

MEASURING ENGAGEMENT AS A MODERATOR WITHIN AN EXPRESSIVE
WRITING INTERVENTION FOR SMOKERS

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To my remarkable family who is always unfailing in their support of every endeavor I

undertake

and

To my Matthew, an amazing source of support and encouragement throughout this

process

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CHAPTER I

INTRODUCTION

According to the National Institutes of Health, 70% of the 44.5 million adult smokers in the United States want to quit, yet only 40% make a serious attempt to do so and a paltry 5% actually succeed in quitting in any given year (National Institutes of Health, 2006). Additionally, the NIH reports that tobacco is at the top of the list for avoidable causes of cancer, accounting for about 30% of the cancer deaths in the United States. Cigarette smoking has also been linked to non-cancerous health problems such as coronary heart disease, stroke, emphysema, and bronchitis – in total accounting for over 400,000 premature deaths in the United States alone. Smoking damages almost every organ within the body and thus causes many diseases and reduces general health (U.S. Department of Health and Human Services, 2004). However, risk of premature death due to tobacco is drastically reduced by smoking cessation; therefore, it is imperative that successful and realistic aids to smoking cessation are designed and made available to smokers. Currently, smoking cessation programs are mainly restricted to pharmacological and behavioral interventions. Such intervention programs are primarily short-term interventions of one to three months and, according to the NIH, 75% to 80% of smokers in these programs relapse within six months. The stagnation of the current situation has opened up the field to new and innovative approaches such as the expressive writing intervention presented in this paper.

The purpose of this article is to examine a possible moderator of expressive writing's effect within a study carried out under the auspices of a grant from the National Cancer Institute. The study explored the efficacy of a psychosocial intervention, expressive writing, focusing on its effects upon the smoking behavior and selected smoking-related cognitions and psychological outcomes of a sample of current cigarette smokers. To date, no existing study has found a main effect for expressive writing as an aid to smoking cessation; however, there may be mediating/moderating factors involved. Using both subjective and objective measures, the analyses presented in this paper look at the degree of a participant's engagement within the writing sessions as a possible moderator of the effect of writing upon specific behavioral and psychological variables.

Expressive Writing

Expressive writing is a psychosocial intervention designed by James Pennebaker in 1986 as a mechanism for stimulating cognitive processing of a traumatic or stressful event. This is relevant to smoking cessation in that many smokers smoke to deal with a trauma in their past or in response to current trauma or stress (quitsmoking.com, 2006). Also, the cessation of smoking in and of itself can be extremely stressful in that it requires re-evaluation of the self and one's place in the world. Such a re-evaluation requires extensive cognitive processing, which may simultaneously destroy old schemas while necessitating the difficult task of creating new schemas (Horowitz, 1986; Janoff-Bulman, 1992). Without adequate cognitive processing, a trauma or stressor causes repetitive and intrusive thoughts that increase the psychological strife and undermine the person's sense of control (Consedine, 2002; Kennedy-Moore, 2001; Lepore, 1997).

However, there is extensive evidence that expressive writing reduces the effects of intrusive thoughts via confrontation (Lepore, 1997). In order to write about an experience, one must organize the thoughts into a coherent narrative, which guides one's thoughts about the experience to a more orderly and less ruminative state (Kennedy-Moore, 2001). Because of this organization, the writer's emotions are more clearly understood, a sense of control is regained, the person feels safe to reappraise the situation, and the dangerous loops of intrusive thoughts are broken.

Within health psychology, self-efficacy is a psychological construct of particular importance for smoking cessation. Self-efficacy beliefs, which affect cognitive, motivational, and emotional processes of behavior control (Manstead & Hewstone, 1996), have been defined by Bandura (1977) and others (e.g. Walker, 2001; Wallston, 2001) as a specific confidence in one's ability to perform a certain behavior within a certain situation in order to obtain a certain desired goal. Perceived competence is a more generalized sense of self-efficacy and has been defined as "the belief that one can determine one's own internal states and behavior, influence one's environment, and/or bring about desired outcomes" (K.A. Wallston, B.S. Wallston, Smith, & Dobbins, 1987, p. 5).

Cognitive restructuring through expressive writing is one possible method for increasing perceived self-efficacy and, perhaps, even a generalized sense of competence. The reasoning behind this is that disclosure allows for ownership over one's emotions and decreases the sense of threat imposed by the stressor on personal identity; these, in turn, lessen subjective stress and negative affect (Schwartz, 2004; Greenberg & Lepore, 2001). Paez et al. (1999) investigated the effects of students writing about undisclosed

traumas and found that negative affect decreased while ownership of the traumatic memories increased. Paez's findings are supported by Greenberg & Lepore (2001) who suggest that safely exploring deep feelings validates the feelings that first connect one to their own self-identity then leads to increased self-awareness and self-efficacy and finally to acceptance.

Twenty years of experimental research by various investigators supports expressive writing as a highly effective therapeutic tool with long-term potential benefits and relatively easy clinical applicability (Lepore et al., 2002). Additionally, expressive writing has distinct advantages over many of the current interventions available to smokers; it costs nothing, requires minimal training, is brief and easily mobile, and is appropriate for a wide range of ages and situations. However, the underlying mechanism through which expressive writing functions has yet to be elucidated (Sloan & Marx, 2004) and it is also uncertain whether the intervention works best for some people rather than others (Norman et al., 2004).

