THE EFFECTS OF VOLITIONAL LAUGHTER ON POSITIVE AND NEGATIVE AFFECT AND DEPRESSIVE SYMPTOMS

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A

THESIS

Presented to the Faculty

of the University of Alaska Fairbanks

in Partial Fulfillment of the Requirements

for the Degree of

MASTER OF ARTS

by

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Fairbanks, Alaska

May 1997

Abstract

The effects of volitional laughter on positive affect, negative affect, and day-to-day depressive symptoms among college students were investigated utilizing a non-equivalent control group design. The laughter group (n = 23) participated in daily volitional laughter treatments (three treatments of 30 seconds each) while the control group (n = 40) received no treatment. Both groups were pre- and post-tested using the PANAS (Positive And Negative Affect Schedule) and the CES-D (Center for Epidemiological Studies - Depression Inventory). A significant difference was found for the laughter group in negative affect. An additional post-hoc analysis, after eliminating a group of subjects from the control group, indicated a significant difference for the volitional laughter treatment group in increasing positive affect. No significant difference in depressive symptoms was detected.

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Acknowledgments

I thank Professors G. Mohatt, K. Hazel, and J. Allen for their advice, guidance and ideas which contributed significantly to this thesis. Also, I thank M. Morris, J. Noet, K. Walsh, E. Drumman, C. Stafford, K. Platten, and L. Savage for demonstrating volitional laughter; W. McGrath and R. Zimmerman for their technical assistance; all of the people who appeared on the laughter demonstration video; and especially the confederates - B. Larue, B. Anderson, B.-M. Skrifvars, C. Cavyell, E. Sarat, R. Hansen, J. Jennings, J. Hughes, M. Metz, M. Knoche, R. Zimmerman, S. Elliot, V. Lewis, and W. Tipton.

Introduction

The purpose of this study is to investigate the effects of volitional laughter on positive and negative affect and depressive symptoms. Laughter is seen as a symptom of happiness; its absence as a symptom of depression. Darwin, Plato, and Rabelais all described laughter as a reaction or a reflex to emotion (Askenasy, 1987). It has generally been assumed that laughter is the indicator of the affect, and not that a causal relationship may exist in the opposite direction.

Research to explore this possibility is important for several reasons. Laughter as a phenomenon is not yet completely understood scientifically. Although it can be physiologically described and it can be associated with other phenomena, there has been little effort to isolate it as a focus for study. There is a potential for research in laughter and emotion to lead to useful findings related to issues of particular importance in polar regions. Because Seasonal Affective Disorder is a prominent cause of depressive symptoms in Alaska (Hellekson, 1989), any research contributing to knowledge about treatment possibilities is useful. In general, any study which seeks to clarify scientific understanding of causal factors influencing affect is important.

A group of college students were tested before and after exposure to a volitional laughter treatment for symptoms of depression using a non-equivalent control group design. Subjects were selected using non-probability sampling. The experimental

group attended brief daily sessions of "laughter therapy" for 5 days while the control group experienced no experimental conditions. Laughter and control groups were compared in terms of their scores on the Positive And Negative Affect Schedule, and the Center for Epidemiological Studies - Depression Inventory. The Wilcoxon Rank Sum W Test was used to compare scores between groups while the Mann-Whitney U Test was used to compare scores over time within groups. A timeline is presented in Appendix A.

Review of Literature

In this study, the increase of positive affect and decrease of negative affect through volitional laughter is the primary focus. High negative affect and, to some extent, low positive affect can be associated with depressive symptoms. But the presence of some degree of these symptoms does not necessarily imply a clinical state of depression. Also, laughter is commonly studied as a component of humor, but in this study it is the physical act of laughter itself that is being examined. It is important to clarify differences between depressive symptoms and depression and between laughter and humor. It is also worthwhile to explain the time of year chosen for the experiment in terms of Seasonal Affective Disorder.

Depressive Symptoms and Depression

While the potential usefulness of laughter is not limited to any single group, the idea of using it as a psychological treatment may be most relevant to those who exhibit symptoms of depression. Most people experience depressive symptoms or a depressed mood as they deal with some of life's hardships. The various forms of clinical or abnormal depression are much less common. Hammen (1991) reports a lifetime prevalence rate of 18 percent in a study using interviews and between 9 and 20 percent in a study using questionnaires. Another study investigated six-month prevalence rates for affective disorders in five different sites in the US and reported between 4.6 and 6.5 percent (Kleinman, 1988).

In the present study potential benefits of volitional laughter were targeted for subjects who were experiencing day-to-day characteristics of depressed mood (low positive affect), but who were not necessarily likely to be suffering from clinical depression. Coon (1989) reports that "up to 78 percent of students in American colleges suffer some of the symptoms of depression" (p. 329).

Affect can be described either as a trait or a state. Affective characteristics of individuals that endure over time and across situations to the extent that they can be considered a part of an individual's personality are considered traits. A person can be generally cheerful, angry, or tense, for example. However, when affective characteristics are likely to change in response to situations they are considered states. Affective states refer to feelings that are present within a given duration, for example right now or during the past week, and can be relatively easily changed (Zuckerman, 1976).

A variety of tests have been developed to measure affective states. They often use a checklist of adjectives which subjects can rate in terms of severity and frequency within a given time frame. A test which asks subjects to rate their affective experience in general or over the past year targets traits while the same test specifying that subjects should describe recent feelings or those experienced in a brief period taps affective states (Zuckerman, 1976). Zuckerman suggests that a useful affective state test has the following characteristics:

1. Test retest reliability should be lower for shorter term time frame specifiers and higher for long term versions of the test.

2. Test results should correlate more with other measures of state than with measures of trait.

3. Test results should change when the test environment changes.

In the present study, affective states are being investigated. Change in affect is being considered in terms of emotional states experienced in week long increments. The design and instruments employed in this study are neither intended to explore subjects' enduring affective personality characteristics nor their immediate emotional response to the treatment session. In terms of Zuckerman's (1976) criteria for useful state tests, the Center for Epidemiological Studies - Depression Inventory (CES-D) and Positive and Negative Affect Schedule (PANAS) (Appendix B) are good measures.

Laughter and Humor

Some important links between humor and therapy are related to the function of humor among the physically ill and injured. Wooten (1996) points out several examples from her experience as a nurse. In one case a patient recovering from open-heart surgery was diagnosed with mild psychosis and severe depression. Recovery went poorly until one day when, as a result of weight loss, his pants fell down as he walked on a tread mill. He shared laughter with his health care workers from that point on, and recovery improved

markedly. This example highlights the role of laughter as part of a socially supportive healing environment.

