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The Effects of Mood States on Productivity: Affect and Cognition in the Organizational Realm

by

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A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of requirements for the degree of Doctor of Philosophy

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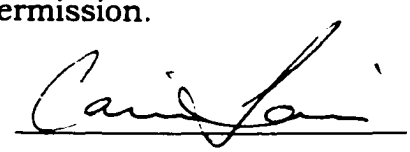

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "The Effects of Mood States on Productivity: Affect and Cognition in the Organizational Realm" submitted by Carrie A. Lavis in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Dedication

I would like to dedicate this thesis to the many members of my two families. To my Ontario family: I thank you for giving me the skills and courage to get this far, and for supporting my decisions through every step of this journey. To my Edmonton family: I thank you for keeping me sane through the insanity that is graduate school, and for believing in my potential even when I lost faith.

To Barbara, Howard, David, Bob, Kelly, Alex, Sean, and Petra: This one's for you.

Abstract

Four studies addressed the effects of affective states on worker productivity and challenged the common sense belief that "happy workers are better workers." In Study 1, participants in induced happy or sad moods built circuit boards. Sad participants were significantly more productive in that they committed significantly fewer assembly errors (but an equal number of circuit boards) than did happy participants. Study 2 addressed whether happy people might be maintaining their moods by failing to devote energy to the task whereas sad people might be engaging in affect repair by devoting energy to the task. Happy or sad moods were induced in participants, moods were measured, participants built circuit boards, and mood was measured again. The performance effects demonstrated in Study 1 replicated. Interestingly, happy participants' moods did not change from pre to post performance, whereas, sad participants displayed a significant change in mood in the positive direction. Study 3 addressed the effects of relatedness of mood and task on performance. Happy or sad participants were led to believe that their mood was either related or unrelated to the performance task. Results indicated that typical mood-related performance differences were attenuated in the related condition. Study 4 more directly addressed the influence of motivational factors (i.e., the desire for mood maintenance/affect repair) on

performance. Participants in happy or sad moods were provided with one of three expectancies about the impact of task performance on their mood state (i.e., mood-maintaining, mood-attenuating, no expectancy). Productivity was highest for the groups that believed the task would lead to a positive mood state, and lowest for those who believed the task would lead to a negative mood state (regardless of induced mood state), with the no expectancy groups replicating the related condition effects in Study 3. This lends support to the proposition that people are motivated by the desire for mood regulation, and that attempts to achieve positive mood states lead to differential performance of tasks. The results are discussed in terms of their importance for expanding the breadth of research on the effects of mood-related processing strategies, and their implications for future organizational research.

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I would like to thank my committee members: Dr. Don Kuiken, Dr. Mike Enzle, Dr. Doug Olsen, Dr. Victor Ottati, and most of all my supervisor, mentor, and friend Dr. Robert Sinclair for their comments and encouragement.

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CHAPTER 1: GENERAL INTRODUCTION

Introduction

The issue of workplace performance is one that is of interest to both psychological researchers and corporate managers. Recent advances in research concerning the effects of mood states on judgmental accuracy and cognitive performance have led to questions concerning the effects of mood states in the workplace. Specifically, researchers are becoming interested in understanding the ways in which mood can affect employee productivity, while managers are interested in ways in which employee performance can be improved (Staw, Sutton, & Pelled, 1994). Unfortunately, very little research has directly addressed the effects of positive and negative affective states on productivity. I intend to demonstrate that the traditional, "common sense" belief that happiness leads to increased productivity is not accurate; that both happy and sad moods can lead to improvements in performance, depending on the motivational processes evoked by affective states and the context in which they are experienced.

Industrial-Organizational psychology has long ignored the potential impact of emotions in the workplace, due in large part to organizations' unwillingness to consider (or even acknowledge) the feelings of their employees (Muchinsky, 2000). Emotions are viewed as being antithetical to logic and reason, and as a result are considered a "taboo" subject within the business world. Ashforth and Humphrey

(1995) note that modern organizations are run according to norms of rationality. They argue that the dominant administrative paradigm is thus to adopt an "overrationalized" view of organizational functioning. As a result of this reliance on rationality, organizations view all forms of expression or instrumentality as threats to be either avoided or at the very least placed under tight organizational control.

Ashforth and Humphrey (1995) outline four basic mechanisms employed by organizations to regulate both the experience and expression of emotions in the workplace. First, organizations attempt to prevent the emergence of workplace emotions through a "neutralizing" process. Attempts at neutralizing emerge in the form of strictly regimented roles, norms, and language adopted as policy within the organization. These tightly structured roles are seen as a way of keeping people focused on meeting their role obligations, and not developing strong emotional connections with others. When organizations fail to prevent the emergence of emotions in the workplace, three additional controls are exercised: Buffering, prescribing, and finally normalizing emotions. Buffering refers to a "compartmentalization" of emotion, i.e., allowing emotional expression only in areas in which it is deemed appropriate (e.g., being friendly when dealing with customers), while ensuring that it will not interfere with more technical aspects of corporate functioning. Some

occupations require considerable emotional expression, and in those cases, the form of expression that is permissible is strictly prescribed, and carried out according to organizational scripts. Ashforth and Humphrey (1995) provide the example of flight attendants, who are trained to always appear friendly and cheerful, and bill collectors, who are taught to convey a sense of urgency. Finally, when these controls have failed, and disruptive or unacceptable emotions do enter the workplace, organizations make attempts to normalize the emotional intrusions, through the use of face-saving practices such as humor, apologizing, or even stigmatizing the individual responsible for displaying the unwelcome emotion. Organizational attempts to quash the understanding of and effects of the experience and expression of affect in the workplace appear to be a tacit acknowledgement that affect in the workplace is important. Thus, the lack of direct research addressing the impact and importance of mood on performance certainly needs to be addressed.

In order to address the impact of mood on performance, one must draw on both basic research concerning the effects of mood states in general, as well as more applied research focusing on worker productivity and motivation. While productivity research has a long (if somewhat narrowly focused) past, research in the area of affect and cognition is still relatively recent, and has only very recently been

acknowledged by organizational researchers (cf. Fisher & Ashkanasy, 2000). Thus, part of my goal was to address some basic issues concerning affective states using dependent variables that might more closely tie basic findings from work in the area of affect and cognition with research in the organizational literature.

What is Productivity?

In order to discuss the effects of mood on productivity, one must first define what is meant by productivity. Productivity, in its simplest sense, refers to a ratio of inputs and outputs (Murphy, 1990). In certain occupations, indices of productivity are relatively clear. An assembly line worker, for example, is evaluated by the input/output ratio: in terms of the number of units produced and number of errors committed. In sales, performance may be measured in terms of overall money generated or new clients acquired by the salesperson. In these two examples, overall performance or productivity is easily assessed. For many occupations, however, the lines are not so clearly drawn. How does one evaluate the productivity of middle managers, teachers, or graphic designers, for example?

Murphy (1990) suggests that the problem lies in confusing job performance with task performance. People in most occupations simply do not spend all of their working hours in job-related behaviors and, as a result, we must take other factors such as citizenship behaviors,

interpersonal interaction, and down time into consideration when assessing performance. Murphy proposes four primary clusters of behaviors that constitute an overall performance domain: task-oriented behaviors, interpersonally-oriented behaviors, down time (or absenteeism), and destructive or hazardous behaviors. It should become apparent that employee moods will have a major impact on all four of these behavior clusters, and should, in future research, be addressed across all indices of productivity. If there is ever to be a comprehensive theory regarding the effects of mood states on productivity, it will need to take dimensions of all four clusters into consideration, in order to provide a more accurate, global assessment of overall performance.

Obviously, it will take more than one series of studies to address the impact of moods on overall work productivity. Most research in the area of workplace performance chooses as its focus one aspect of the work endeavor, and thus defines the construct of productivity in terms of what is important to the particular researcher. For the purposes of the present discussion, productivity will be defined in terms of task oriented behaviors, i.e., how well people perform at the task set before them.

Early Productivity Research: Scientific Engineering

From its beginnings with the work of engineers like Taylor (1911) and Gilbreth (1909), research concerning tasks and their completion has focused largely on the performance of individuals. Early attempts at scientific engineering yielded answers about how people can be taught to increase their output, with a minimum of effort expended. What these early forays into industrial psychology failed to consider were people factors. Training a bricklayer to use 5 motions instead of the usual 18 while laying bricks (Gilbreth, 1909) might have led to more fluid, productive work, but might also have led to a miserable worker. Hilgard (1987) proposes that the essential flaw of early productivity research was the absolute ignorance of basic psychological principles. Early researchers were focused on improving and increasing the potential of jobs, not of workers.

Yet, organizations are not comprised of jobs, but of people — people who experience a plethora of emotions throughout the course of their working life. To ignore the experience and expression of emotions at work is to ignore the very essence of the thing that makes organizations tick. A number of researchers (e.g., Fisher & Ashkanasy, 2000; George & Brief, 1996) have recently drawn attention to this lack of understanding, and have called for extensive research into both the causes and consequences of emotions in the workplace. One area cited

as being severely understudied is that of the impact of moods on performance and productivity (Fisher & Ashkanasy, 2000).

The modern successor to these early productivity studies can be found in the area of ergonomics, in which researchers attempt to increase productivity through manipulations of the physical environment. Some ergonomics researchers have attempted to manipulate mood through alterations in the work environment, in the hopes that these environmental manipulations would affect productivity. For example, Kwallek, Lewis, and Robbins (1988), and Ainsworth, Simpson, and Cassell (1993), manipulated interior color of offices in an attempt to influence mood, and thereby productivity. In both studies, participants were placed in rooms of varying colors (red and blue in the Kwallek et al. study, and red, white, and blue-green for the Ainsworth et al. study), and asked to perform a typing task. Results from both studies failed to demonstrate a difference in mood as a result of the room color, and subsequently no difference in typing performance. Larsen, Adams, Deal, Kweon, and Tyler (1998) assessed the impact of the density of plants in an office on mood, perceptions of performance, and actual productivity task performance. They found that reported mood and perceptions of performance were more positive in the presence of plants, but that actual task performance was inversely related to plant density. This might be indicative of a

performance decrement in good moods and a lack of consistency between perceptions of performance and true performance.

Ergonomics research, while occasionally delving into person factors that might be seen as a proxy for mood state (Ainsworth et al., 1993; Kwallek et al., 1998), is primarily concerned with manipulations of the environment, with little attention to the existing body of knowledge concerning the effects of mood states in general. As a result of a lack of grounding in basic social cognitive principles, much of this research remains inconclusive regarding the effects of mood states on productivity.

Motivation

Intuitively, one might think that research addressing employee motivation would provide a starting point for bridging the research gap between the jobs themselves, the work environment, and the people who perform those jobs. Research on motivation, however, while acknowledging the importance of affective consequences, has largely overlooked the role of mood states as motivators themselves. Often, mood is relegated to the role of a desired end state, and not as a contributing factor to the processes that lead to motivational differences, and thus performance differences.

In their summary of current approaches to motivation in the workplace, George and Brief (1996) note that moods do not play a

central role in any of the major motivational theories currently in vogue. To support their observation, they note that in one of the most comprehensive reviews of work motivation (Pinder's 1984 volume, Work motivation), no mention is made in the subject index of any terms referring to mood states.

So, what knowledge can be drawn from the motivation literature, with regard to the effects of moods on productivity? At the very least, this body of research can provide us with the methodologial tools needed to assess performance. Kanfer (1990) points to three criteria used when assessing motivation and subsequent performance. Direction-based research focuses on motivated choice, such as when participants choose between alternatives that differ in the levels of effort required. Intensity-based measures focus on the performance of specific tasks. Finally, persistence measures assess higher-level executive functions assumed to maintain levels of task activity.

In the confines of laboratory research such as this, the choice is overwhelmingly in favor of using specific task performance as an index of motivation. Implicit in this research is the assumption that changes in effort (thus to some degree motivation) bring about changes in performance (Kanfer, 1990). If such an assumption is made, the researcher must be careful to have more than one measure of performance, i.e., to assess both effort and accuracy. People may in fact

be motivated to work in two, sometimes conflicting, ways: To work harder, and to work smarter. To work hard at the expense of being careful is to engage in what is known as a speed-accuracy trade-off (Drury, 1994). To work both quickly and accurately is to be productive.

Processing and Performance Effects Associated with Different Mood States

As a result of eliciting changes in processing strategy, sad moods appear to enhance analytical thinking and decision making. People in sad moods thus display greater accuracy across many judgmental tasks (e.g., Sinclair, 1988; Sinclair & Mark, 1995). For example, sad people have been shown to be more accurate in making performance appraisals (Sinclair, 1988; Sinclair, Wuest, Lavis, & Soldat, 1998). Specifically, Sinclair (1988) had participants read about a university professor who displayed 16 positive and 16 negative behaviors. The behaviors mapped onto 8 behavioral categories (e.g., preparation and organization, sensitivity, etc.) with 4 behaviors per category. Sinclair varied the number of positive and negative behaviors within category (within subject). Later, he induced happy, neutral, or sad moods in participants and found that sad people were most accurate in their performance appraisals. That is, their evaluations of the target on scales assessing performance on the 8 behavioral categories mapped more closely onto the behavioral content in the categories (relative to

neutral and happy mood participants). Furthermore, sad participants displayed less halo error in their evaluations than did neutral or happy participants. That is, sad people discriminated when making their evaluations and displayed lower interdimensional correlations than did happy people (neutral fell in between). Happy people appeared to fail to discriminate across behavioral categories and evaluated the target as positive, neutral, or negative across all behavioral dimensions; this resulted in higher interdimensional correlations. Finally, Sinclair (1988) demonstrated that the global evaluations of the target by sad people were predicted by more behavioral category ratings than were the evaluations of happy or neutral people. Sinclair concluded that sad people were engaging in more deliberate, analytical, systematic processing and were attending to more information and more diverse information when making their judgments (relative to neutral and happy people). Furthermore, Sinclair argued that happy moods caused people to engage in less effortful, less systematic, and more heuristic processing that led to judgmental errors (see also Sinclair & Mark, 1992). In the study, the neutral group always fell between the happy and sad groups.

Sinclair and Mark (1995) extended this argument to statistical judgments and found that sadness caused greatest accuracy and happiness caused least accuracy. Cognitive response analyses

indicated that sad people were engaging in more systematic processing than were happy people.

Furthermore, in the context of studies addressing responses to persuasive communications, sad people were more discriminating than happy people when processing arguments (Bless, Bohner, Schwarz, & Strack, 1990; Sinclair, Mark, & Clore, 1994a). Thus, sad people elaborated arguments and were persuaded by strong, but not weak arguments. Happy people failed to elaborate and were equally persuaded by strong and weak arguments. Mackie and Worth (1989) and Worth and Mackie (1987) demonstrated similar happy-neutral differences (cf. happy-sad). Thus, happy moods lead to heuristic processing of arguments and reliance on peripheral cues such as source attractiveness, likeability, and expertise (Sinclair, Mark, Soldat, Lavis, & Moore, 1999). As a result, happy people do not elaborate arguments, and are equally persuaded by strong or weak appeals, whereas sad people elaborate, attend to argument strength, and are thus persuaded only by strong arguments. These are just a few examples stemming from a much larger body of research that demonstrates a consistent and robust effect: Sad moods facilitate performance on tasks that require significant cognitive effort and

analytical thought (see Clore, Schwarz, & Conway, 1994; Schwarz, 1990; Sinclair & Mark, 1992).

Happy Moods: Creativity and Expressiveness

Happy moods, however, are not without their advantages. Research concentrating on the effects of happy moods has consistently demonstrated that positive moods appear to facilitate expressive behaviors. For example, happiness (relative to a neutral control) has consistently been shown to lead to enhanced creativity (Isen, Johnson, Mertz, & Robinson, 1985), and flexible thinking in terms of broader categorization (Isen & Daubman, 1984, Murray, Sujan, Hirt, & Sujan, 1990).

Isen et al. (1985) demonstrated that people in induced happy moods made more unusual and diverse word associations to neutral target words than did those in a neutral control condition. They interpreted this as evidence that happiness facilitated creative, flexible thinking. Isen and Daubman (1984) had happy and control participants rate and sort stimuli according to perceived category membership. They found that the happy people used fewer categories when sorting stimuli, and considered more unusual exemplars in each category than did the control group. In another series of studies, Isen, Daubman, and Nowicki (1987) examined the impact of positive moods on two tests of creative problem solving: Duncker's (1945) candle task,

and the Mednick's Remote Associates Test (Mednick, Mednick, & Mednick, 1964). In the well-known candle task, participants are given a box of tacks, a candle, and matches, and asked to then attach the candle to the wall so that, when lit, it will not drip wax onto the floor. The solution (which is often not obvious at first, but once solved becomes unforgettable) is to empty the tack box and attach it to the wall to serve as a holder for the candle. In the Remote Associates Test, participants are provided with three words that are only remotely related to one another, and asked to supply a fourth word, that ties them all together (a task that will seem strangely familiar to anyone with a fondness for the popular board game "TriBond"). If, for example, the participant was given the words "trinity, grail, and father", the correct solution would be the word "holy." Isen et al. found that happy people significantly outperformed both a no mood induction control group and a neutral induction group on both creative tasks.

Collectively, the results of studies such as the ones discussed above point to a rather robust finding: Happy people perform very well across multiple indices of creative, flexible thought. Unfortunately, the vast majority of studies addressing this issue have failed to include the use of a negative or sad mood induction comparison group, which would have proven more informative, and strengthened the case put forth by Isen and her colleagues. Furthermore, it is unclear what an

accuracy criterion would be in many creativity tasks. For example, Sinclair and Mark (1995) found that happy people were more creative in the strategies that they used when making statistical judgments and provided more creative examples. Sinclair and Mark also demonstrated that happy people were also less accurate. Despite these shortcomings, there does appear to be ample evidence that happiness may provide some advantages in domains that require a measure of expressiveness.

Mood Effects on Judgment

As is apparent from this brief review, much of the recent research on the effects of mood states has focused on their impact on judgment and decision making. This basic framework has provided the direction for the current research on the impact of moods on both motivation and performance. Several excellent reviews of the effects of mood on judgments exist elsewhere (e.g., Clore et al., 1994; Isen, 1984; Schwarz, 1990; Sinclair & Mark, 1992, 1995), so I will attempt to keep this discussion brief. I should note that the present discussion will be limited to research concerning the effects of temporary mood states (typically experimentally induced states of happiness or sadness) and not studies addressing the effects of chronic states such as depression. While the effects of chronic states are certainly interesting, they cannot be readily applied to many of the theories of mood effects to be discussed here. Furthermore, the primary concern with the present

review is the role played by more normal, day-to-day states typically encountered in the workplace.

Processing Strategy

According to Sinclair and Mark's (1992, 1995) processing strategy model, people process information differentially depending on their mood state. People in happy moods tend to process information nonsystematically, in less detail, and rely more on the use of heuristics when making judgments. Conversely, people in sad moods process more systematically, in greater detail, and more effortfully than people in happy moods. These processing strategy differences have been demonstrated across a variety of judgmental tasks, from performance appraisal judgments (Sinclair, 1988) to estimations of the magnitude of correlation coefficients (Sinclair & Mark, 1995), to responses to persuasive appeals (Bless et al., 1990; Mackie & Worth, 1987; Worth & Mackie, 1989; Sinclair et al., 1994a). These results represent a very robust and far-reaching pattern, indicating that for many types of judgments, sad people display greater accuracy than do happy and neutral people. Three mechanisms have been posited to account for these mood-related processing differences: 1) Cognitive capacity; 2) Affect-as-information; and 3) Mood maintenance/affect repair.

Cognitive Capacity

The first explanation focuses on a restriction of available cognitive capacity in happy mood states. It has been demonstrated that happy moods generally lead to activation of more thoughts than sad moods (Isen, 1984). This activation is proposed to lead to a restriction of available cognitive capacity, which in turn may lead to less effortful processing and greater use of heuristics (Worth & Mackie, 1987, Mackie & Worth, 1989; 1991).

Having already established that participants in positive moods did not process arguments as systematically as those in a neutral control group (Worth & Mackie, 1987), Mackie and Worth (1989) wanted to explain the process underlying these processing differences. In two studies, participants in either induced happy moods or a neutral control condition were presented with strong or weak counterattitudinal messages for either a limited or unlimited amount of time. The results indicated that happy people failed to elaborate on the messages (thus were equally persuaded by strong or weak arguments) only when time to process was limited. Mackie and Worth interpreted this as evidence for a restricted capacity explanation for mood-related differences in processing. When happy people were given more time to spend processing the arguments, they demonstrated systematic, discriminatory processing.

Most of the research that has demonstrated processing strategy differences, however, cannot be explained by restricted capacity in happy moods. Bless et al. (1990) did not limit time to process during a persuasion task, and yet still found typical mood-related differences in processing. Similarly, Sinclair (1988) gave participants unlimited time to complete a performance evaluation task, yet found that happy people demonstrated halo error, while sad people were more accurate and displayed less halo in their evaluations. Given that there are now numerous studies in which processing time has been unlimited, and processing strategy differences still emerge, it has generally been accepted that restricted capacity alone may not be an adequate explanation for typical processing strategy differences (Sinclair & Mark, 1992; Sinclair et al., 1994a).

Affect-As-Information

Another possible explanation of processing strategy is found in the affect-as-information hypothesis (Schwarz & Clore, 1983, 1988; see also Clore et al., 1994; Schwarz 1990), which proposes that people use their current mood state as a source of information about the state of their lives in general. Schwarz and Clore (1983) had people undergo a covert mood induction in the form of a life events recall procedure, and then provided them with either an incorrect attribution (the strange room the experiment took place in) or no external attribution for their

current mood state. They then had participants evaluate both their current mood state, and their overall life satisfaction. Participants with no external attribution for their mood state provided significantly higher ratings of life satisfaction when in the happy condition than in the sad condition, but this difference was eliminated in the conditions where participants had an attribution for their mood state. This demonstrated the informative function of mood states: when we attribute our moods internally, they serve to provide us with information about the state of our lives in general. When we can point to some external cause as the source of that mood state, however, our current mood ceases to provide us with useful information, i.e., "I'm feeling really down, but it's only because I'm in a small cramped room. Overall, my life is going well."

The cognitive tuning extension of the affect-as-information hypothesis (Clore et al., 1994; Sinclair et al., 1994a), expands the informative function of moods beyond mere evaluations of life satisfaction, to encompass judgments and decision making in general. Happy moods lead us to believe that things are going well in our lives, that we are making good judgments, and as a result, have no need to pay particular attention to our current situation. Sad moods, however, may act as a signal that things are somehow wrong or threatening, and that perhaps we need to pay more attention in order to improve the

current situation. These different types of signals regarding the state of our lives reflect the differential processing strategies used by happy and sad people. If things are going well in our lives, and we are not paying particular attention to things, we are then more likely to engage in processing that reflects an inattention to detail, whereas if we have been alerted to a problem, we will be more vigilant in our processing. In order to provide support for this hypothesis, Sinclair et al. (1994a) approached participants on either pleasant sunny days or unpleasant overcast days, and then cued half of the people to the weather as a possible source for their mood (i.e., provided an external attribution for mood). They then had participants read either strong or weak arguments supporting comprehensive final exams for graduating university students (Petty & Cacioppo, 1986). Participants who had not been cued to the weather as a source of mood displayed the typical mood-related processing strategy differences: Those approached on unpleasant days (analogous to sad mood induction participants) elaborated the arguments, and were convinced only by the strong arguments. Participants in the pleasant weather condition (similar to happy participants) failed to elaborate only when they were not cued to the weather, and were equally persuaded by strong and weak arguments. When these participants were cued to the weather, however, their pleasant mood state did not serve as information about

the pleasant state of their lives in general, and thus participants engaged in effortful processing and elaborated the messages.

The cognitive tuning framework provides us with important clues about processes that attenuate mood-related processing differences in judgmental accuracy. If moods are seen as relevant (i.e., originating internally), then they can provide us with a source of useful information. If, however, we attribute the source of our mood to an external factor (e.g., the weather), our mood is rendered uninformative, and typical mood-related processing differences disappear (Clore et al., 1994; Sinclair et al., 1994a).

