your spelling, or even if you are writing in complete sentences; try to write continuously for the next thirty minutes.

"Do you have any questions?"

Repeat (portions of) instructions as needed. Make note of questions, your repeated instructions and other responses.

"Please begin writing. I will return in 30 minutes."

Leave subject, but note to them that the door does NOT lock.

After 30 minutes

Take manila envelope, post-essay questionnaire into subject's room.

If the subject is not finished, instruct to finish sentence they are working on.

"I'd like you to fill out this questionnaire now.

"I'll leave you with it for about five minutes, and then I'll return."

Leave subject for approximately 5 minutes.

When you return, check to see that subject has coded both the manila envelope and the questionnaire.

Ensure that subject seals envelope.

Fill out Attendance Sheet

(*Closing*0

"That is all that I need you to do today.

"Tomorrow, when you return here at [name time], you will again be writing.

"We'll review the instructions again at that time.

"Do you have any questions or concerns about your participation here today?"

Make note of any questions or concerns. For anything less than major problems, put off answering any questions until they are debriefed in the last session.

"I'd like to remind you of the request I made of you yesterday.

"That is, because this experiment will be taking place during this term and the next, and you are participating on more than one occasion, it is very important that you do not talk to others, especially others in your Introduction to Psychology class, about your experiences in these procedures.

"Can you agree to that?"

Thank subject; explain further if needed.

Dismiss subject. Say, as a reminder:

"See you tomorrow at [time]."

After the session, staple subject's materials together, i.e., envelope and two questionnaires -- keep consent form separate.

Appendix D: Experiment One, Thursday Experiment Script

Treherne
THURSDAY D PROCEDURES

Before the session:

Be sure that you have all of your supplies. The writing rooms should have:

- Two pads of paper on the desk
- two pens on the desk
- a box of tissues on the desk
- the lamp turned on, the overhead light off
- garbage or other materials off the floor and desktop.

Your should have:

- a file folder to shield you materials
- these instructions (!)
- pre-essay questionnaire
- Code name form

Greeting the subject:

"Hi, [subject's name]. I'm glad to see you again. Please follow me."

Have the subject place outerwear and/or other materials on the floor behind chair in the room.

Formal instructions:

"I'd like you to fill out this brief questionnaire.

"Please read the instructions carefully.

"I'll leave you with it for a few minutes, and give you more instructions when you finish."

Give pre-essay questionnaire to subject.

Stay with subject, but remain unobtrusive.

DOUBLE CHECK THAT YOU HAVE THE CORRECT INSTRUCTIONS FOR THIS SESSION.

If subject does not code his/her questionnaire, respond:
"I'll get you to label this questionnaire with your name code, please."

If the subject has forgotten name code, have them complete new form.
Collect questionnaire.

(Formal instructions)

"As we have done previously, I will be leaving you alone in this rooms for approximately 30 minutes.

"When I return at the end of that 30 minutes, I will bring an envelope that you can seal your writing in, and I will have another brief questionnaire.

"At the end of each session, I would like you to submit your questionnaire and your writing.

"As I have said before, what you write will be treated confidentially, and will be regarded only for the purposes of this research.

"Should you feel strongly at the end of any session that you do not want to submit your writing because of the material you have written, you will not be forced to leave it.

"Do you have any questions up to this point?"

(Put aside questions about the *content* of writing).

DISCLOSURE
READ SLOWLY AND DELIBERATELY:

"During the next thirty minutes, I want you to write about the most traumatic and upsetting experiences of your entire life.

"You can write on different topics today or the same topic or topics you have written about previously.

"The important thing is that you really let go and explore your deepest thoughts and feelings.

"Ideally, whatever you write about should deal with events or experiences that you have not talked about in detail with others.

"Don't worry about your spelling, or if you are writing in complete sentences.

"Try to write continuously for the next thirty minutes.

"Do you have any questions?"

CONTROL
READ SLOWLY AND DELIBERATELY:

"During each of the next three days, I want you to write about what you have done in the previous 24 hours.

"Your description should be as detailed as possible.

"As well, you should try to write about events which have occurred without writing about your feelings about them or your thoughts or opinions about them.

"Try to write as objectively as you can.

"Don't worry about your spelling, or even if you are writing in complete sentences; try to write continuously for the next thirty minutes.

"Do you have any questions?"

Repeat (portions of) instructions as needed. Make note of questions, your repeated instructions and other responses.

"Please begin writing. I will return in 30 minutes."

Leave subject, but note to them that the door does NOT lock.

After 30 Minutes

CHECK ON THE TIME OF SUBJECT'S NEXT (Friday) APPOINTMENT.

Take manila envelope, post-essay questionnaire into room.

If subject is not finished, instruct to finish that the sentence that they are working on.

"I'd like you to fill this questionnaire now.

"I'll leave you with it for about 5 minutes, and then I'll return."

Leave subject for approximately 5 minutes; give instructions to second subject.

When you return, check to see that subject has coded both the manila envelope and the questionnaire.

Ensure that subject seals his or her envelope.

Fill out ATTENDANCE SHEET

(Closing)

"That is all that I need you to do today.

"Do you have any questions or concerns about your participation here today?"

Make note of any questions or concerns. For anything less than major problems, put off answering any questions until they are debriefed in the last session.

"Tomorrow you will be meeting with another researcher with this project.

"You won't be meeting in this room; instead, go to room ____, at your appointment time.

"You will be attending that session with others who are participating in this experiment.

"It will be very important at that time not to talk about your own experiences in the experiment with those others.

"At the last session, next Friday, the researcher in charge of this project will explain the purpose and the procedures of the study.

"However, until then, I'm asking you to maintain your silence about your own participation. Okay?

"Thank you for your efforts over these past three days."

Dismiss subjects.

After the session, staple subject's materials together, i.e., envelope and two questionnaires -- keep consent forms separate.