To date, expressive writing as a tool to facilitate smoking cessation has not been found to be beneficial. A study by Ames et al. (2005) measured the intervention's effects upon perceived stress and affect for college-aged individuals who were making an attempt to quit smoking. That study found no effects for expressive writing, but did find that their participants lacked enthusiasm for the expressive writing treatment. Though our study, designed before the Ames et al. study was published, implements a similar intervention within a population of smokers, the design of our study varies greatly from the one done by Ames et al. In our study, we have both control and experimental writing conditions; in addition, our participants vary widely in age and education and have a

broad range of current attitudes towards smoking cessation. Finally, the Ames et al. study did not collect or analyze the writing samples, which is a focal point of this article. Within this article, we define a possible moderator, engagement, and investigate its effects upon specific study outcome variables.

Engagement

Engagement is a psychological construct that is often mentioned in the intervention literature, yet is rarely defined; however, there are a few existing frameworks under which engagement is being studied. The most common is within educational research where engagement is often conceptualized as the degree to which a student finds an intervention interesting and useful (Aveyard, et al., 2003) or to what degree they are motivated to get good grades and is often operationalized as degree of assignment completion (Kern et al, 2006; Walker et al., 2006). Within the expressive writing literature, engagement was mentioned in a study by Lepore (1997) in which he reported that expressive writing participants were engaged by the exercises, thereby achieving emotional contemplation of thoughts and feelings resulting in cognitive insight. However, Lepore did not employ an actual measure of engagement within this study, nor did he provide a framework within which it was defined.

Carpenter (2000) designed a model based upon the concept that written self-disclosure combined with emotional engagement leads to a decrease in avoidance of objects, language, images, situations, and actions associated with a traumatic event. Furthermore, the author stated that a second mechanism, the translation of affective or cognitive distress into language, is also a factor within self-disclosure. Many studies

support the existence of a combined cognitive-affective process that integrates and resolves stressors and has the following three components: affective arousal, cognitive change, and a shift to positive feelings (Greenberg & Safran, 1987; Murray, 1985; Nichols & Efran, 1985; Segal & Murray, 1994).

In 1986, Pennebaker & Beall conducted the first expressive writing study and their design touched upon the basic constructs within our definition of engagement. Their study demonstrated the importance of both a cognitive and emotional investment within the writing sessions. In their study, subjects writing about traumatic incidences were told to write an account in one of three ways. The first, in which subjects were to write only the facts of their trauma, was called trauma-facts. The second, in which they were to write only of their emotional response to their trauma, was trauma-emotion. The third group, in which subjects wrote about both the factual aspects of their trauma and the associated emotions, was trauma-combination. The results of this study showed that the trauma-combination group showed the most improvement on physiological and health self-report measures. The trauma-emotion group did not increase their health as much as the combination group, though there was significant overlap between these two groups. The trauma-facts group, however, was very similar on these outcome measures to the control group who simply wrote about trivial topics.

Previous theory and research support both cognition and emotion as critical components within an expressive writing intervention; therefore, for the purpose of these analyses, engagement within expressive writing shall be defined as a cognitive and emotional investment in the writing tasks.

Linguistic Inquiry and Word Count

Linguistic Inquiry and Word Count (LIWC) is a computerized approach to calculating percentages of words used within writing samples written in the English language. LIWC recognizes more than 2200 words, which accounts for about 80% of words commonly used, aside from technical writing, as determined by over 43 studies encompassing a total of 1.6 million words (Groom & Pennebaker, 2002; Pennebaker & Graybeal, 2001). This extensive word list is broken down into subcategories covering various psychological processes (e.g., positive emotions), relativity in time and space (e.g. verb tense), and personal concerns (e.g., work). These sub-dictionaries were determined by human judges and reliabilities within these judges were found to range from 93 to 98%. Results of studies that utilize LIWC analysis suggest that certain specific sub-dictionaries may represent cognitive complexity (Pennebaker & Lay, 2002). For instance, LIWC's cognitive processing sub-dictionaries, causal and insight, have been linked to complex cognition (Pennebaker et al., 1997, 2003; Pennebaker & King, 1999; Burke & Dollinger, 2005). LIWC analyses have been used in previous substance-use and smoking studies (e.g. Pennebaker & King, 1999; Collins et al., 2005).

In this study we compare the predictive values of a subjective (self-report) measure of engagement to the more objective measures generated by the LIWC analysis. LIWC analyses within EW studies have already demonstrated a relationship between cognitive and/or emotion word use and positive outcome changes. For example, several studies have found that the beneficial effects of EW are enhanced if the participant uses a relatively high number of positive emotion words or increases in causal or insightful words during the intervention (Campbell & Pennebaker, 2003; Klein & Boals, 2001).

Pennebaker et al. (1997) analyzed six writing studies and found that health improvement was related to both the use of emotion terms and cognitive words. There was also a very strong effect on health improvement for an increase in the use of cognitive words across the writing intervention sessions. LIWC analysis is strongly supported throughout the expressive writing literature. Collins et al. (2005) wrote, “exploring the language elicited by [a writing] intervention may provide a more accurate measure of motivation to change and thus a more effective predictor of treatment outcomes than self-report measures.” The wide empirical support for LIWC makes it a solid base with which to compare our self-report measure of subjective engagement.

The analyses in this paper have three main objectives: (1) To determine the degree of correlation between a subjective measure of engagement and objective measures of constructs within engagement; (2) To assess the predictive properties of these measures of engagement, both mean and change scores, with respect to behavioral and psychological variables within a sample of smokers enrolled in an expressive writing intervention study; and (3) To determine if, in fact, subjective engagement acts as a moderator of experimental condition on changes in smoking cessation self-efficacy.

CHAPTER II

METHOD

Participants

Participants were recruited throughout Middle Tennessee via flyers, email recruitment within the Vanderbilt University Medical Center, advertisements, and enrollees in a smoking cessation program at the Kim Dayani Human Performance Center. Inclusion criteria included being able to read and write English, able to sit and write for 20 minutes, and having smoked at least one cigarette in the past week. Participants were screened and excluded if they were taking anti-psychotic medications or had a history of PTSD or suicidality. Participants were enrolled regardless of intention to quit or to continue smoking. They were told that the study was looking at the relationship between stress and smoking.