Mood-Maintenance/Affect Repair

The final explanatory process proposed to cause processing strategy differences is the motivation for mood maintenance or affect repair (see, e.g., Isen, 1984; Schaller & Cialdini, 1990; Sinclair & Mark, 1992). Happy people may be motivated to maintain their positive mood state, but completing a task that requires effortful processing is seen as a factor that interferes with the pleasant mood state. Consequently, people in good moods might try to avoid such situations (i.e., avoid engaging in effortful processing), and are thus more likely to adopt the most simple strategies for processing, (i.e., reliance on heuristics, paying less attention to detail, use of stereotypic information). Conversely, people who are in a sad mood may be motivated to

eliminate or reduce their negative mood state. One way of accomplishing this goal may be to engage in a task that distracts them from their negative mood. Thus, sad people may engage in effortful processing, and use a systematic approach when making judgments, in an effort to repair their negative affective state.

Mood Regulation 1: Hedonic Contingency. Wegener and Petty's (1994) Hedonic Contingency hypothesis challenges the basic notion that both happy and sad people are motivated to engage in mood regulation (see also, Wegener, Petty, & Smith, 1995). They note that, while both happy and sad people are likely motivated by the desire to achieve positive mood states, happy people are more restricted in the activities they may choose. Because almost any behavior that sad people can engage in will be presumably more pleasant than their current negative state, they have little reason to scrutinize the hedonic consequences of their behaviors. As a result, the Hedonic Contingency hypothesis maintains that it is happy people who are most likely to scrutinize the hedonic benefits of behaviors, and use that knowledge when deciding whether or not to take part in activities.

In three studies (using three different mood manipulations), Wegener and Petty had happy, neutral, and sad participants rank order their interest in watching 8 videotapes. Participants were provided with information about how agreeable, happy, and interesting others had

found each of the tapes. Findings across all three studies indicated that people in happy moods utilized the mood-relevant information (i.e., whether or not others rated the tapes as being happy) more than neutral and sad mood participants when making their choice of which tape to watch. Thus, happy people consistently chose an activity that they believed would lead to a positive mood state, to the relative exclusion of other factors. Both the neutral and sad groups were more likely to consider other factors (namely how interesting others found the tapes) when making their choices.

Mood Regulation 2: Negative State Relief. The propositions put forth by the Hedonic Contingency hypothesis contradict the earlier Negative State Relief (NSR) hypothesis put forth by Cialdini and his colleagues (Cialdini, Bauman, & Kenrick, 1981; Cialdini & Kenrick, 1976; Schaller & Cialdini, 1990). According to the NSR, sad people are the ones who are most likely to be uncomfortable with their current affective state, and as a result, are more likely to actively seek ways of improving that state. The NSR position has been tested primarily within the area of altruism research. While findings generally demonstrate a tendency for happy people to help others more than sad people (Schaller & Cialdini, 1990), a number of studies have shown that sad people will help when they believe the altruistic act will lead to an improvement in their mood state and that happy people will fail to help

when the helping is perceived as potentially detrimental to their moods (Schaller & Cialdini, 1990). Thus it seems reasonable to suggest that both the Wegener and Petty and the Schaller and Cialdini positions may operate in different situations.

Research on Affect in the Workplace: Current Status

The Happier-is-Better Myth

The evidence supporting differential processing (and subsequent performance differences) in different mood states is quite convincing. Yet in the area of workplace performance, the mantra that "happy workers are better workers" remains intact (Staw & Barsade, 1993) among both researchers and managers. This belief flies in the face of what is known about the relative strengths and weaknesses in performance attributed to positive versus negative moods.

If we are to believe that happy workers are better workers, must we then believe that all jobs entail only creative or expressive tasks? Part of the problem lies in the lack of empirical research directly comparing the effects of positive and negative moods on work-related behaviors.

Research concerning the effects of mood on workplace performance is surprisingly sparse, and can be grouped into three rough categories: (1) the impact of positive mood states on interpersonal workplace behaviors (e.g., Baron, 1990); (2) correlational

research concerning the impact of trait affect, or Positive Affectivity/Negative Affectivity (PA/NA; e.g., Staw et al., 1994); and (3) research directed at finding a satisfaction-performance link (see Weiss & Cropanzano, 1996 for a detailed review).

Happiness and Expressive Behaviors. As discussed previously, Isen and her colleagues have marshaled considerable evidence supporting the benefits of positive mood states, much of which may have implications for workplace settings. In addition to fostering creativity, happy moods seem to facilitate interpersonal behaviors such as altruism (Isen & Levin, 1972) and negotiation skills (Baron, 1990; Carnevale & Isen, 1986).

Several studies of helping behavior have shown that happy people are more likely to engage in altruistic acts than are people in neutral states (e.g., Isen & Levin, 1972; cf., e.g., Schaller & Cialdini, 1990). Whereas it is true that happiness can lead to more altruistic behavior, it has also been demonstrated that happy people are less likely to engage in an altruistic act if the actor believes that helping will lead to a decrease in positive affect (Schaller & Cialdini, 1990). It has further been demonstrated that sad people, instead of avoiding altruistic acts, are also more likely to engage in helping behavior if the hedonic benefits of the act are emphasized (Manucia, Baumann, & Cialdini, 1984; Schaller & Cialdini, 1990).

Research addressing the impact of mood states on another interpersonal behavior (i.e., negotiation) has demonstrated that happiness may facilitate negotiation success. Carnevale and Isen (1986) gave participants a free gift, then had them read cartoons as a means of inducing positive moods. They then compared the performance of the happy people with that of controls in a face to face integrative bargaining task (i.e., one in which opponents must bargain with one another in an effort to reach the highest possible personal outcome). Carnevale and Isen found that the happy participants were more likely than controls to reach the best agreement with their bargaining partner (i.e., to collectively attain the highest payoffs, both individually and jointly). They also found that the happy participants rated the experience more positively, and displayed less hostile tactics than the control group. Carnevale and Isen interpreted these results as an indication that happy people are better able to understand the goals of others, and are also more skilled at interacting in a situation requiring considerable interpersonal skills. Baron (1990) exposed participants to either pleasant or neutral odors (assuming that the odors would lead to either a positive or neutral mood state), then assessed their expectations about, and performance during, a negotiation task. He found that the participants in the pleasant odor condition went into the negotiation situation with the expectation that

they would obtain more favorable outcomes than the neutral group. Participants in the pleasant condition also used less confrontational tactics, and were willing to make more concessions than neutral participants during the negotiation process.

Isen and Baron (1991) propose that, because positive mood states can facilitate organizationally-relevant interpersonal behaviors (i.e., citizenship behaviors), managers should attempt to create a work environment that promotes positive affect. Such a proposition seems premature, however, on at least two levels: First, the impact of negative moods has been largely overlooked; and second, given what we know about the effects of environmental sources of mood (i.e., external attributions attenuate typical mood-related effects), such workplace manipulations may ultimately prove ineffective. Clearly, more research is needed to establish the contexts in which particular moods will facilitate particular types of performance.

Dispositional Affect. Studies of dispositional affect present additional problems. In such research, participants typically complete questionnaires designed to measure affect as an individual difference measure. Their performance on work-related behaviors is then correlated with their self-reported tendency for either Positive Affectivity (a feeling of zest for life) or Negative Affectivity (a feeling of being upset or negatively aroused; Clark & Watson, 1988).

Dispositional research has demonstrated a negative correlation between PA and absenteeism (George, 1989), and a positive relationship between PA and interpersonal effectiveness, group performance, and leadership (Staw & Barsade, 1993). Staw et al. (1994) propose that this growing body of dispositional evidence points to the fact that employees' positive emotions lead invariably to positive outcomes in the workplace. Their work has demonstrated a positive relationship between PA and, primarily, interpersonal factors like coworker support and supervisory ratings; they have hypothesized that these factors will then lead to greater work achievement. There is however very little actual evidence to support this contention, in the form of work-related performance measures.

The existing literature has also failed to demonstrate a clear relationship between NA and workplace behaviors, due in part to the fact that PA and NA are conceptualized as orthogonal constructs and not assumed to follow the more traditional structure of a single bipolar positive-negative continuum (Clark & Watson, 1988; Watson & Tellegen, 1985). As with all correlational research, no specific causal linkages between mood and performance can be predicted. Furthermore, such an approach ignores the influence of the work environment on transient fluctuations in mood, preferring instead to

focus on generalized tendencies toward the experience of positive and negative states.

The Search for a Satisfaction-Performance Link. The final area of investigation involving affective influences in the workplace involves the search for a relationship between performance and satisfaction. Years of research aimed at finding a link between job satisfaction and performance has failed to yield any straightforward answers. At best, it appears that most researchers have accepted the notion that satisfaction does not predict performance on tasks at work, but is negatively correlated with withdrawal behaviors such as lateness, absenteeism, and turnover (George, 1989). The failure to establish a firm satisfaction-performance link is widely cited as one of the biggest disappointments in the organizational literature (Weiss & Cropanzano, 1996). The current attitude toward this failure is best described by Weiss and Cropanzano (1996), who admit that "there is very little reason to expect any relationship [between satisfaction and performance] to begin with." They further argue that one should not expect that satisfaction with one's job would lead to either greater effort or more accurate performance. Indeed, many people may be very satisfied precisely because their jobs require very little from them in terms of either input or accuracy. Conversely, others may work very

hard at jobs that are ultimately frustrating in the very challenge they present.

An additional problem with this line of research is one of definition. Researchers often confuse job satisfaction with mood, overlooking the fact that satisfaction is an attitude. Satisfaction, like any other attitude, must be viewed as an evaluation containing cognitive, affective, and behavioral components (Eagly & Chaiken, 1998). Too many researchers in the organizational literature focus on the affective component of this attitude, to the exclusion of the other two components. Additionally, job satisfaction must be viewed as a multidimensional construct (Organ, 1988). Task performance is but one facet of the construct, in addition to organizational citizenship behaviors and perceptions of job fairness. Perhaps researchers are casting their nets too widely in searching for one global evaluation of satisfaction that will adequately predict multiple levels of performance. One possible solution is to narrow the focus of the evaluation, i.e., examine satisfaction across multiple indices of performance.

The Purpose of the Present Research

It should be clear from this brief review that while the study of the effects of mood on productivity has considerable importance, the existing research has left large gaps in understanding even the fundamental processes of concern. The aim of this research was thus

fourfold: 1) to bring knowledge gained from research on mood-related processing strategy differences into the domain of productivity research; (2) to expand the existing knowledge about the effects of moods on performance by examining both positive and negative mood states; (3) to provide evidence for potential motivational factors underlying mood-related differences in performance; and (4) to provide evidence for possible moderators of these performance differences. Four studies were designed to address these issues.

CHAPTER 2: STUDY ONE

Introduction

The first step in this research endeavour was to assess whether different mood states would in fact lead to differences in overall productivity on a task. Previous research addressing the effects of mood on judgment has demonstrated a distinct performance advantage for people in sad moods on tasks that are complex, i.e., tasks that require considerable cognitive effort (Sinclair, 1988; Sinclair & Mark, 1992, 1995). It was thus necessary to choose a performance task that was cognitively complex, but at the same time one that could be both demonstrated to and learned by participants relatively quickly (i.e., within the time constraints of a laboratory experiment). The task that was eventually chosen was building circuit boards. Participants first learned the correct steps involved in assembling a circuit board. Following a brief practice session, they were exposed to either a positive or negative mood induction and mood was measured. Participants then completed the assembly task again. Speed and accuracy of assembly were assessed.

It was predicted that sad participants would perform more accurately than happy participants, i.e., that they would commit fewer errors. What remained unclear, however, was whether the performance differences would emerge in the form of a speed-accuracy trade-off (Drury, 1994). For instance, happy participants, who would have higher

arousal levels than sad participants, might work faster, but with less attention to detail, leading to greater speed at the price of reduced accuracy. The reverse pattern of effects might emerge for sad participants: Due to lower arousal, and the lethargy associated with sadness, these participants might work more slowly, but pay greater attention to detail, resulting in lower speeds and greater accuracy. The issue of a speed-accuracy trade-off in performance in different mood states has not been addressed previously in the literature, consequently, the results of Study 1 were anticipated to help clarify this issue.

Method

Participants

Participants were 18 introductory psychology students from the University of Alberta. All were volunteers who received credit toward their final grade for participating.

Materials

The circuit board was designed from a kit used primarily as a children's educational toy, and was selected as an appropriate task based on three criteria: (1) the task must be cognitively demanding (2) the task can be completed within the time constraints of a laboratory experiment and (3) the task must be novel (i.e., the actual design of the board was created specifically for these experiments), eliminating any

possible effects of prior experience (The circuit board diagram is presented in Appendix A). Furthermore, the choice of an assembly task allows for a relatively objective measure of productivity. The assembly of the board required 17 steps, to be followed in numerical order. Coding of the boards thus provided two indices of productivity: The number of steps completed (speed of performance) and the number of errors made (accuracy of performance). It could be further argued that, conceptually, the assembly task resembles the type of task that employees regularly complete in jobs such as manufacturing. However, considering the novelty of the task, generalization to any actual assembly occupations seems premature.

Procedure

Participants were run in groups of 2 to 4, using an unrelated second-study paradigm (Higgins, Rholes, & Jones, 1977). One study involved the apparent validation of a group administration of a mood induction procedure. The other study purportedly assessed how people remember information and use it to follow instructions. The experimental script is presented in Appendix B.

Participants were greeted by two experimenters (E1 and E2), who were apparently running the two separate studies. The first experimenter (E1) explained that, due to a shortage of volunteers for research projects, the experimenters would be running two studies per

session as a means of maximizing participant use. E1 further explained that to be fair to both experimenters, a random draw was to be held at the beginning of the session to determine which study would go first. E1 then asked a participant to draw a slip of paper from a random draw box, and read aloud what was written on the paper. The draw was actually rigged, with both slips containing the words "Memory and Instructions Study".

At this point, E2 took over and explained to participants that he/she was interested in factors that influence the way people remember information and use it to follow instructions. E2 explained that participants would be shown how to assemble a circuit board, then asked to assemble the board on their own using diagrams and a set of instructions. After obtaining informed consent (see Appendix C), E2 handed each participant a diagram of the circuit board, an instruction sheet containing 17 steps for assembling the board (see Appendix D), a sheet identifying all the parts necessary for assembly (see Appendix E), and an additional sheet containing information about the correct method for assembling pins, washers, and springs, as well as the correct method of attaching the wires to the springs (see Appendix F). E2 then demonstrated the correct way to assemble the circuit board by reading the 17 assembly steps from the instruction sheet while pointing to the appropriate parts of a completed board.

Participants were instructed to follow along using their instruction sheets and diagrams. Following the demonstration, E2 read over the additional instructions for attaching wires and for installing pins, washers, and springs. Participants were then randomly assigned to one of four individual rooms for the assembly task. Participants were instructed to take their diagrams and instruction sheets to the rooms with them, and to assemble a circuit board by following the instructions step by step, in numerical order. After 10 min, participants returned to the main room and, to be consistent with the cover story, completed a bogus questionnaire assessing their reactions to the assembly task (see Appendix G). The questionnaire actually served as a filler task, used primarily to further the notion that Study 1 was nearly completed. Upon completion of the questionnaire, E2 thanked participants for their co-operation, and informed them that the first study was over. E2 then turned the session over to E1, went to the individual rooms to gather up the circuit boards, then left the room.

E1 explained that his/her study was an attempt to validate a group administration of a modified mood induction procedure (see Sinclair, Mark, Enzle, Borkovec, & Cumbleton, 1994b for details). After explaining the mood induction procedure, E1 obtained informed consent (see Appendix H). Participants were randomly assigned to either a happy or sad modified Velten (1968) mood induction

procedure. The mood induction consisted of 60 cards containing mood-related statements presented at the rate of one every 15 seconds, followed by a 2-min incubation period (Sinclair et al., 1994b). Following administration of the mood induction procedure, participants completed a mood measure (see Appendix I). The mood measure asked participants to describe how they felt "right now, today" on four 5-point Likert scale items anchored at 1 (strongly disagree) and 5 (strongly agree), with a neutral midpoint of 3 (neither agree nor disagree). The four scale items were 1 (very bad); 2 (very passive); 3 (very good); and 4 (very active). Items 1 and 2 were reverse-scored for all analyses.

Following completion of the mood measure, E1 thanked participants and left the room. E2 then returned, and explained that he/she was also interested in the effects of a time delay on the ability to recall and follow instructions. Participants were informed that they had been assigned to the delayed assembly condition. Participants were asked to return to the rooms that they had been assigned to earlier, and to assemble the boards "as quickly and accurately as possible." During this second assembly period, participants were provided with the written instruction sheet only (no diagrams), and informed that the experimenter would not be able to answer questions or help in any other way. Participants were further informed that if they completed a board before the time was up, they were to set the completed board

outside the door to their room, pick up a new board, and begin assembling the second board, and then on to a third board, if necessary. Participants then assembled the boards for 30 min.

After the second assembly period, participants returned to the main room where suspicion was assessed through a funnel-type debriefing (Page, 1975). They were then exposed to a 10 minute mood restoration using a life events recall task (see Appendix J). Participants were then fully debriefed (see Appendix K for the verbal debriefing and Appendix L for the debriefing handout). No participants were hypothesis suspicious.

Results

Manipulation Check

The mean of the four mood measure items served as an index of current mood with low scores (1) indicating negative affect and high scores (5) indicating positive affect. An internal consistency analysis demonstrated that these items formed an internally consistent index of current mood (Cronbach's alpha = .90). A oneway analysis of variance (ANOVA) performed on the mean of the 4 mood measure items indicated that the mood induction was effective. Happy participants (M = 3.97) reported more positive affect than sad participants (M = 2.08), $F(1, 16) = 43.32$, $p<.0001$.

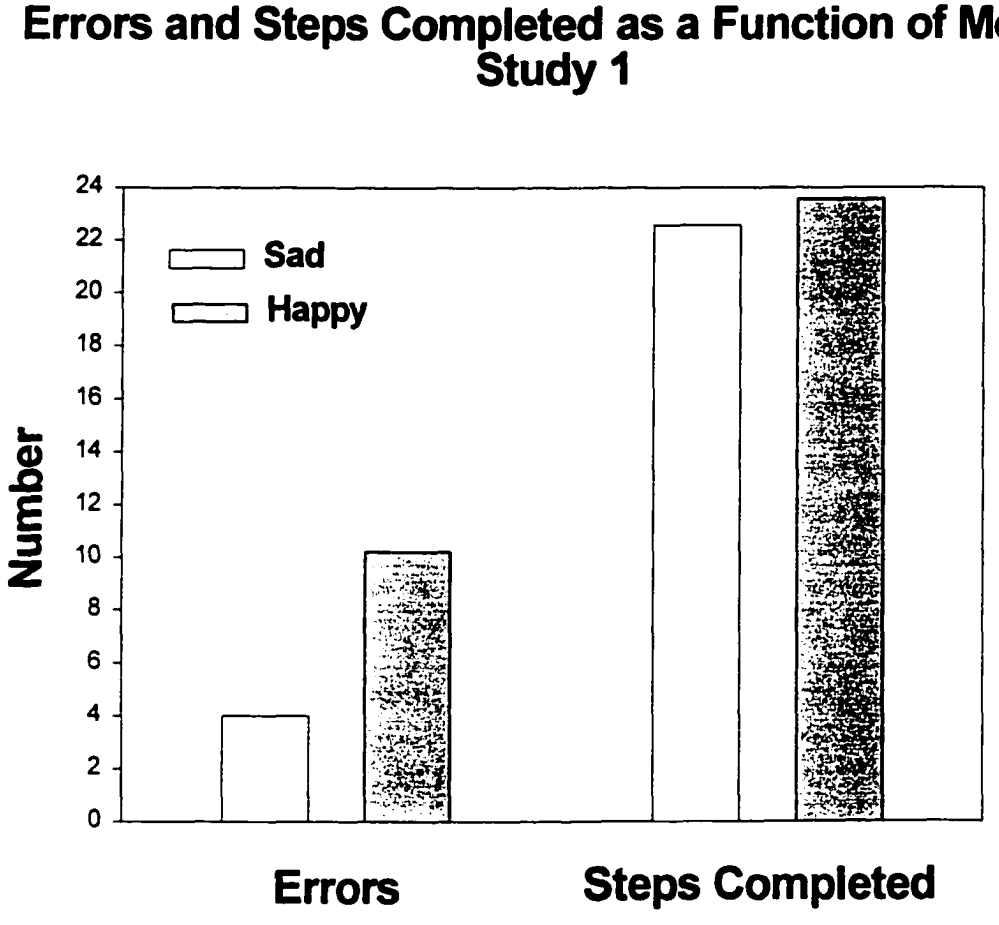
Accuracy and Productivity Measures

The circuit boards were evaluated in terms of the number of steps completed and number of errors committed[1]. A oneway ANOVA performed on the number of errors indicated that, as predicted, sad participants (M = 4.00) made significantly fewer assembly errors than happy participants (M = 10.22), F (1, 16) = 9.50, p < .008. However, there was no speed/accuracy trade-off in performance with the happy participants, as a oneway ANOVA performed on the number of steps completed indicated that the happy (M = 23.56) and sad (M = 22.56) groups did not differ, F (1, 16) = 0.11, ns. The number of errors committed and steps completed for the happy and sad groups are presented in Figure 1. As is apparent from the figure, sad participants display significantly greater accuracy than happy participants, while maintaining the same speed of performance, resulting in greater overall productivity.

Discussion

The results of Study 1 are the first to demonstrate that sad participants are more accurate on a cognitively demanding productivity task than are happy participants, without compromising overall speed of performance. Thus, there was significantly higher productivity in the sad group.

Figure 1. Errors and Steps Completed as a Function of Mood: Study 1.



While the prediction from the outset was that a performance advantage would be demonstrated by the sad group, the magnitude of the performance difference was somewhat of a surprise. Standard mood research using paper and pencil measures typically yields mood-related differences that, while consistent, are subtle. Finding that happy participants made nearly twice as many errors as sad participants led to a need for caution in the interpretation of the results, and replication of these findings was deemed necessary from the outset. Beyond mere replication however was the need to begin searching for factors underlying these performance differences. Of the three processes proposed to underlie processing strategy differences (affect-as-information, mood-maintenance/affect repair, cognitive capacity), the desire for mood maintenance or affect repair emerged as the most likely contributor to these differences. In the case of cognitive capacity, it has been argued that providing happy participants with unlimited time to complete tasks eliminates mood effects (Mackie & Worth, 1989). This would lead one to expect significantly slower performance in the happy group. In the present study, however, speed of performance was not affected by mood state. Neither an affect-as-information nor a mood regulation explanation for these results has, however, been ruled out. Further studies were designed to address these issues.

CHAPTER 3: STUDY TWO

Introduction

Due to the novelty of the findings in Study 1, I believed it would be prudent to first replicate the productivity differences demonstrated, and then to address one possible motivational influence (mood maintenance/affect repair) on performance. The procedure for Study 2 was identical to that of Study 1, except for the inclusion of additional questionnaires given to participants after the second assembly period, assessing participants' perceptions of their performance in terms of speed, accuracy, and overall satisfaction, in addition to ratings of their mood at time 2 (following the 30 min assembly period).

It was expected that, as in Study 1, sad participants would demonstrate greater productivity (i.e., make fewer errors in the same number of steps completed) than happy participants, while completing the same number of steps (thus, no speed-accuracy trade-off). Additionally, I predicted that I would find evidence that one factor underlying these performance differences would be the motivation for mood-maintenance or affect repair (Isen, 1984; Schaller & Cialdini, 1990; Sinclair & Mark, 1992). This motivational explanation is based on the simple premise that people have the desire to experience positive mood states. Thus, when one is experiencing a positive mood, one will try to avoid effortful thinking or distractions that may detract from the positive state. When in a negative mood, one will seek out distractions

that may help alleviate the negativity (often resulting in better, more accurate performance).

If participants are in fact motivated by this desire to achieve positive affect, then one would expect different patterns of reported mood from people, both immediately following a mood induction, and following completion of the task. Previous research examining the duration of experienced affect following exposure to a modified Velten procedure has indicated that both happy and sad groups return to baseline (i.e., scale midpoint) mood levels within 30 minutes following the mood induction (Sinclair et al., 1994b). Thus, if it could be demonstrated that happy participants maintained their positive mood (i.e., their moods did not become more negative), while sad participants' mood rebounded (i.e., their moods became more positive) after 30 minutes, it would lend support to mood-maintenance/affect repair processes as an underlying motivational basis for the performance differences.