Appendix E: Experiment One, Friday One Experiment Script

Treherne
FRIDAY 1 PROCEDURES

Before the session:

You should have:

- FILLED COLOURED ENVELOPES - make sure letter on bottom of measures matches letter of week (A or B)
- pens
- "Experiment in Progress" sign
- tape
- PANAS questionnaire
- experimental credit cards (in case)
- stopwatch or timer
- Code name instruction sheet
- attendance sheets
- "Instructions for ..." sheets, numbered with order of task presentation.

Place piles of envelopes on desks with pen and with PANAS questionnaire on top.

Greeting the subjects:

"Please come in, and find a seat at separate desks where there is a stack of envelopes. Please do not open these envelopes or remove the contents until you are told to do so. Please put your books and bags on the floor beside you. There should be nothing on your table except the materials provided."

Wait for stragglers if more are expected.

"I'm expecting a few more people, so we'll wait just a few more moments before we begin.

"My name is _____, and this is the fourth session of Treherne.

"You're going to be doing something different today than you have been asked to in the sessions earlier in the week.

"The first thing that I'd like you to do is to put the code name that you have been using in this experiment on the bottom of the papers extending out of the envelopes, Again, DO NOT remove the papers from the envelopes.

"While you're doing that, I'll pass around an attendance sheet for each of you to sign.

Pass out attendance sheet.
Hand out code name forms and/or pens where needed.

> "Please complete the questionnaire on top of the stack of envelopes, which begins "Below are a number of words that describe different feeling and emotions." When you've finished with that, just put it to the other side of the desk."

Wait for all subjects to finish.

> "You're going to be doing a number of tasks today, which are contained in these envelopes. All of these tasks are pen-and-paper tasks. All of the tasks have a time limit, so in general, you will be trying to work as quickly as you can.
>
> "There's how it will work. I will tell you the colour of the envelope; you will take that envelope out, WITHOUT REMOVING THE CONTENTS YET, and put the other envelopes to the side. I will tell you how much time you have, and then I will tell you to begin. At that point, you will remove the contents of the envelope, read the instructions, and do the task. There will be no further instructions other than what is written on each sheet of paper, so you will have to respond to each task as best you think is appropriate. When your time is up, I will say "STOP"; please put your pen down, put the paper under the envelope, and put them aside at the other end of the table. We will then go on to the next task.
>
> "Do you have any questions?"

Respond if needed.

> "Please be aware that assignment of experimental credit does not depend on your perforomance on these tasks: you don't have to *pass* them to get your credit for being here. However, I do expect you to give your very best effort on each task.
>
> "The first envelope is the _*_ envelope."

*Refer to the "Instructions for ..." sheet. Present tasks in order numbered 1 to 7. Note that BKx is BLACK, while BLx is BLUE. xxA is form A of each task, corresponding to the weeks designated "A", while xxB is form B of each task, corresponding to the weeks designated "B".

> "Please take that envelope out WITHOUT REMOVING ITS CONTENTS. You will have __ minutes to work on this task. Please begin."

Time out 3 or 5 minutes.

> "Stop.

"Put that sheet underneath the envelope, and just put that to the other side of your desk.

"The next envelope is the _*_ envelope. For this task you will have __ minutes. Please begin."

Continue through all six remaining tasks.

(Closing)

I have three things that I'd like to say before you go. First, thank you for your time and effort here today. These tasks can take a lot of concentration and writing, and that's real work. I appreciate your efforts.

Second, next week, at the same time and in this same room, will be your last session. At that time you'll be supplied with some background information about this experiment, and there will be any questions that you have, or comments that you may wish to make. Also at that time, your experimental credit will be assigned, so please bring your experimental credit cards.

The last thing that I'd like to mention is request that has been made of you all week. I'd like your continued cooperation and support in not discussing your experience in this experiment with others who may be in and Introductory Psychology class. This would include each other. As much as possible we would like individuals to have the exact same experience in this experiment as do other people in the experiment. This means that we don't want people to come in with prior knowledge or expectations or knowledge that other people didn't have. You may appreciate for yourself that if you had known what you would be doing in this experiment prior to participating, you might have felt less anxious or more anxious, you might have thought more about what you might write, and so on. These kinds of expectations can alter experimental findings, and can ruin experiments. That would mean your time here would have been wasted. So please, your silence and cooperation is appreciated.

Are there any questions?

Dismiss Subjects after answering questions.

Have a good weekend. See you next week.

Appendix F: Experiment One, Friday Two Experiment Script

Treherne
FRIDAY Day 2 PROCEDURES

Before the session:

You should have:

- FILLED COLOURED ENVELOPES - make sure letter on bottom of measures matches letter of week (A or B)
- pens
- Experiment in Progress" sign
- tape
- PostExp questionnaire
- experimental credit cards (in case)
- stopwatch or timer
- PANAS questionnaire
- Code name instruction sheet
- attendance sheets
- "Instructions for ..." sheets, numbered with order of task presentation.

Place piles of envelopes on desks with pen and with PANAS questionnaire on top.

Greeting the subjects:

"Welcome back, and find a seat at separate desks where there is a stack of envelopes. Please do not open these envelopes or remove the contents until you are told to do so. Please put your books and bags on the floor beside you. There should be nothing on your table except the materials provided."

Wait for stragglers if more are expected.

"I'm expecting a few more people, so we'll wait just a few more moments before we begin.

"This is the last session of Treherne, and as you may have gathered, the procedure we'll be following will be identical to the procedure we used last week.

"The first thing that I'd like you to do is to put the code name that you have been using in this experiment on the bottom of the papers extending out of the envelopes, Again, DO NOT remove the papers from the envelopes.

"While you're doing that, I'll pass around an attendance sheet for each of you to sign.

Pass out attendance sheet.
Hand out code name forms and/or pens where needed.

> "Please complete the questionnaire on top of the stack of envelopes, which begins "Below are a number of words that describe different feeling and emotions." When you've finished with that, just put it to the other side of the desk."

Wait for all subjects to finish.