Procedure and Design

The study was approved by the Vanderbilt University Institutional Review Board. After an initial phone screening for inclusion/exclusion factors, participants were scheduled for an introductory meeting in which the study was explained to them in detail, informed consent was obtained, and participants were given a packet that contained all materials for the four sets of assessment measures and for four writing sessions. This packet included instructions, a study schedule, assessment forms, writing paper, and pre-addressed stamped envelopes in which the participants mailed all materials back to the research office.

This study employed a randomized, two-group design with repeated assessments. Participants were assigned to either an experimental condition where they were directed to do expressive writing (see below for instructions) or to a control condition in which they were directed to write about time management issues. According to Pennebaker (personal communication to K. Wallston and colleagues, May, 2003), these control writing instructions have been shown to be an improvement over the traditional “trivial writing” instructions used in most previous studies using this paradigm. The general assessment batteries were filled out at baseline, one week after the completion of the writing sessions (post-intervention), one month later (1-month follow-up), and two months after that (3-month follow-up). In addition, brief post-writing questionnaires were filled out immediately after the first and fourth writing sessions.

After their introductory session, participants were instructed to fill out their baseline set of questionnaires, wait one week, then do two writing sessions, for 20-30 minutes each, two days apart. They were asked to mail in their baseline questionnaire, their first post-writing questionnaire, and their first two writings. The following week they were instructed to write for two more sessions, two days apart, then wait a week and fill out the post-questionnaires and mail those items back to the research office. Participants were also instructed to complete and mail back the 1 month and 3 month follow-up questionnaires. Additionally, midway through the study, an online version of the 1 month and 3 month follow-up questionnaires became available to the participants. However, those sets of questionnaires will not be analyzed within this article because of a change in wording in some critical items. Thus, the analyses in this paper will only use questionnaire data from the first two of these four administrations (pre- and post-

intervention) which occurred approximately 3-4 weeks apart. In addition, the analyses will make use of data from the first and fourth writing sessions which occurred approximately nine days apart.

The participants in the expressive writing condition received the following instructions:

Using the paper we have provided for your writing sessions, we would like you to write your thoughts, feelings, and emotions about something extremely upsetting or traumatic in your life. This might be something that happened in the past, or something that is currently ongoing, including stressors that are related to smoking or smoking cessation. Really let go and explore your deepest feelings and thoughts about it. If you are writing about smoking, smoking cessation, or other stressors, you might tie your experiences to your childhood, your relationship with your parents, people you have loved or love now, or even your career. You might focus on what made you originally start to smoke, why you want to quit, etc. How is smoking (or smoking cessation) related to who you would like to become, who you have been in the past, or who you are now? If your thoughts lead you to other topics, you can write about them as well. You can write about the same issue every day or a series of different issues.

The participants in the control condition received the following time management writing instructions:

Using the paper we have provided for your writing sessions, we would like you to write about the ways in which you spend your time. For example, you could write about how you spent your time over the course of this past week, how you spent your time yesterday, how you plan to spend your time for the next 24 hours, or how you plan to spend your time over the course of the next week. In your writing, try to be as objective as possible. Feel free to be as detailed as you can be. It is critical that you describe your days as accurately, as completely, and as objectively as possible.

All subjects were told to find a quiet place in their home in which they could write continuously for 20 minutes without being disturbed. After writing, they were instructed to place their writing samples in a sealed envelope.

Measures

Measures of engagement

Subjective engagement (SE) was measured by three items completed by the participants immediately after the first and fourth writing sessions. The items were: (1) “How personal did you consider your essay to be?” (2) “To what degree did you reveal emotions in your essay?” and (3) “To what extent did you feel free to express your deepest emotions, thoughts, and feelings while you were writing?” The possible responses ranged from 1 (not at all) to 7 (a great deal). The Cronbach’s alpha of the three item SE scale after the first writing session was .74 and after the fourth writing session was .84.

Objective measures of subconstructs within engagement were analyzed via the following LIWC variables: Cognitive Mechanism words (e.g., cause, know, ought), Causal words (e.g., because, effect, hence), Insight words (e.g., think, know, consider), Positive Emotion words (e.g., happy, pretty, good), and Negative Emotion words (e.g., hate, worthless, enemy). To parallel the measurement of subjective engagement, the LIWC analyses were done on the first and fourth writing samples. To prepare the writing samples for LIWC analysis, spelling errors were corrected, abbreviations were spelled out, some contractions were separated, and some punctuation was corrected.

The average SE score was computed as the mean SE score from the first and fourth sessions. Similarly, the average LIWC counts were computed as the average counts of a given variable across the two sessions. Changes in SE and LIWC variables were computed by the difference in scores between the first and fourth writing sessions

(i.e., subtracting the value from the first writing session from that of the fourth session). High change scores signify an increase in engagement.

Psychological outcome measures

Smoking cessation self-efficacy (SCSE) is a smoking cessation specific measure of self-efficacy. SCSE was assessed by four items written specifically for this study assessing both the respondent's confidence in being able to quit smoking for three and 12 months and how difficult it would be to quit smoking for three and 12 months. At baseline for this study, the SCSE scale had a Cronbach's alpha of .84. In previous analyses (Stone, Wallston & Hepworth, 2006) we have shown that SCSE scores have a significant relationship with a decrease in consumption of cigarettes per day ($r = .37, p = .002$), an increased likelihood of an attempt to quit ($r = .57, p < .001$), and an increase in self-reported abstinence ($r = .53, p < .001$); therefore, SCSE could be a vital component of successful cessation.