The second issue that I wanted to address with this study was participants' perceptions of their performance. The inability to demonstrate a satisfaction-performance link that has plagued researchers for decades may be due in large part to the fact that satisfaction is an affectively-based construct, and that people who are happy with their jobs (i.e., satisfied) may be so precisely because their

job requires little effort or accuracy (Weiss & Cropanzano, 1996). Similarly, people may report dissatisfaction with a job that is too stressful or demanding, but excel all the same. What is needed is a more narrowly defined approach to the issue of job satisfaction, i.e., one that hinges on peoples' perceptions of their actual performance at various facets of the job. If researchers begin to tie perceptions of actual performance more closely to feelings of satisfaction (i.e., being satisfied with a job well done), the relationship between satisfaction and performance may become much clearer. As a result, this study represents a first attempt at disentangling the satisfaction-performance link.

Furthermore, it was expected that sad participants, who are known to be more accurate in their judgments (Schwarz, 1990; Sinclair & Mark, 1992), would report both more positive evaluations of their performance (if in fact it was once again superior to that of happy participants), and greater satisfaction with a job well done, providing evidence against a simple mood-congruence effect on evaluations (see, e.g., Bower, 1981).

Method

Participants

Participants were 24 introductory psychology students at the University of Alberta. All were volunteers who participated in order to fulfill a course requirement.

Procedure

The procedure for Study 2 was identical to that of Study 1, until after completion of the 30 minute assembly period. Following the assembly period, participants were asked to complete two additional questionnaires. The first questionnaire (see Appendix M) contained four items related to participants' perceptions of their performance and of the study itself. The first three items consisted of evaluations of performance and satisfaction, in the form of 7-point Likert scales. These items addressed (1) speed (How quickly do you think you assembled the circuit boards?; anchored at 1 [very slowly] and 7 [very quickly]); (2) accuracy (How accurately do you think you assembled the circuit boards?; anchored at 1 [very inaccurately] and 7 [very accurately]); and (3) satisfaction (How satisfied are you with your performance at the assembly task?; anchored at 1 [very dissatisfied] and 7 [very satisfied]). The fourth item on the questionnaire consisted of an open-ended question designed to assess suspiciousness about the experimental hypotheses (Page, 1975). The second questionnaire was

described to participants as a "Control questionnaire" designed to account for any effects of the mood induction study on the subsequent assembly task. It consisted of the same four mood measure items described in Study 1. No participants were hypothesis suspicious.

Results

Manipulation Check

The mean of the four mood measure items served as an index of current mood with low scores (1) indicating negative affect and high scores (5) indicating positive affect. An internal consistency analysis demonstrated that these items formed an internally consistent index of current mood (Cronbach's alpha = .92). A oneway ANOVA performed on the mean of the 4 mood measure items indicated that the mood induction was effective. Happy participants (M = 4.15) reported more positive affect than did sad participants (M = 1.90), $F(1, 22) = 83.64$, $p<.0001$.

Accuracy and Productivity Measures

The circuit boards were evaluated in terms of the number of steps completed and number of errors committed. A oneway ANOVA performed on the number of errors indicated that, as predicted, sad participants (M = 4.67) made significantly fewer assembly errors than did happy participants (M = 8.75), F (1, 22) = 3.23, $p < .05$. A oneway ANOVA performed on the number of steps completed indicated that, as

in Study 1, there were no difference in the happy (M = 22.58) and sad groups (M = 23.58), F (1, 22) = 0.16, ns. This pattern of results is presented in Figure 2. As is apparent from the figure, sad participants once again outperformed happy participants in terms of accuracy, while maintaining the same level of speed, thus providing a replication of the findings from Study 1.

Mood at Time 2

It was predicted that sad participants would use the assembly task as a means of distracting themselves and engaging in affect repair, thus reporting more positive moods at time 2, whereas happy participants would maintain their moods across time. To test this prediction, participants' mood at time 1 was subtracted from mood at time 2, and a one-way ANOVA was then performed on difference scores for the happy and sad groups. The results of this analysis confirmed my predictions, with sad participants showing an increase in mood from time 1 to time 2 (M = 1.39) and happy participants showing no difference in mood (M = -.28) across time, $F(1,16)^2 = 23.68$, $p < .0002$. This pattern of results is presented in Figure 3. As is apparent from the figure, happy participants maintained their moods across time, whereas sad participants' moods became more positive from time 1 to time 2. This result is consistent with a motivational mood maintenance/affect repair position, in that the sad participants may

Figure 2. Errors and Steps Completed as a Function of Mood: Study 2.

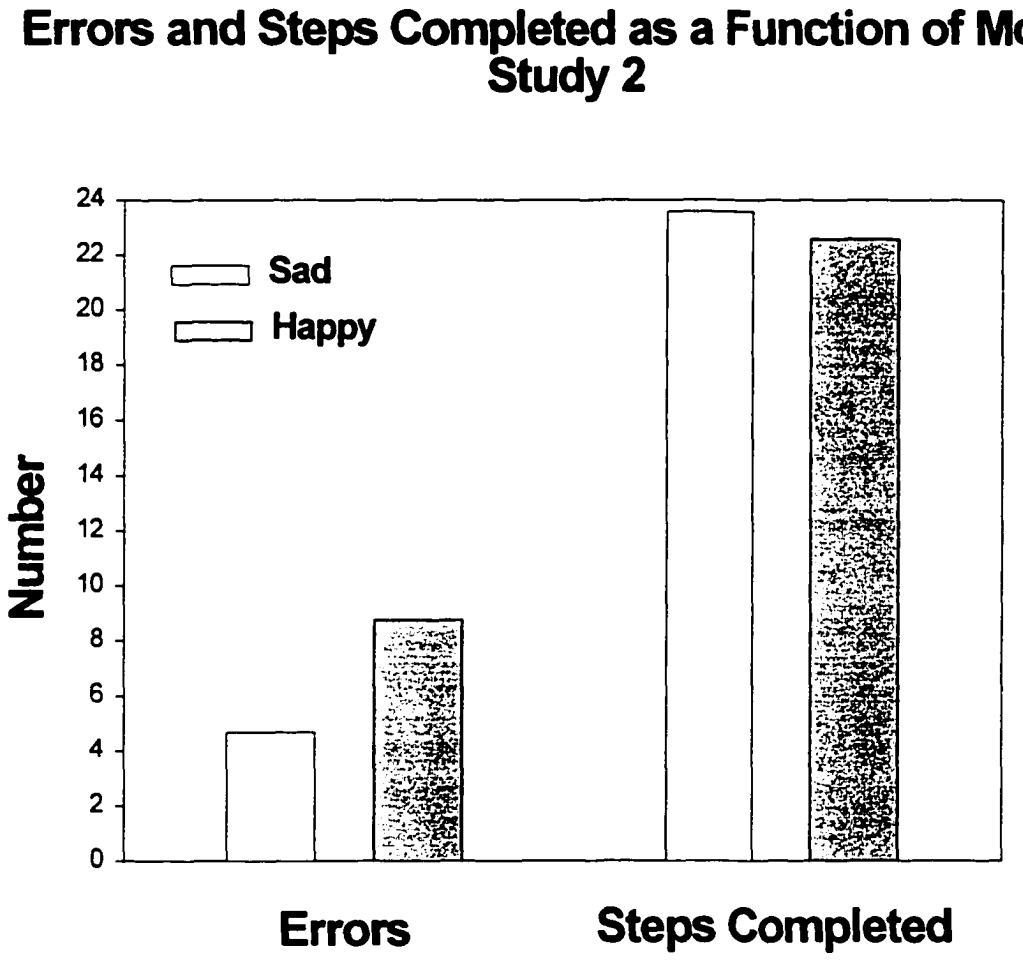
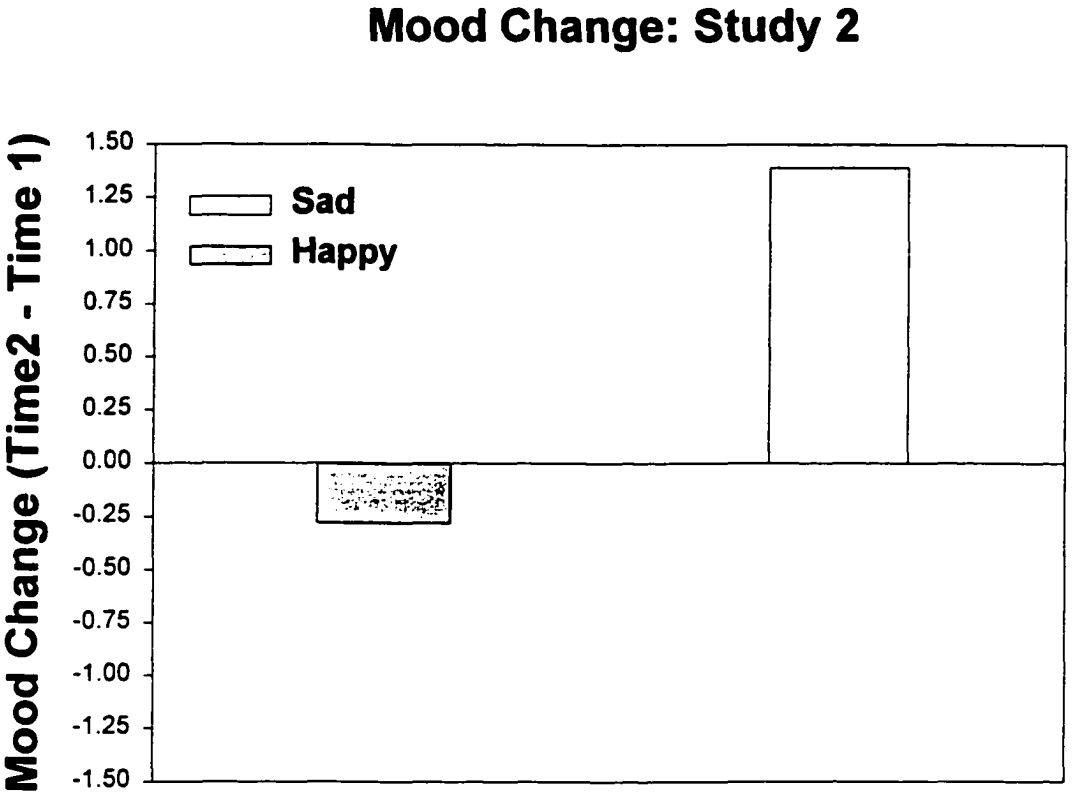


Figure 3. Mood Change: Study 2.



have used the cognitively demanding task as a means of distraction from (and eventual repair of) their negative mood state, while happy participants may have been concentrating more on maintaining their positive mood than on accurate task performance.

Perceptions of Performance

Oneway ANOVAs performed on participants' responses to items assessing perceptions of their performance indicated that sad participants (M = 5.50) rated their performance as more accurate than happy participants (M = 4.33), F (1, 22) = 4.31, p = .05. On the measure of speed, there were no differences in the evaluations of happy (M = 4.17) and sad participants (M = 5.00), F (1, 22) = 2.10, ns. This reflects accurate appraisals from both the happy and sad participants, with the sad participants correctly perceiving more accurate and equally fast performance, and the happy participants displaying awareness of their poorer performance in terms of accuracy but not speed. Consistent with the predictions, on the measure of satisfaction with one's task performance, sad participants (M = 5.58) reported greater satisfaction than did happy participants (M = 4.58), F (1, 22) = 3.16, p < .05.

Discussion

Consistent with my predictions, sad moods once again facilitated greater overall productivity than happy moods, with the sad group performing more accurately while still maintaining a comparable level

of speed with the happy group. While the magnitude of the performance difference was slightly smaller than that of Study 1, I felt it safe to conclude that sad moods do in fact enhance performance of a novel, complex assembly task. More interesting perhaps were the findings regarding participants' perceptions of their performance. Both happy and sad participants were accurate in their assessments of their performance, with sad participants rating their accuracy much higher than happy participants, and no differences in ratings of performance speed. Furthermore, all participants indicated an awareness of this performance difference in terms of ratings of overall satisfaction. The finding that sad participants were more satisfied with their (superior) performance indicates that satisfaction ratings can be an accurate assessment of one's performance, and not merely a mood-congruent response (see e.g., Bower 1981).

CHAPTER 4: STUDY 3

Introduction

Having established and replicated a significant difference in productivity between happy and sad participants and having addressed one possible mechanism underlying the effect, it was now necessary to examine other factors that may mediate the effects of mood on productivity. The informational value of mood states appears to be influenced by attributions about the cause of the mood (Schwarz & Clore, 1983; Sinclair et al., 1994a). The way in which we use our mood states as a source of information depends largely on whether those moods are attributed to internal or external causes. If we attribute moods internally, they are seen as a source of information, but if we attribute moods to an external source, they are no longer informative, and thus do not influence processing. This is of particular importance in workplaces, where attempts are often made to influence employee mood through environmental manipulations, such as office lighting levels (Oldham & Rotchford, 1983), plant density (Larsen et al., 1998), and room color (Ainsworth et al., 1993; Kwallek et al., 1988).

Study 3 was therefore designed to further investigate the informational and motivational implications of mood when that mood is seen as either related or unrelated to task performance. By directly manipulating mood/task relatedness and testing two possible patterns of results, I will be able to demonstrate whether previously observed

performance differences will be either attenuated or reversed, thus providing support for either informational or motivational factors moderating productivity. It was hypothesized that the mood-related performance differences demonstrated previously would be eliminated if the mood state that participants were experiencing was seen as being related to the performance task itself. In this way, sad participants may view the task as a contributing factor to their negative mood, and not a possible source of alleviation and, as a result, expend less effort, resulting in poorer performance. Happy participants, on the other hand, may expend more effort if their positive mood state is seen as related to the performance task, leading to increased performance and greater productivity.

There are two possible outcomes when mood is manipulated so as to be related to the work experience: People will see their mood as externally-influenced and therefore uninformative, or they will see the mood as being tied to task performance, thus the mood state will have direct motivational implications. These two outcomes would result in slightly different patterns of effects on performance. When mood and task are unrelated, one would expect exactly the same mood-related performance differences as in Studies 1 and 2, as this condition is essentially the same in design as the two previous studies. When mood and task are related, however, one of two possible patterns of

performance might emerge. From a straight motivational perspective, one would expect a complete reversal in performance, i.e., happy people would see the task in a positive light and sad people would see it in a negative light, thus the happy group would outperform the sad group. From an affect-as-information perspective, one would expect the mood state to be uninformative when it is attributed to the task at hand, thus one would expect an attenuation of typical mood-related performance differences.

Recall that in Study 2, participants in the sad condition rated their performance as equally fast, more accurate, and more satisfying than the performance ratings of happy participants. In that study, performance of the task and mood state were always unrelated. Another issue I now wanted to address whether perceptions of performance would be affected when the mood and task were related to one another. The possibility existed that participants might respond in a mood-congruent manner when mood and task were related, with happy participants rating their performance more favorably than sad participants, simply because the task was viewed more positively. Similarly, I needed to address participants' satisfaction with their performance, and if the greater satisfaction previously displayed by sad participants would be alleviated once mood and task were related.

Method

Participants

Participants were 36 introductory psychology students from the University of Alberta. All were volunteers who participated in order to receive course credit. An additional 6 participants inappropriately participated and were not included because they had participated in other mood studies.

Procedure

Participants, who were run individually, were randomly assigned to one of two mood induction conditions (happy, sad) and one of two relatedness conditions (mood and task related, mood and task unrelated). A copy of the related condition script is presented in Appendix N. A copy of the unrelated condition script is presented in Appendix O.

Participants, who were run individually, were either greeted by one (related condition) or two (unrelated condition) experimenters. Participants read and signed two consent forms at various times throughout the session (see Appendix P for the consent forms for the related condition and Appendix Q for the consent forms for the unrelated condition; see the scripts for the exact timing of consent form presentation). The unrelated condition was structured similarly to the scenario in Studies 1 and 2. Using an unrelated second-study

paradigm, the researchers explained to participants that they would be running two separate studies during the experimental session. One study involved attempting to collect Canadian norms for a new mood induction procedure, while the other study was concerned with memory for instructions. After holding a (rigged) random draw, the experimenter for the memory and instructions study began the session. In the related condition, the (single) experimenter explained that the study was concerned with the effects of mood on memory for instructions. For both related and unrelated conditions, participants were provided with a set of written instructions and diagrams, and shown a demonstration of how to assemble a circuit board. They then spent 10 min assembling a board (practice period). Following the practice board, participants completed a questionnaire (actually the filler task used in Studies 1 and 2) assessing their reactions to the assembly task. At this point, the experimenter in the unrelated condition informed participants that his/her study was over, and turned the session over to the second experimenter. Participants in the related condition were told that the first part of the study was over, and that the mood induction portion would begin. In both conditions, the experimenter then obtained informed consent for the mood induction procedure. Participants were then exposed to either a happy or sad modified Velten (1968) procedure (Sinclair et al., 1994b), and completed a mood measure (see Appendix

R), that asked participants to rate their immediate feelings on four 7-point bipolar items (happy--sad, good--bad, active--passive, and anxious--calm). In the unrelated condition, the first experimenter then returned, and informed participants that one of the things he/she was interested in was the effects of a time delay on people's ability to follow instructions. As a result, participants would spend an additional 20 minutes assembling circuit boards. Participants in the related condition were informed that the researcher wanted to see how well they could remember the assembly instructions, so participants were to spend another 20 min assembling circuit boards, this time with only written instructions (no diagrams). Following the second assembly period, participants completed a questionnaire assessing their perceptions of their performance. The first two items asked participants to rate the speed and accuracy of their performance on scales anchored at (1) very slowly and (7) very quickly; and (1) very inaccurately and (7) very accurately. The third item asked participants to rate their satisfaction with their performance on a scale from (1) very dissatisfied to (7) very satisfied. Upon completion of the questionnaire, the experimenter informed participants that the psychology department was conducting a survey of all research participants, as part of a "research restructuring" initiative in the department. The "restructuring" questionnaire (see Appendix S) allowed the opportunity

to unobtrusively conduct a manipulation check on relatedness of mood and task, and also to assess participants' perceptions of the research experience, and their current mood state. Participants were instructed to provide information to the Psychology Department about the study (related condition) or studies (unrelated condition) in which they had just participated. In the related condition, participants indicated how related they thought the experimental *tasks* were during the session (i.e., the mood induction and the assembly task); while in the unrelated condition, participants indicated how related they thought the two *studies* were during the session (i.e., the mood study and the assembly study). Both measures were in the form of 5-point Likert scales anchored at (1) not at all related, and (5) highly related. Participants then completed a second measure of current mood state. The measure consisted of two 5-point Likert scales anchored at (1) very sad -- (5) very happy, and (1) very active -- (5) very passive. Item 2 was reverse scored for all analyses. The final item on the survey was an open-ended question that assessed suspicion about the true hypotheses of the study. Upon completion of the departmental questionnaire, sad participants underwent a mood restoration in the form of a happy life events recall, and all participants were verbally debriefed (see Appendix T) and given a handout debriefing.

Results

Manipulation Checks

Mood Measure. The mean of the four mood measure items (with items 1 and 4 reverse scored for all analyses) served as an index of current mood with low scores (1) indicating negative affect and high scores (7) indicating positive affect. An internal consistency analysis demonstrated that these items formed an internally consistent index of current mood (Cronbach's alpha = .88). A 2 (Mood: Happy vs. Sad) X 2 (Relatedness: Related vs. Unrelated) ANOVA performed on the mood measure indicated that the mood induction was effective, with happy participants (M = 5.11) reporting more positive affect than sad participants (M = 2.69), $F(1, 31) = 94.72$, $p<.0001$. There was no main effect of relatedness nor a mood x relatedness interaction.

Relatedness Measure. The relatedness item served as a measure of how related participants thought the mood and task were, with low scores (1) indicating low perceived relatedness and high scores (5) indicating high perceived relatedness. A 2 (Mood: Happy vs. Sad) X 2 (Relatedness: Related vs. Unrelated) ANOVA performed on the relatedness item indicated that the relatedness manipulation was effective, with participants in the related condition perceiving the two tasks as highly related (M = 4.06) and participants in the unrelated condition perceiving that the two tasks were unrelated (M = 1.71),

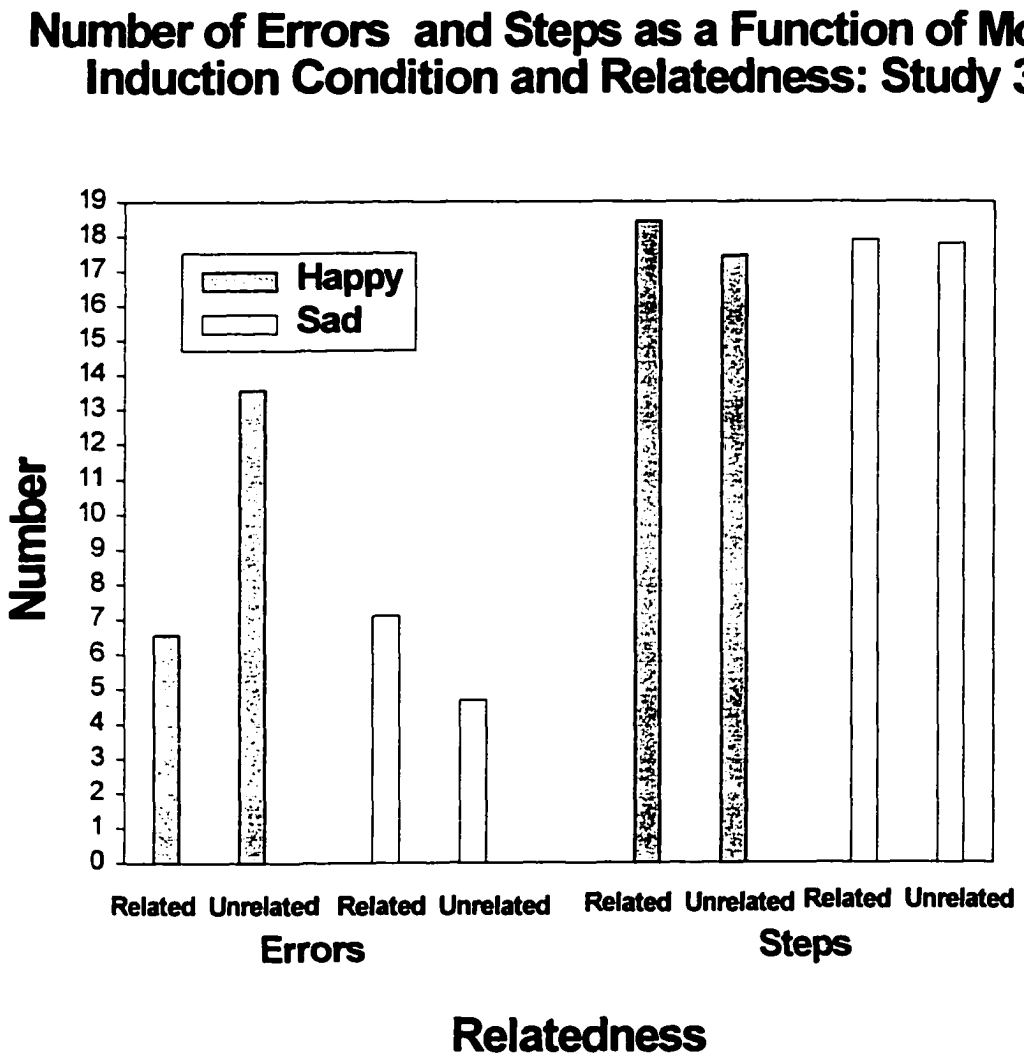
$F(1,29)^3 = 49.67$, $p<.0001$. There was no main effect of mood nor a mood x relatedness interaction.

Accuracy and Productivity Measures

The circuit boards were evaluated in terms of the number of steps completed and number of errors committed[4]. Total number of errors served as the dependent measure in a single orthogonal contrast. The contrast weights were 0, 1, 0, -1 for the happy-related, happy-unrelated, sad-related, and sad-unrelated groups, respectively, reflecting a pattern whereby we expected the typical mood-related differences to be attenuated in the related condition (i.e., happy and sad groups to perform equally well), but the happy group to significantly underperform (i.e., make more errors) and the sad group to perform well (i.e., make fewer errors) in the unrelated condition. The predicted pattern of effects was significant, F (1,32) = 9.26, $p<.005$. The pattern of this interaction is presented in Figure 4. As is apparent from the figure, participants in the happy-unrelated (13.56) condition committed the most errors, participants in the sad-unrelated (4.67) condition committed the least errors, while happy-related (M = 6.56) and sad-related (M = 7.11) conditions fell in the middle.