> "You're going to be doing a number of tasks today, which are contained I these envelopes. All of these tasks are pen-and-paper tasks. All of the tasks have a time limit, so in general, you will be trying to work as quickly as you can.
>
> "There's how it will work. I will tell you the colour of the envelope; you will take that envelope out, WITHOUT REMOVING THE CONTENTS YET, and put the other envelopes to the side. I will tell you how much time you have, and then I will tell you to begin. At that point, you will remove the contents of the envelope, read the instructions, and do the task. There will be no further instructions other than what is written on each sheet of paper, so you will have to respond to each task as best you think is appropriate. When your time is up, I will say "STOP"; please put your pen down, put the paper under the envelope, and put them aside at the other end of the table. We will then go on to the next task.
>
> "Do you have any questions?"

Respond if needed.

> "As I mentionned last week, please be aware that assignment of experimental credit does not depend on your perforomance on these tasks: you don't have to *pass* them to get your credit for being here. However, I do expect you to give your very best effort on each task.
>
> "The first envelope is the _*_ envelope."

*Refer to the "Instructions for ..." sheet. Present tasks in order numbered 1 to 7. Note that BKx is BLACK, while BLx is BLUE. xxA is form A of each task, corresponding to the weeks designated "A", while xxB is form B of each task, corresponding to the weeks designated "B".

> "Please take that envelope out WITHOUT REMOVING ITS CONTENTS. You will have __ minutes to work on this task. Please begin."

Time out 3 or 5 minutes.

> "Stop.

"Put that sheet underneath the envelope, and just put that to the other side of your desk.

"The next envelope is the _*_ envelope. For this task you will have __ minutes. Please begin."

Continue through all six remaining tasks.

"Thank you very much for your efforts.

"The last thing that I would like for you to do is to complete one last questionnaire, but this time it is a questionnaire about your experiences in this experiment. That is, what I would like to find out from you is your honest opinion of what it has been like to be in this experiment. We intend the experiment to be a certain way, but I'd like to find out what it really has been like for you. For example, are there things you wondered about, or that troubled you? Did you have your own guesses about why certain things happened? This questionnaire is an attempt to find out from you what you think. You don't have to answer all the questions, but if you have an opinion please respond. If there is something you're wondered about, but this questionnaire doesn't ask for, please write that down."

Hand out post-exp questionnaires.

"While you are working on this, I'll also hand out a summary of rationale behind this experiment. When you've finished the questionnaire, you can read through this summary, and if you have questions or comments to make, I can respond.

Respond to questions/comments from subjects.

Appendix G: Experiment One, Positive and Negative Affect Schedule

Below are a number of words that describe different feelings and emotions. Read each item and then indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to rate the degree to which you feel this way. Mark the appropriate answer in the space next to that word.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

____ interested	____ irritable
____ distressed	____ alert
____ excited	____ ashamed
____ upset	____ inspired
____ strong	____ nervous
____ guilty	____ determined
____ scared	____ attentive
____ hostile	____ jittery
____ enthusiastic	____ active
____ proud	____ afraid

Appendix H: Experiment One, Post-Essay Questionnaire

Please complete the questions below with regard to what you just written (which will be referred to as "your essay").

1. To what degree does your essay contain material that is deeply personal and revealing?

1	2	3	4	5	6	7
Not at all						a great deal

2. To what degree does your essay reveal your real feelings and emotions?

1	2	3	4	5	6	7
Not at all						a great deal

3. To what degree was it stressful to write this essay?

1	2	3	4	5	6	7
Not at all						a great deal

4. Overall, how much have you told other people about what you wrote today?

1	2	3	4	5	6	7
Not at all						a great deal

Appendix I: Experiment One, Post Experimental Questionnaire

Thank you for your participation in this study today and last week. Without your time and efforts, this research could not be conducted; I appreciate your input very much.

Below are a series of questions regarding your experiences in this study. There are no right or wrong answers; I hope you will provide honest thoughts and opinions as best you can. The aim of these questions is to find out what it has been like for you to be a subject in this experiment, so that I can better understand the impact of different elements of the study. If you have additional comments, please add those.

Generally, what did you think (or what would you now guess) was the purpose of this study?

Did you feel you had sufficient privacy and/or confidentiality to write a candid essay? Could you have written more than you did?

Is there anything that would have made you feel more assured of pirvacy and/or confidentiality?

Was your experience in this study in any way helpful or harmful to you? Did any part of the experiment especially intrigue you or upset you?

Additional comments:

Please complete the following questions. This information will help me to understand the population of students who have participated in this experiment. This information, like all the other information you have contributed today, will be kept confidential and will not be linked with your identity.

What is the first language you learned to speak?

_____

What are your parents' first or primary lanuages?

Father _____
Mother _____

If English is not your first language, when did you learn to speak English?

Age _____

What other languages do you speak? At what age did you learn this/these language(s)?

_____ age _____
_____ age _____
_____ age _____

In what language was your schooling?

Kindergarten, grades 1 to 3 _____
Grades 4 to 6 _____
Grades 7 to 9 _____
Grades 10 to 12 _____

What is your age? _____

In what faculty and year are you registered? _____

Are you Male or Female (please circle)

Thank you!

Appendix J: Experiment One, Written Feedback to Subjects

Experiment *Treherne*: Theoretical Foundations

Sharing information about ourselves is important in our relationships. Revealing information about ourselves to others allows us opportunity to compare thoughts, beliefs and opinions; in revealing ourselves, we also learn about ourselves.

We can reveal ourselves by talking, but we can also write about thoughts and feelings in letters, journals, or diaries. These are also avenues for increased self-knowledge.

Previous research (Pennebaker & Beall, 1986; Pennebaker, Kiecolt-Glaser, & Glaser, 1986) has reported significant benefits to health (i.e., improved self-reports of health, decreased visits to health care providers, increase in immune system functioning) which occur as a function of writing self-disclosing essays of personal trauma. The health benefits seem to occur especially when the trauma which has been experienced has not previously been reported to others. People appear to become healthier by virtue of having written about upsetting, painful aspects of their past.