Cousins (1983) has written about the usefulness of humor in healing. He has personally recovered from a collagen disease and a heart attack and believes that a lifestyle in which laughter is common is one which is also likely to be high in positive emotions and low in negative ones. He points out that "panic, fear, suppressed rage, exasperation, frustration and depression all levied a fearsome toll on human physiology" (p. 234). These emotions lead to illness, hormonal problems, heart dysfunction, and cardiovascular constriction. Cousins explains that positive emotions can work like blocking agents in that they can protect us from the negative effects of negative emotions. He suggests that taking an active conscious role in one's own healing is universally helpful. Laughter is one of many components of a healthy lifestyle in which healing is facilitated. For Cousins, laughter is a term interchangeable with humor, and he considers it one of many healthy emotions along with "hope, faith, love, will to live, creativity and playfulness" (p.154).

Typically, when laughter is studied by social scientists, it is examined only indirectly as an indicator of humor or release of tension. Falk and Hill (1992) point out that laughter is used as an indicator or reflection of "a desirable shift in self concept" (p. 39), an increased degree of intimacy in relationships, "heightened experiencing, strong feeling expression, emotional flooding or catharsis" (p. 39). It has been demonstrated that only a small

fraction of naturally occurring laughter comes as a response to comedy or humor (Kluger, 1994). The focus of research has been on finding out which feelings make people laugh.

Little research has been initiated with the intention of determining what laughing makes people feel. In some cases, people use laughter to accomplish specific goals. Provine (1996) points out that people use laughter as a tool for communication. He says that laughter contributes to "mutual playfulness, in-group feeling and positive emotional tone" (p. 41). He further indicates that laughter may be as much a useful tool as it is an indicator of emotion by reporting that, "the average speaker laughs about 46 percent more often than the audience" (p. 41). The speaker may be using laughter to accomplish a communicative or a self-regulatory goal.

The physical act of laughter is also likely to have a therapeutic value for several reasons. During the physical act of laughing, respiratory and heart rates are increased (Cousins, 1983; Wooten, 1996). Wooten claims that muscular activity is increased in several areas, and the endocrine system reacts by adjusting hormone levels in a way that strengthens immunity and facilitates healing.

Frequent intentional laughter may contribute to one's sense of well-being in general (Cousins, 1983). Because it is a means of exercising self-control, it is likely to encourage an internal locus of control. People who have an internal locus of control are less likely to suffer distress than those with more fatalistic outlooks (Atkinson, Atkinson, & Hilgard, 1983).

Contagious laughter has been recognized as a social phenomenon in which laughter itself is the provoking stimulus (Kluger, 1994). While this still lies in the arena of causes of laughter, it may be useful evidence that laughter is more than an indicator of emotion.

Some research has examined the causal effects of smiling on emotion. Duchenne de Boulogne in 1862 (1862/1990) explained that a certain type of smile required the movement of two specific facial muscle groups: the zygomatic major (in the cheeks), and the orbicularis oculi (around the eyes). This expression, now called the Duchenne Smile, was shown in 1993 to increase electrical activity in the left frontal lobe of the brain in subjects who smiled on command. Activity in this part of the brain is associated with positive emotions (Ekman & Davidson, 1993; Szpir, 1994). Ekman, one of the researchers in the 1993 study, also points out that the Stanislavski Method used by professional actors is an example of a related phenomenon. In both cases he suggests that new neural pathways are created and strengthened voluntarily by exercising control over expressions of emotion.

Among individuals with a high degree of depressive symptoms, laughter is a less common behavior than among normals (Coon, 1989). Various theories have suggested that one's own interpretation of his or her response to an emotional stimulus can affect the subjective experience of the emotion. The contemporary model of emotion described by Coon includes emotional expressions

as one of the factors which determines the emotional experience in an interactive process as an emotion develops.

The most common types of laughter occur in groups. Askenasy (1987) points out that "laughter frequency increases in direct proportion to social agglomeration... The occurrence of epidemic laughter is a direct consequence of its social dependence", and "the group dependent laughter due to its role in communicative behavior has a universal cultural quality" (p. 318). Further, investigations have been performed in the psychology classroom environment in which a laughter stimulating stimulus was introduced successfully to a group of 128 students (Provine, 1996). With reference to contagious laughter, Kluger (1994) claims that "the mere sight or sound of one person laughing can be a sufficient cue to elicit the response in others" (p. 20).

Another reason people are likely to laugh more in groups is because of conformity. In Asch's (1952) famous experiment, it was shown that subjects would respond in agreement with a group even when the subjects internally disagreed. Asch was able to elicit incorrect responses from the majority of a group by using confederates. The group that the subjects were a part of was actually composed of prearranged cooperating assistants who posed as subjects, but responded to the experimenter's questions with predetermined incorrect answers. The use of confederates benefited the present study in terms of conformity and laughter contagion.

Seasonal Affective Disorder

Because there is a greater prevalence of Seasonal Affective Disorder (SAD) in Alaska than in the general population (Hellekson, 1989), research in the treatment of SAD is valuable to this study. Special factors that influence depressive symptoms associated with SAD include light exposure, diet, and sleep patterns (Rosenthal, 1990).

People with SAD are likely to suffer from biological consequences of dark winters. Normally, deprivation of sunlight leads to the secretion of melatonin during a circadian rythm cycle, but in people suffering from SAD, melatonin levels may fluctuate abnomally during dark winter months. This abnormal melatonin cycle is associated with depressive symptoms. People with SAD experience increased food consumption (especially carbohydrates), and weight gain more than the rest of the population with major depressive disorder (Paramore & King, 1989). SAD symptom intensity cycles with the seasons and peaks during the dark winter months. Therefore, it is important not to perform an experiment directed at decreasing depressive symptoms during a part of the year when such symptoms may be diminishing anyway in a significant portion of the sample.

A study by Lam, et al. (1995) supports experimentation in the fall semester when Seasonal Affective Disorder is an especially relevant factor. Experimental subjects who entered their program in October and November benefited more in comparison to the control

subjects than those who entered in December, January, or February, 1995.

Rationale

A study that utilizes volitional laughter as a treatment condition could lead to useful conclusions about the relationship between affect, depressive symptoms, and volitional laughter. There is evidence to suggest that increasing volitional laughter behavior - an emotional expression - may lead to a decrease in depressive symptoms (and an increase in positive emotions). Therefore, the hypotheses for this study are:

H_A1. The volitional laughter treatment will increase positive affect.

H_A2. The volitional laughter treatment will decrease negative affect.

H_A3. The volitional laughter treatment will decrease depressive symptoms.

Methods

Design

Change in depressive symptoms of two groups (laughter and control) was compared based on changes in pre- and post-test scores on the Center for Epidemiological Studies - Depression Inventory (CES-D) and the Positive And Negative Affect Schedule (PANAS). The design is a quasi-experimental non-equivalent control group using repeated measures of the PANAS and CES-D.

Subjects

The subjects were undergraduate students (N=64) enrolled in Psychology 101-003 and 101-002 (Introduction to Psychology), Sociology 100x-002 (Society and the Individual), and Psychology 345-001 (Abnormal Psychology) courses at the University of Alaska Fairbanks. They were offered extra credit to participate in the experiment.[1] All of these classes had a slightly higher number Alaska Natives than classes at other universities. All classes had about 75 students enrolled with a regular turn out for classes between 30 and 60.