In order to more directly compare the proposed patterns of results, I conducted a 2 (Mood: Happy vs. Sad) X 2 (Relatedness: Related vs. Unrelated) ANOVA on the number of errors. The traditional

Figure 4. Number of Errors and Steps as a Function of Mood Induction Condition and Relatedness: Study 3



ANOVA would correspond to a pattern of results indicating that mood-task relatedness led to increased motivation to perform better in the happy-related condition, and less motivation (thus poorer performance) in the sad-related condition, i.e., a simple crossover interaction. The results of the ANOVA demonstrated a significant effect for mood, with happy participants (M = 10.06) committing more errors than sad participants (M = 5.89), F (1,32) = 4.07, $p < .05$. This main effect occurred in the context of a significant Mood X Relatedness interaction, F (1,32) = 5.52, $p < .03$. A comparison of the effect sizes for both the planned contrast and the traditional ANOVA indicated that the contrast pattern (i.e., no differences in performance for the related groups, typical mood-related difference in the unrelated groups) effect size (Rosnow, Rosenthal, & Rubin, 2000; r = .46) provided a better fit with the data than the traditional crossover pattern (r = .35), although both effect sizes were relatively large.

A 2 (Mood: Happy vs. Sad) X 2 (Relatedness: Related vs. Unrelated) analysis of variance (ANOVA) performed on the number of steps indicated that, once again, there were no main effects nor interactions on the number of steps completed. The mean number of steps completed is included in Figure 4.

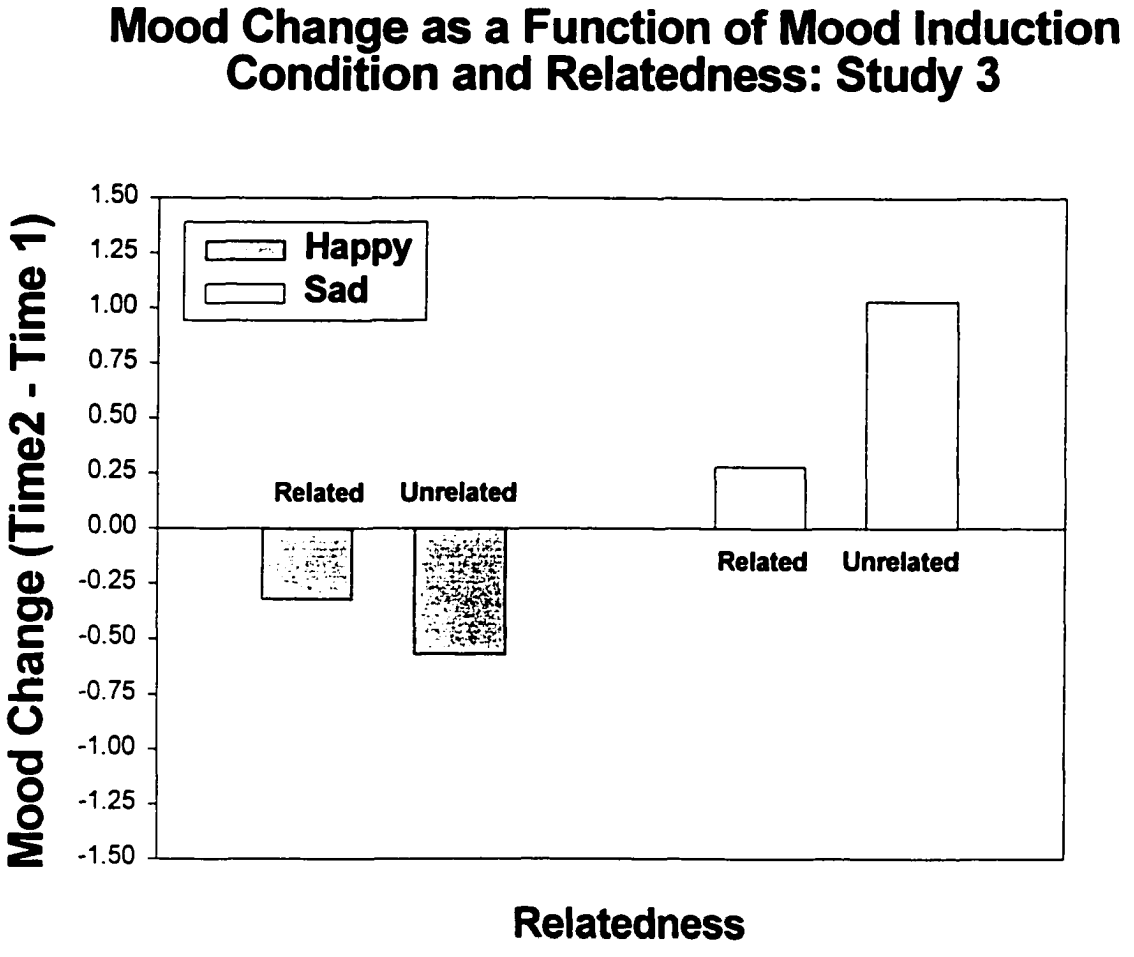
Mood at Time 2

The mean of the two mood measure items served as an index of current mood with low scores (1) indicating negative affect and high scores (5) indicating positive affect. An internal consistency analysis demonstrated that these items formed a moderately internally consistent index of current mood (Cronbach's alpha = .68). Because the scale of the items on this mood measure differed from the scale of the mood measure at Time 1 (a 5-point scale vs. a 7-point scale), scores on both measure were standardized. A difference score was then calculated on these transformed scores by subtracting mood at Time 1 from mood at Time 2. It was predicted that changes in mood from Time 1 to Time 2 would be a function of both mood condition and relatedness, with sad participants showing the most improvement in mood in the unrelated condition, and no mood change in the related condition. Happy participants were expected to maintain their mood in both relatedness conditions. It was predicted that sad participants would use the assembly task as a means of distracting themselves and engaging in affect repair only when the mood and task were unrelated to one another, whereas happy participants would strive for mood maintenance irrespective of relatedness. This prediction was confirmed through a planned contrast with weights of -1, -1, -1, 3 for the happy-related, happy-unrelated, sad-related, and sad-unrelated groups

respectively conducted on the difference scores. The results of the contrast confirmed my predictions, with little change in mood for the happy-related (M = -.32) happy-unrelated (M = -.57) and sad-related (M = .28) groups, and significantly more positive mood at time 2 in the sad-unrelated group (M = 1.03), F(1, 32) = 19.98, p < .0001. This pattern of results is presented in Figure 5. As is apparent from the figure, happy participants maintained their moods across time whereas sad participants' moods became more positive only when mood and task were unrelated.

While the predicted contrast is significant, it seems apparent from viewing the figure that perhaps the pattern of mood change over time does not correspond precisely with the predicted pattern. To address this, a 2 (Mood: Happy vs. Sad) X 2 (Relatedness: Related vs. Unrelated) ANOVA was conducted on the difference scores. The results of the ANOVA indicated a Mood X Relatedness interaction, F (1,32) = 8.90, p < .0001. Fisher's LSD indicated that the sad unrelated group differed from the other three groups at the p < .05 level (as expected), but that the sad related group also differed from the happy-unrelated group at the p <.05 level. Thus, while it is obvious that there was a significant improvement in mood state in the sad unrelated group, the other groups showed slightly more mood change than expected. It

Figure 5. Mood Change as a Function of Mood Induction Condition and Relatedness: Study 3



should be noted, however, that the contrast does, in fact, fit the data to a better degree than does the standard ANOVA.

Perceptions of Performance

Participants ratings of speed, accuracy, and satisfaction with their task performance were subjected to a series of 2 (Mood: Happy vs. Sad) X 2 (Relatedness: Related vs. Unrelated) ANOVAs. Results of the analyses indicated that there were no main effects nor interactions on the ratings of either speed or accuracy. Thus, both happy and sad participants in both the related and unrelated conditions rated their performance as being equally fast and accurate. There was, however, a significant main effect for relatedness on ratings of satisfaction, with participants in the related condition (M = 5.11) reporting significantly greater satisfaction than those in the unrelated condition (M = 4.22), F (1, 32) = 5.02, $p < .03$. This main effect occurred within the context of a marginal mood X relatedness interaction, F (1, 32) = 3.84, $p < .06$. Participants in the happy-related condition reported the highest level of satisfaction (M = 5.44), while participants in the other three conditions reported moderate satisfaction with their performance (M's = 3.78, 4.78, and 4.67 for the happy-unrelated, sad-related, and sad-unrelated groups, respectively). Fisher's LSD tests performed on the four means indicated that only the happy related condition differed from the other three conditions at the $p < .05$ level.

Discussion

The results from Study 3 lend support to the operation of affect-as-information processes underlying mood-related productivity. These results, however, should be viewed cautiously, as an alternative explanation (i.e., the direct motivational implications of mood and task relatedness) was not excluded as a contributing factor to the performance differences. Ideally, one would have hoped for results that more conclusively supported one process over the other, however, these data might be interpreted as evidence for the operation of dual (or perhaps even multiple) processes operating simultaneously.

A dual-process model of the effects of mood on productivity must examine two main contributing factors: an informational influence (through affect-as-information) and a motivational influence (through the desire for mood maintenance or affect repair). One goal for future research in this area should be to further explore an additive model addressing the differential impact of these two processes on productivity.

The finding that the desire for mood maintenance only emerged for sad participants in the unrelated condition could lend support to either informational or motivational processes underlying performance. One explanation for this finding would be that the sad participants in the related condition realized that their mood state was situationally-

driven, and that it served no informational purpose with regard to task performance. Consequently, their task performance was worse, and did not lead to a change in subsequent mood. An alternative explanation (and one that might be more likely) is that participants in the sad-related condition saw the task as a contributing factor to their negative state, and thus believed that the task could not offer the chance for mood regulation or affect repair. This in turn led to poorer performance and no change in mood state. For the happy groups, there was evidence that they were motivated to maintain their positive mood states, but the happy-unrelated group appeared to maintain their mood to a lesser extent from Time 1 to Time 2. This is further reflected in the happy-unrelated group's reported satisfaction, which was significantly lower than the happy-related group's satisfaction. The evidence suggests that performance satisfaction for happy people is much more contingent on mood-task relatedness than it is for sad people. Recall that in Study 2, sad people expressed greatest satisfaction when mood and task were unrelated. The findings from this study indicate that such a satisfaction advantage for sad people is eliminated when happy people see their mood as being related to the task.

The results from this study with regard to the impact of informational functions of mood were mixed. The evidence for motivational factors, however, once again appeared in this study. For

the purposes of the present research, it was determined that a final study was needed to further address the influence of both mood and mood-related motivational processes on productivity. These processes are the focus of the fourth and final study in this series, discussed in Chapter Five.

CHAPTER 5: STUDY FOUR

Introduction

While Study 2 provided some evidence for the operation of mood-maintenance/affect repair processes underlying performance, a more direct test of these motivational processes was necessary. Recall that in Study 2, I compared participants' mood state immediately following the mood induction with their mood following the assembly task, and found evidence that sad peoples' mood had rebounded while happy peoples' moods had remained constant. This lends support to the operation of mood-maintenance and affect repair processes, but further evidence was deemed necessary to more directly test this process.

Because the desired outcome of both mood-maintenance and affect repair processes is a positive mood state, I decided to examine the effects of differential expectancies about the potential hedonic consequences of a task on actual task performance. If my hypotheses are correct, then mood-related differences in task performance (i.e., productivity) should be mediated by participants' expectancies about whether or not the task will eventually lead to a positive mood state.

Previous research (Hirt, Melton, McDonald, & Harackiewicz, 1996; Martin, Ward, Achee, & Wyer, 1993; Murray et al., 1990) suggests that when happy people find tasks enjoyable, they exert more effort in performing the task. The premise behind this line of research comes from Martin, Ward, Achee and Wyer's (1993) stop-rules

explanation of mood-related processing differences. The stop rules position argues that people approach tasks with one of two processing goals: performance-based, or enjoyment-based. Thus, people will continue performance of a task if it meets their particular processing goal. If the goal is performance-based, a person will persist until they feel they have done enough, whereas if the goal is enjoyment-based, a person will persist until they no longer enjoy performing the task. Martin et al found that happy people will exert more effort when given an enjoyment-based stop rule, while sad people persist longer when given a performance-based stop rule. Similarly, Hirt et al. (1996) had participants in happy, sad, or neutral moods generate lists of similarities and differences between various television programs, using either performance-based, enjoyment-based, or no stop rules. They found that when happy participants used an enjoyment-based stop rule, they persisted longer at the task, and generated longer, more creative lists. Sad participants ended task performance sooner when in the enjoyment-based condition. While neither Hirt et al. nor Martin et al. actually manipulated task enjoyment (or prior expectancies about how enjoyable the task would be), it seems reasonable to assume that happy participants in their studies did in fact enjoy the task more (and approach the task with more favorable expectations) than did sad participants, due to a simple mood-congruence effect (Bower, 1981).

If the stop rules explanation is to be applied to the current research, one could fairly assume that happy participants would produce more (i.e., complete more steps) when they find the task enjoyable. The findings from the first three studies would seem to argue against such an explanation, in that no differences in the number of steps completed were found. A more direct test, then, of both mood-maintenance/affect repair processes, as well as possible stop-rule differences, would be provided, if participants were provided with an expectancy about task enjoyment, prior to task completion.

In Study 4, participants were randomly assigned to one of two mood conditions (happy vs sad), and assembled circuit boards after receiving one of three expectancies (mood-maintaining, mood-attenuating, no expectancy) about the task. Guided by the results of Study 2, and in anticipation of a mood-maintenance/affect repair process underlying performance, I expected that for participants in happy moods, performance would be best (i.e., the least errors) in the mood-maintaining expectancy condition, worst (i.e., the most errors) in the mood-attenuating condition, with no expectancy falling between the other two conditions. The reverse pattern of effects was expected for sad participants, with greatest performance in the mood-attenuating condition, worst performance in the mood-maintaining condition, and no expectancy again falling in the middle. As in the previous three

studies, I predicted no difference in the number of steps completed. This pattern of results would argue against a stop-rules explanation, in which one would expect an effect of the expectancy manipulation on the number of steps completed.

Method

Participants

Participants were 96 introductory psychology students at the University of Alberta. All were volunteers who participated in order to fulfill a course requirement.

Procedure

Participants were run individually, by a single experimenter. Participants were told that the study was addressing the effects of mood on three types of memory: procedural, semantic, and autobiographical (a copy of the experimental script is presented in Appendix U). They were told that they would be asked to perform a number of memory tasks and undergo a mood induction. They were then told that the experimenters were not sure what specific effects (if any) mood would have on the various tasks, so that any further discussion of the hypotheses would be delayed until the debriefing. The experimenter briefly described procedural, semantic, and autobiographical memory, and informed participants that they might be asked to study lists of words, learn a procedural task, or recall

events from their lives. Participants completed an informed consent form (see Appendix V) and were then given a word list, and asked to circle 6 words on the list that related to animals (see Appendix W). The word list was actually a distractor task designed to lend credibility to the notion that the experimenters were interested in memory processes, and to deter suspicion about the true nature of the experiment. The experimenter then demonstrated the procedure for assembling the circuit boards, as described in Study 1. However, in the present study, participants were not provided with a practice period following the demonstration, so that they would have no prior experience with the assembly task, and would be less likely to have expectations about how enjoyable they would find the task. After the assembly demonstration, participants were randomly assigned to either a happy or sad modified Velten procedure (Sinclair et al., 1994b). Following the mood induction, participants completed the 4-item mood measure described in Study 3. Items 1 and 4 were reverse scored for all analyses.

Following the mood measure, participants were told that they had been randomly assigned to complete the procedural memory task first (i.e., to spend 20 min in a private room assembling the circuit boards) and given one of three expectancies about the assembly task. They were either told that the task would not interfere with their current mood (mood maintaining condition), would interfere with their

current mood (mood attenuating condition) or were not told about any effects of the task on their mood (no expectancy). The expectancy manipulations were as follows for the four conditions: Happy-maintaining: "Because pilot tests have indicated that people tend to enjoy our assembly task, it won't interfere with your current mood state." Happy-attenuating: "Because pilot tests have indicated that people tend not to enjoy our assembly task, it will interfere with your current mood state." Sad-maintaining: "Because pilot tests have indicated that people tend not to enjoy our assembly task, it won't interfere with your current mood state." Sad-attenuating: "Because pilot tests have indicated that people tend to enjoy our assembly task, it will interfere with your current mood state."

Participants were then instructed to complete the board as quickly and accurately as possible, with no help from the experimenter. After the assembly period, participants returned to the main experimental room, and completed a questionnaire (see Appendix X) assessing their current mood, reactions to the assembly task, and suspicion about the true hypotheses of the study. The first three items on the questionnaire consisted of the speed, accuracy, and satisfaction questions described in Study 2. The fourth question was "How enjoyable was the assembly task?," anchored at 1 (not at all enjoyable) and 7 (very enjoyable). Question 5 asked participants to rate the extent

to which they believed their performance was affected by each of four factors (ability, effort, mood, and gender) on 7-point scales anchored at 1(no influence at all) and 7 (a significant influence). The final page of the questionnaire assessed suspiciousness, and contained a follow-up mood measure that consisted of items 1 and 4 from the earlier mood measure. Upon completion of the questionnaire, happy participants were informed that the study was over, and were debriefed. Participants in the sad conditions underwent a mood restoration using a life events recall, and were then orally debriefed and given a written debriefing. The verbal debriefing is presented in Appendix Y. No participants were hypothesis suspicious.

Results

Manipulation Check

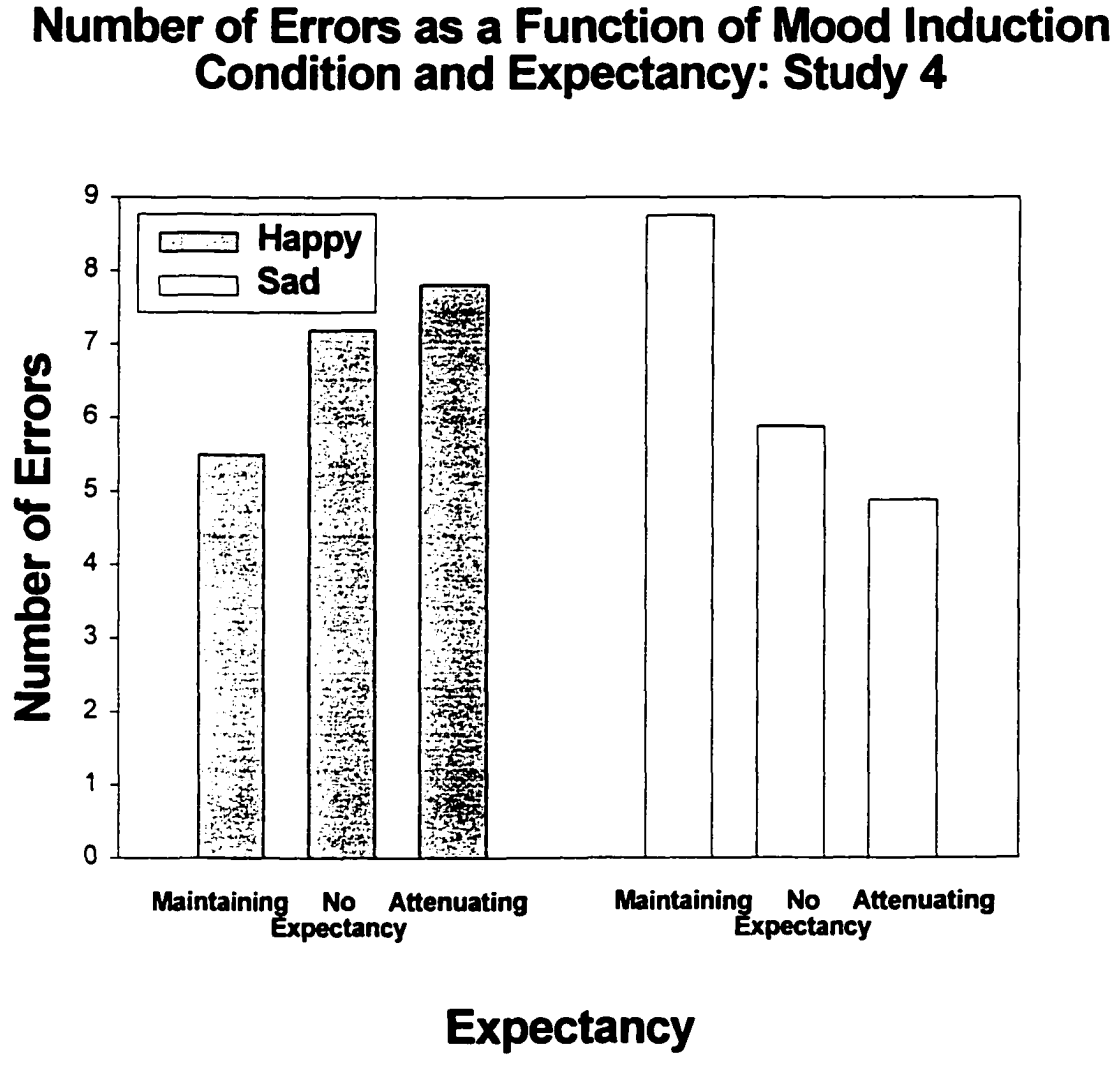
The mean of the four mood measure items served as an index of current mood with low scores (1) indicating negative affect and high scores (7) indicating positive affect. An internal consistency analysis demonstrated that these items formed an internally consistent index of current mood (Cronbach's alpha = .93). A 2 (Mood: Happy vs. Sad) X 3 (Expectancy: Consistent, Inconsistent, or No Expectancy) ANOVA performed on the mood measure indicated that the mood induction was effective, with happy participants (M = 5.37) reported more positive affect than sad participants (M = 2.63), $F(1, 90) = 182.87$, $p<.0001$.

There was no main effect for expectancy nor a mood x expectancy interaction.

Accuracy and Productivity Measures

The circuit boards were evaluated in terms of the number of steps completed and number of errors committed. Total number of errors served as the dependent measure in a single orthogonal contrast, with weights of -1, 1, 0, 1, -1, and 0, for the happy-maintaining, happy-attenuating, happy-no expectancy, sad-maintaining, sad-attenuating, and sad no-expectancy conditions, respectively. This predicted pattern of results corresponds to my predictions that performance would be best (i.e., fewest errors) in the groups that were led to believe that task completion would lead to a positive mood state (i.e., the happy-maintaining and sad-attenuating groups), while performance would be worst for those who were led to believe that completion of the task would lead to a negative mood state (i.e., happy-attenuating and sad-maintaining). The no expectancy groups should display the same pattern as found in the related condition in Study 3 (i.e., the happy and sad groups should show no performance differences and should fall between the other means). The predicted pattern of effects was significant, F (1,90) = 9.08, p<.005, and is presented in Figure 6. As is apparent from the figure, participants in the happy-maintaining (M = 5.50) and sad-attenuating (M = 4.88)

Figure 6. Number of Errors as a Function of Mood Induction Condition and Expectancy: Study 4.