With changes in health, these researchers also suggest that changes in cognition occur consequent to written self-disclosure. Thinking seems to become broader, in terms of conceptual or temporal focus, and incorporates a greater consideration of the individual's own emotional status. However, these researchers have not operationalized and measured these cognitive changes. The study you have participated in is investigating the cognitive consequences of writing about personal trauma.

Whereas some individuals were asked to write about "the most upsetting experience of [their] entire life," some individuals wrote without feeling or opinion about details of the past 24 hours. The latter group represents a "control" or comparison group; the comparison between the group disclosing and the control group represents the primary independent variable of the study. You were placed into a control group or a group asked to disclose solely on the basis of random assignment.

A number of questionnaires were competed, to measure mood at various points during the procedure, and, at the end of the study, to query your own personal experience of this study and to collect demographic data.

Some mentally challenging tasks were presented to you today and last Friday. The tasks represent the dependent variables of interest; my hypothesis is that expressing thoughts and feelings regarding upsetting painful experiences that one has been through leaves one with a thinking style which is conceptually or temporally broadened, which facilitates performance on mentally challenging tasks. The support, or lack of support, for this hypothesis will be borne out in statistical comparisons.

Please be assured that all essays, questionnaire materials, and other materials you produced/completed will be treated as strictly confidential. No attempt will be made to link this information with you personally. You have shared information which is, to a greater or lesser extent, personal and revealing; I wish to be respectful of that, as a matter of appropriate, ethical conduct, but also in gratitude to your contribution to my research.

Some individuals may find that, through the writing that they have done, they become more aware of personal feelings and issues which they are not comfortable dealing with on their own. They may wish to seek counseling for themselves, an opportunity to explore feelings and experiences with an individual who is trained to be helpful and compassionate. A number of opportunities exist for counseling for students at the University of Manitoba, including the Counseling Service in UMSU, and the Psychological Service Centre. Both facilities provide professional quality services which are free of charge. If you feel that there are issues which you have uncovered by reporting your experiences in this study, and you would like to pursue counseling, I would invite you to contact me through the Psychology General Office, 474-9338. I would be pleased to assist you by providing further information about services available and, if appropriate and at your request, by making a referral. You can, otherwise, contact the Counseling Service or the Psychological Service Centre independently; a referral is not required.

I would be pleased to address any further questions that you may have regarding this study; contact me through the Psychology General Office, 474-9338. I have a request of you: because this research is ongoing, I would appreciate your cooperation and support in not telling your peers about your experience in this study. Others will be participating -- it is very important that they are not informed about the procedures ahead of time, or their expectations will alter their performance of the tasks I present to them. That would, in effect, ruin the experiment which you have just invested two hours of your time in. Feel free to talk with family and friends who are not in Introductory Psychology -- if you want to! But thank you for not discussing this study with others in your Intro Psych class.

Thank you for all your efforts here today.

Kent Somers, M.A.
Ph.D. Candidate
Department of Psychology
University of Manitoba

Appendix K: Experiment Two, Subject Consent to Participate

Consent to Participate in Experiment "Jasper"

As a participant in this experiment, "Jasper" I have been informed, and understand, that I will be asked to write about topics that may reveal personal information and that may be unpleasant or distressing.

I have been informed and understand that any material that I write will be treated as confidential. As such, this material will not bear my name or other identifying information and will be stored in a locked room accessed only by researchers associated with this project. I understand that my writings will be read for the purposes of this research, but will be read only by researchers in the project who are kept unaware of my identity. I understand that any scholarly reporting of this material will be in aggregate form, that is, any reporting will refer to groups and not to specific individuals.

I have been informed and understand that, as a participant in psychological research at the University of Manitoba, it is my right to withdraw from any experiment at any time should I find the procedures too unpleasant or too distressing; in such circumstance, I will inform the experimenter. I understand that I will not be penalized for withdrawal but will receive credit for the time I have contributed. From my full particpation I will earn two (2) experimental credits to be applied to my final grade in Introductory Psychology.

_____ _____

Name Date

Appendix L: Experiment Two, Experiment Script

Experiment: Jasper 41
PROCEDURES

Before the session:
- posted signs?
- Dividers up?
- Random numbers on desks?

Be sure that you have all of your supplies. The writing areas should have:
- pad of paper on the desk
- two pens on the desk
- a box of tissues on the desk
- garbage or other materials off the floor and desktop.
- packet of experiment materials

Your should have:
- a file folder to shield your materials
- these instructions (!)

Greeting the subject(s):

"Welcome to the experiment _____; my name is . . . .

"I'll be giving you instructions throughout today's session. Please do not begin any task or turn over any papers until I ask you to do so. Your cooperation is appreciated.

"First off, thank you for agreeing to participate in this study. You will be here for two hours -- we will take a brief break approximately half way through.

Subject Rights

"I want you to know that as a subject in any psychology experiment at this University, you have the right to withdraw from any experiment at any time should you find that the procedures are upsetting or unpleasant for you.

"You may do this without penalty, which means that you would still receive credit for the time that you had put in.

"Should you find that the procedures become intolerable for you, please let me know, and you can be excused.

* * *

Subject Rights -- Continued

"You will be writing today about information that is of a personal nature, and which may be unpleasant for you.

"What you write *will* be read by researchers with this project. Because of that you are NOT to write your name, student number, or any other personal information on the materials given to you today. Your identity will not be linked to the materials you produce.

"All the materials that you write on will be stored in a locked lab, and will be stored without any indication of your identity.

"Do you have any questions about what I've told you to this point?

[if not]
"Please turn over the top page from the stack of papers in front of you. I would like you to read this Consent to Participate, which covers what I have told you, and, if you agree with it, please sign and date it.

"Please be aware that this consent will be stored separately from other materials that you complete."

Collect Consent forms

Panas1

"So that all of the materials that you produce today can be linked together, a number has been taped to your desk. These are random numbers that will label all the materials that you produce without any indication of your personal identity. I'll refer to it as your Table Number.

"Please turn over the next paper from the stack in front of you.

"Please copy your Table Number onto the bottom right hand corner of the questionnaire.