Perceived competence (PC) was assessed by the shortened four-item version of Wallston's generalized measure of self-efficacy expectations. Although the longer eight-item version of this scale has never been published, it has been reported in the literature (Wallston, 2001) and has been used by a number of investigators. Pender et al., (1990) found that PC was the best predictor of health-promoting lifestyle behaviors in a large sample of factory workers. A health-specific version of PC, the Perceived Health Competence Scale, was published by Smith, Wallston, and Smith (1995) and is widely used by health researchers. The PC4 used in this study had a Cronbach's alpha of .75 at baseline. See Appendix I for actual measure.

Perceived stress was assessed by the 14 items on the Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983), a self-report instrument that measures the extent to which situations in an individual's life are appraised as stressful over the previous seven days. The PSS, which also comes in 10-item and 4-item versions, has been shown to be both reliable and valid (Aveyard, 2005; Cohen & Lichtenstein, 1990; Cohen & Williamson, 1998). Cronbach's alpha for the PSS at baseline for this study was .84. See Appendix I for actual measure.

Changes in the psychological outcomes were computed by subtracting the scores from the post-questionnaires from the respective scores on the pre-questionnaires.

Behavioral measures

In each questionnaire administration, participants were asked to report the average daily number of cigarettes smoked over the previous seven days. Unfortunately, due to the way the questionnaire was laid out, many participants overlooked this critical behavioral measure, thus reducing the sample size for analysis of this variable. Change in the percentage of daily cigarettes smoked was computed as the difference between the reported daily average on the post-questionnaire minus the pre-questionnaire divided by the daily average on the pre-questionnaire with the resultant multiplied by 100. Thus, if a participant began the study smoking an average of 15 cigarettes a day and reported smoking 10 cigarettes a day on the post-intervention questionnaire, the percent change calculated would be -33.3%.

Statistical Analysis

Independent group t-tests were used to compare means of the two experimental conditions (EW and CW) on the mean indicators of engagement and on changes in the behavioral and psychological outcome variables.

Then, the subjective measure of engagement (SE), averaged over the first and fourth sessions, was compared to specific LIWC sub-dictionary counts, also averaged over those two sessions, using Pearson product-moment correlations. Then, mean SE and mean scores of the LIWC variables were correlated with changes from pre- to post-intervention for the following behavioral and psychological outcome variables: average number of cigarettes smoked per day, percent change in average number of cigarettes smoked per day, smoking cessation self-efficacy (SCSE), perceived competence (PC4), and perceived stress (PSS). Finally, changes from the first to fourth session of SE and the LIWC variables were correlated with the changes in the behavioral and psychological outcome variables. The majority of analyses within this article utilize all writings as one group, regardless of writing condition. This was done for several reasons, the first being that the primary objective of these analyses was to measure engagement in writing sessions, irrespective of topic. Secondly, a reading of the writing samples in the control group persuaded this investigator that some nontrivial number of participants in the control writing condition appeared to be engaged in the writing task. And, finally, it was also the belief of this investigator that using only engagement of those in the expressive writing condition would severely restrict the range of scores within the analyses; however, the addition of scores for those in the control condition might better represent the possible range of scores for subjective engagement. For these reasons, the primary

analyses utilize the entire sample as a whole. In addition, as can be seen in the results section, we did compare subjective engagement scores for expressive writers with those of control writers to assess statistical support for combining the groups. Also, for exploratory purposes, we calculated separate correlations within in each writing condition and the resulting significant correlations are reported.

Finally, a moderated multiple regression was performed to assess the probability of subjective engagement as a possible moderator of smoking cessation self-efficacy. The independent variables were writing condition, mean subjective engagement, and the product of multiplying mean centered writing condition and mean centered subjective engagement.

CHAPTER III

RESULTS

Participant Characteristics

This study was conducted from June 2004 to January 2006. The study screened 250 people and enrolled 181. The analyses reported in this paper use data from the 85 participants who completed and submitted both post-writing questionnaires and the post-intervention questionnaire. This sample is 71% female, 83% Caucasian, and ranges in age from 18 – 61 years. At baseline, our participants had a mean cigarette consumption of 16 cigarettes per day, with a range of 2 to 40 cigarettes. Forty-one participants were in the control condition (CW) and 44 were in the experimental condition (EW).

Group Differences on Engagement

As seen in Table 1, for mean SE and four of the five mean variables from the LIWC analysis, scores were higher among participants in the expressive writing condition than in the control writing condition. The only exception was for mean positive emotion word count, which was nonsignificantly higher for the control participants than those in the experimental condition. Nevertheless, as seen in the boxplots in Figure 1, the spread of mean subjective engagement scores in the control condition significantly overlapped that of the expressive writing condition. 31.7% of SE scores for CW were equal to or above the mean score for EW and 85.4% of CW SE scores were within the range of EW scores, leaving 14.6% of CW scores below the range of SE scores for EW.

In addition to significant overlap in scores for the two conditions, combining them creates a group with scores spanning the entire spectrum of possible SE scores, thus preventing errors due to restriction of range to occur within our analyses.