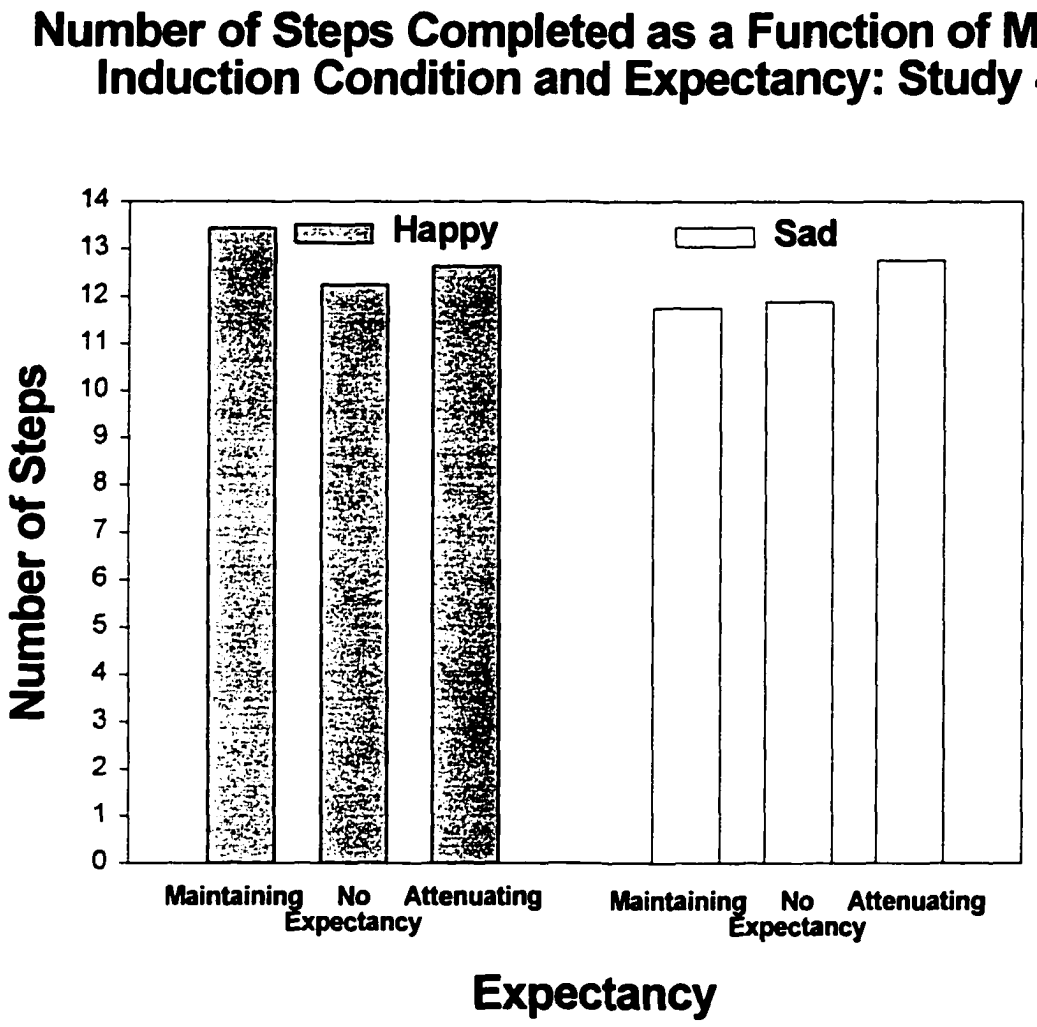
conditions committed the fewest errors, while participants in the happy-attenuating (M = 7.81) and sad-maintaining (M = 8.75) conditions committed the most errors. The no expectancy control groups fell in the middle (M's = 7.19 and 5.88, for happy and sad groups respectively).

A 2 (Mood: Happy vs. Sad) X 3 (Expectancy: Maintaining, Attenuating, or No Expectancy) ANOVA performed on the number of number of steps indicated once again that there were no differences in the number of steps completed by the happy and sad groups, and that there were no interactions involving steps completed. The means for the number of steps completed are presented in Figure 7.

Mood at Time 2

The mean of the two follow-up mood measure items served as an index of current mood with low scores (1) indicating negative affect and high scores (7) indicating positive affect. An internal consistency analysis demonstrated that these items formed an internally consistent index of current mood (Cronbach's alpha = .94). It was predicted that changes in mood from Time 1 to Time 2 would be a function of both mood condition and expectancy, with sad participants showing the most improvement in mood in the mood attenuating condition, least improvement in the mood maintaining condition, and the no expectancy condition falling in the middle.

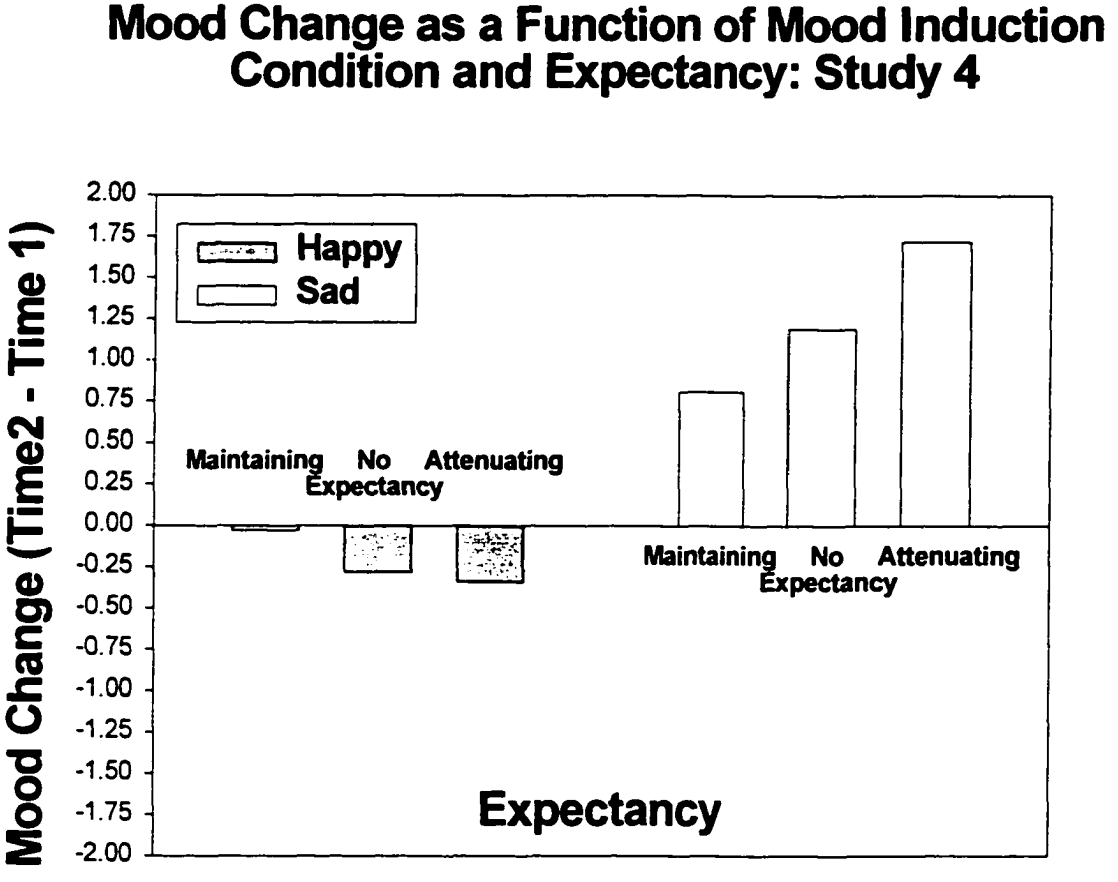
Figure 7. Number of Steps Completed as a Function of Mood Induction Condition and Expectancy: Study 4.



The reverse pattern of effects was predicted for happy participants: the largest decrease in positive mood was predicted for the happy mood attenuating condition, the smallest difference was predicted for the happy mood-maintaining condition, and the no expectancy group was expected to fall in the middle.

This prediction was confirmed through a planned contrast with weights of 0, -2, -1, 0, 2, 1 for the happy-maintaining, happy-attenuating, happy-no expectancy, sad-maintaining, sad-attenuating, and sad-no expectancy groups, respectively, conducted on the difference scores (calculated as mood at Time 2 minus mood at Time 1). The results of the contrast confirmed our predicted pattern, F (1,90) = 51.24, $p < .0001$, and is presented in Figure 8. As is apparent from the figure, happy participants showed a small decrease in moods over time, (M's = -.03, -.28, and -.34 for the maintaining, no expectancy, and attenuating conditions, respectively), while sad participants' moods became most positive in the mood-attenuating condition (M = 1.72), with less improvement in the no expectancy (M = 1.19) and mood-maintaining (M = .81) conditions. I should note that this effect also supports the validity of the mood and expectancy manipulations, in that the happy and sad maintaining groups maintained their moods to the greatest degree, and the happy and sad attenuating groups showed the greatest change in mood (the no expectancy groups fell in between).

Figure 8. Mood Change as a Function of Mood Induction Condition and Expectancy: Study 4.



Perceptions of Performance

Participants ratings of speed, accuracy, satisfaction with and enjoyment of their task performance were subjected to a series of 2 (Mood: Happy vs. Sad) X 3 (Expectancy: Maintaining, Attenuating, or No Expectancy) ANOVAs. The results of the analyses indicated a marginal main effect for mood on ratings of speed, with happy participants (M = 3.17) rating their performance as faster than sad participants (M = 2.71), F (1,90) = 3.06, $p < .08$. There were no main effects or interactions on ratings of accuracy. In terms of ratings of satisfaction, there was a main effect of mood, with happy participants (M = 4.29) reporting greater satisfaction with their performance than sad participants (M = 3.25), F (1,90) = 10.53, $p < .002$. Participants' ratings of task enjoyment provided an interesting finding, in that only a main effect for mood emerged. Happy participants (M = 4.64) rated the task as significantly more enjoyable than did sad participants (M = 3.81), regardless of expectancy condition, F (1,90) = 5.77, $p < .02$. While this may appear to be a failure in the expectancy manipulation, recall that the manipulation was designed to trigger expectancies prior to engaging in the task. Apparently, upon completion of the task, participants were responding in a more mood congruent pattern (cf. Bower, 1981) when asked about actual task enjoyment.

Discussion

Study 4 provided additional evidence for the operation of mood-regulatory processes underlying mood related effects on performance. As predicted, performance was best for those who believed that the task would lead to a positive mood state, and worst for those who believed the task would lead to a negative mood state. These effects occurred regardless of the mood state experienced by participants. Thus, this refutes the notion that either happy or sad workers are superior in terms of productivity. Rather, the findings from this study would indicate that, as long as a person believes that completion of a task will lead to hedonic benefits, how they are currently feeling is irrelevant, at least if the measure of concern is eventual task performance.

These findings lend support to motivational properties as a significant factor in understanding mood-related effects. The results from this study lend direct support to the operation of mood-regulation as a mediator of typical mood-related processing differences. These findings do not, however, conclusively support either a Hedonic Contingency explanation, nor a Negative State Relief explanation, in that the hedonic consequences of the task appeared to be equally relevant to people in happy and sad states. Wegener and Petty (1994) have argued that hedonic concerns are of particular importance to happy people, but other factors such as task interest may be more

relevant to sad people. In the present study, it appears that *beliefs* about task enjoyment were crucial to the performance of the task for both happy and sad people, in spite of the fact that in subsequent ratings of actual task enjoyment, happy people indicated much greater enjoyment than did sad people. These findings also do not support a stop-rules explanation, given that, consistent with predictions, neither mood nor expectancy had an effect on the number of steps completed.

CHAPTER 6: GENERAL DISCUSSION

Summary of Results

The four studies outlined here have provided the basic groundwork for better understanding the complex effects of mood on productivity, and the processes that underlie those effects. The first two studies provided evidence to counter the prevailing notion that positive mood states provide unrivaled superiority in performance and productivity. For at least some tasks, specifically those that (1) are novel; and (2) require considerable cognitive effort, there is now a demonstrated advantage for negative mood states on productivity. Studies 3 and 4 provided more evidence for two particular processes underlying these mood-related performance differences: informational processes and motivational processes.

Together, these results provide an important new link between research on the effects of mood and judgment and the research on productivity in the workplace. They represent one of the first examples of a systematic program of research designed to address theories of mood-related processing with applied dependent measures. This research is best viewed as an initial step, and will point the way to new avenues of research, particularly those concerned with the complex interplay between mood, expectancies about the hedonic consequences of tasks, and environmental influences on mood and performance. Furthermore, the results from Study 2 provided some rationale for

explaining these differences in performance. The motivation for mood maintenance among happy participants appears to contribute to their poorer performance, while the desire for affect repair appears to lead to the superior performance of sad participants. Finally, Study 3 provided evidence for both informational and motivational factors, while Study 4 directly tested and found support for the operation of one particular motivational factor underlying performance (i.e., perceived hedonic consequences).

Interestingly, this research failed to provide any conclusive evidence supporting either a Hedonic Contingency (Wegener & Petty, 1994) or a Negative State Relief (Cialdini & Kenrick, 1976) explanation for mood regulation over one another. Instead, my findings appear to suggest that the desire for mood regulation is experienced by both happy and sad people. The key, it appears, is that the person (regardless of mood state) must believe that the potential for mood regulation exists, i.e., that they will be able to either maintain their positive state, or reduce their negative state. This was suggested first in Study 2, which provided evidence that both the happy and sad groups were motivated by the desire to achieve a positive mood state, despite the fact that the mood and task were unrelated. In Study 4, I provided more direct evidence for this position, by demonstrating that people attempted to engage in mood regulation primarily when they were given

expectancy that their mood could in fact be regulated, resulting in the greatest affect repair in the sad group who believed the task would interfere with mood, and least affect repair in the sad group who believed their mood was stable. The happy groups demonstrated a similar pattern in terms of mood maintenance (i.e. best performance in the maintaining condition and worst performance in the attenuating condition). I propose that this is evidence to argue against differential motivation for mood regulation as a function of mood state (cf. Hedonic Contingency and Negative State Relief). It appears that the opportunity to engage in mood regulation that leads to positive affect, not the valence of the current mood state, is the basis of actual mood regulatory behavior. Finally, it should be noted that, in the absence of explicit task-related hedonic expectancies and when mood was seen as unrelated to the task, happy people appear to believe that the task will attenuate their moods whereas sad people appear to believe that the task will attenuate their sad moods. Future research should more directly address these hedonic task-related expectations and should address expectations in the context of other tasks (e.g., tasks in which the implicit hedonic expectations might be different from those in the circuit board task).

In terms of participants' perceptions of their performance, the results are not as clear. In Study 2, both happy and sad participants

demonstrated accurate assessments of their performance, with the sad group indicating that they were more accurate, but no faster, than the happy group. This was related to greater satisfaction in the sad group. In Studies 3 and 4, however, the happy and sad groups did not differ in their performance ratings, with both the happy and sad groups rating their speed and accuracy equally. In both of these studies, however, the happy participants reported greater satisfaction with their performance, even in conditions where they performed significantly worse than the other groups. At first, this may appear to contradict the findings of Study 2, but recall that in that study, mood and the performance task were always unrelated. In Study 3, mood and task were related for half of the participants, and in Study 4, mood and task were always related. It would appear that when happy people believe that their current mood is tied to the task at hand, they report greater overall satisfaction with their performance, regardless of the actual merits of performance. This may help to explain the repeated failure in organizational research to find a satisfaction-performance link. Specifically, people who see their work as a source of positive mood will report greater satisfaction with their work, often in spite of poor job performance. As Weiss and Cropanzano (1996) note, the reason many people report high job satisfaction is because their jobs require little from them in terms of either effort or accuracy. Perhaps this effect is more pronounced when

the task (or work situation) is seen as a contributor to current mood.

A further explanation for this finding comes from the work of Cervone, Kopp, Schaumann, Scott, et al. (1994), who demonstrated that people in negative mood states set higher performance standards for themselves, thus creating a vicious cycle in which they cannot meet their stringent expectations, and as a result display less satisfaction with their performance. Happy people, however, set lower standards, and thus were satisfied with poorer performance. It would appear that this effect occurs when the mood and task are related, as is evidenced by the satisfaction outcomes from Study 4. Future research should address the role played by self-set expectancies prior to task completion, and the possible effects of those expectations on subsequent mood and satisfaction with performance.

Theoretical Implications

The four studies discussed here were unique, in that they addressed the effects of mood on performance, utilizing behavioral measures. Traditional research in the affect and cognition literature has employed attitudinal measures or judgmental tasks. A notable exception to this trend is in the area of altruism, where numerous studies have examined the effects of mood on people's actual behavior, i.e., the tendency to offer help to others (Schaller & Cialdini, 1990). Studies of managerial performance, specifically in the area of

negotiation, have also employed behavioral measures, but have not directly manipulated mood. Instead, this research has examined trait affectivity (i.e., PA/NA, Staw & Barsade, 1993) and its relationship to negotiation success. The current studies mark one of the first programs of research into the effects of mood states on productivity that included a combination of attitudinal and behavioral outcomes. By using different measures such as these, the conclusions reached by this research may be received with greater confidence than research employing only one type of measure.

Practical Implications

Organizational leaders have long been interested in two issues: increasing employee productivity, and fostering employee job satisfaction. The current research, while conducted solely in the laboratory, provides some interesting insights that may eventually be very useful within corporations. First, this research underlines the need to take workers' moods into account when making managerial decisions or implementing programs in the workplace. Corporate managers have long been taught to ignore the mood state of their employees, preferring instead to focus on motivational strategies that employ financial benefits, or punish unwanted actions.

When mood does become a consideration, the assumption within corporations is that "happier is better" across all situations. Our

research has clearly demonstrated that happy workers are not always better workers. Perhaps a more appropriate corporate motto would be: "Workers who find happiness in their work are better workers." Furthermore, the findings regarding motivational processes underlying performance may see future applications in the workplace. Current approaches often involve attempts to boost company morale or to employ environmental manipulations aimed at creating a happy work atmosphere (Isen & Baron, 1991). Perhaps the future of such attempts will now include programs that help workers to find mood-related motivators within their jobs. Recent work in the area of goal setting may provide a starting point for such employee motivation programs. Sheldon and his colleagues (Sheldon & Elliot, 1999; Sheldon & Marko, 2001) have proposed that self-concordance (i.e., a consistency between one's self-set goals and their core value system) of people's self-initiated goals leads to the greatest sense of fulfillment and psychological well-being. Sheldon and Marko (2001) found that college students with self-concordant motivation (i.e., those who set goals for the coming semester that were tied closely to implicit values) demonstrated better adjustment, well-being, and scholastic performance than those whose goals were not concordant. The researchers caution, however, that the ability to set and adhere to self-concordant goals is difficult, and often requires that people can regularly achieve success in attaining their

goals in order to maintain the cycle of goal striving – success – positive feelings.

Limitations and Directions for Future Research

Obviously, as with any program of research in a novel area, there were omissions and oversights. Perhaps the most significant issue to note is the novelty of the task used for all four studies. It could be argued that the large performance differences demonstrated in these studies were due primarily to the fact that the task being completed was novel to the participants. Similar results might not be expected in situations in which the task being performed is one that is well-learned or automatic. This is a valid point, and a line of research addressing this issue is currently being conducted. Specifically, I have devised a number of studies in which participants learn either a relatively simple or relatively complex task (tying various types of knots), then undergo a mood induction, then spend time tying either the knot they have already learned to tie or a new knot, that is either simple or complex.

Another area open to criticism may be the failure to include a neutral control group in any of the four studies. It could be argued that, while we know the relative strengths and weaknesses associated with happy and sad moods, the failure to include a neutral group leaves us guessing as to whether or not *either group* would outperform a neutral group on the assembly task. Perhaps both moods actually

impair performance to some degree, and a neutral group would demonstrate both greater speed and accuracy when completing the task. This criticism, while potentially valid, does fly in the face of a great deal of research in the area of affect and cognition that consistently shows neutral control groups falling between happy and sad groups on a variety of judgments (see, e.g., Sinclair 1988; Sinclair & Mark, 1995).

Conclusions

Perhaps the most exciting finding stemming from this research has been the hint that perhaps mood states themselves are not as important to performance as are the expectancies people have about hedonic consequences. It may be that the best motivator (and thus the most likely way to improve performance) involves finding ways to help people achieve a positive mood state through their work tasks. Perhaps those who currently spend their time trying to manipulate and create "happy" workplaces will abandon the notion that the physical work environment should be their focus of attention. Clearly, manipulations of external environmental cues in this way will not lead to desired outcomes for most managers. The focus of workplace enlightenment needs to be shifted to that of the worker, and must concentrate on building effective motivators within each individual. The benefits from such a program would be enormous: The organization achieves its

goals in terms of improving individual performance, while the employee achieves a healthy attitude toward work through the realization of personal (hedonic) goals, and ultimately may find greater satisfaction with the work experience.

Footnotes

[1] The circuit boards for Studies 1 and 2 were coded by one of six trained judges who were blind to conditions. In order to assess interjudge reliability, the six judges first coded a sample board containing 13 steps and 5 errors. Interrater reliability was $\underline{r} = .85$. Discrepancies were then discussed and agreement was reached regarding the coding of any discrepancies.

[2] The change in degrees of freedom reflect a collating error which led to 6 participants failing to receive the time 2 mood measure.

[3] The change in degrees of freedom reflect 3 participants who failed to complete the relatedness measure.

[4] All circuit boards for Studies 3 and 4 were coded by a single trained judge who was blind to conditions.

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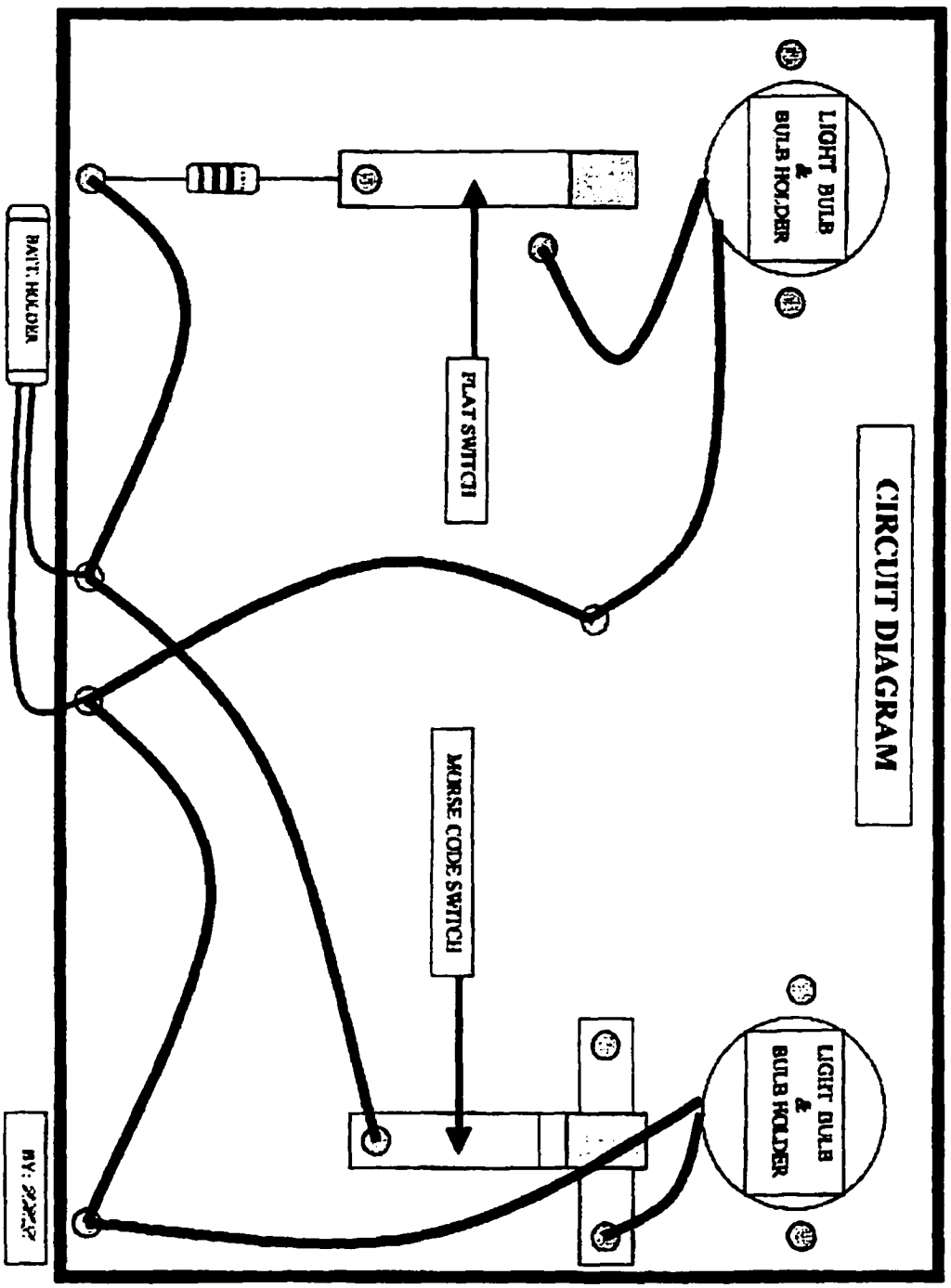
Appendix A



Appendix B

Study 1 Script

E2: Hi, my name is _____, and I'm working with Dr. Stern. This is _____, and he/she is working with Dr. Mark. Because we've been having trouble getting enough participants to sign up for our sessions, we decided to maximize participant use by running 2 studies per session. To be fair to both _____ and I, we decided to hold a random draw at the beginning of each session to determine who will go first for that session. **(Approach one of the participants and ask:)** Would you please draw a slip of paper from this box and read what it says?