"I'd like you to fill out this brief questionnaire now.

"Please read the instructions carefully. It should take you only a few minutes to complete.

"When you have finished with that questionnaire, please put it face down on the other side of your desk."

RSS

"Next, I have a longer questionnaire for you to complete. Please turn over the stapled packet from the stack in front of you. It should read 'The Health and Opinion Survey.'

"Please copy your Table Number onto the bottom right hand corner of the questionnaire.

"Please turn to the second page; I'll read the instructions aloud:

> This inventory consists of numbered statements. Read each statement and decide whether it is *true as applied to you* or *false as applied to you.*
>
> You are to mark your answers on this booklet.
> - If a statement is **true** or **mostly true**, as applied to you, circle the letter **T** in the column beside the statement.
> - If a statement is **false** or **usually not true**, as applied to you, circle the letter **F** in the column beside the statement.
> - If a statement does not apply to you or if it is something that you do not know about, it is permissible to leave that item unmarked, **however** you should try to give a response to every statement.
>
> Remember to give **your own** opinion of yourself. Please complete all of the pages.

You will have approximately 20 minutes to complete this. Don't linger too long on any one item, but give the first response that occurs to you. I will make an announcement when 15 minutes have passed.

I cannot give you any further information as you complete this task, so complete each item as you see fit.

> **Please turn the page and begin.** Put your questionnaire face-down on the other side of the table when you have finished.

Vocabulary test

"Please turn over the next stapled packet from the stack in front of you. Please copy your Table Number onto the bottom right hand corner of the front page.

"This next task lists a number of words. I will say each word aloud. I want you to write the meaning of that word in the space provided.

"You should put your answer down promptly, as there is a limited amount of time for each word.

Allow 40 seconds per word

"The first word is Conceal; What does Conceal mean?
"The next word is Consume; What does Consume mean?
Terminate
Domestic
Ponder
Sanctuary
- please turn the page
"The next word is Evasive; What does Evasive mean?
Perimeter
Matchless
Tangible
Ominous
Audacious

Break

* * *

Preamble to Control/Disclosure condition

"For the next 30 minutes, I will be having you write -- on a topic which I will supply to you in just a minute.

"At the end of that 30 minutes, you will seal your writing in the manila envelope supplied, and I will have a few other brief tasks for you to do.

"At the end of today's session, I would like you to submit your writing along with the rest of your materials. This writing is valuable to this research.

"As I said previously, what you write will be treated confidentially, and will be regarded only for the purposes of this research.

"However, should you feel strongly at the end of the session that you do not want to submit your writing because of what you have written, you will not be forced to leave it.

"Do you have any questions up to this point?"

DISCLOSURE

READ SLOWLY AND DELIBERATELY:

"During the next thirty minutes, I want you to write about the most traumatic and upsetting experience or experiences of your entire life.

"You can write about a single topic or about a number of topics.

"The important thing is that you reaily let go and explore you deepest thoughts and feelings.

"Ideally, whatever you write about should deal with events or experiences that you have not talked about in detail with others.

"Don't worry about your spelling, or even if you are writing in complete sentences. Try to write continuously for the 30 minutes.

"Do you have any questions?"

* * *

"Please begin writing. I will announce the end of the 30 minutes."

CONTROL

READ SLOWLY AND DELIBERATELY:

"During the next thirty minutes, I want you to write about what you have done in the previous 24 hours.

"Your description should be as detailed as possible.

"As well, you should try to write about events which have occurred without writing about your feelings about them or your thoughts or opinions about them.

"Try to write as objectively as you can.

"Don't worry about your spelling, or even if you are writing in complete sentences. Try to write continuously for the 30 minutes.

"Do you have any questions?"

* * *

"Please begin writing. I will announce the end of the 30 minutes."

After 30 minutes of writing.

"Please stop writing. Separate the pages that you have written on, and put those into the manila envelope.

"Please seal the envelope. Copy your table number onto the envelope. When you have done that, please put the envelope to the other side of your table.

PANAS2

"Please turn over the next page, copy your table number to the bottom right hand corner, and complete that questionnaire. Put it to the other side of your table when you have completed it.

Problem-Solving Measures

"Please do not turn over the next two pages until I ask you to do so.

"We will be completing them one at a time; I will tell you when to start each page.

"On each page is a word problem. When I ask you to, you will turn over the page, read the instructions, and do that task.

"I cannot give you further instructions beyond what is printed, so you will have to respond as you see fit.

"Each task has a time limit, so work as quickly as you can.

Please try your very best on each task.

* * *

"Please turn over the first page now. You have five minutes.

* * *

"Please turn over the next page. You have five minutes.

* * *

"Please copy your table number to each of those last twp pages, and put them to the other side of your table.

Postexp

"I have one last task for you today before you are excused.

"The experiment itself is actually over; that is, the independent variable has been systematically varied, and the dependent measures have been completed.

"However, it is helpful for me to know what it has been like for you to be a subject in this experiment. Have you been curious or uncomfortable? Did you have an idea of what this experiment was about, or were you uncertain? It's important to know the informal effects of the experiment to be able to reasonably interpret the formal effects.

"For this reason, I have a Post-Experiment Questionnaire for you to complete. It asks these kinds of questions; if you have other comments, please feel free to add them.

"The second page of the questionnaire includes demographic information, such as age, gender, and languages that you speak. As with all other information collected, this information will not be used to identify you personally, but allows me to describe the population of subjects in my experiment.

"To link this information with the other material you have produced today, please copy your table number to the front page of the questionnaire."

Feedback

"One last thing. Once you have finished that questionnaire, you are excused.

"I want you to know that I am grateful for your presence and your efforts here today; though you must do this for credit, you make time and expend effort to be here, and I thank you for that.

"At the front of the room is a printed synopsis of the rationale for this research.

"If you're curious about why you did some of the things you did and what it's all about, it will give you some feedback.

"If you would like to wait around to ask questions or to speak with me about the experiment or your experience here, I will be available after the session, and I would be pleased to speak with you.