These nonprobability samples were selected based on subjective judgements that they fairly accurately represented the

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[1]The students in 100 level courses were offered one percentage point of their class grade while the abnormal psychology students were offered 20 extra credit points in accordance with an already existing extra credit system established by their professor.

university population. In terms of sex, the pre-tested sample contained a larger number of women (Table 1). However, because significantly more women dropped out of the study than men between pre- and post-tests, the sample at post-test accurately reflected the university population (Table 2). The mean age of subjects pre-tested was 23 (one year younger than the university mean). At post-test (after attrition) the mean age of subjects was 24.

The Psychology 101-003 and Psychology 345-001 classes were assigned to the experimental condition, and the other two classes to the control condition. All subjects in the experimental condition were asked to attend each of the five sessions and to arrive on time. Three of the five sessions for the experimental group took place during the regularly scheduled class time on Monday, Wednesday, and Friday. The other two meetings for the experimental group took place on Tuesday and Thursday evenings. Only subjects who attended and participated in at least three of the sessions were considered subjects in data analysis. One woman was excluded from analysis because she claimed that abnormal PMS during the week of the experiment was likely to have affected her responses on the questionnaires. The control classes were pre-tested during their regularly scheduled Thursday and Friday classes and post-tested exactly one week later. These groups experienced no experimental conditions between the pre- and post-tests.

Table 1.

Sample Profile and Mortality

Pre-tested Subjects

	Male	Female	Mean Age	Native	Non-Native
Psy 101-003 Laughter	9 (53%)	8 (47%)	21	1 (6%)	16 (94%)
Psy 345-001 Laughter	5 (14%)	30 (86%)	25	2 (6%)	33 (94%)
Combined Laughter	14 (19%)	38 (81%)	26	3 (7%)	49 (93%)
Psy 101-002 Control	9 (33%)	18 (67%)	22	4 (15%)	23 (85%)
Soc 100x-002 Control	18 (45%)	22 (55%)	20	6 (15%)	34 (85%)
Combined Control	27 (40%)	40 (60%)	21	10 (15%)	57 (85%)
Total	41 (36%)	78 (64%)	23	13 (11%)	106 (89%)

University of Alaska Fairbanks Fulltime Undergraduates

Male	Female	Mean Age	Native	Non-Native
41%	59%	24	8%	92%

(Brown, 1996)

Table 2.

Sample Profile and Mortality

Post-tested Subjects

	Male	Female	Mean Age	Native	Non-Native
Psy 101-003 Laughter	5 (62%)	3 (38%)	27	0 (0%)	8 (100%)
Psy 345-001 Laughter	3 (19%)	13 (81%)	28	1 (6%)	15 (94%)
Combined Laughter	8 (33%)	16 (67%)	28	1 (4%)	23 (96%)
Psy 101-002 Control	6 (48%)	7 (52%)	23	0 (0%)	13 (100%)
Soc 100x-002 Control	13 (48%)	14 (52%)	20	2 (7%)	25 (93%)
Combined Control	19 (48%)	21 (52%)	21	2 (5%)	38 (95%)
Total	27 (42%)	37 (58%)	24	3 (5%)	61 (95%)

University of Alaska Fairbanks Fulltime Undergraduates

Male	Female	Mean Age	Native	Non-Native
41%	59%	24	8%	92%

(Brown, 1996)

Variables and Instruments

Volitional Laughter. In this study volitional laughter was operationally defined as artificially initiated laughter produced by subjects when cued. Volitional laughter was objectively judged by the intensity criteria established by Falk and Hill (1992) (length, strength, bodily involvement, and smiling). It is measured ordinally as either enduring strong laughter which lasts at least 30 seconds, or other laughter which includes any response or type of laughter lasting less than 30 seconds. The experimental group experienced enduring strong laughter as the treatment.

The sessions took place in classrooms at the university. Each treatment session was video taped using two separate cameras so that each subject's laughter could be recorded clearly for later measurement. Laughter was considered satisfactory if it fit criteria for enduring strong laughter. It was not difficult to achieve an environment in which all subjects laughed audibly for at least 30 seconds at a time. The laughter criteria score sheet used to codify data is shown in appendix C. The VHS video cameras were used to record subject behavior in each of the experimental sessions.

Depressive Symptoms. Positive affect, negative affect, and depressive symptoms have been operationally defined for this study as the subjects' scores on the PANAS and CES-D. Pre-test and post-test measurement of depressives symptoms were made using the PANAS and CES-D. These instruments are presented in Appendix B.

The PANAS is an adjective checklist type self-report scale

which measures affect on two separate dimensions. Positive affect (PA) refers to the dimension with high energy, awareness, and effectiveness at the high end, and a sad stagnant mood at the low end. Negative affect (NA) describes an active unpleasant mood associated with "anger, contempt, disgust, guilt, fear, and nervousness" (Watson, Clark, & Tellegen, 1988). A low NA describes a person with a relaxed and quiet comfortable mood. The scale uses 10 adjective descriptors for the NA measurement and 10 for the PA. Subjects are asked to report how much they have felt each of the descriptor moods within the specified period by rating them on a five point scale. The five ratings are: very slightly or not at all, a little, moderately, quite a bit, and very much. The scale is designed to be useful in measuring affect over a variety of time frames ranging from "at the present moment" to "generally". In this study the specified time frame was "during the past week."

The PANAS has been found to be a reliable instrument for measuring positive and negative affect. Internal consistency reliabilities are from .84 to .90 (Watson, et al., 1988). Further, the correlation between the two scales is low at -.12 to -.23 indicating that they are measuring two distinct aspects of affect. Test retest reliability was verified by finding no significant differences after an 8 week interval.

Internal validity was established through a principal components analysis with varimax rotation. A clear two-factor structure was obtained for both scales. When scales were compared

to their regression-based factor scores, convergent correlations were high, .89 to .95, while discriminant correlations were low, -.02 to -.18. External validity was demonstrated for the NA scale by correlations between .51 and .74 with the Hopkins Symptom Checklist, the Beck Depression Inventory (BDI), and the STAI State Anxiety Scale. The PA scale did not correlate strongly with the psychopathology related instruments (Watson, et al., 1988).

The CES-D was designed to measure depressive symptoms through the use of 20 items already employed by other valid scales (the Masachusets Multiphasic Personality Inventory-Depression, the BDI, and the Zung Self-Rating Depression Scale). The instrument assessed depressed mood through items which also explore "feelings of guilt... worthlessness... helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance" (Shaw, Vallis, & McCabe, 1985, p. 390). Of the four factors generated by a factor analysis of the instrument, depressed mood was the largest. The others were somatic and retarded activity, interpersonal factors, and positive affect. The scale measures frequency of symptoms in the past week. Subjects indicate the number of times they have experienced a given symptom with ratings from 0 (less than one day) to 3 (five to seven days). The range of the scale is -12 to 48 with a score of 16 or more indicating significant depressive symptoms.