(Participant says "Memory and Instructions Study")

E2: Okay, so that means that _____ goes first. (To E1): I'll be back in a few minutes. My materials are in the large packets on your desks. Please place them to the right of your desk until it's time for my study. Thanks

(E1 takes over)

E1: Dr. Mark and I are interested in factors that may influence the way people remember information and use it to follow instructions. For my session, I'm going to demonstrate the steps involved in assembling a circuit board. I'm going to show you all the steps while you follow along with some instruction sheets and diagrams. Then you're going to spend a few minutes assembling the board on your own. I'm going to

measure your reactions to the assembly task and how well you think you were able to follow the instructions. Do you have any questions?

(Pause)

(Hand out consent forms)

Before I begin with the instructions, please read and sign my consent form and place it on the side of your desk when you're done.

Now, I'm going to show you how to assemble the circuit board. Please pay careful attention to the instructions. **(Hand P's instruction sheet, diagram, parts ID sheet, and general instructions sheet).** These instructions and diagrams will help you follow along while I show you how we want the circuit board assembled.

(Hold up sample circuit board)

This is an example of a completed circuit board. I'm going to go over each of the steps required to complete the board now. You can follow along with your diagrams and the sheet entitled "INSTRUCTIONS FOR ASSEMBLING CIRCUIT BOARD". You can refer to the parts identification sheet if you need to know what the parts look like up close.

(Read each of the 17 steps in order while pointing to the parts they refer to. When you've read through all 17, turn the board around so they can have a look at the finished product from front & back)

(Set the circuit board down on the counter)

Now I'm going to show you one more thing you'll need to know in order to assemble the board properly. You can follow along with the sheet entitled "General Instructions for Installing Pins, washers, and springs". **(Hold up a pin, washer, and spring, and say, while showing each:)** this is a pin, this is a spring, and this is a washer. **(Then assemble the three while reading word-for-word from the instruction sheet)**

Okay, now I'm going to have each of you spend the next few minutes assembling a circuit board. Make sure you follow the instructions step by step, in numerical order. I'll let you know when your time's up. Now, I need to set each of you up in a private room. In the room, you'll find all the parts you will need to assemble the board. Please take your diagrams and instruction sheets with you to the room. **(Point to each person in turn, and assign them to one of the 4 rooms)**

(When P's are in rooms, start stopwatch. Then go place a questionnaire at each person's desk).

(E2 returns)

(After 10 minutes, ask participants to join you in the main room again:).

Okay, time's up. Please come back into the main room now. Just leave everything in the room. **(Wait until P's have returned, and hand them each a questionnaire).** As I said earlier, I'm interested in your reactions to our instructions and the assembly task. On each of your desks is a questionnaire assessing your reactions. Please complete the questionnaire now.

(Wait until P's finished with questionnaire). Okay, that's it for my study. Thank you very much for participating today. I'm going to let _____ take over now. Please hand me my materials now.

(Collect consent forms and questionnaires, in pre-arranged order). Thanks again.

(E1: go collect boxes and take them to 310)

E2: Please get my packet of materials now. Please remove the butterfly clip from the packet and place it on the desk to your right. There should now be a consent form in front of you. It's marked "Group Administration of a Modified Mood Induction Procedure." Please read and sign the consent form and place it on the desk to your right when you are done. That way, I'll know that you're ready to continue. Please don't look through the other materials until I ask you to.

(When participants have completed consent forms.)

E2: I'm working with Dr. Stern, and we're attempting to validate a group administration of a modified mood induction procedure. The mood induction, known as the Velten, is usually administered orally to individual people. It is very effective in creating temporary mood changes.

Usually, participants are presented with a set of cards that have mood-related statements typed on them. As they read the cards, first to themselves, then aloud, their moods change progressively to become like the mood represented on the cards. Then, participants sit for a few minutes to think about things in their own lives that have made them feel like the mood represented by the cards. With concentration, this builds the moods even further. People who have done it, at least at the individual administration level, find that they really get into it. They've found that it's interesting to learn how to change their own moods. I hope that, if you get anything out of this session, it's the knowledge that you can change your mood. If you can learn how to talk yourself into a mood, you can learn how to talk yourself out of a mood.

The one drawback with this technique is that it requires running one participant at a time. It's difficult to use groups because people are reading aloud and this distracts them from the mood induction. So Dr. Stern and I have devised a method that allows me to induce

different moods in different people, in the same group at the same time. We haven't tested this group method before, so we need to know if it works. It's important that you concentrate very hard and try to "get into the mood." Another thing is, it's very easy to react to the mood induction. You start feeling your mood change and try to fight it. Please don't do this. Just go with the flow and let your mood change.

If this works, we'll be able to use this induction for a lot of future research. So, on the mood measure that I'll give you later, it is important for you to answer the questions honestly. Otherwise, I might try to use the data to guide my future research when the data aren't valid. It'll be obvious what mood condition you're in, so be sure to respond the way you really feel. Your help is appreciated.

As I said, I'm going to change your mood by having you read some statements to yourself. After you read a statement, you'll concentrate on it. This procedure is designed to make you feel a certain way. These statements will gradually change your mood and will make you think of things in your own life that reflect that mood. After you've done this, I'll have you read a brief description indicating how to build the mood even further. Then you'll sit for a few minutes, with your eyes closed, and concentrate on building the mood. You'll think of things that make you feel more like the mood. I have you do

this because thinking about a feeling builds it. You'll experience it. Simply concentrate on what you're reading, thinking, and feeling and the mood will build.

Please remove the paper clip from my packet and place it on the desk to your right. There are a set of instructions in front of you. After you've read through the instructions, put the sheets on the desk to your right so I'll know you are ready to continue. I'll tell you when to begin going through the packet of mood statements and when to go on to the next card in the packet. Also, please don't write on the instructions or packet of statements, since I re-use them. Read the instructions now. And, as I said, don't begin going through the mood packet until I ask you to.

(P's read instructions)

We're ready to begin. Don't go on to the next statement until I tell you to. One final thing, if the induction gets to be too much, raise your hand and I'll stop you. Please concentrate and the mood will build. The first page of the packet indicates what mood condition you're in. Open the packet to the page marked Card 1. Begin now.

(Watch for people who raise their hand.)

15 sec (next)

15 sec (next)

(Last card is incubation instructions.)

E2: Next. Please read these instructions, close your eyes, and concentrate on building your mood. Begin now.

(After 2 minutes.)

Please place the packet of mood statements on the desk to your right. In front of

you is the mood measure. Turn it over and quickly read and complete it. When you're done, turn it over and place it on top of the mood statements.

(After all P's are done)

E2: Thank you very much (to E1): That's the end of my study. Thank you very much for your cooperation. Please hand me my materials now. **(Collect packets)**

To E1: You can take over now.

E1: There's another issue that we wanted to address in this study. Dr. Mark and I are also interested in the effects of a delay on the ability to recall and follow instructions. The draw that we held at the beginning of this session determined whether you'd be in the immediate or delayed assembly condition. In one condition, we have people assemble the circuit boards immediately following our demonstration. In the other condition, which is the one you were assigned to, we have people spend a few minutes familiarizing themselves with the boards right after the demonstration, then wait for

a delay of 30 minutes before the real assembly task. Because of the way the draw turned out today, you're in the 30 minute delay condition.

For this part of the session, you won't have the diagrams, but I'll give you the written instructions to help you assemble the circuit boards. You'll each go back into separate rooms and work on completing the boards. This time, there won't be any batteries to test the circuits with. I'll test each one after the session's over to see if they work. Please try to assemble the circuit boards as quickly and accurately as possible. Because some people may be faster at assembling these than others, you may finish one board before the time is up. If you finish the board, please place it outside your door immediately, and pick up another circuit board, then work on the second one until I tell you that the time is up. If you need help remembering any of the steps, please refer to the written instruction sheet. Make sure you follow the instructions step by step, in numerical order. I can't answer any questions or help you in any other way while you are assembling the boards. Does anyone have any questions?

(Wait for response)

I just need to set up the rooms again. Please wait for a couple of minutes and then we'll begin.

Okay, then let's begin. Would each of you please go back into the same room you were in before? I'll let you know when the time's up.

(Start stopwatch for 30 minutes. When 30 min are up, say:)

Okay, time's up. Please come back into the main room now. I'd like to ask you one final question now about my study. I've put a questionnaire on each of your desks. Please complete it now.

(Wait until P's finish)

Is everyone finished? Ok. I have one final questionnaire that I'd like you to complete now. Dr. Mark said that it was alright for me to collect 5 minutes worth of my thesis data at the end of each session. I'm interested in the study of people's life histories. I'm trying to create a life events inventory that can be used in future research, so I'm asking people to write down various life events that have happened to them over the past 5 years. I'm interested in literally hundreds of different types of events, but it would be difficult to have people write about that many different things, so I've randomly assigned everyone to write about just one type of event.**(Hand out the life events questionnaire--face up).** Please read the instructions on my questionnaire and complete the task. Begin now.

(Start stopwatch for 5 minutes)

Okay, the session's over now.

(E2 Begin debriefing)

(E1 go to rooms and begin evaluating boards)

Appendix C

Memory and Instructions Study

Consent Form

I _____ agree to participate in a study addressing factors that affect memory for instructions. I know that I will watch a demonstration of how to assemble a circuit board, and that I will later be asked to assemble the board on my own, and complete a questionnaire assessing my reactions to the task. I realize that further knowledge of the hypothesis at this time could bias the results of the study, and that I will be completely debriefed upon completion of the experiment. I also realize that my name will not be associated in any way with my data, and that I am free to discontinue participation in the study at any time whatsoever, without penalty. I know that I will receive research participation credit for this study.

Signature:_____Date:_____

Appendix D

INSTRUCTIONS FOR ASSEMBLING CIRCUIT BOARD

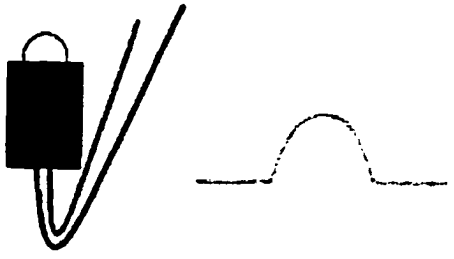
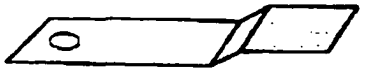
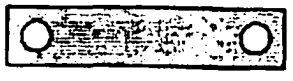
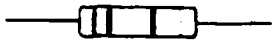
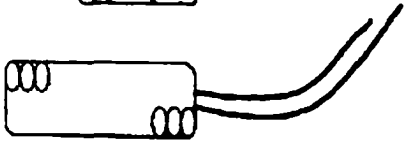
1. Using u-shaped metal brackets, pins, and washers, place light bulbs facing upward on opposite top corners of the board.
2. Install 2 pins, washers, and springs onto bottom center of the board. Please look at the diagram. Attach red battery wire to the left pin and blue battery wire to the right pin.
3. Attach 2 long black wires to each of the pins on the bottom center of board.
4. In each of the bottom corners, install one pin, washer, and spring.
5. Connect a long clack wire from the red wired pin to the far left corner pin.
6. Repeat the previous procedure, this time connecting the black wire from the blue wired pin to the far right corner pin.
7. Connect the black wire from the right light bulb to the bottom right corner pin.
8. Attach brass colored plate with 2 pins, washers, and springs horizontally beneath the right light bulb.
9. Attach the morse code switch plate with pin, washer, and spring so that the yellow plastic square is positioned over the brass plate.
10. Attach the red wire from the right light bulb to the right pin on the brass plate.
11. Attach the second long black wire from the red wired pin to the pin on the morse code switch.
12. Attach a yellow flat switch vertically (with the yellow part closest to the light bulb) immediately below the left light bulb using a pin, washer, and spring. Place a pin, washer, and spring on the

right side of the flat switch, adjacent to the metal portion of the switch.

13. Insert a pin, washer, and spring in the very center of the board.
14. Take the free end of the black wire from the blue pin and attach it to the center pin.
15. Take the red wire from the left light bulb and attach it to the center pin as well.
16. Attach the black wire from the left light bulb to the pin on the right side of the flat switch.
17. Finally, attach a resistor from the pin in the bottom left corner of the board to the flat switch pin.

Appendix E

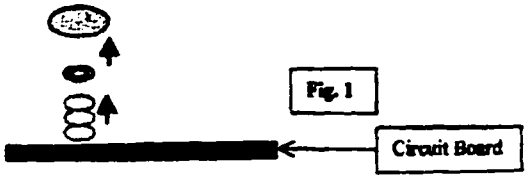
PARTS IDENTIFICATION LIST

DIAGRAMS	NAMES OF OBJECTS
	GOLD PIN
	SPRING
	WASHER
	LIGHT BULB and BULB HOLDER
	FLAT SWITCH
	MORSE CODE SWITCH
	BRASS PLATE
	RESISTOR
	BATTERY HOLDER
	LONG BLACK WIRE

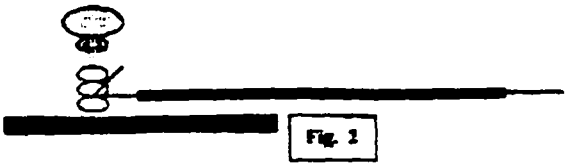
Appendix F

GENERAL INSTRUCTIONS WHEN INSTALLING Gold Pins, Washers, Springs and Wires

1. To install pins, washers, and springs:
   Insert narrow end of the gold pin through the washer and then the spring. Then insert the end of the pin through one of the holes on the board. When properly assembled, the washer and the spring will be located between the top surface of the board and the head of the pin.
   (Please refer to Fig.1)



2. When asked to install wire(s) onto gold pin(s), make sure the metallic portion of the wires are touching the washer or spring to ensure a good electrical conductance. (Please refer to Fig.2)



Appendix G

Filler Questionnaire

ASSEMBLY QUESTIONNAIRE

Please indicate your feelings about the circuit board assembly task by circling the appropriate number on each of the following items.

1. The demonstration of how to assemble the circuit board was:

1	2	3	4	5	6	7
not at all helpful						very helpful

2. The written instructions indicating how to assemble the circuit board were:

1	2	3	4	5	6	7
not at all helpful						very helpful

3. Having a diagram of a fully assembled circuit board was:

1	2	3	4	5	6	7
not at all helpful						very helpful

4. I feel that assembling the circuit board was:

1	2	3	4	5	6	7
very difficult						very easy

5. I think I assembled the board:

1	2	3	4	5	6	7
very slowly						very quickly

6. I think I assembled the board:

1	2	3	4	5	6	7
not at all accurately						very accurately

7. Compared to others, I think my performance was:

1	2	3	4	5	6	7
much worse						much better

8. I have had a lot of past experience with assembling things:

1	2	3	4	5	6	7
strongly	disagree				strongly	agree

Appendix H

Studies 1 and 2 Mood Consent Form

ADMINISTRATION OF A MOOD INDUCTION PROCEDURE
Informed Consent Form

I agree to participate in the study being conducted under the direction of Dr. Stern. The study involves validating a group administration of a mood induction procedure. I know I will read a set of mood related cards at the rate of one per 15 seconds. I know these cards are designed to change my mood. I will then read a set of instructions indicating how to build my mood even further by sitting for a few moments and concentrating on building my mood. I know that I will complete a brief mood measure. I am aware that the study will take approximately 45 minutes and that I will receive one research participation credit. I know that my responses will be kept in strictest confidence, and that I am free to discontinue participation at any time without penalty.

Signature: _____

Date: _____

Appendix I

PRESENT MOOD STATE INVENTORY

Please circle the appropriate number on each of the following scales that best describes how you feel right now, today.

	Strongly Disagree		Neither Agree Nor Disagree		Strongly Agree
1. Very bad	1	2	3	4	5
2. Very passive	1	2	3	4	5
3. Very good	1	2	3	4	5
4. Very active	1	2	3	4	5

Appendix J

Mood Restoration
Development of a Life Events Inventory

One final thing I'd like to ask you to do today is to provide us with some data that will help me develop a life events inventory that will eventually be used with university students. I've found in the past, when developing similar inventories for different populations, that it's best to have people focus on one type of life event. This approach seems to result in more detailed and easily coded life events. Different people are being asked to recall different types of events.

I'm looking for a detailed list of different kinds of events in different people's lives. So, different people are going to be asked to write about different kinds of events. I'm going to give you 5 minutes to write down some of the events that have happened to you in the last few years that have made you feel very very good. Focus on each good event and vividly recall what led up to each event. Relive each experience in your mind's eye. For each good event write about what led up to it and who was involved. Be sure to carefully describe the positive feelings that you were having at the time of each good event and be sure to try to relive these positive feelings as you write. Be sure to describe each good event in great detail and discuss as many positive thoughts and feelings related to each good event that you can. In detail, write a few paragraphs about some of these events that made you feel very good. As I said, try to relive the good events. You'll have 5 minutes -- please try to use all of the time (but you don't need to use all of the pages). Begin now.

Appendix K

Studies 1and 2 Verbal Debriefing

Okay, the study is over now. I'd like to take this opportunity to tell you a little bit more about what we were studying here today. First, I'd like to apologize for not telling you everything in advance, but I think you'll understand why I wasn't able to. We are both actually working with Dr. Sinclair from the psychology department, studying the effects of induced moods on productivity and accuracy in an assembly task. So really, this was one study, not two separate studies. I guess you can see that if I told you that I was changing your mood to see how this affected how quickly and accurately you assembled circuit boards, that you might have responded differently than you did. The reason that we sometimes don't tell people exactly what we're studying and exactly what we expect to find before our studies is because this often causes people to behave in a way that they think that we want, rather than how they really would behave without expectations. People behaving based on what they think the experimenters want rather than how they would truthfully respond is called demand characteristics. This can be a problem in research. So, I hope you can see how having people know exactly what we're looking for would lead to problems in the interpretation of our data. So, again, I'm sorry that I didn't tell you everything ahead of time, but I guess that you can see that if I told you we were looking at how your mood

affected the way you assembled the circuit board, you might have behaved a little differently. One thing that I need to ask you is, please don't tell other students what we were studying because, if others know, our data wouldn't be valid and this would cause us a lot of problems in the future with our research. If someone asks you about it, you can tell them that you did two studies: one where you assembled a circuit board and another where your mood was changed.

Independent variables are variables that researchers manipulate or change. Our independent variable in this study was mood. Some people read cards designed to make them feel happy, some read cards designed to make them feel sad. So, mood was an independent variable and it had two levels -- happy and sad. Our critical dependent variable, or the variable that we measure, was your performance at the assembly task. We will assess the circuit boards people assembled for both speed and accuracy of assembly. Our third dependent variable is the questionnaire you completed after you went through the mood induction. We need to know whether the induction worked, so we will compare the means of the responses to the happy and sad mood inductions to make sure that people were in fact feeling differently in the two mood conditions.

Most of us believe that good moods have benefits; while this is true, recent research coming from Dr. Sinclair's lab and other labs

around the world suggest that, for some decisions and processes, good moods are not beneficial. For example, Dr. Sinclair has shown that happy people were least accurate in a performance appraisal decision, happy people are most biased in forming impressions, and are least accurate when doing things like making mathematical estimates. People in good moods appear to process information nonsystematically or heuristically, whereas people in bad moods appear to devote more energy to actively processing information--they appear to process systematically, leading to more accurate and less biased judgments. To date, no one has addressed whether moods affect workers' productivity, and so this study is an attempt to clarify this issue. We believe that, based on previous findings from other types of mood research, that happy people may in fact work more quickly than sad people, but pay less attention to detail, and as a result, make more mistakes in their work. So, while happy people may be more productive, sad people may be more accurate.

Please turn to the last page of the life events inventory you just completed. This page is yours to keep and contains information that relates to the test that you'll be taking on the research component of your introductory psych class. It describes the reason for the life events task that you completed at the end of the session. It's actually a mood restoration procedure that's designed to make you feel happy

before leaving. If you have any questions, feel free to ask me.

(Wait until they've finished reading)

Are there any questions? I'd like to thank you all for coming out to this session. Without the help of people like you, we couldn't answer most important scientific questions in psychology. You've been a great help. If you have any questions about the study or just general questions related to the issues we addressed here, feel free to contact Dr. Sinclair or his research assistant. Their phone numbers are on the hand out I just gave you. Again, I want to apologize for not telling you everything in advance. Please don't let other people know what we're studying, because that knowledge would bias the results of our research.

HAND THEM A CREDIT SHEET AND THANK THEM AGAIN FOR PARTICIPATING.

Appendix L

Studies 1-4 Handout Debriefing

STANDARD DEBRIEFING--READ THIS SECTION NOW

I'd like to provide you with more information about our research. One of the reasons that we conduct research in the area of mood is to understand how our mood states affect our judgments. Much research has suggested that, while happy people tend to cue to happy stimuli and recall happy thoughts, they also tend to devote less energy to judgments. Of course, this means that for some judgments, happy people make more mistakes than do sad people. So, there are some advantages to being sad and some disadvantages to being happy. We're attempting to understand these mood-related processing differences further. We believe that understanding the effects of normal moods on judgments will lead to insights into the effects of more extreme affective states (e.g., severe depression, anxiety disorders, etc.). Further, we are attempting to understand the conditions under which happy moods and sad moods might improve judgments each day that can affect our lives and, of course, our moods do change throughout the day. However, we don't want people leaving our study feeling sad. This is the real reason that we had you complete the life events task at the end of the session. Previous research has shown that focusing on happy events in people's lives actually makes them feel happy (this probably doesn't come as a great surprise to you). The procedure that we just exposed you to is known as a mood restoration procedure. It's designed to remove the effects of the sad mood induction and to reinstate happy moods in all of the participants prior to leaving the room.

Our sad mood induction isn't terribly potent (that is, it doesn't usually result in feelings of extreme sadness). If you've found yourself feeling quite sad, down, or stressed out over the past few weeks of your life, this might be the normal kind of feelings that we experience during stressful times in our lives -- indeed, while some of our time at university can be quite fun, there are other aspects that can make any of us feel down -- this is normal. But sometimes, even these normal feelings can be troublesome in our lives. Sometimes, they interfere with our ability to study or work or focus on getting things dome. This is sometimes a warning sign that things are not going well in our lives. If you've been feeling this way, or if you know someone who has been feeling this way, you might consider some options that involve talking with people about problems -- often just doing this helps get over these feelings. Listed below are phone numbers for various agencies located near campus that provide these kinds of services free of charge: 1) Student Counselling Services -- 492-5205; 2) Health Services -- 492-2612; 3) Student Help -- 492-4266; 4) Distress Line -- 482-4257; 5) University Student Advisor (more for academic problems) -- 492-2965;

6) University Hospital Walk-in Clinic -- 492-6501; 7) Sexual Assault Centre -- 492-9771; 8) Academic Support Centre (for study skills problems) -- 492-2682.

READ THIS SECTION LATER

We manipulate independent variables in order to assess how these variables cause changes in other variables called dependent variables. So independent variables are the theoretical causes and dependent variables, the variables that we measure, are the effects or outcomes of our independent variables. Sometimes we do research in which we do not manipulate variables, but instead measure predictor variables and criterion variables. For example, we could look at gender (Male versus Female) as a predictor of verbal ability scores. This type of study is correlational in nature and because we did not manipulate any variables, we could not make any cause and effect inferences. That is, we couldn't say that gender causes differences in verbal ability because we cannot manipulate gender. As you're likely aware, there are a lot of differences between men and women, like how men versus women are socialized, that could provide an alternative explanation for any relationship between gender and verbal ability. In the present study, because we manipulated our independent variables and used random assignment, we can make cause and effect inferences. Random assignment to conditions means that each of you had an equal probability of receiving any of the levels of each of our independent variables. Because of this, we know that the Different groups of people who receive the various levels of our independent variables are about the same before our manipulations; that is all groups contain tall people and short people, smart and not so smart people, people who have had a lot of coffee and people who haven't had much coffee, etc.--so height, intelligence, and amount of coffee cannot be what cause any differences on our dependent variables. The only difference between the groups is the levels of our independent variable, so our independent variable has to be the cause of any change that we find in our dependent variable. So, if the groups are the same before our manipulations, then any differences that we find on our dependent variables must be due to our independent variables causing some effect.