"Thank you once again for your time and efforts here today."

Appendix M: Experiment Two. Positive and Negative Affect Schedule

Below are a number of words that describe different feelings and emotions. Read each item and then indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to rate the degree to which you feel this way. Mark the appropriate answer in the space next to that word.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested	_____ irritable
_____ distressed	_____ alert
_____ excited	_____ ashamed
_____ upset	_____ inspired
_____ strong	_____ nervous
_____ guilty	_____ determined
_____ scared	_____ attentive
_____ hostile	_____ jittery
_____ enthusiastic	_____ active
_____ proud	_____ afraid

Appendix N: Experiment Two. Revised Repression-Sensitization Scale

THE HEALTH AND OPINION SURVEY
D. Byrne, J. Barry, & D. Nelson
University of Texas

GROUP FORM TEST BOOKLET

THE HEALTH AND OPINION SURVEY
The University of Texas Press

THE HEALTH AND OPINION SURVEY

D. Byrne, J. Barry, & D. Nelson
University of Texas

This inventory consists of numbered statements. Read each statement and decide whether it is *true as applied to you* or *false as applied to you.*

You are to mark your answers on this booklet.

- If a statement is **true** or **mostly true**, as applied to you, circle the letter **T** in the column beside the statement.
- If a statement is **false** or **usually not true**, as applied to you, circle the letter **F** in the column beside the statement.
- If a statement does not apply to you or if it is something that you do not know about, it is permissible to leave that item unmarked, **however** you should try to give a response to every statement.

Remember to give **your own** opinion of yourself.

Please complete all five pages.

Please turn the page and begin.

1. I have a good appetite. T F
2. I wake up fresh and rested most mornings. T F
3. I am easily awakened by noise. T F
4. I like to read newspaper articles on crime. T F
5. My hands and feet are usually warm enough. T F
6. My daily life is full of things that keep me interested. T F
7. I am about as able to work as I ever was. T F
8. There seems to be a lump in my throat much of the time. T F
9. I enjoy detective mysteries. T F
10. Once in a while I think of things too bad to talk about. T F
11. I am very seldom troubled by constipation. T F
12. At times I have fits of laughing and crying that I cannot control. T F
13. I am troubled by attacks of nausea and vomiting. T F
14. I feel that it is certainly best to keep my mouth shut in times of trouble. T F
15. At times I feel like swearing. T F
16. I find it hard to keep my mind on a task or job. T F
17. I seldom worry about my health. T F
18. At times I feel like smashing things. T F
19. I have periods of days, weeks, or months when I couldn't take care of things because I couldn't "get going". T F
20. My sleep is fitful and disturbed. T F
21. Much of the time my head seems to hurt all over. T F
22. I do not always tell the truth. T F
23. My judgment is better than it ever was. T F
24. Once a week or oftener I suddenly feel hot all over, without apparent cause. T F
25. I am in as good physical health as most of friends. T F
26. I prefer to pass by school friends, or people I know but have not seen for a long time, unless they speak to me first. T F
27. I am almost never bothered by pains over the heart or in my chest. T F
28. I am a good mixer. T F
29. Everything is turning out just like the prophets of the Bible said it would. T F
30. I do not read every editorial in the newspaper every day. T F
31. I sometimes keep on at a thing until others lose their patience with me. T F
32. I wish I could be as happy as others seem to be. T F
33. I think that a great many people exaggerate their misfortunes in order to gain the sympathy and help of others. T F
34. I get angry sometimes. T F
35. Most of the time I feel blue. T F
36. I sometimes tease animals. T F
37. I am certainly lacking in self-confidence. T F
38. I usually feel that life is worth while. T F
39. It takes a lot of argument to convince most people of the truth. T F
40. Once in a while I put off until tomorrow what I could do today. T F

41. I think that most people would lie to get ahead. T F

42. I do many things which I regret afterwards (I regret things more often than others seem to). T F

43. I go to church almost every week. T F

44. I have very few quarrels with members of my family. T F

45. I believe in the second coming of Christ. T F

46. My hardest battles are with myself. T F

47. I have little or no trouble with my muscles twitching or jumping. T F

48. I don't seem to care what happens to me. T F

49. Sometimes when I am not feeling well I am cross. T F

50. Much of the time I feel as though I have done something wrong or evil. T F

51. I am happy most of the time. T F

52. Some people are so bossy that I feel like doing the opposite of what they request even though I know they are right. T F