The CES-D is an internally consistent measure. For normal groups, split-half correlations were .77. "Coefficient alpha and

Spearman-Brown coefficients were... .85 and .87 for normal groups" (Shaw et al., 1985, p. 390). Test-retest reliability was .54 with a 6 month interval between tests. With recovered depressed patients, the scale correlated with the BDI at .81 and with the SDS at .90. Interviewer ratings of depression and the scale are correlated at .46 to .53. This scale is also useful because of its low negative correlations with social desirability (Shaw, et al., 1985).

Procedures

The week of the experiment was determined on the basis of academic schedules and the predicted prevalence of depressive symptoms caused by SAD. It was important to hold the experiment on a week in which neither midterm nor final examinations were likely to influence depressive symptoms. With this in mind, and because SAD symptoms generally do not begin to diminish until the Spring semester (Lam et al., 1995), November 11 - 15 was chosen as the experiment week for the Psy 101-003 and control classes and November 18 - 22 for the Psy 345-001 class.

On November 7, 8, and 15 the experimenter visited each class for the first time. Each student was offered the opportunity to participate in an experiment for extra credit. The experiment was described only to the extent necessary to make scheduling commitments clear. Participating subjects in the experimental condition were asked to meet in the classroom again at 8 PM on Tuesday and Thursday evenings. The abnormal psychology class met at 5:30 PM on those evenings. Those students who were not

interested in participating were permitted to attend class fifteen minutes late for each of the class meetings on the week of the experiment. If students asked what was being studied, only necessary details were provided, but assurrance was given that the project would be explained in detail on the last day.

All interested students were given the consent form to read and sign (see Appendix D) and the PANAS and CES-D to complete. Students were asked to respond to the questions honestly and identify themselves only by indicating the last four digits of their phone number (or similar easily remembered number, like a parent's phone number in the case that subject's phone numbers were not available) and M or F to indicate sex. They were assured that their professors would not see the data. This was done to increase honesty in self-reporting.

Experimental group subjects arrived at the experiment initially at the regularly scheduled Monday class period (2:15 PM for Psychology 101-003). It took place in the same classroom in which the pre-test was first administered. At the same time a group of thirteen confederate assistants also arrived. They consisted of personal friends who were both willing and capable and who had an interest in the research. These confederates were to facilitate an atmosphere in which the treatment task would be more easily performed. Because the treatment task required the violation of certain social norms (strong enduring laughter is normally inappropriate in an academic environment), it would be more

difficult to inspire the subjects to laugh on command without some role models to facilitate laughter. Thirteen confederates was sufficient to ensure that each subject was likely to have at least one confederate or the experimenter near him or her in the classroom.

The confederates were trained before the experiment to engage in the treatment behavior on cue. They knew the purpose and theory behind the experiment, and had experience with their roles through two confederate-only practice sessions. The purpose of this procedure was to encourage an environment in which volitional laughter was acceptable behavior. This assignment was facilitated by instructing confederates to choose seats which spread them out evenly among the subjects. As part of a cover story, subjects were led to believe that the confederates were students from another class which had also been invited to receive credit for volunteering.

Subjects were asked to identify themselves to the experimenter on all written materials only by the same four digits they used on the first Depression Inventory. They wrote their numbers on an attendance sheet as they entered the room (Appendix E). Once the class arrived the experimenter read the following script:

> Hello, and welcome to our study. You have all been assigned to participate in the "laughter before task" condition of this research. That means that you are all going to be doing

some laughing today. It is an extremely easy job and one that you will probably find quite enjoyable. On my cue, you will begin laughing and continue for 30 seconds. Then we will do it again two more times. No one is going to tell jokes or try to entertain you but you are welcome to think about anything you like if you find it helps you laugh. It is likely that just being in this room will be pretty funny. Before we start, I'm going to show you all a quick video which demonstrates what this experience is like.

A video of a simulation of the experimental condition was shown. It was about a minute long and showed the experimenter in the same room with a similar group of "subjects" (actually confederates). On being told to laugh, they did so enthusiastically, each one meeting the requirements for enduring strong laughter. This video had been produced with the same experimenter, and ten different confederates who were acquired in the same way as the other confederates. After the video, the experimenter continued reading:

Okay, you probably noticed that in the video the subjects were laughing pretty hard. That is because the assignment is not just to laugh, but to laugh well. You will be required to demonstrate four specific aspects of laughter; volume, smiling, bodily movement, and endurance. But don't let that

bother you. We are going to take a moment to practice before we really start. If you are not laughing hard enough at first I will let you know. You probably won't have to keep the four characteristics in mind, because it will all be automatic once you get started, but I'm going to write them on the board (the experimenter does so).

Now, just for practice I'm going to ask you to begin laughing. This is so we can be sure everyone knows how to do it. During the real laughter session I won't be able to offer any help or suggestions, but during practice I may coach you along.

The experimenter answered any relevant questions and then asked subjects to begin laughing. As they proceeded, the experimenter advised those subjects who didn't demonstrate the minimal laughter criteria. After 30 seconds of practice, the experimenter read;

In addition to quality laughter there are two other requirements. One - it is absolutely necessary that each of you is here at exactly 8 pm on Tuesday and Thursday evenings. The second thing is the questionnaires. After Friday's session there will be a few quick questionnaires to finish things off.

Okay, if there are no questions, we can get started.

Subjects were again invited to ask relevant questions, and, after it was determined that they were ready, the experimenter said, "Begin laughing!" Thirty seconds were timed using a digital watch, and then the experimenter said, "That's 30 seconds!" This procedure was repeated twice more for a total of three rounds of thirty seconds of volitional laughter.

The confederate subjects left the room after the session. They were prepared to name the class they were getting credit for, but each would say they had to hurry if a real subject tried to engage them in a conversation.

The subsequent days were almost identical to the first session. One exception is that the description in the beginning was shortened to include only relevant information. Also, for the abnormal psychology class, the experiment was held at the end rather than at the beginning of the class period as requested by the professor.

Analysis

Six separate t-tests were used for each of the scales to determine if there were significant differences between any two classes at pre-test. This was done to detect any possible extremes in score that would differentiate one class from the others in terms of pre-treatment levels of positive affect, negative affect, and/or depressive symptoms. The two control classes were then combined into one group, and the two laughter classes into another. Then the mean changes in score were compared. Between group comparisons

were made using the Wilcoxon Rank Sum W Test. Within group changes in score were compared from pre- to post-test by the Mann-Whitney U Test.

Results

In terms of sex, age, and ethnicity, there were some differences between the subjects who completed the experiment, and those who dropped out. One observation was that those that attrited were younger than the subjects who did not (Tables 1 and 2). Additionally, a larger number of Alaska Native and/or American Indian subjects (77%) discontinued participation after the experiment began compared to non-natives (57%). Also, a higher percentage of females (53%) dropped out than males (34%).

All statistical tests were run with an alpha level of .05. To determine if any two classes significantly differed from each other on the PA scale, the NA scale, and/or the CES-D at pretest, mean scores for each class were compared separately to each of the other three classes using t-tests. With two exceptions, no significant differences were found between any two pretest score means (Table 3). Significant differences were found between the two control group classes on the NA scale and between the sociology control and abnormal psychology experimental classes on the CES-D.