Part of the scientific process involves building on previous research in order to attempt to clarify issues and lead to new discoveries. The findings in the present work will lead to modifications of theory and other testable hypotheses which, in turn, should lead to other hypotheses, and so on. This is how science builds on previous work and is known as the functional approach to theory development. We often identify issues raised in journals, point out problems, extend the issues, or modify theories in order to advance our understanding.

As you can see, it is very important to have people participate in our research so that the scientific endeavor can progress. Hopefully, your participation not only helps to advance science, but leads you to understand how we go about conducting research so that we can address important psychological issues.

One of the last things that I want to discuss with you is why, in the beginning, I didn't explain exactly what our hypotheses were. I guess you can see if I told you what we were studying, you might have felt a lot of pressure or demand to react one way or the other. You might have felt pressured to react in the way you thought we expected you to on the basis of our theory rather than reacting the way you normally would. The possibility that some participants might react to independent variable manipulations based on what they believe the experimenters expect is called the demand awareness effect. This can be a problem in research because our results could reflect nothing having to do with the psychological processes that we're interested in studying, but could simply reflect demand awareness. If this was the case, scientific progress would be slowed and inappropriate avenues of research could be followed. So, I hope you can see how having people know our hypotheses in advance of responding would lead to problems in the interpretation of our data.

If you have any questions about the study or just general questions related to the issues we addressed here, contact us at the following phone numbers: Dr. Robert Sinclair: 492-3822; Carrie Lavis: 492-5645.

Appendix M

ASSEMBLY TASK: IMPRESSION QUESTIONNAIRE

Please place a check mark beside the condition you were in:

IMMEDIATE ASSEMBLY _____

DELAYED ASSEMBLY _____

1. How quickly do you think you assembled the circuit boards?

1	2	3	4	5	6	7
very slowly						very quickly

2. How accurately do you think you assembled the circuit boards?

1	2	3	4	5	6	7
very inaccurately						very accurately

3. How satisfied are you with your performance at the assembly task?

1	2	3	4	5	6	7
very dissatisfied						very satisfied

Appendix N

Study 3 Script (Related Condition)

Hi, my name is _____ and I'm working with Dr. Webber. We're interested in the effects of mood on a number of cognitive processes. For example, we're interested in factors that may influence the way people remember information and use it to follow instructions. For the first part of the session, I'm going to demonstrate the steps involved in assembling a circuit board. I'm going to show you all the steps while you follow along with some instruction sheets and diagrams. Then you're going to spend a few minutes assembling the board on your own. I'm going to measure your reactions to the assembly task and how well you think you were able to follow the instructions. Once we've finished, I'll explain more about the rest of the study. Do you have any questions?

Here's a consent form that applies to this part of the study. Please read and sign it if you agree to participate.

Now, I'm going to show you how to assemble the circuit board. Please pay careful attention to the instructions. **(Hand P instruction sheet, diagram, parts ID sheet, and general instructions sheet)**. These instructions and diagrams will help you follow along while I show you how we want the circuit board assembled.

This is an example of a completed circuit board. I'm going to go over each of the steps required to complete the board now. You can follow along with your diagrams and the sheet entitled "INSTRUCTIONS FOR ASSEMBLING CIRCUIT BOARD". You can refer to the parts identification sheet if you need to know what the parts look like up close.

(Read each of the 17 steps in order while pointing to the parts they refer to.)

Now I'm going to show you one more thing you'll need to know in order to assemble the board properly. You can follow along with the sheet entitled "General Instructions for Installing Pins, washers, and springs". **(Hold up a pin, washer, and spring, and say, while showing each:)** this is a pin, this is a washer, and this is a spring. **(Then assemble the three while reading word-for-word from the instruction sheet)**

Okay, now I'm going to have you spend the next few minutes assembling a circuit board. Make sure you follow the instructions step by step, in numerical order. I'll let you know when your time's up. Now, I need to set you up in a private room. In the room, you'll find all the parts you will need to assemble the board. Please take your diagrams and instruction sheets with you to the room. **(Take P to room)**

(When P is in room, start stopwatch. Then go place a questionnaire at the desk).

(After 10 minutes, ask participant to join you in the main room again:).

Okay, time's up. Please come back into the main room now. Just leave everything in the room. **(Wait until P sits down).** As I said earlier, I'm interested in your reactions to our instructions and the assembly task. On your desk is a questionnaire assessing your reactions. Please complete the questionnaire now.

(Go to room, collect board and box, and place them on table at the back of the room)

Now I can explain a bit more about the rest of the study. Dr. Webber and I are interested in the ways that mood affects memory. A great deal of research has shown that happy and sad moods do affect memory processes. Sometimes happy moods facilitate performance, and sometimes they inhibit performance. The same is true for sad moods. Sometimes, neither of these moods have an effect on performance. So far, no one has studied the effects of mood on procedural memory, which is the kind required for things like assembly tasks. So for this study, we want to measure the effects of these mood states on your procedural memory. Since this has never been addressed before, we're not sure what the exact effects of the

moods will be, if any, so please just respond the way you really feel, and not in any way that you think we want you to.

(Hand P consent form for Velten)

Before we go ahead with the mood induction, please read and sign this consent form if you agree to continue.

(Wait till P is finished)

Okay, now it's time for the mood induction. The mood induction we use, known as the Velten, is very effective in creating temporary mood changes. For this induction, participants are presented with a set of cards that have mood-related statements typed on them. As they read the cards their moods change progressively to become like the mood represented on the cards. Then, participants sit for a few minutes to think about things in their own lives that have made them feel like the mood represented by the cards. With concentration, this builds the moods even further. People who have done it find that they really get into it. They've found that it's interesting to learn how to change their own moods. I hope that, if you get anything out of this session, it's the knowledge that you can change your mood. If you can learn how to talk yourself into a mood, you can learn how to talk yourself out of a mood.

In order for the induction to work, it's important that you concentrate very hard and try to "get into the mood." Another thing is,

it's very easy to react to the mood induction. You start feeling your mood change and try to fight it. Please don't do this. Just go with the flow and let your mood change.

Once you've gone through the induction, I'll give you a mood measure. It's important for you to answer the questions on the mood measure honestly, by telling me how you really feel. Otherwise, I might try to use this data to guide my future research when the data aren't valid. It'll be obvious what mood condition you've been assigned to, so be sure to respond the way you really feel. Your help is appreciated.

As I said, I'm going to change your mood by having you read some statements to yourself. After you read a statement, you'll concentrate on it. This procedure is designed to make you feel a certain way. These statements will gradually change your mood and will make you think of things in your own life that reflect that mood. After you've done this, I'll have you read a brief description indicating how to build the mood even further. Then you'll sit for a few minutes, with your eyes closed, and concentrate on building the mood. You'll think of things that make you feel more like the mood. I have you do this because thinking about a feeling builds it. You'll experience it. Simply concentrate on what you're reading, thinking, and feeling and the mood will build.

Please remove the paper clip from my packet and place it on the desk to your right. There are a set of instructions in front of you. After you've read through the instructions, put the sheets on the desk to your right so I'll know you are ready to continue. I'll tell you when to begin going through the packet of mood statements and when to go on to the next card in the packet. Also, please don't write on the instructions or packet of statements, since I re-use them. Read the instructions now. And, as I said, don't begin going through the mood packet until I ask you to.

(P reads instructions)

We're ready to begin. Don't go on to the next statement until I tell you to. One final thing, if the induction gets to be too much, let me know and I'll stop you. The first page of the packet indicates what mood condition you're in. Open the packet to the page marked Card 1. Begin now.

(Watch for people who may react.)

15 sec (next)... **(After the first "next", move to desk and sit down)**

15 sec (next)...

(At 15 min, last card is incubation instructions.)

...Next. Please read these instructions, close your eyes, and concentrate on building your mood. Begin now.

(After 2 minutes.)

Please place the packet of mood statements on the desk to your right. In front of you is the mood measure. Turn it over and quickly read and complete it. When you're done, turn it over and place it on top of the mood statements.

(When P is done, return and stand in front of them)

As I said earlier, we're interested in the effects of mood on procedural memory. So what I'm going to have you do now is work on assembling circuit boards again. This time, you won't have the diagrams, but I'll give you the written instructions to help you assemble the circuit boards. Please try to assemble the boards as quickly and accurately as possible. Because some people may be faster at assembling these than others, you may finish one board before the time is up. If you finish the board, please place it outside your door immediately, and pick up another circuit board, then work on the second one until I tell you that the time is up. If you need help remembering any of the steps, please refer to the written instruction sheet. Make sure you follow the instructions step by step, in numerical order. I can't answer any questions or help you in any other way while you are assembling the boards. Do you have any questions now? (Wait for response). Okay, you can come in now. **(Take P over to room, hand them a board & box)**. I'll let you know when your time's up. You may begin now.

(Start stopwatch for 20 minutes. When 20 min are up, say:)

Okay, time's up. Please come back into the main room now. I'd like to ask you some questions about the task you just completed. Please complete this questionnaire now.

Okay, the session is now over, but before you go, the psychology department has asked us to distribute surveys to all participants in our studies. They're thinking about restructuring the research program here, and want to get feedback from our participants first. Here are the materials. Please put the questionnaire back in the envelope and seal it when you're done. I'm just going to go and straighten up in the other room now.

(When P has finished questionnaire)

HAPPY CONDITION: (Are now finished. Go straight to debriefing).

SAD CONDITION:

(Sad condition only) Ok. I have one final questionnaire that I'd like you to complete now. Dr. Webber said that it was alright for me to collect 5 minutes worth of my thesis data at the end of each session. Sorry I didn't do this earlier, but the departmental questionnaire you just completed only refers to research done by faculty members and graduate students, so I didn't want you to complete my research before you filled out the survey. I'm interested in the study of people's life histories. I'm trying to create a life events inventory that can be

used in future research, so I'm asking people to write down various life events that have happened to them over the past 5 years. I'm interested in literally hundreds of different types of events, but it would be difficult to have people write about that many different things, so I've randomly assigned everyone to write about just one type of event.**(Hand out the life events questionnaire--face up).** Please read the instructions on my questionnaire and complete the task. Begin now.

(After 10 min) Okay, time's up. **(Collect life events, then do debriefing)**

Appendix O

Study 3 Script (Unrelated Condition)

E2: Hi, my name is _____, and I'm working with Dr. Stern. This is _____, and he/she is working with Dr. Webber. Because we've been having trouble getting enough participants to sign up for our sessions, we decided to maximize participant use by running 2 studies per session. To be fair to both _____ and I, we decided to hold a random draw at the beginning of each session to determine who will go first for that session. **(Approach the participant and ask:)** Would you please draw a slip of paper from this box and read what it says?

(Participant says "Memory and Instructions Study")

E2: Okay, so that means that _____ goes first. (To E1): I'll be back in a few minutes. My materials are in the large packets on your desks. Please place them to the right of your desk until it's time for my study. Thanks

(E1 takes over)

E1: Dr. Webber and I are interested in factors that may influence the way people remember information and use it to follow instructions. For my session, I'm going to demonstrate the steps involved in assembling a circuit board. I'm going to show you all the steps while you follow along with some instruction sheets and diagrams. Then you're going to spend a few minutes assembling the

board on your own. I'm going to measure your reactions to the assembly task and how well you think you were able to follow the instructions. Do you have any questions? **(Pause)**

(Hand out consent form)

Before I begin with the instructions, please read and sign my consent form and place it on the side of your desk when you're done.

Now, I'm going to show you how to assemble the circuit board. Please pay careful attention to the instructions. **(Hand P's instruction sheet, diagram, parts ID sheet, and general instructions sheet)**. These instructions and diagrams will help you follow along while I show you how we want the circuit board assembled.

This is an example of a completed circuit board. I'm going to go over each of the steps required to complete the board now. You can follow along with your diagrams and the sheet entitled "INSTRUCTIONS FOR ASSEMBLING CIRCUIT BOARD". You can refer to the parts identification sheet if you need to know what the parts look like up close.

(Read each of the 17 steps in order while pointing to the parts they refer to)

Now I'm going to show you one more thing you'll need to know in order to assemble the board properly. You can follow along with the sheet entitled "General Instructions for Installing Pins, washers, and

springs". **(Hold up a pin, washer, and spring, and say, while showing each:)** this is a pin, this is a washer, and this is a spring. **(Then assemble the three while reading word-for-word from the instruction sheet)**

Okay, now I'm going to have you spend the next few minutes assembling a circuit board. Make sure you follow the instructions step by step, in numerical order. I'll let you know when your time's up. Now, I need to set you up in a private room. In the room, you'll find all the parts you will need to assemble the board. Please take your diagrams and instruction sheets with you to the room. **(Point P to the room)**

(When P is in room, start stopwatch. Then go place a questionnaire on desk).

(After 10 minutes, ask participants to join you in the main room again).

Okay, time's up. Please come back into the main room now. Just leave everything in the room. **(Wait until P's have returned, and hand them each a questionnaire).** As I said earlier, I'm interested in your reactions to our instructions and the assembly task. On your desk is a questionnaire assessing your reactions. Please complete the questionnaire now.

(Go to private room and collect circuit board, parts, and instruction sheets, and place them on the desk at the back of the room)

(Wait until P's finished with questionnaire). Okay, that's it for my study. Thank you very much for participating today. Please hand me my materials now. I'm just going to go get the other experimenter.

(Collect consent forms and questionnaires). Thanks again.

(Pick up circuit board and parts box and leave room. Go to back room and disassemble the board)

(E2 Returns)

E2: Hi, I'm _____. Dr. Stern and I are attempting to validate a mood induction. Please get my packet of materials now. Please remove the paper clip from the packet and place it on the desk to your right. There should now be a consent form in front of you. It's marked "Administration of a Modified Mood Induction Procedure." Please read and sign the consent form and place it on the desk to your right when you are done. That way, I'll know that you're ready to continue. Please don't look through the other materials until I ask you to.

(When participants have completed consent forms.)

E2: Dr. Stern and I are trying to establish Canadian norms for a modified mood induction procedure. The mood induction, known as

the Velten, is used widely in research in the United States. It is very effective in creating temporary mood changes. Participants are presented with a set of cards that have mood-related statements typed on them. As they read the cards to themselves, their moods change progressively to become like the mood represented on the cards. Then, participants sit for a few minutes to think about things in their own lives that have made them feel like the mood represented by the cards. With concentration, this builds the moods even further. People who have done it find that they really get into it. They've found that it's interesting to learn how to change their own moods. I hope that, if you get anything out of this session, it's the knowledge that you can change your mood. If you can learn how to talk yourself into a mood, you can learn how to talk yourself out of a mood.

We haven't used this technique as widely in Canada, so before we begin using it in the lab, we'd like to confirm that it will be as effective with a Canadian sample as it is with an American sample. Once we've shown its effectiveness, we can use it more often in our lab. For this induction, it's important that you concentrate very hard and try to "get into the mood." Another thing is, it's very easy to react to the mood induction. You start feeling your mood change and try to fight it. Please don't do this. Just go with the flow and let your mood change.

If this works, we'll be able to use this induction for a lot of future research. So, on the mood measure that I'll give you later, it is important for you to answer the questions honestly. Otherwise, I might try to use the data to guide my future research when the data aren't valid. It'll be obvious what mood condition you're in, so be sure to respond the way you really feel. Your help is appreciated.

As I said, I'm going to change your mood by having you read some statements to yourself. After you read a statement, you'll concentrate on it. This procedure is designed to make you feel a certain way. These statements will gradually change your mood and will make you think of things in your own life that reflect that mood. After you've done this, I'll have you read a brief description indicating how to build the mood even further. Then you'll sit for a few minutes, with your eyes closed, and concentrate on building the mood. You'll think of things that make you feel more like the mood. I have you do this because thinking about a feeling builds it. You'll experience it. Simply concentrate on what you're reading, thinking, and feeling and the mood will build.

Please remove the paper clip from my packet and place it on the desk to your right. There are a set of instructions in front of you. After you've read through the instructions, put the sheets on the desk to your right so I'll know you are ready to continue. I'll tell you when

to begin going through the packet of mood statements and when to go on to the next card in the packet. Also, please don't write on the instructions or packet of statements, since I re-use them. Read the instructions now. And, as I said, don't begin going through the mood packet until I ask you to.

(P's read instructions)

We're ready to begin. Don't go on to the next statement until I tell you to. One final thing, if the induction gets to be too much, let me know and I'll stop you.The first page of the packet indicates what mood condition you're in. Open the packet to the page marked Card 1. Begin now. **(Keep an eye on the P in case of a reaction).**

15 sec (next) **(After the first "next", move slowly over to desk behind participant)**

15 sec (next)...

(After 15 minutes, you reach the final card)

...Next. Please read these instructions, close your eyes, and concentrate on building your mood. Begin now.

(After 2 minutes.)

Please place the packet of mood statements on the desk to your right. In front of you is the mood measure. Turn it over and quickly read and complete it. When you're done, turn it over and place it on top of the mood statements.

(When P is finished questionnaire, move back in front of them)

E2: Thank you very much. That's the end of my study. Thank you very much for your cooperation. Please hand me my materials now. **(Collect packets)**. I'm just going to go get the other experimenter now.

(E2 leaves, goes and gets E1)

E1: There's another issue that Dr. Webber and I wanted to address in our study. We're also interested in the effects of different delay periods on procedural memory. The draw that we held at the beginning of this session actually served two purposes. It helped us decide who got to go first for the session, but it also helped me determine whether you'd be in the immediate or delayed condition for my study. In one condition, we have people assemble the circuit boards immediately following our demonstration. In the other condition, which is the one you were assigned to, we have people spend a few minutes familiarizing themselves with the boards right after the demonstration, then wait for a delay of 30 minutes before the real assembly task. Because of the way the draw turned out today, you're in the 30 minute delay condition.

For this part of my study, you won't have the diagrams, but I'll give you the written instructions to help you assemble the circuit boards. You'll go back into that room and work on completing the

boards. Please try to assemble the circuit boards as quickly and accurately as possible. Because some people may be faster at assembling these than others, you may finish one board before the time is up. If you finish the board, please place it outside your door immediately, and pick up another circuit board, then work on the second one until I tell you that the time is up. If you need help remembering any of the steps, please refer to the written instruction sheet. Make sure you follow the instructions step by step, in numerical order. I can't answer any questions or help you in any other way while you are assembling the boards. Do you have any questions? **(Wait for response)**

(Hand P a circuit board and parts box) Take these into the room with you now. I'll let you know when the time's up.

(Start stopwatch for 20 minutes. When 20 min are up, say:)

Okay, time's up. Please come back into the main room now. I'd like to ask you some final questions now about my study. I've put a questionnaire on your desk. Please complete it now.

(Wait until P's finish)

Okay, this study is over now, but before you go, I have something else for you to complete. The psychology department has asked us to distribute surveys to all participants in our studies. They're thinking about restructuring the research program here, and

want to get feedback from our participants first. Here's the materials. Please put the questionnaire back in the envelope and seal it when you're done. I'm just going to go and straighten up in the other room now.

(When P has finished questionnaire)

HAPPY CONDITION: (Is now finished. Go straight to debriefing).

SAD CONDITION: Ok. I have one final questionnaire that I'd like you to complete now. Dr. Webber said that it was alright for me to collect 5 minutes worth of my thesis data at the end of each session. Sorry I didn't do this earlier, but the departmental questionnaire you just completed only refers to research done by faculty members and graduate students, so I didn't want you to complete my research before you filled out the survey. I'm interested in the study of people's life histories. I'm trying to create a life events inventory that can be used in future research, so I'm asking people to write down various life events that have happened to them over the past 5 years. I'm interested in literally hundreds of different types of events, but it would be difficult to have people write about that many different things, so I've randomly assigned everyone to write about just one type of event.**(Hand out the life events questionnaire--face up).** Please read the instructions on my questionnaire and complete the task. Begin now.

(Start stopwatch for 5 minutes)

Okay, the session's over now.

(Begin debriefing)

Appendix P

Study 3 Consent Form (Related Part 1)

Memory and Instructions Study

Part A: Assembly Task

Consent Form

I _____ agree to participate in a study addressing factors that affect memory for instructions. I know that I will watch a demonstration of how to assemble a circuit board, and that I will later be asked to assemble the board on my own, and complete a questionnaire assessing my reactions to the task. I realize that further knowledge of the hypothesis at this time could bias the results of the study, and that I will be completely debriefed upon completion of the experiment. I also realize that my name will not be associated in any way with my data, and that I am free to discontinue participation in the study at any time whatsoever, without penalty. I know that I will receive research participation credit for this study.

Signature: _____
Date:_____

Study 3 Consent Form (Related Part 2)
Memory and Instructions Study

Part B: Mood Induction Procedure

Consent Form

I agree to undergo a mood induction procedure. I understand that this part of the session is concerned with the amount of mood change people experience when they're exposed to a mood induction procedure. I know that I will read a set of mood related cards at the rate of one per 15 seconds. I further know that these cards are designed to change my mood. I will then read a set of instructions indicating how to build the mood even further and I will sit for a short period of time, with my eyes closed, concentrating on changing my mood. I know that I will complete a brief mood measure. I know that I am free to discontinue participation at any time without penalty, and that I will receive credit for participating.

Signature:_____
Date:_____

Appendix Q

Study 3 Consent Form (Unrelated Part 1)
Memory and Instructions Study

Consent Form

I _____ agree to participate in a study addressing factors that affect memory for instructions. I know that I will watch a demonstration of how to assemble a circuit board, and that I will later be asked to assemble the board on my own, and complete a questionnaire assessing my reactions to the task. I realize that further knowledge of the hypothesis at this time could bias the results of the study, and that I will be completely debriefed upon completion of the experiment. I also realize that my name will not be associated in any way with my data, and that I am free to discontinue participation in the study at any time whatsoever, without penalty. I know that I will receive research participation credit for this study.

Signature: _____

Date: _____

Study 3 Consent Form (Unrelated Part 2)

Administration of a Modified Mood Induction Procedure

Consent Form

I agree to undergo a mood induction study being conducted by Dr. Stern. I understand that the study is concerned with the amount of mood change people experience when they're exposed to a mood induction procedure. I know that I will read a set of mood related cards at the rate of one per 15 seconds. I further know that these cards are designed to change my mood. I will then read a set of instructions indicating how to build the mood even further and I will sit for a short period of time, with my eyes closed, concentrating on changing my mood. I know that I will complete a brief mood measure. I know that I am free to discontinue participation at any time without penalty, and that I will receive credit for participating.

Signature:_____

Date:_____

Appendix R

Studies 3 and 4 Mood Measure

Please circle the number for each item that best represents how you are feeling right now:

1	2	3	4	5	6	7
very happy						very sad
1	2	3	4	5	6	7
very passive						very active
1	2	3	4	5	6	7
very bad						very good
1	2	3	4	5	6	7
very excited						very calm

Appendix S

Departmental Questionnaire

September 11, 2000

Psychology Department Notice
Department of Psychology
P-220 Biological Sciences Building
University of Alberta

Campus Mail

To All Staff and Graduate Students:

Re: Research Conducted in Fall Term, 00/01

The aforementioned are asked to inform their research assistants to administer the following questionnaire regarding the restructuring of research procedures in psychological studies in this department. Please ask participants to fill out the enclosed questionnaire (including this cover sheet) and thank them for their assistance in this matter. Thank you and we apologize for any inconvenience.