53. Often I feel as though there were a tight band about my head. T F

54. My table manners are not quite as good at home as when I am out in company. T F

55. I seem to be as capable and smart as most others around me. T F

56. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it. T F

57. The sight of blood neither frightens me nor makes me sick. T F

58. Often I can't understand why I have been so cross and grouchy. T F

59. I have never vomited or coughed up blood. T F

60. I do not worry about catching diseases. T F

61. At times my thought have raced ahead faster than I could speak them. T F

62. If I could get into a movie without paying and be sure I was not seen I would probably do it. T F

63. I commonly wonder what hidden reason another person may have for doing something nice for me. T F

64. I believe that my home life is as pleasant as that of most people I know. T F

65. Criticism or scolding hurts me terribly. T F

66. My conduct is largely controlled by the customs of those around me. T F

67. I certainly feel useless at times. T F

68. At times I feel like picking a fist fight with someone. T F

69. I have often lost out on things because I couldn't make up my mind soon enough. T F

70. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important. T F

71. I would rather win than lose a game. T F

72. Most nights I go to sleep without thoughts or ideas bothering me. T F

73. During the past few years I have been well most of time. T F

74. I have never had a fit or convulsion. T F

75. I am neither gaining nor losing weight. T F

76. I cry easily. T F

77. I cannot understand what I read as well as I used to. T F

78. I have never felt better in my life than I do now. T F

79. I resent having anyone take me in so cleverly that I have to admit that it was one on me. T F

80. I do not tire quickly. T F

81. I like to study and read about things that I am working at. T F

82. I like to know some important people because it makes me feel important. T F

83. What others think of me does not bother me. T F

84. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things. T F

85. I frequently have to fight against showing that I am bashful. T F

86. I have never had a fainting spell. T F

87. I seldom or never had dizzy spells. T F

88. My memory seems to be all right. T F

89. I am worried about sex matters. T F

90. I find it hard to make talk when I meet new people. T F

91. I am afraid of losing my mind. T F

92. I am against giving money to beggars. T F

93. I frequently notice my hand shakes when I try to do something. T F

94. I can read a long while without tiring my eyes. T F

95. I feel weak all over much of the time. T F

96. I have very few headaches. T F

97. Sometimes, when embarrassed, I break out in a sweat which annoys me greatly. T F

98. I have had no difficulty in keeping my balance in walking. T F

99. I do not have spells of hay fever or asthma. T F

100. I do not like everyone I know. T F

101. I wish I were not so shy. T F

102. I enjoy many different kinds of play and recreation. T F

103. I like to flirt. T F

104. In walking I am very careful to step over sidewalk cracks. T F

105. I frequently find myself worrying about something. T F

106. I gossip a little at times. T F

107. I hardly ever notice my heart pounding and I am seldom short of breath. T F

108. I have at times stood in the way of people who were trying to do something, not because it amounted to much but because of the principle of the thing. T F

109. I get mad easily and then get over it soon. T F

110. I brood a great deal. T F

111. I have periods of such great restlessness that I cannot sit long in a chair. T F

112. I dream frequently about things that are best kept to myself. T F

113. I believe I am no more nervous than most others. T F

114. I have few or no pains. T F

115. Sometimes without any reason or even when things are going wrong I feel excitedly happy, "on top of the world". T F

116. I can be friendly with people who do things which I consider wrong. T F

117. Sometimes at elections I vote for men about whom I know very little. T F

118. I have difficulty in starting to do things. T F

119. I sweat very easily even on cool days. T F

120. It is safer to trust nobody. T F

121. Once a week or oftener I become very excited. T F

122. When in a group of people I have trouble thinking of the right things to talk about. T F

123. When I leave home I do not worry about whether the door is locked and the windows closed. T F

124. I do not blame a person for taking advantage of someone who lays himself open to it. T F

125. At times I am full of energy. T F

126. My eyesight is as good as it as been for years. T F

127. I have often felt that strangers were looking at me critically. T F

128. I drink an unusually large amount of water every day. T F

129. Once in a while I laugh at a dirty joke. T F

130. I am always disgusted with the law when a criminal is freed through the arguments of a smart lawyer. T F

131. I work under a great deal of tension. T F

132. I am likely not to speak to people until they speak to me. T F

133. I have periods in which I feel unusually cheerful without any special reason. T F

134. Life is a strain for me much of the time. T F

135. In school I found it very hard to talk before the class. T F

136. Even when I am with people I feel lonely much of the time. T F

137. I think nearly anyone would tell a lie to keep out of trouble. T F

138. I am easily embarrassed. T F

139. I worry over money and business. T F

140. I almost never dream. T F

141. I easily become impatient with people. T F

142. I feel anxiety about something or someone almost all the time. T F

143. Sometimes I become so excited that I find it difficult to get to sleep. T F

144. I forget right away what people say to me. T F

145. I usually have to stop and think before I act even in trifling matters. T F

146. Often I cross the street in order not to meet someone I see. T F

147. I often feel as if things were not real. T F

148. I have a habit of counting things that are not important such as bulbs on electric signs, and so forth. T F

149. I have strange and peculiar thought. T F

150. I get anxious and upset when I have to make a short trip from home. T F

151. I have been afraid of things or people that I knew could not hurt me. T F

152. I have no dread of going into a room by myself where other people have gathered and are talking. T F

153. I have more trouble concentrating than others seem to have. T F

154. I have several times given up doing a thing because I thought too little of my ability. T F

155. Bad words, often terrible words, come into my mind and I cannot get rid of them. T F

156. Sometimes some unimportant thought will run through my mind and bother me for days. T F

157. Almost every day something happens to frighten me. T F

158. I am inclined to take things hard. T F

159. I am more sensitive that most other people. T F

160. At periods my mind seems to work more slowly than usual. T F

161. I very seldom have spells of the blues. T F

162. I wish I could get over worrying about what I have said that may have injured other people's feelings. T F

163. People often disappoint me. T F

164. I feel unable to tell anyone about myself. T F

165. My plans have frequently seemed so full of difficulties that I have had to give them up. T F

166 Often, even though everything is going fine for me, I feel that I don't care about anything. T F

167. I have sometimes felt that difficulties were piling up so high that I could not overcome them. T F

168. I often think, "I wish I were a child again". T F

169. I have often met people who were supposed to be experts who were no better than I. T F

170. It makes me feel like a failure when I hear of the success of someone I know well. T F

171. I am apt to take disappointments so keenly that I can't put them out of my mind. T F

172. At times I think I am no good at all. T F

173. I worry quit a bit over possible misfortunes. T F

174. I am apt to pass up something I want to because others feel that I am not going about it the right way. T F

175. I find it hard to set aside a task that I have undertaken, even for a short time. T F

176. I have several times had a change of heart about my life's work. T F

177. I must admit that I have at times worried beyond reason over something that did not really matter. T F

178. I like to let people know where I stand on things. T F

179. I have a daydream life about which I do not tell other people. T F

180. I have often felt guilty because I have pretended to feel more sorry about something that I really was. T F

181. I feel tired a good deal of the time. T F

182. I sometimes feel that I am about to go to pieces. T F

Appendix O: Experiment Two, Vocabulary Measure

Conceal

Consume

Terminate

Domestic

Ponder

Sanctuary

Evasive

Perimeter

Matchless

Tangible

Ominous

Audacious

#_ _ _ _ _

Appendix P: Experiment Two, Post Essay Questionnaire

Please complete the questions below with regard to what you have just written (which will be referred to as "your essay"). For each numbered question, indicate your response by circling a number from 1 to 7.