The two control classes were combined to form one control group (n=40) and the two laughter classes were combined two form one laughter group (n=23) in order to increase sample size, especially in the laughter group, and to minimize the effects of between-class differences detected at pre-test (Table 3). Mean score changes between the two groups were compared using the

Table 3.

Mean Scores For Subjects By Class

Measure And Class	Pre-test $\bar{X}$	Pre-test SD	Post-test $\bar{X}$	Post-test SD	n
PANAS PA Scale					
Psy 101 - 003 (Laughter)	34.2	3.6	33.6	6.2	7
Psy 345 - 001 (Laughter)	35.4	6.4	35.8	6.4	16
Psy 101 - 002 (Control)	34.3	7.0	36.4	6.3	13
Soc 100x - 002 (Control)	33.7	6.7	30.7	6.6	27
PANAS NA Scale					
Psy 101 - 003 (Laughter)	23.6	9.2	19.7	9.2	7
Psy 345 - 001 (Laughter)	19.8	4.9	14.6	3.2	16
Psy 101 - 002 (Control)	18.5[a*]	5.7	18.2	6.5	13
Soc 100x - 002 (Control)	22.3[a*]	4.8	21.4	6.2	27
CES-D					
Psy 101 - 003 (Laughter)	4.0	11.6	3.1	13.9	7
Psy 345 - 001 (Laughter)	-0.5[b*]	7.5	-4.1	6.5	16
Psy 101 - 002 (Control)	0.7	9.0	-1.2	7.9	13
Soc 100x - 002 (Control)	4.9[b*]	7.6	5.9	11.7	27

[a] $t = 2.19$, $df = 38$. [b] $t = 2.26$, $df = 41$. [*] $p < .05$, two-tailed.

Wilcoxon Rank Sum W Test for the PA scale, the NA scale, and the CES-D. Within group changes for the laughter and control groups were compared using the Mann-Whitney U Test for each of the three scales. Significant differences were found between the mean score changes on the NA scale, but not the PA scale or the CES-D (Table 4).

The test was run again twice after separating the control group into its original two classes. When the Psychology 101-002 control class (n=13) was compared to the laughter group, (the Sociology 100x-002 control class was omitted from analysis) no significant differences were found between change in score for any of the scales (Table 5). However, when the Sociology 100x-002 control class (n=27) was compared to the laughter group, (the Psychology 101-002 control class was omitted from analysis) significant differences were found between change in score on both the PA and the NA scales (Table 6). No significant difference was found for the CES-D.

Responding to the feedback questionnaire, three of the 40 control group subjects claimed not to enjoy participating. Another five gave neutral answers or did not respond to the question. The other 32 said they did enjoy participating. Ten said they could not guess what the research hypothosis was or did not answer. The other 30 suspected it had to do with emotion, and, of that group, ten also mentioned SAD and 14 mentioned another factor (like age or self-esteem). In response to the question that explored whether the

Table 4.

Pre-test to Post-test Change in Scores And Comparison for PA, NA, and CES-D Measures

Measure and Group	Pre-test		Post-test		Change $\bar{X}$	Rank $\bar{X}$	Sum of Ranks	n
Change in PA	$\bar{X}$	SD	$\bar{X}$	SD				
Laughter	35.0	5.7	35.1	6.3	0.409	34.80	800.5	23
Control	33.9	6.5	32.5	7.0	-1.122	30.39	1216.0	40

U = 395.5, W = 1215.5 ns, Z = -0.9232, 1-Tailed, ns

Measure and Group	Pre-test		Post-test		Change $\bar{X}$	Rank $\bar{X}$	Sum of Ranks	n
Change in NA	$\bar{X}$	SD	$\bar{X}$	SD				
Laughter	21.0	6.1	16.2*	6.0	-4.727	38.96	896.0	23
Control	21.1	5.7	20.4	6.4	-0.976	28.00	1120.0	40

U = 300.0, W = 1120.0, Z = -2.2900, 1-Tailed, p > .05

Measure and Group	Pre-test		Post-test		Change $\bar{X}$	Rank $\bar{X}$	Sum of Ranks	n
Change in DS	$\bar{X}$	SD	$\bar{X}$	SD				
Laughter	0.9	9.1	-1.9	9.6	-3.454	35.22	810.0	23
Control	3.5	8.1	3.6	11.1	-0.195	30.15	1206.0	40

U = 386.0, W = 1206.0 ns, Z = -1.0585, 1-Tailed, ns

Table 5.

Post-Hoc Comparison of Laughter Group with Psy. 101-002 Class as control for PA, NA, and CES-D Measures

Measure and Group	Mean Change	Mean Rank	Sum of Ranks	n
Change in PA				
Laughter	0.409	17.37	399.5	23
Psy. 101-002	-0.6	20.50	266.5	13

U = 123.5, W = 399.5 ns, Z = -0.8606, 1-Tailed, ns

Measure and Group	Mean Change	Mean Rank	Sum of Ranks	n
Change in NA				
Laughter	-4.727	20.63	474.5	23
Psy. 101-002	-3.9	14.73	191.5	13

U = 100.5, W = 191.5 ns, Z = -1.6218, 1-Tailed, ns

Measure and Group	Mean Change	Mean Rank	Sum of Ranks	n
Change in DS				
Laughter	-3.454	18.96	436.0	23
Psy. 101-002	-0.9	17.69	230.0	13

U = 139.0, W = 230.0 ns, Z = -0.3469, 1-Tailed, ns

Table 6.

Post-Hoc Comparison of Laughter Group with Soc. 100x-002 Class as control for PA, NA, and CES-D Measures

Measure and Group	Mean Change	Mean Rank	Sum of Ranks	n
Change in PA				
Laughter	0.1	29.43	667.0	23
Soc. 100x-002	-3.0	22.15	598.0	27

U = 220.0, W = 598.0, Z = -1.7656, 1-Tailed, p > .05

Measure and Group	Mean Change	Mean Rank	Sum of Ranks	n
Change in NA				
Laughter	-4.8	30.33	697.5	23
Soc. 100x-002	-0.9	21.39	577.5	27

U = 199.5, W = 577.5, Z = -2.1653, 1-Tailed, p >.05

Measure and Group	Mean Change	Mean Rank	Sum of Ranks	n
Change in DS				
Laughter	-3.454	28.26	650.0	23
Soc. 100x-002	1.0	23.15	625.0	27

U = 247.0, W = 625.0 ns, Z = -1.2382, 1-Tailed, ns

subjects may have responded in a biased manner in the experiment, 33 said no, three said yes, three gave a neutral response, and one did not answer (see Appendix F).

Of the 24 laughter group respondents, one gave a neutral answer and the rest said they enjoyed participating. All but one subject guessed the hypothesis had something to do with laughter, and 20 indicated emotion. The third question for the laughter group asked for subjective interpretations of emotional differences between the treatment and natural laughter. Thirteen subjects said it felt fake or forced, three indicated it was difficult to perform, and three thought it was funny. The others did not respond. Responding to the final question, three said they may have responded differently than they would have outside the experimental environment, three gave no response, one said maybe, and the rest of the laughter group subjects (16) said no.