Department of Psychology
RESEARCH RESTRUCTURING SURVEY

SECTION 1: DEMOGRAPHIC INFORMATION
Age _____
Gender (circle one) M F
Year in University (circle one) 1 2 3 4 5

SECTION 2: EXPERIMENT CHARACTERISTICS
FOR THE FOLLOWING SECTION, PLEASE INDICATE IF YOU TOOK PART IN ONLY **ONE EXPERIMENT** DURING THIS SESSION, OR **MORE THAN ONE EXPERIMENT**, THEN PROCEED TO THE APPROPRIATE SECTION:

Number of **experiments** conducted during this experimental session (check one):
____ 1 (Please complete Section 2A only)
____ More than 1 (Please complete Section 2B only)

SECTION 2A: SINGLE EXPERIMENT SESSIONS
Study name and number: _____
Number of credits of the current session: 1 2 3
Number of experimenters running session: 1 2 3
Length of session (in minutes): _____
Number of tasks completed during the experiment: _____
If more than one task was completed during the experiment, indicate the degree to which the tasks appeared to be related to one another:

1	2	3	4	5
not at all related				highly related

SECTION 2B: MULTIPLE EXPERIMENT SESSIONS

Study name and number: _____

Number of credits of the current session: 1 2 3

Number of experimenters running session: 1 2 3

Length of session (in minutes): _____

Number of different experiments conducted during the experiment: _____

Indicate the degree to which the experiments appeared to be related to one another:

1	2	3	4	5
not at all related				highly related

SECTION 3: PARTICIPANT EVALUATION

*IF YOU HAVE NOT PARTICIPATED IN ANY OTHER PSYCHOLOGY STUDIES, PROCEED DIRECTLY TO SECTION 4

Compared to other studies you have participated in, this study was (please circle the appropriate number for each of the following criteria):

1	2	3	4	5
less enjoyable		about the same		more enjoyable
less fatiguing		about the same		more fatiguing
longer		about the same		shorter
less interesting		about the same		more interesting
less organized		about the same		more organized

SECTION 4: IMPACT OF RESEARCH

How satisfied are you with your experience as a research participant?

1	2	3	4	5
very dissatisfied				very satisfied

How do you feel right now?

1	2	3	4	5
very sad				very happy

1	2	3	4	5
very active				very passive

SECTION 5: OVERALL IMPRESSIONS

In the space below, please write a brief description of:

1. What you think the researcher(s) was(were) studying
2. Any impressions you have of the study/studies

Appendix T

Study 3 Verbal Debriefing

Okay, the study is over now. I'd like to take this opportunity to tell you a little bit more about what we were studying here today. What you took part in today was a social psychology experiment. Sometimes, in social psychology, we can't tell you up front exactly what the study is about, because we want you to react naturally to the situation, and not in the way you think we want you to react.

[Unrelated condition]

So, first off, this was actually only one big study. We're both working with Dr. Sinclair from the psychology department, studying the effects of induced mood and relatedness of mood and task on productivity in an assembly task.

[Related condition]

I'm actually working with Dr. Sinclair from the psychology department, studying the effects of induced mood and relatedness of mood and task on productivity in an assembly task.

[All conditions]

I guess you can see that if I told you that I was changing your mood and whether or not the mood seemed related to a subsequent task to see if this affected how quickly and accurately you performed the task, that you might have responded differently than you did. The reason that we sometimes don't tell people exactly what we're studying

and exactly what we expect to find before our studies is because this often causes people to behave in a way that they think that we want, rather than how they really would behave without expectations. People behaving based on what they think the experimenters want rather than how they would truthfully respond is called demand characteristics. This can be a problem in research. So, I hope you can see how having people know exactly what we're looking for would lead to problems in the interpretation of our data. So, unfortunately, I couldn't tell you everything ahead of time. Hopefully now you can see that if I told you we were really interested in the effects of mood on how you assembled the circuit board, you might have behaved a little differently.

Independent variables are variables that researchers manipulate or change. Our independent variable in this study was mood. Some people read cards designed to make them feel happy, some read cards designed to make them feel sad, some read neutral cards. So, mood was an independent variable and it had three levels -- happy, sad and neutral. Our second independent variable was whether or not the mood appeared to be related to the assembly task. We had two expectancy conditions: in one, we told people that we were conducting two separate studies today, one involving mood and one involving memory for instructions. In the other condition, we told people that we

were interested in the effects of mood on procedural memory, so in a way, we related the mood task with the assembly task. Our critical dependent variable, or the variable that we measure, was your performance on the assembly task. We will assess the circuit boards people assembled for both speed and accuracy of assembly. Our second dependent variable is the questionnaire you completed after you went through the mood induction. We need to know whether the induction worked, so we will compare the means of the responses to the happy, sad and neutral mood inductions to make sure that people were in fact feeling differently in the three mood conditions. Our third dependent variable is the questionnaire you completed after the assembly task. We want to assess how people responded to the task, and if their mood or expectations affected how well they think they performed the task. Finally, our fourth dependent variable was the departmental survey you completed at the end of the study. We needed to assess your mood, and your reactions to our study once again, to make sure our manipulations worked, so we embedded questions about your reactions and how you were feeling in the follow-up survey. We sometimes need to embed questions like that, so that people feel freer to respond how they're feeling, without trying to "tell us what we want

Most of us believe that good moods have benefits; while this is true, recent research coming from Dr. Sinclair's lab and other labs around the world suggest that, for some decisions and processes, good moods are not beneficial. For example, Dr. Sinclair has shown that happy people were least accurate in a performance appraisal decision, happy people are most biased in forming impressions, and are least accurate when doing things like making mathematical estimates. People in good moods appear to process information nonsystematically or heuristically, whereas people in bad moods appear to devote more energy to actively processing information--they appear to process systematically, leading to more accurate and less biased judgments. We've recently shown that sad people perform much better at this assembly task than happy people. That is, they make significantly less errors while maintaining the same level of productivity. We believe that this is because happy people don't want to be distracted from their positive mood, or brought down, by trying to think or work too hard. Sad people, on the other hand, may use a task to distract themselves from their negative mood, and actually wind up improving how they feel. What we need to do now is further explore this issue. Now we need to see whether performance will still be affected if the mood is directly related to the work task. We suspect that, if people attribute their negative mood to the task they're working on, they may not work

as hard to complete the task. Similarly, we believe that if people see a positive mood as being related to a task, they may want to work harder at the task. Hopefully, this type of research will further our knowledge about the effects of mood on productivity.

SAD CONDITION ONLY:

Please turn to the last page of the life events inventory you just completed. This page is yours to keep and contains information that relates to the test that you'll be taking on the research component of your introductory psych class. It describes the reason for the life events task that you completed at the end of the session. It's actually a mood restoration procedure that's designed to make you feel happy before leaving. If you have any questions, feel free to ask me.

(Wait until they've finished reading)

ALL CONDITIONS:

Are there any questions? I'd like to thank you for coming out to this session. Without the help of people like you, we couldn't answer most important scientific questions in psychology. You've been a great help. Once again, I want to apologize for not telling you all of this information in advance. If you have any questions about the study or just general questions related to the issues we addressed here, feel free to contact Dr. Sinclair or his research assistant. Their phone numbers are on the hand out I just gave you. One final thing that I need to ask

you is, please don't tell other students what we were studying because, if others know, our data wouldn't be valid and this would cause us a lot of problems in the future with our research. If someone asks you about it, you can tell them that you learned how to assemble things. HAND THEM A CREDIT SHEET AND THANK THEM AGAIN FOR PARTICIPATING.

Appendix U

Study 4 Script

E2: Hi, my name is _____, and I'm working with Dr. Stern. We're interested in the effects of different mood states on three specific types of memory: Procedural, Autobiographical, and Semantic. For procedural memory we're interested in people's ability to recall instructions, for autobiographical memory we're interested in people's ability to recall specific personal memories from their past, and for semantic memory we're interested in people's ability to recall word lists. First, I'm going to show you some things that you'll need for the memory tasks you'll be completing later. Then I'll put you through a mood induction, then you'll complete the memory tasks.

Before we begin, I'd like you to please read and sign the consent form in front of you. You can place it in the corner of your desk when you're done.

(Go get word list. Hand list to P, and say:)

Now I'm going to show you a few things you'll need to know for the memory portion of the study. First, I'd like you to familiarize yourself with the words on this list, by reading through the list and circling 6 words that refer to animals. By animals, I mean any living creatures, so birds, insects, mammals, etc. will all count. Okay, so go through this list now, and circle 6 words referring to animals. Please let me know when you've circled six.

(After P is done circling, take word list from them and place it on desk)

Okay, now I'm going to show you all the steps involved in assembling a circuit board. I'm going to demonstrate the steps while you follow along with these instruction sheets and diagrams. **(Hand P's instruction sheet, diagram, parts ID sheet, and general instructions sheet)**. These instructions and diagrams will help you follow along while I show you how we want the circuit board assembled.

(Hold up sample circuit board)

This is an example of a completed circuit board. I'm going to go over each of the steps required to complete the board now. You can follow along with your diagrams and the sheet entitled "INSTRUCTIONS FOR ASSEMBLING CIRCUIT BOARD". You can refer to the parts identification sheet if you need to know what the parts look like up close.

(Read each of the 17 steps in order while pointing to the parts they refer to. When you've read through all 17, turn the board around so they can have a look at the finished product from front & back)

Now I'm going to show you one more thing you'll need to know in order to assemble the board properly. You can follow along with the

sheet entitled "General Instructions for Installing Pins, washers, and springs". **(Hold up a pin, washer, and spring, and say, while showing each:)** this is a pin, this is a spring, and this is a washer. **(Then assemble the three while reading word-for-word from the instruction sheet)**

(Take away instructions and diagrams and place them back on shelf. Then sit casually on edge of desk)

Okay, now it's time for the mood induction. The mood induction we use, known as the Velten, is very effective in creating temporary mood changes. For this induction, participants are presented with a set of cards that have mood-related statements typed on them. As they read the cards their moods change progressively to become like the mood represented on the cards. Then, participants sit for a few minutes to think about things in their own lives that have made them feel like the mood represented by the cards. With concentration, this builds the moods even further. People who have done it find that they really get into it. They've found that it's interesting to learn how to change their own moods. **(Look P in the eye when you say the next section)** I hope that, if you get anything out of this session, it's the knowledge that you can change your mood. If you can learn how to talk yourself into a mood, you can learn how to talk yourself out of a mood.

In order for the induction to work, it's important that you concentrate very hard and try to "get into the mood." Another thing is, it's very easy to react to the mood induction. You start feeling your mood change and try to fight it. Please don't do this. Just go with the flow and let your mood change.

Once you've gone through the induction, I'll give you a mood measure. It's important for you to answer the questions on the mood measure honestly, by telling me how you really feel. Otherwise, I might try to use this data to guide my future research when the data aren't valid. It'll be obvious what mood condition you've been assigned to, so be sure to respond the way you really feel. Your help is appreciated.

As I said, I'm going to change your mood by having you read some statements to yourself. After you read a statement, you'll concentrate on it. This procedure is designed to make you feel a certain way. These statements will gradually change your mood and will make you think of things in your own life that reflect that mood. After you've done this, I'll have you read a brief description indicating how to build the mood even further. Then you'll sit for a few minutes, with your eyes closed, and concentrate on building the mood. You'll think of things that make you feel more like the mood. I have you do

this because thinking about a feeling builds it. You'll experience it. Simply concentrate on what you're reading, thinking, and feeling and the mood will build.

(Go to desk and get Velten packet. Give it to P)

Please remove the paper clip from my packet and place it on the desk to your right. There are a set of instructions in front of you. After you've read through the instructions, put the sheets on the desk to your right so I'll know you are ready to continue. I'll tell you when to begin going through the packet of mood statements and when to go on to the next card in the packet. Also, please don't write on the instructions or packet of statements, since I re-use them. Read the instructions now. And, as I said, don't begin going through the mood packet until I ask you to.

(Go get stopwatch. Return when P is done reading instructions)

We're ready to begin. Don't go on to the next statement until I tell you to. One final thing, if the induction gets to be too much, let me know and I'll stop you. The first page of the packet indicates what mood condition you're in. Open the packet to the page marked Card 1. Begin now. **(Remain standing by desk until the first 15 sec have passed, then go to desk and sit for remainder of Velten)**

15 sec (next)

15 sec (next)

(Last card is incubation instructions.)

E2: Next. Please read these instructions, close your eyes, and concentrate on building your mood. Begin now.

(Look at sticky note, and prepare for expectancy manipulation. You have 2 minutes. After 2 min, say:)

Please place the packet of mood statements on the desk to your right. In front of you is the mood measure. Turn it over and quickly read and complete it. When you're done, turn it over and place it on top of the mood statements.

(Write subject # on follow-up questionnaire. After P is finished mood measure, walk back to P desk)

Now it's time to complete the memory tasks. **(Go to appropriate expectancy condition)**

NO EXPECTANCY CONDITION:

Our procedural memory task involves assembling a circuit board, like I demonstrated earlier. You've been randomly assigned to complete the procedural memory task first.

(Go directly to section labelled "COMMON INSTRUCTIONS")

HAPPY-CONSISTENT CONDITION:

Our procedural memory task involves assembling a circuit board, like I demonstrated earlier. You've been randomly assigned to complete the procedural memory task first.

Because pilot tests have indicated that people **tend to enjoy** our assembly task, it won't interfere with your current mood state.

(Go directly to section labelled "COMMON INSTRUCTIONS")

SAD-CONSISTENT CONDITION:

Our procedural memory task involves assembling a circuit board, like I demonstrated earlier. You've been randomly assigned to complete the procedural memory task first. Because pilot tests have indicated that people tend **not to enjoy** our assembly task, it won't interfere with your current mood state.

(Go directly to section labelled "COMMON INSTRUCTIONS")

HAPPY-INCONSISTENT CONDITION:

Our procedural memory task involves assembling a circuit board, like I demonstrated earlier. You've been randomly assigned to complete the procedural memory task first. Because pilot tests have indicated that people tend **not to enjoy** our assembly task, it will interfere with your current mood state.

(Go directly to section labelled "COMMON INSTRUCTIONS")

SAD-INCONSISTENT CONDITION:

Our procedural memory task involves assembling a circuit board, like I demonstrated earlier. You've been randomly assigned to complete the procedural memory task first. Because pilot tests have

indicated that people **tend to enjoy** our assembly task, it will interfere with your current mood state.

COMMON INSTRUCTIONS:

For this part of the session, you won't have the diagrams, but I'll give you the written instructions to help you assemble the circuit boards. Please try to assemble the circuit boards as quickly and accurately as possible. Because some people may be faster at assembling these than others, you may finish one board before the time is up. If you finish the board, please place it outside your door immediately, and pick up another circuit board, then work on the second one until I tell you that the time is up. If you need help remembering any of the steps, please refer to the written instruction sheet. Make sure you follow the instructions step by step, in numerical order. I can't answer any questions or help you in any other way while you are assembling the boards. Do you have any questions now? (Wait for response). Okay, I'll just set you up in this room now. (Take P over to room). I'll let you know when your time's up. You may begin now.

(Start stopwatch for 20 minutes. When 20 min are up, say:)

Okay, time's up. Please come back into the main room now. I'd like to ask you some questions about the task you just completed. Please complete this questionnaire now.

HAPPY CONDITIONS: (Are now finished. Go now to debriefing).

SAD CONDITIONS:

Now I'd like to test your autobiographical memory, which refers to memory for past events from your life. Since you went through a sad mood induction, I'm going to test your memory for a different kind of personal event, namely happy events from your past. I'd like you to read through the instructions on this sheet, and then spend a few minutes writing about events from your life. **(Hand out life events inventory)**. You may begin now.

(After 5 min) Okay, time's up. **(Collect life events)**

(Go to debriefing)

Appendix V

Study 4 Consent Form

MOOD AND MEMORY STUDY

Consent Form

I agree to participate in the mood and memory study being conducted by Dr. Stern. I understand that the study involves testing three types of memory: semantic, procedural, and episodic. I know that I may be required to read and remember word lists, and sets of instructions. I further know that I will be shown how to assemble a circuit board, and will spend time working on an assembly task. I know that I may be asked to recall past events from my life. I know that I will complete questionnaires addressing the memory tasks that I complete. I also understand that this session involves a mood induction. I know that I will read a set of mood related cards at the rate of one per 15 seconds. I further know that these cards are designed to change my mood. I will then read a set of instructions indicating how to build the mood even further and I will sit for a short period of time, with my eyes closed, concentrating on changing my mood. I know that I will complete a brief mood measure. I am aware that the study takes about 90 minutes. I know that I am free to discontinue participation at any time without penalty, and that I will receive 2 credits for participating.

Signature:_____
Date:_____

Appendix W

Bolt	Tree	Watch	Vent	Scaffold	Element
Eyebrow	Continent	Film	Actor	Knuckle	House
Sky	Drill	Zipper	Braid	Tank	Bench
Ring	Fig	Towel	Bone	Hall	Loop
Balloon	Dolphin	Sticker	Quote	Saddle	Mirror
Dove	Soap	Dog	Street	Caterpillar	Dial
Plastic	Microphone	Plaza	Screen	Television	Glue
Cylinder	Holiday	Mantle	Map	Jersey	Folder
Lens	Eclipse	Satellite	Flower	Light	Coin
Brick	Colony	Chin	Toy	Shoelace	Bean
Soccer	Elevator	Valley	Garbage	Cow	Squirrel
Idea	Submarine	Window	Rift	Desk	Brooch
Plan	Chain	Jet	Stair	Cone	Pond
Index	Plantation	Person	Store	Kite	Pool
Vein	Note	Clock	Bin	Turtle	Sofa
Pocket	Pan	Deer	Data	Bike	Nature
Glass	Wax	Tar	Square	Page	Arrow
Axe	Baseball	Train	Keys	Mill	Deck
Matches	Horse	Farm	Bargain	Stapler	Domino
Helicopter	Bell	Checker	Kettle	Road	Letter
Mountain	Carpet	Token	Dish	Park	Pyramid
Curl	Pencil	Planet	Sand	Ocean	Gravel
Highway	Sweater	Mailbox	Fence	Door	Denim
Sock	Package	Plane	Flame	Telephone	Bump
Shadow	Lead	Bottle	Tent	Thermometer	Shuttle
Drawer	Umbrella	Lamp	Poster	Wheel	Salt
Star	Clip	Cart	Zoo	Belt	Rug
File	Carpenter	Oven	Crest	North	Lot
Antenna	Stage	Wood	Sink	Circle	Sign
Trampoline	Bus	Calendar	Bridge	Clay	Song
Bag	Carnation	Newspaper	Curb	Rock	Book
Gum	Youth	Chair	Tools	Stripe	Fan
Battery	Iron	Cliff	Pole	Mouse	Bird
Cloth	Plus	Hood	Railroad	Season	Statue
Clamp	Seat	Loft	Flour	Button	Box

Appendix X

ASSEMBLY TASK: IMPRESSION QUESTIONNAIRE

1. How quickly do you think you assembled the circuit boards?

1	2	3	4	5	6	7
very slowly						very quickly

2. How accurately do you think you assembled the circuit boards?

1	2	3	4	5	6	7
very inaccurately						very accurately

3. How satisfied are you with your performance at the assembly task?

1	2	3	4	5	6	7
very dissatisfied						very satisfied

4. How enjoyable was the assembly task?

1	2	3	4	5	6	7
not at all enjoyable						very enjoyable

5. Please circle the number on each scale that indicates how much influence each of the following factors has on the performance of assembly tasks:

ABILITY

1	2	3	4	5	6	7
no influence at all						a significant influence

EFFORT

1	2	3	4	5	6	7
no influence at all						a significant influence

MOOD

1	2	3	4	5	6	7
no influence at all						a significant influence

GENDER

1	2	3	4	5	6	7
no influence at all						a significant influence

FOLLOW-UP INFORMATION

This information was requested by Dr. Stern so that he can use it as a statistical control.

1. What do you think I was studying?

2. How are you feeling right now?

1	2	3	4	5	6	7
very sad						very happy

1	2	3	4	5	6	7
very bad						very good

3. Have you recently read any newspaper articles or listened to radio programs describing research similar to the study you took part in today?(circle one)

Yes
No

If yes, place a check mark next to the media source(s) that apply:

Edmonton Journal article _____
National Post article _____
radio program _____
other media source _____

Appendix Y

Study 4 Verbal Debriefing

Okay, the study is over now. I'd like to take this opportunity to tell you a little bit more about what we were studying here today. What you took part in today was a social psychology experiment. Sometimes, in social psychology, we can't tell you up front exactly what the study is about, because we want you to react naturally to the situation, and not in the way you think we want you to react.

I'm actually working with Dr. Sinclair from the psychology department, studying the effects of induced mood and expectancies about how a task would affect that mood on productivity on that task. Basically, we first changed everyone's mood, then we varied your expectations about how the assembly task would affect your mood. Some people were told that the task wouldn't interfere with their mood, others were told it would, and others weren't given any expectation about the task.

I guess you can see that if I told you that I was changing your mood and giving you a particular expectancy about the task you were going to perform, and then measuring if this affected how quickly and accurately you performed the task, that you might have responded differently than you did. The reason that we sometimes don't tell people exactly what we're studying and exactly what we expect to find before our studies is because this often causes people to behave in a

way that they think that we want, rather than how they really would behave without expectations. People behaving based on what they think the experimenters want rather than how they would truthfully respond is called demand characteristics. This can be a problem in research. So, I hope you can see how having people know exactly what we're looking for would lead to problems in the interpretation of our data. So, unfortunately, I couldn't tell you everything ahead of time.

Independent variables are variables that researchers manipulate or change. Our first independent variable in this study was mood. Some people read cards designed to make them feel happy, some read cards designed to make them feel sad. So, mood was an independent variable and it had two levels -- happy and sad. Our second independent variable was your expectancy about the effects of the task on your. We had three expectancy conditions: mood-consistent, where we told people that the assembly task wouldn't interfere with their mood; mood-inconsistent, where we told people that the task would definitely interfere with their mood; and no expectancy, which was basically a control condition. Our critical dependent variable, or the variable that we measure, was your performance on the assembly task. We will assess the circuit boards people assembled for both speed and accuracy of assembly. Our second dependent variable is the

questionnaire you completed after you went through the mood induction. We need to know whether the induction worked, so we will compare the means of the responses to the happy and sad mood inductions to make sure that people were in fact feeling differently in the two mood conditions. Our third dependent variable is the questionnaire you completed after the assembly task. We want to assess how people responded to the task, and if their mood or expectations affected how well they think they performed the task. We also included a follow-up mood measure, to see if the interaction between mood and expectancy led to different moods in people following performance of the task.

Most of us believe that good moods have benefits; while this is true, recent research coming from Dr. Sinclair's lab and other labs around the world suggest that, for some decisions and processes, good moods are not beneficial. For example, Dr. Sinclair has shown that happy people were least accurate in a performance appraisal decision, happy people are most biased in forming impressions, and are least accurate when doing things like making mathematical estimates. People in good moods appear to process information nonsystematically or heuristically, whereas people in bad moods appear to devote more energy to actively processing information--they appear to process systematically, leading to more accurate and less biased judgments.

We've recently shown that sad people perform much better at this assembly task than happy people. That is, they make significantly less errors while maintaining the same level of productivity. We believe that this is because happy people don't want to be distracted from their positive mood, or brought down, by trying to think or work too hard. Sad people, on the other hand, may see the task as an opportunity to distract themselves from their negative mood, and actually wind up improving how they feel. What we need to do now is to determine if our effects are really due to these kinds of expectancies. If we're right, then happy people who are told that the task will maintain their happy mood should perform better than happy people who are told that the task will interfere with their happiness. For sad people, we should see the reverse pattern, with sad people performing best when they think the task will interfere with their mood. In the control condition, we expect to find the same pattern we've found before, with sad people outperforming happy people. Hopefully, this type of research can be expanded to other kinds of tasks and environments, so we can eventually apply our findings to real-world workplaces.

SAD CONDITION ONLY:

Please turn to the last page of the life events inventory you just completed. This page is yours to keep and contains information that relates to the test that you'll be taking on the research component of

your introductory psych class. It describes the reason for the life events task that you completed at the end of the session. It's actually a mood restoration procedure that's designed to make you feel happy before leaving. If you have any questions, feel free to ask me.

(Wait until they've finished reading)

ALL CONDITIONS:

Are there any questions? I'd like to thank you for coming out to this session. Without the help of people like you, we couldn't answer most important scientific questions in psychology. You've been a great help. If you have any questions about the study or just general questions related to the issues we addressed here, feel free to contact Dr. Sinclair or his research assistant. Their phone numbers are on the hand out I just gave you. One final thing that I need to ask you is, please don't tell other students what we were studying because, if others know, our data wouldn't be valid and this would cause us a lot of problems in the future with our research. We've actually gone to a lot of trouble to set up our study so that people really do respond naturally. If people were to come into our lab with prior knowledge about our hypotheses, then we'd wind up finding what we expected, but it would be for all the wrong reasons. So, we'd like to ask for your help with this problem. If someone asks you what this study is about, you can tell them that you learned how to assemble things. You're

telling the truth, and we can run the study without worrying about demand characteristics. Okay, thanks again for participating. **Thank P again, and hand them a credit sheet.**