Table 1: Analysis of Group Differences on Indicators of Engagement

	Mean EW	Mean CW	t-score	df	Significance
Subjective Engagement	17.18	14.09	-4.45	83	<.001
Cognitive Mechanisms	7.22	5.30	-4.98	84	<.001
Causal	.99	.67	-3.28	84	.002
Insight	2.19	1.39	-5.03	84	<.001
Negative Emotion	2.32	1.15	-6.95	84	<.001
Positive Emotion	1.97	2.22	1.08	84	.284

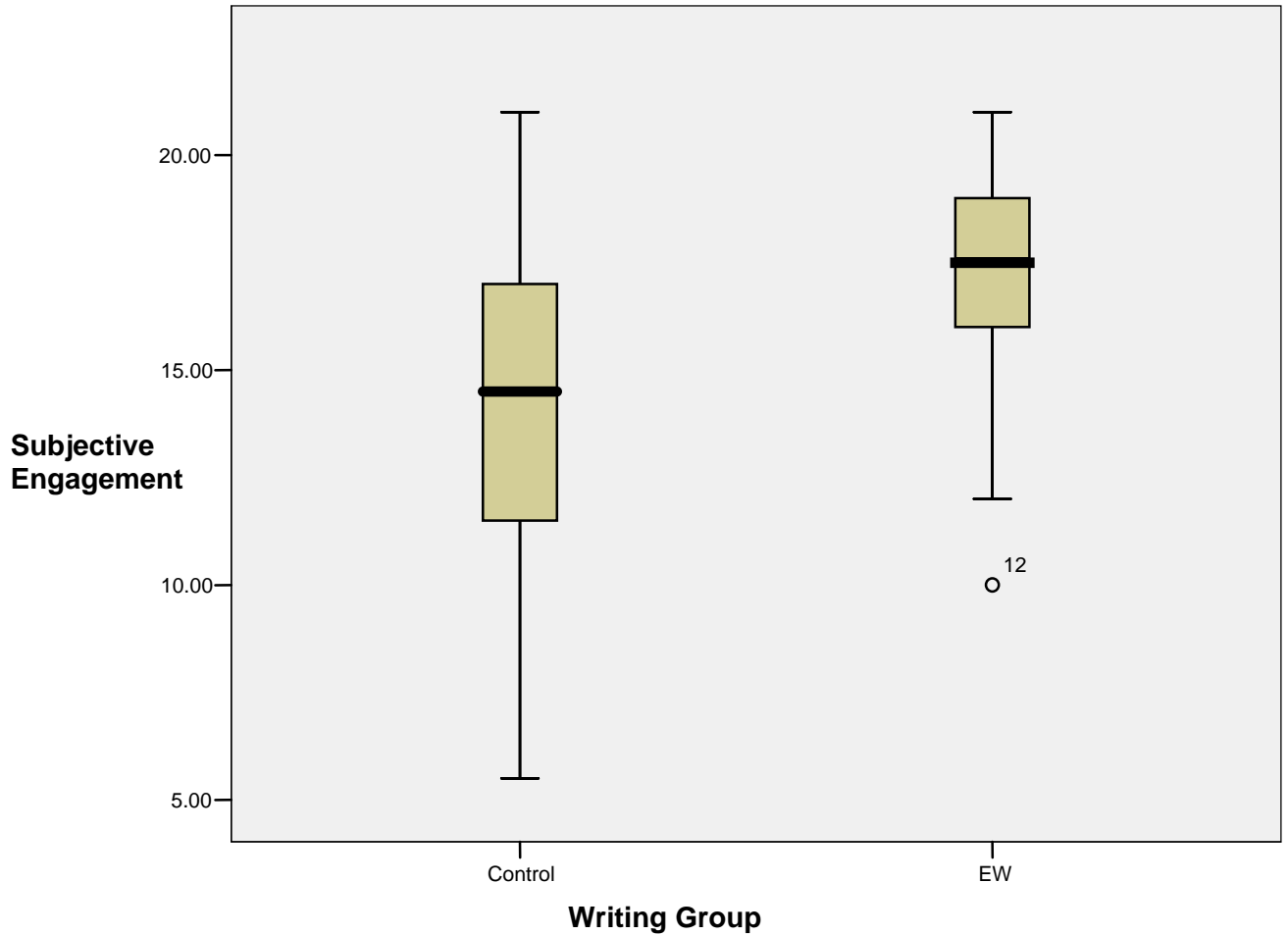


Figure 1: Boxplots of Mean Subjective Engagement by Group

Relationship of Subjective Engagement to Objective Engagement

Mean SE scores were significantly correlated with the following LIWC sub-dictionary mean scores: Cognitive Mechanisms ($r = .34$, $p = .002$), Insight ($r = .44$, $p < .001$), Negative Emotions ($r = .45$, $p < .001$), and Causal words ($r = .25$, $p = .021$). No significant correlation was found with Positive Emotions.

Group Differences on Behavioral and Psychological Outcome Variables

There were no significant between group differences in change in the average number of cigarettes smoked daily or in percent change in cigarettes smoked. On average, both groups reported smoking approximately six cigarettes less per day one week after the writing sessions ended. This represented a 41.3% reduction for the control writers ($n = 29$) compared to a 32.5% reduction for the expressive writers ($n = 35$). There was a significant increase in smoking cessation self-efficacy (SCSE) scores for the expressive writers (mean increase = 13.1 points; $n = 42$) compared to the control writers (mean increase = 1.3 points; $n = 36$; $t = -2.53$, $p < .02$). There was no significant between group difference in change in general perceived competence (PC4) scores; however, there was a trend ($p < .10$) toward a group difference in perceived stress scores. Control writers decreased their PSS scores an average of 1.75 points while expressive writers had a 0.80 average increase in PSS ($t = -1.77$; $p = .08$).

Relationship of Engagement to Behavioral Outcome Variables

No significant correlation was found between change in cigarettes per day and mean SE scores or any of the mean LIWC measures; additionally, no significant correlation was found between change in cigarettes per day and change in SE or change scores for any of the LIWC variables. Also, no significant correlation was found between change in percent of cigarettes smoked per day and mean or change scores of SE and the LIWC measures. See Table 2.