Discussion

Results support the hypothesis that volitional laughter decreases negative affect but fail to support the hypotheses that volitional laughter increases positive affect and/or decreases depressive symptoms. A clear decrease in negative affect was experienced by the laughter group while the control group's score remained relatively unchanged. Although negative affect is the only scale which yielded a statistically significant change in symptoms, it is worth noting that the change in score for the other two scales also occurred in the expected direction. That is, the mean score for positive affect increased more for the laughter group than it did for the control group, and the mean score for the CES-D decreased more for the laughter group than it did for the control group.

The change in negative affect experienced by the laughter subjects reflects a movement away from an anxiety-oriented mood and toward a feeling of calm serenity (Watson, Clark, & Telegen, 1988). The mood characteristics associated with high negative affect are precisely those which other research points out as detrimental to human well-being, to one's ability to heal, and to the immune system (Cousins, 1983; Wooten, 1996).

It is a particularly interesting finding that results are more promising for negative affect than for positive affect or for the depressive symptoms measured by the CES-D. This is consistent with other research which elucidated an association between laughter and release of tension (Falk & Hill, 1992; Provine, 1996).

Because of the differential results on the three separate scales used, there is an indication that volitional laughter may have very specific effects on emotion which may not necessarily be those associated with natural laughter. While natural laughter occurs as an accompaniment to a variety of emotions, it may be that volitional laughter effects only a discrete few. For example, natural laughter is likely to occur while one experiences a highly energetic level of happiness (high positive affect) or during moments of embarrassment or communication difficulty. But the differential results of this research imply that volitional laughter may not induce any of these conditions. Further research to test this possibility is suggested.

Negative affect which is normally reduced automatically with laughter in day-to-day human interactions may also be reduced through intentional use of volitional laughter. Volitional laughter may be useful as a therapeutic tool for clinical patients experiencing disorders related to negative affect like stress, anxiety, and anger. As a self-initiated relaxation/stress-reduction technique, the general population may also find volitional laughter useful.

To some extent the characteristics of negative affect can be considered depressive, but they more accurately indicate a negative mood with a high level of energy as in anger, distress, and anxiety. Because the negative affect scale was the only one in which a significant change in score was found, this may imply that volitional

laughter is more directly useful as a tool for decreasing symptoms of anger, distress, and anxiety than it is as a tool for decreasing depressive symptoms. It may be more accurate to say that volitional laughter contributes to relaxation than it is to say that it contributes to euphoria or happiness.

Decrease in negative affect (anger, distress, and anxiety) may result from physical components of laughing. People often use physical exercise as a treatment for these unhealthy emotional states and for high blood pressure, muscle tension, and other stress-related physiological problems (Wooten, 1996). Wooten explains that laughter is similar to physical exercise in that it stimulates some of the same glandular activity, and requires diverse muscular movements, rapid breathing, and increased heart rate. The addition of the volitional aspect to laughter changes its definition in an important way. While day-to-day laughter may also contribute to health and well-being in similar ways as exercise, ordinary laughter's occurrence is relatively uncontrollable and unpredictable by the initiator. Volitional laughter, however, is available at any time and is under the control of the laughing person both in terms of frequency and intensity. As this research demonstrates, volitional laughter, like exercise, is a way to exert intentional physical control over one's body in order to contribute to well-being. Both exercise and volitional laughter may also serve to increase one's internal locus of control.

Volitional laughter can be added to one's overall list of skills or tools for self betterment. In this respect it is like meditation, relaxation training, or even vocational education, because it adds to one's abilities in terms of self improvement. Like any other self sought skill, it discourages fatalism and encourages self reliance. As a contributor to internal locus of control, volitional laughter is likely to increase one's sense of well being (Atkinson, Atkinson & Hilgard, 1983).

The results of this study are consistent with the findings of researchers who measured short-term fluctuations in brain waves resulting from voluntary smiling. Both studies indicate that voluntary physical action, either smiling or laughing, leads to a condition of low negative affect (Eckman & Davidson, 1993). Unlike the studies on the effects of the Duchenne Smile, this study examined relatively enduring changes in affect. It will be beneficial to future research in volitional laughter to also take brain waves and other physiological changes into account during long term experiments.

An important difference between Cousins' (1983) insight and this study was that for Cousins, laughter, more accurately referred to as humor, is an emotion which contributes to health and healing. In this study, laughter was considered a behavior and not an emotion. The implication of the results of this study suggest that volitional laughter leads to a shift toward healthy emotions. Low negative affect can be associated with a healthy emotional state like

Cousins' concept of laughter/humor. So, while Cousins is suggesting laughter as a means to achieve health and healing, this study points to the potential of laughter as a means to achieve humor (among other healthy emotions).

Although statistical significance was not found on the positive affect scale in the original analysis, a post-hoc re-division of the control group allowed for some interesting observations. There were two reasons for conducting the additional post-hoc analysis. The first is that the two classes used in the original control group were determined by t-test to have statistically significant differences in pre-test scores on the NA scale (see Table 3). It is possible that one class more accurately represented the general population than the other in terms of negative affect. The second reason was that the size of one of the classes was large enough that it could constitute a reasonable sample for statistical analysis.

The original control group was comprised of two 100 level Social Science classes - one in Psychology (n=13) and one in Sociology (n=27). When the psychology students were removed from the control group and the data was re-analyzed, a significant difference in change in score was found between the laughter and the new control groups on the positive affect scale. That is, by removing the psychology students from the control group, results supported the hypothesis that the volitional laughter treatment had an effect on both of the PANAS axes.

The same procedure was again utilized, and a third analysis was conducted. This time the control group consisted of the Psychology students only: The Sociology students were removed. This analysis yielded no statistically significant changes for either of the PANAS scales or for the CES-D. It is worth noting that this control group was the smallest (n=13) group used in any analysis in the study, and that the low number of subjects may decrease the value of any conclusions based on it.

A question that remains unanswered in this study pertains to the dynamic nature of group laughter. Group laughter was chosen as the treatment in this research because it was easily accomplished (Kluger, 1994). Subjects who attended at least three sessions all surpassed expectations by performing the treatment behavior with little or no difficulty. However, there may be important differences between volitional laughter occurring in groups and volitional laughter initiated by individuals alone.

A basic intent of this research was to demonstrate that the effects of laughter could be separated from the effects of humor. But some subjects may have found group laughter humorous, and the introduction of humor may have confounded the results. It was impossible to determine the degree to which any subject found the environment humorous. Evidence which denies the likelihood of humor-induced laughter comes from the feedback questionnaires. Almost all laughter group subjects who responded to the question

about differences between volitional laughter and everyday laughter said that volitional laughter was more difficult or forced.