1. To what degree does your essay contain material that is deeply personal and revealing?

1	2	3	4	5	6	7
not at all						a great deal

2. To what degree does your essay reveal your real feelings and emotions?

1	2	3	4	5	6	7
not at all						a great deal

3. To what degree was it stressful to write this essay?

1	2	3	4	5	6	7
not at all						a great deal

4. Overall, how much have you told other people about what you wrote today?

1	2	3	4	5	6	7
not at all						a great deal

Appendix Q: Experiment Two, Post Experimental Questionnaire

Thank you for your participation in this study today. Without your time and efforts, this research could not be conducted; I appreciate your input very much.

Below are a series of questions regarding your experiences in this study. There are no right or wrong answers; I hope you will provide honest thoughts and opinions as best you can. The aim of these questions is to find out what it has been like for you to be a subject in this experiment, so that I can better understand the impact of different elements of the study. If you have additional comments, please add those.

Generally, what did you think (or what would you now guess) was the purpose of this study?

Did you feel you had sufficient privacy and/or confidentiality to write a candid essay? Could you have written more than you did?

Is there anything that would have made you feel more assured of pirvacy and/or confidentiality?

Was your experience in this study in any way helpful or harmful to you? Did any part of the experiment especially intrigue you or upset you?

Additional comments:

Please complete the following questions. This information will help me to understand the population of students who have participated in this experiment. This information, like all the other information you have contributed today, will be kept confidential and will not be linked with your identity.

What is the first language you learned to speak?

_____

What are your parents' first or primary lanuages?

Father _____
Mother _____

If English is not your first language, when did you learn to speak English?

Age _____

What other languages do you speak? At what age did you learn this/these language(s)?

_____ age _____
_____ age _____
_____ age _____

In what language was your schooling?

Kindergarten, grades 1 to 3 _____
Grades 4 to 6 _____
Grades 7 to 9 _____
Grades 10 to 12 _____

What is your age? _____

In what faculty and year are you registered? _____

Are you Male or Female (please circle)

Thank you!

_ _ _ _ _

Appendix R: Experiment Two, Written Feedback to Subjects

Experiment *Jasper*: Theoretical Foundations

Sharing information about ourselves is important in our relationships. Revealing information about ourselves to others allows us opportunity to compare thoughts, beliefs and opinions; in revealing ourselves, we also learn about ourselves.

We can reveal ourselves by talking, but we can also write about thoughts and feelings in letters, journals, or diaries. These are also avenues for increased self-knowledge.

Previous research (Pennebaker & Beall, 1986; Pennebaker, Kiecolt-Glaser, & Glaser, 1986) has reported significant benefits to health (i.e., improved self-reports of health, decreased visits to health care providers, increase in immune system functioning) which occur as a function of writing self-disclosing essays of personal trauma. The health benefits seem to occur especially when the trauma which has been experienced has not previously been reported to others. People appear to become healthier by virtue of having written about upsetting, painful aspects of their past.

With changes in health, these researchers also suggest that changes in cognition occur consequent to written self-disclosure. Thinking seems to become broader, in terms of conceptual or temporal focus, and incorporates a greater consideration of the individual's own emotional status. However, these researchers have not operationalized and measured these cognitive changes. The study you have just participated in is one of a series of a studies investigating the cognitive consequences of writing about personal trauma.

Whereas some individuals were asked to write about "the most upsetting experience of [their] entire life," some individuals wrote without feeling or opinion about details of the past 24 hours. The latter group represents a "control" or comparison group; the comparison between the group disclosing and the control group represents the primary independent variable of the study. You were placed into a control group or a group asked to disclose solely on the basis of random assignment.

A number of questionnaires were competed, to measure mood at various points during the procedure, to survey attitudes toward health and wellness, and, at the end of the study, to query your own personal experience of this study and to collect demographic data.

Some mentally challenging tasks were presented to you. The first, defining a list of words, was intended to determine verbal ability in a written context, prior to the assignment of an essay topic. The tasks after you wrote your essay represent the dependent variables of interest; my hypothesis is that expressing thoughts and feelings regarding upsetting painful experiences that one has been through leaves one with a thinking style which is conceptually or

temporally broadened, which facilitates performance on mentally challenging tasks. The support, or lack of support, for this hypothesis will be borne out in statistical comparisons.

Please be assured that all essays, questionnaire materials, and other materials you produced/completed will be treated as strictly confidential. No attempt will be made to link this information with you personally. You have shared information which is, to a greater or lesser extent, personal and revealing; I wish to be respectful of that, as a matter of appropriate, ethical conduct, but also in gratitude to your contribution to my research.

Some individuals may find that, through the writing that they have done, they become more aware of personal feelings and issues which they are not comfortable dealing with on their own. They may wish to seek counseling for themselves, an opportunity to explore feelings and experiences with an individual who is trained to be helpful and compassionate. A number of opportunities exist for counseling for students at the University of Manitoba, including the Counseling Service in UMSU, and the Psychological Service Centre. Both facilities provide professional quality services which are free of charge. If you feel that there are issues which you have uncovered by reporting your experiences in this study, and you would like to pursue counseling, I would invite you to contact me through the Psychology General Office, 474-9338. I would be pleased to assist you by providing further information about services available and, if appropriate and at your request, by making a referral. You can, otherwise, contact the Counseling Service or the Psychological Service Centre independently; a referral is not required.

I would be pleased to address any further questions that you may have regarding this study; contact me through the Psychology General Office, 474-9338. I have a request of you: because this research is ongoing, I would appreciate your cooperation and support in not telling your peers about your experience in this study. Others will be participating -- it is very important that they are not informed about the procedures ahead of time, or their expectations will alter their performance of the tasks I present to them. That would, in effect, ruin the experiment which you have just invested two hours of your time in. Feel free to talk with family and friends who are not in Introductory Psychology -- if you want to! But thank you for not discussing this study with others in your Intro Psych class.

Thank you for all your efforts here today.

Kent Somers, M.A.
Ph.D. Candidate
Department of Psychology
University of Manitoba

October 96