Table 2: Correlations between Engagement Variables and Cigarette Consumption

	Change in Cigarettes per Day	Change in Percent Cigarettes per Day
Subjective Engagement		
Mean score:	$r = -.03, p = .831$	$r = .04, p = .761$
Change score:	$r = .10, p = .460$	$r = .15, p = .269$
Cognitive Mechanisms		
Mean score:	$r = .01, p = .920$	$r = .11, p = .411$
Change score:	$r = .00, p = .999$	$r = -.01, p = .971$
Insight		
Mean score:	$r = .03, p = .817$	$r = .04, p = .753$
Change score:	$r = -.04, p = .786$	$r = -.14, p = .286$
Causal		
Mean score:	$r = -.11, p = .439$	$r = .06, p = .635$
Change score:	$r = -.13, p = .335$	$r = -.17, p = .219$
Positive Emotions		
Mean score:	$r = -.10, p = .457$	$r = -.23, p = .092$
Change score:	$r = -.04, p = .776$	$r = .02, p = .891$
Negative Emotions		
Mean score:	$r = -.06, p = .663$	$r = .09, p = .521$
Change score:	$r = -.13, p = .324$	$r = -.14, p = .293$

Relationship of Engagement to Psychological Outcome Variables

Data for all psychological outcome variables where the two groups are combined are presented in Table 3. Table 4 presents selected correlations from the exploratory analyses where the groups are treated separately.

Perceived stress (PSS)

Change in PSS scores was found to have a significant relationship with mean subjective engagement ($r = .25$, $p = .031$). Additionally, change in perceived stress was found to have a significant relationship with mean negative emotion ($r = .33$, $p = .004$). Furthermore, when the sample was split into writing conditions, change in perceived stress for those in the control condition was found to have a significant correlation with insight ($r = .37$, $p = .025$), though no such relationship was found for those in the experimental condition (see Table 4).

Perceived competence (PC)

No significant correlation was found between change in perceived competence and either mean or change in subjective engagement, nor between perceived competence and either mean or change scores of any of the LIWC measures.

Smoking cessation self-efficacy (SCSE)

Change in SCSE did not correlate with the overall mean SE scores; however, when the sample was split into writing conditions, two distinct correlations were found. The mean of subjective engagement for those in the *experimental* condition had a

significant *positive* correlation with SCSE ($r = .32, p = .040$). The mean of subjective engagement for those in the *control* condition had a significant *negative* correlation with SCSE ($r = -.35, p = .033$) (see Table 4). Finally, no significant correlation was found between change in SCSE and any of the LIWC measures.

Table 3: Correlations of Psychological Outcome Measures and Measures of Engagement

	<i>Changes in Perceived Stress</i>	<i>Changes in Smoking Cessation Self-Efficacy</i>	<i>Changes in Perceived Competence</i>
<i>Mean Scores</i>			
Subjective Engagement	r = .25*, p = .031	r = .06, p = .574	r = -.08, p = .467
Cognitive Mechanisms	r = .06, p = .632	r = .21, p = .067	r = -.04, p = .739
Insight	r = .22, p = .058	r = .14, p = .228	r = .01, p = .907
Causal	r = .14, p = .241	r = .20, p = .074	r = -.11, p = .350
Positive Emotion	r = -.10, p = .409	r = -.04, p = .732	r = -.01, p = .965
Negative Emotion	r = .33**, p = .004	r = .16, p = .173	r = -.16, p = .154
<i>Change Scores</i>			
Subjective Engagement	r = -.12, p = .307	r = .03, p = .789	r = -.12, p = .300
Cognitive Mechanisms	r = -.10, p = .390	r = -.04, p = .753	r = .08, p = .470
Insight	r = -.08, p = .518	r = -.02, p = .880	r = -.03, p = .826
Causal	r = -.13, p = .261	r = -.03, p = .778	r = .10, p = .379
Positive Emotion	r = -.08, p = .525	r = .01, p = .965	r = -.15, p = .193
Negative Emotion	r = -.12, p = .325	r = -.10, p = .380	r = .03, p = .785

* If these results were corrected for multiple comparisons, it would be necessary for $p < .01$ in order to have a significant result, so this result would not be significant.

** This result would remain significant after correction for multiple comparisons.

Table 4: Significant Correlations Within Split Sample Analyses

	<i>Perceived Stress</i>	<i>Smoking Cessation Self-Efficacy</i>	<i>Perceived Competence</i>
<i>Subjective Engagement</i>			
Expressive Writing		$r = .32^*, p = .040$	
Control Writing		$r = -.35^*, p = .033$	
<i>Insight</i>			
Expressive Writing	$r = .01, p = .960$		
Control Writing	$r = .37^*, p = .025$		

* If these results were corrected for multiple comparisons, it would be necessary for $p < .01$ in order to have a significant result, so this result would not be significant.

Subjective Engagement as a Moderator of Smoking Cessation Self-Efficacy

Subjective engagement was shown to be a moderator of smoking cessation self-efficacy with a beta weight of 0.34, $t = 3.4$, $p = .001$.

CHAPTER IV

DISCUSSION

Although it wasn't the main focus of this paper, our analyses have shown that participants involved in expressive writing are significantly more engaged, both subjectively and objectively, than those who received our control writing instructions. This is not too surprising given the nature of the different writing instructions. What *was* surprising is that a goodly number of control group writers appeared to be highly engaged in the task, no matter how we defined engagement. Contrary to the advice given by Pennebaker, asking individuals to write about how they schedule and manage their daily tasks can, in fact, be quite engaging for some individuals.