Subjects in a laughing group may be affected by their perceptions of the laughter around them. Other research has proposed that the mere perception of laughter triggers laughter on the part of the perceiver (Provine, 1992). As Provine (1996) indicates, laughter in groups may also contribute to communication between group members and increase a sense of belonging. This sense of belonging and perception of fellow group member laughter may have an effect on the presence of depressive symptoms. In contrast to a sense of belonging is one of self-consciousness which is likely to exist in groups. As subjects performed the laughter task, they each may have been concerned with the perceptions and judgments of the other group members. In the feedback questionnaires, some subjects mentioned the experience of watching or being watched by other group members. While the present study supports the effectiveness of group volitional laughter, no conclusions can be made about the degree to which a group environment contributed to the results. To determine if the group dynamics may have accounted for score changes on the scales used in this study, further research should be conducted with an experimental condition in which subjects laugh in isolation.

Limitations

There are several possible explanations for the different pre-test scores and for the results of the analyses which used different

control group compositions. Limitations to this quasi-experimental design include threats to internal validity.

Selection. Because subjects were not randomly assigned to the laughter and control conditions, a selection bias may exist in the design. Even if neither group experienced a treatment condition, it would still be reasonable to expect some degree of differential post-test results between groups. Any nonrandomly selected group of subjects will tend to differ from any other in ways that may effect the outcome to some degree.

There may have been an inherent difference in the nature of affective characteristics and depressive symptoms between the two control classes and/or between the Sociology control class and the Abnormal Psychology laughter class (see Table 3). It could be that some shared experience within any of the classes caused extreme scores on the NA scale or CES-D at pretest. For example, the teaching style of the professor, the time of day, the content of class material, or the students' majors all could have been extraneous variables affecting negative affect or depressive symptoms collectively in one or both of the cases. Also, the Abnormal Psychology class was a 300 level course. This increased the average age and education of students in that class. Finally, the small number of subjects in classes other than the Sociology control may not have been enough to base accurate statistical comparisons on.

Maturation. A bias is introduced into within-group comparisons because of maturation. All of the laughter group

subjects experienced a treatment condition between pre- and post-tests. Because subjects are likely to change in terms of positive affect, negative affect, and depressive symptoms over the course of a week, some change in the outcome measures can be expected regardless of the introduction of the treatment. Maturation is also likely to interact with selection bias and confound between group comparisons. That is, the laughter and control groups may have matured at different rates between pre- and post-test.

History. Related to maturation are the historical experiences of the various groups. Within-group comparisons may have been confounded by an event which took place during the experiment and which affected the whole population. For example, a local flu or a political issue may have been competing with the treatment as an explanation for the measured effects. Between groups, differential historical events may account for apparent treatment effects. For example, because of an unforeseen schedule change, the Psy 101 classes both had a test in the middle of the experimental week. Also, the laughter group was excused from more class time than the control group.

Mortality. Many subjects who started the experiment never finished. Of the 67, pre-tested control subjects, 27 dropped out by post-test. Of the 52 who started in the laughter group, 29 failed to complete at least three sessions and the post-test. Within groups, unknown characteristics of the subjects who dropped out may have included affective and depressive patterns which would have altered

the results had they not dropped out. For example, subjects with excellent grades may have been less interested in the extra credit. It is possible that this group chose not to complete the experiment and that such students would have scored in one or the other extreme at post-test. If the types of students who dropped out of the control group differed in a relevant way from those who dropped out of the laughter group, this differential attrition would degrade between-group comparisons. Finally, if laughter group drop-outs failed to complete the experiment because of the treatment, a definite bias would confound the results. For example, if subjects who don't like laughing or who were adversely affected by the treatment dropped out, important data would have been missed.

External Validity. The age, socioeconomic status, level of education, and cultural background of the sample chosen for this study are relatively different than in the general population. Therefore, it is not possible to generalize results to populations outside the university setting. Also, the specific type of laughter treatment in this study has qualities which differentiate it from other types of laughter. Results, therefore, cannot be generalized to apply to laughter occurring in natural settings. Finally, the measurement of depressive symptoms is intended to apply to affective states which are likely to fluctuate within a week. Longer term, or permanent changes in affect cannot be inferred from the results of this study.

Getting a commitment to a treatment schedule beyond a week's duration or involving lengthy sessions would have been problematic with this group. While the effectiveness of this treatment on a long term or more intense basis merits further study, it was beyond the scope of this investigation.

Some of the undergraduate Psychology student volunteers had difficulty attending all of the sessions. In general, subjects attended fewer laughter sessions than had been intended. Therefore, the overall treatment intensity was weakened. To fully take advantage of daily treatment, sessions should occur for every subject every day during the week in question. Had a larger number of laughter group subjects participated in at least 5 sessions, findings may have more clearly supported the existence of a treatment effect, possibly on the PA scale or the CES-D.

Experimenter Bias. Although specific criteria were used to determine if laughter subjects performed the volitional laughter task, the meeting of these criteria were judged subjectively by the experimenter. To control for this potential bias, similar research should employ a multi-rater technique in which various observers judge that the laughter criteria are met.

Subject Bias. In this experiment as with many similar ones there was likely to be a certain degree of subject expectancy and examination apprehension. All reasonable efforts were made to keep subjects from predicting the research hypothesis and, therefore, responding in a biased manner. However, the possibility exists that

control and experimental group subjects could communicate with each other during the course of the experiment and that this communication could affect the level of honesty and objectivity during the post-test measurement. Feedback questionnaires showed that while none of the control group subjects were able to guess the research hypothesis, almost all of the laughter group subjects did. Almost all subjects claimed to respond honestly to the items on the test instruments. However, there is no way of knowing if there were some subjects who were dishonest on both the outcome measures and the feedback questionnaire. The feedback questionnaire and debriefing process were intended, in part, to detect these and other possible extraneous variables to the degree it was possible.

Summary

In summary, this study suggests support for the hypothesis that volitional laughter is useful in terms of reduction of negative affect on a short term basis. Findings did not indicate the presence of a relationship between volitional laughter and positive affect or depressive symptoms as measured by the CES-D.

To my knowledge this is the first controlled study of volitional laughter as a therapeutic tool. Future research should attempt to replicate these findings with larger samples and diverse populations which include individuals with established diagnoses related to depression, anxiety, stress, and anger. Comparisons should be made between the laughter treatment and other

treatments like meditation, physical exercise, drug therapy, counseling, and placebo. Also a variety of laughter treatment intensities (frequency and duration of volitional laughter sessions) should be attempted. Designs should include suggested controls for factors which limited this study.

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Appendix A

Thesis Time Line

My committee has been appointed and consists of Professors G. Mohatt, K. Hazel, and J. Allen. The thesis proposal was submitted for IRB approval in September 1996, and I recruited subjects in the second week of November. The experiment began in the third week of November, and the first draft of the thesis was ready in December. My thesis defense was on 10 March 1997.

Recruit and pretest potential subjects.

Assign subjects to groups.

8 November

Apply treatment to laughter group.

11-15 November

Posttest and debrief subjects.

15 November

Analyze data.