We also demonstrated that the type of writing assignment had no short-term differential effect on the target behavior, cigarette smoking, although it is interesting to note that participants on whom we were able to calculate these data averaged approximately a 35% reduction in cigarette smoking over a 3-4 week period with many of them not particularly desiring to change their smoking behavior at study onset. Of the three psychological outcome variables examined in this paper, only smoking cessation self-efficacy scores were beneficially helped by our expressive writing task. This difference did not carry over to the more generalized measure of perceived competence. Furthermore, the short term effect of expressive writing was to raise perceived stress levels in comparison to a reduction of perceived stress in the control group.

The analyses in this paper had three main objectives: (1) To determine the degree of correlation between a subjective measure of engagement and objective measures of constructs within engagement; (2) To assess the predictive properties of these measures of engagement, both mean and change scores, with respect to behavioral and psychological variables within a sample of smokers enrolled in an expressive writing intervention study; and (3) To determine if, in fact, subjective engagement acts as a moderator of experimental condition on changes in smoking cessation self-efficacy.

Based upon wide empirical support of a combined cognitive-affective process, we expected to find that our subjective measure of engagement would be correlated with LIWC sub-dictionaries measuring both cognitive and emotion word use. However, it was expected that SE's correlation with measures of cognition would be weak due to a possible insufficiency in the measure of subjective engagement itself. Taken at face value, the three questions constituting the SE measure do not seem to adequately address a self-perception of cognitive investment in the writing sessions, instead concentrating on emotional disclosures. Statistical analyses, however, show a significant relationship between the measure of subjective engagement and the writers' use of cognitive words. Within these analyses we used three objective variables from LIWC that are related to cognition. The first, cognitive mechanisms (e.g. cause, know, and ought), represents generalized cognition. Statistical analysis shows a significant positive correlation between SE and this generalized use of cognitive words. Furthermore, this study analyzed two sub-components of cognitive mechanisms: causal and insight words. Causal words (e.g. because, effect, and hence) showed a moderate, but significant, positive correlation with SE; use of insight words (e.g. think, know, and consider) showed an even stronger

positive correlation with SE. The strength of these correlations is surprising considering there is not a question within the SE measure that specifically addresses cognition. However, the final question (“To what extent did you feel free to express your deepest emotion, thoughts, and feelings while you were writing?”) may tap into cognitive engagement more strongly than anticipated.

The second construct within our definition of engagement is an emotional investment. The use of emotion words was measured by LIWC sub-dictionaries positive emotion and negative emotion words. Interestingly, no significant relationship was found between SE and positive emotion, but there was a significant correlation with negative emotion. These results imply that the three SE questions, which tap into revealing deep emotions, mostly relate to a high use of negative emotion words. This may indicate that study participants are reporting deep emotions that are “revealed” as negative, rather than positive, in nature.

This development of a subjective scale of engagement fills a hole in current expressive writing analysis. If, as the Pennebaker & Beall (1986) study demonstrates, both cognition and emotion are vital to the processes underlying the framework for expressive writing, it should then be standard within expressive writing studies to measure cognitive and emotional engagement on the part of participants when doing expressive writing. Additional support of this can be found within the Ames et al. (2006) study, which stated that one reason expressive writing had no effect may be that the participants were unenthusiastic about the intervention, thus implying that it is crucial to measure these types of constructs that relate to personal investment in the intervention .

It is the belief of this investigator that a subjective scale of engagement is preferable to an objective measure because a specific number of cognitive or emotion words can have different personal significance for different individuals. For example, a man who prides himself on being stoic may consider six emotion related terms per writing session an incredibly intense emotional experience, whereas a woman who prides herself on being open and loving may consider six emotion words per session a trivial investment. Thus, in order to get at the investment behind the use of emotional and cognitive words, a subjective measure may have some advantages. This study did not analyze possible gender differences; however, that could be an area for future research. Understanding factors such as personal value of emotion words within expressive writing may allow for better specification of writing instructions, which could, in turn, optimize expressive writing effects within specific populations.

With respect to the first major objective of this paper, our subjective measure of engagement was significantly correlated with relevant LIWC sub-dictionaries. This indicates that the measure is indeed tapping into engagement as a cognitive and emotional investment in the writing sessions and, therefore, might be a valid and, especially, very efficient means of assessing engagement in studies of this nature.

With respect to predictive properties of engagement, the Perceived Stress Scale showed the highest number of significant correlations within our analyses. Interestingly, our results show that a high level of subjective engagement is related to an *increase* in perceived stress. This may reflect the short-term stress reaction of cognitive and emotional investment in the writing sessions. As was stated by Horowitz (1986), those in the experimental condition who write about traumas are engaged in extensive cognitive

processing as they re-evaluate and modify existing schemas, which understandably can cause an increase in short-term stress. On the other hand, those in the control condition who are becoming engaged with the writing samples, yet are simply writing about daily tasks, may be reflecting the stress of their daily lives when responding to the items of the Perceived Stress Scale.

We also found that a high use of negative emotion words is related to an increase in perceived stress; however, there was no significant relationship with use of positive emotion words. Additionally, PSS was not significantly correlated with causal words or cognitive mechanism words. These results indicate that perceived stress is more highly related to a measure of emotional investment (e.g. negative emotion) than to measures of cognitive engagement – a result that is not surprising. Finally, though the use of insight words was not correlated with perceived stress across all writing samples, when the subjects were split into their writing condition groups differential correlations were found. Those in the *control* condition had a significant positive correlation between use of insight words and an increase in PSS scores, though there was *no* significant correlation between insight and PSS for those within the experimental condition. Therefore, use of insight words when addressing a *trauma* did not lead to an increase in perceived stress, but higher use of insight words for those writing about daily schedules was related to higher levels of perceived stress.

This study did not find any significant relationship between changes in perceived competence and subjective engagement or any of the LIWC variables. The results of this study may be explained by the relative immediacy of the data used for the analyses in this paper. Many expressive writing investigators believe that the psychological effects of

expressive writing can best be seen three to six months after the intervention, if not longer. The post-intervention responses used for these analyses were filled out one week after the intervention; therefore, a significant change in psychological outcomes relative to our predictor variables may be detected at a time further out from the intervention.

Finally, we found that none of the objective LIWC measures had a significant relationship with changes in smoking cessation self-efficacy (SCSE). However, it was found that the subjective measure of engagement does have a significant relationship with changes in SCSE, though that relationship was not evident when all participants were treated as a single sample. Rather, significant correlations with engagement were found when we separated the experimental and control writing sessions. For those in the *expressive* writing condition, a high SE score was related to an *increase* in SCSE. On the other hand, for those in the *control* writing condition, a high SE score was related to a *decrease* in SCSE. Furthermore, a moderated multiple regression analysis found that SE does act as a moderator of writing condition on change in SCSE. Looking back at Walker's (2001) and Wallston's (2001) definition of self-efficacy, it is important to note that self-efficacy is a situation-specific construct; the definition references beliefs in specific behaviors within a specific environmental context. It then follows that a measure of SCSE is restricted to a confidence specifically in one's ability to cease smoking. When we look at the distinction between writing instructions for the expressive writers versus control writers, and keep the specificity of SCSE in mind, the disparity between the correlations for the two writing groups actually makes sense. Whereas the experimental writers were instructed to write about stressful or traumatic events (including smoking and/or smoking cessation), possibly gaining ownership over and a new perspective on

these events, the control writers were instructed to write about schedules and tasks of daily life. For purposes of speculation, it seems that, for those in the control writing condition, a subjective feeling of engagement may be a reflection of a hectic or stressful daily life and writing about these events may increase perceived stress which, in turn, could increase a person's perceived dependency upon cigarettes and inability to quit smoking. These results could imply that, for an expressive writing intervention for smokers trying to quit, writing about daily tasks may be detrimental to their confidence in their ability to quit, whereas writing about a traumatic or stressful event may serve to enhance one's confidence in one's ability to quit.

Because smoking cessation self-efficacy is the only outcome variable to have a significant correlation with both the primary outcome variable, cigarette consumption, and the primary variable of this article, subjective engagement, we ran a moderated multiple regression that showed that subjective engagement is more beneficial with regards to smoking cessation self-efficacy for those in the experimental condition than those in the control condition.

Finally, change in cigarette consumption was not significantly related to any of our predictor variables. Neither change in cigarettes smoked per day nor change in percent of cigarettes smoked per day was significantly correlated with subjective engagement or any objective LIWC variable. These results could be affected by the fact that many participants left blank the line for cigarettes smoked per day, an omission that was not caught until the study had concluded. However, this lack of results was not simply due to a lack of statistical power; it may just be that we haven't yet come up with the best set of writing instructions to help people quit. Or, it may also be that it takes a

high initial level of motivation to quit in order for expressive writing to be effective. It was beyond the purpose of these analyses to factor in the individual differences in participants' initial desires to quit smoking, but only a relatively small percentage of our participants were motivated to quit smoking when they signed up for our study. One final possibility is that expressive writing has no effect upon smoking cessation besides a possible indirect effect through SCSE.

If this study were to be run again, a higher yield of data would be of utmost importance. This study lost a large amount of data due to incomplete forms. Additionally, this study could be strengthened by an increase in the number of participants, more behavioral outcome variables, and the analysis of data from questionnaires administered more than three months post-intervention. In turn, this paper defined a concept, engagement, which has long been neglected in published literature. Going beyond simply defining the construct, we also developed a three-item measure of subjective engagement that had significant relationships with targeted, objectively measured constructs assessed by LIWC analysis. The analyses in this paper have shown that a subjective measure of engagement in an intervention may be a better predictor of outcome variables than an objective measure; this is a finding that can be applied to any intervention in which personal engagement is desired. Furthermore, with the addition of a perceived cognitive investment question, subjective engagement may have even more accurate predictive properties. Another strength of this study was the composition of participants who had a wide range of age and attitudes toward smoking, thereby comprising a relatively general representation of smokers.

CHAPTER V

CONCLUSION

In sum, smoking is deleterious to one's health in a myriad of ways; therefore, smoking cessation is vitally important for increasing health and quality of life for those who currently smoke. Unfortunately, successful cessation is accomplished by very few smokers, despite the large number of those wanting and attempting to quit. The field of smoking cessation is ripe for new and innovative aides and expressive writing may be just such an intervention; but, at this point, no main effect has been found for expressive writing facilitating smoking cessation. This study shows that it is possible to measure subjective engagement with the writing sessions and it opens the field up to a possible moderator of expressive writing. This paper described a three-item measure of subjective engagement that was significantly correlated with relevant LIWC variables of both cognitive and emotion word use. When compared with objective measures of engagement, it was found that neither relevant LIWC sub-dictionaries nor subjective engagement was able to predict change in cigarette consumption, though this result may not be valid, considering that many participants failed to report the number of cigarettes smoked per day. It was also found that subjective engagement was the only predictor significantly correlated with change in SCSE. Further analyses also showed that subjective engagement acts as a moderator of writing condition on SCSE. These findings could be important on a larger scale because SCSE has also been found to be statistically

related to a decrease in cigarette consumption, an increased likelihood of an attempt to quit, and an increase in self-reported abstinence (Stone, Wallston, & Hepworth, 2006).

In sum, including a measure of subjective engagement within an expressive writing intervention is a simple and time-efficient way to get at the construct of engagement in comparison to the more labor and time intensive approach of LIWC analysis. The results presented here need further study and verification before they can be considered reliable and valid; however, they do show promise that subjective engagement may be a factor within expressive writing that may help elucidate the mechanism by which the intervention is successful.

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