16-26 November

Appendix B

PANAS and CES-D

The PANAS

Easily remembered four digit ID#:_____
Sex: M / F
Age:_____
Ethnic origin (circle one): Asian American / African American / Latino American / Alaska Native or American Indian / Euro American / Other

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to the word. Indicate to what extent you have experienced the feeling/emotion during the past week. Use the following scale to record your answers.

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

The CES-D

BELOW IS A LIST OF STATEMENTS THAT DESCRIBE THE WAY YOU MAY HAVE FELT.
Please indicate how often you have felt this way during the last week: (0) rarely or none of the time; (1) some or a little of the time; (2) occasionally or a moderate amount of the time; or (3) most or all of the time.

Please write the number for the answer you choose to the left of each item.

0 = Rarely or none of the time (< 1 Day)
1 = Some or a little of the time (1-2 Days)
2 = A moderate amount of the time (3-4 Days)
3 = Most or all of the time (5-7 Days)

___1. I was bothered by things that usually don't bother me.
___2. I did not feel like eating; my appetite was poor.
___3. I felt I could not shake off the blues even with help from my family and friends.
___4. I felt that I was just as good as other people.
___5. I had trouble keeping my mind on what I was doing.
___6. I felt depressed.
___7. I felt that everything I did was an effort.
___8. I felt hopeful about the future.
___9. I thought my life had been a failure.
___10. I felt fearful.
___11. My sleep was restless.
___12. I was happy.
___13. I talked less than usual.
___14. I felt lonely.
___15. People were unfriendly.
___16. I enjoyed life.
___17. I had crying spells.
___18. I felt sad.
___19. I felt that people disliked me.
___20. I could not get "going".

Appendix C

Laughter Criteria Score Sheet

Date:__________. Subject:________.

Laughter Code (circle one)

A) Laughter is perceivable at least 30 seconds. =enduring strong laughter

B) Laughter which endures at least 30 seconds is not perceivable. =other laughter

Date:__________. Subject:________.

Laughter Code (circle one)

A) Laughter is perceivable at least 30 seconds. =enduring strong laughter

B) Laughter which endures at least 30 seconds is not perceivable. =other laughter

Date:__________. Subject:________.

Laughter Code (circle one)

A) Laughter is perceivable at least 30 seconds. =enduring strong laughter

B) Laughter which endures at least 30 seconds is not perceivable. =other laughter

Date:__________. Subject:________.

Laughter Code (circle one)

A) Laughter is perceivable at least 30 seconds. =enduring strong laughter

B) Laughter which endures at least 30 seconds is not perceivable. =other laughter

Date:__________. Subject:________.

Laughter Code (circle one)

A) Laughter is perceivable at least 30 seconds. =enduring strong laughter

B) Laughter which endures at least 30 seconds is not perceivable. =other laughter

Date:__________. Subject:________.

Laughter Code (circle one)

A) Laughter is perceivable at least 30 seconds. =enduring strong laughter

B) Laughter which endures at least 30 seconds is not perceivable. =other laughter

Date:__________. Subject:________.

Laughter Code (circle one)

A) Laughter is perceivable at least 30 seconds. =enduring strong laughter

B) Laughter which endures at least 30 seconds is not perceivable. =other laughter

Appendix D

Consent Form

(Experimental Group Version)

Dear participant:

You are volunteering to participate in a week long psychological research experiment which involves laughter. You will be expected to participate in each of five daily sessions of about 15 minutes. The first session will take place on Monday 11 November and the last on Friday 15 November 1996. You will be assigned to either of two groups. After a week of daily brief laughter sessions you will be asked to complete a few simple questionnaires. As incentive to participate, you are being offered extra class credit to volunteer. Your participation will help to advance scientific knowledge about the nature of the influence of the various conditions of the experiment on people. VHS recorders will be used in order for the researcher to review and observe participants behavior in detail. The research report and associated materials including video tape will be the property of UAF and a copy will be kept with the Community Psychology Program. Minimal risk or discomfort is considered to be associated with this study. For the purpose of this research it is not necessary for the experimenter to know the subjects' identities. Video tape will be used to record the experiment, but will be viewed only by the researcher. Any records with your name will be used solely for identifying students who will receive extra class credit. These documents will be kept entirely separate from those related to the research. Funds for this study were provided by the researcher, Greg Krauss. For answers to questions about your rights as a research participant, please contact him at PO box 750996, Fairbanks AK, 99775. Questions can also be directed to Professor G. Mohatt or Professor C. Geist at the UAF Psychology department (474-7007). Participation is voluntary at all times. You may decide not to participate, or to discontinue participation at any time, and you will still get credit for volunteering. There will be between 30 and 60 subjects in this study. You will receive a copy of this form.

Subject signature and date

Witness signature and date

Researcher signature and date

Consent Form

(Control Group Version)

Dear participant:

You are volunteering to participate in a week long psychological research experiment which involves . You will be expected to participate in each of five daily sessions of about 15 minutes. The first session will take place on Monday 11 November and the last on Friday 15 November 1996. You will be assigned to either of two groups. After a week you will be asked to complete a few simple questionnaires. As incentive to participate, you are being offered extra class credit to volunteer. Your participation will help to advance scientific knowledge about the nature of the influence of the various conditions of the experiment on people. The research report and associated materials including video tape will be the property of UAF and a copy will be kept with the Community Psychology Program. Minimal risk or discomfort is considered to be associated with this study. For the purpose of this research it is not necessary for the experimenter to know the subjects' identities. Video tape will be used to record the experiment, but will be viewed only by the researcher. [Any records with your name will be used solely for identifying students who will receive extra class credit. These documents will be kept entirely separate from those related to the research. Funds for this study were provided by the researcher, Greg Krauss. For answers to questions about your rights as a research participant, please contact him at PO box 750996, Fairbanks AK, 99775. Questions can also be directed to Professor G. Mohatt or Professor C. Geist at the UAF Psychology department (474-7007). Participation is voluntary at all times. You may decide not to participate, or to discontinue participation at any time, and you will still get the credit for volunteering. There will be between 30 and 60 subjects in this study. You will receive a copy of this form.

Subject signature and date

Witness signature and date

Researcher signature and date

Appendix E

Attendance Sheet

Subject	Attendance	Seat
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Appendix F

Feedback Questionnaire

(Experimental Version)

To the participant,

Thank you for participating in this experiment. You're almost through. Please take the time to answer these questions honestly and completely. You may write on the back if you need more space.

1) Did you enjoy participating?

_____

_____

2) What do you think was the research hypothesis in this experiment?

_____

_____

3) If you were in the "laughter before task" group, how would you say you felt while laughing as compared to how you feel when you laugh in everyday situations?

_____

_____

4) Some subjects try to help the experiment work by changing their responses to fit in with the hypothesis. May you have performed or answered differently in any of the tasks than you would have outside of an experimental situation? How?

_____

_____

Thanks. Once everybody is finished with this questionnaire, you will be debriefed, and allowed to ask any questions you may have.

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(Control Version)

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