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DEFENSIVE MISERLINESS: HOARDING ATTENTION IN THE SERVICE OF EMOTIONAL REGULATION

by

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Submitted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy

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GRADUATE STUDIES

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DEFENSIVE MISERLINESS: HOARDING ATTENTION IN THE SERVICE OF EMOTIONAL REGULATION

Abstract
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The purpose of the present investigation was to determine whether repressors will allocate attentional resources in a way that is especially conducive to using attention to regulate their emotional experience. This bias in allocation was referred to as defensive miserliness. A pair of experiments examined whether repressors were better able than nonrepressors to shift their attention from one stimulus to another in two divided attention tasks. The experiments also examined whether repressors became unwilling to shift their attention across tasks when the threat of experiencing negative emotions was made salient. The results of the first experiment suggested that repressors did indeed show a bias in the manner in which their attentional resources were allocated. A more rigorous and complex test of the hypothesis conducted in the second
experiment, however, failed to support the defensive miserliness hypothesis. The bias demonstrated by repressors in the first experiment is believed to explain in part why repressors are successful at regulating emotional states, and why shifting attention is one effective way to control emotions.
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Defensive Miserliness: Hoarding Attention in the Service of Emotional Regulation

"What should you do when you see something that bothers you?" Grandmother might reply, "Just ignore it." The advice may seem simplistic but it may also be wise counsel: if one can avoid paying attention to unpleasant things, one might be able to avoid feeling bad. It seems unlikely that one would be able to completely avoid feeling bad, but unpleasant or unwanted feelings can sometimes be disruptive in daily life. When one wants to make a good impression, or complete an important project, feeling bad can make it difficult to function very well. Many people, however, seem to have adapted to these circumstances, and have a number of means by which they can avoid or minimize bad feelings that occur throughout the day. The use of such emotional regulation strategies varies according to dispositional and situational factors, and some individuals seem to use a wide range of strategies and do so habitually. Repressors are individuals who habitually try to avoid or minimize
the experience of unpleasant feelings. Many of the strategies used by repressors to control emotions seem to be of a cognitive nature; that is, repressors will often control their attention, memory, and thoughts in the service of defense. In fact, the control of attention seems to be central to many strategies for the regulation of emotion (e.g. Bryant & Zillmann, 1984; Parrott, 1993; Rippere, 1977). Thus, for repressors at least, Grandmother’s advice seems to have been taken to heart.

One problem arises with the habitual use of cognitive defense against unwanted emotions; as with any form of regulation, controlling one’s unpleasant feelings requires the expenditure of finite resources (Baumeister, Heatherton, and Tice, 1994). Effective defense would therefore implicate a more judicious or efficient use of resources. In fact, resources might have to be used so judiciously that one appears to act miserly, conserving and hoarding resources to ward off any bad feelings. The purpose of the present investigation is to determine whether individuals who generally act in a defensive manner will appear to conserve and hoard a particular cognitive resource, attention, to be able to avoid the experience of
unpleasant emotions. Such behavior will be referred to as defensive miserliness.

**Emotional Regulation**

The ability to control one's feelings is often a highly valued skill for people (Baumeister et al., 1994). Indeed, most people have a variety of means by which they may seek to prolong or escape from an emotional state (see Morris & Reilly, 1987, for a review). Some strategies involve overt behavior (such as going for a walk or listening to music) but many methods of emotional regulation seem to be primarily cognitive in nature; that is, these strategies seem to involve the control, alteration, or reinterpretation of perceptions and thoughts. For example, research indicates that controlling one's thoughts or interpretations of events may help to control anxiety. Fenz and Epstein (1967) found that denying anxiety (that is, teaching people to deny that they are experiencing anxiety) can help to reduce both the subjective experience of and objective physiological arousal associated with anxiety. Lazarus and Opton (1966) found that intellectualization, thinking about the source of
anxiety, is useful in controlling the unpleasant emotion. Thus anxiety, which is often experienced as an unpleasant emotional state, seems amenable to reduction or elimination through cognitive strategies. Other negative emotional states, and negative emotional states in general (such as the common non-specific bad mood) seem also to be affected by cognitive methods of regulation. One of the most important of these cognitive methods is self-distraction, or more generally the control of attention.

The control of attention seems to be at the heart of many techniques for regulating emotion. This is especially true of techniques which research participants describe as being particularly useful or effective. One such technique is distraction. For example, the research of Zillmann and colleagues (Bryant & Zillmann, 1984; Zillmann, Hezel, & Medoff, 1980) found that watching humorous television programs seemed to help subjects control anger successfully. The researchers concluded that the television viewers felt better because their attention was being diverted from the source of their anger. Television, however, is only one of the many distractors which individuals
may find useful in managing mood. Almost any activity that absorbs attention may help to improve one's mood. Rippere (1977) found that mildly depressed individuals felt their mood improved the most when they were able to undertake activities that completely distracted them from the source of their sadness or depression. Indeed, the level of distraction seemed to be the primary reason why depressed people chose particular activities. The activity of thinking our own thoughts may be distracting as well. Parrott (1993) suggests that the recollection of personal memories may act as a mood regulation strategy because of the utility of memories as a distraction from unpleasant thoughts or events (or as a source of a desired affective state). Why does distraction seem to work so well? The answer to the question might be found in the way the cognitive process of attention functions.

**Attention**

Attention is generally considered to be the first step in the cognitive processing of information, the interface between sensory input and further processing. In order for sensory information to be processed the information must first be attended to.
The prevailing view of attention as a gateway to further processing might offer a clue why emotional regulation tactics such as distraction seem to be particularly effective. If individuals are able to remove their attention from the source of an emotional reaction, the flow of information from the source is attenuated, and individuals are unlikely to continue processing information about the stimulus. Presumably, then, the emotion itself is attenuated or avoided completely. For example, Boden and Baumeister (1995) suggest that under certain conditions (during exposure to an unpleasant film) individuals will generate pleasant thoughts such as happy personal memories to occupy their attention. In this manner the stimulus material (the film) is processed less, attenuating any emotional response on the part of the individual. As attention is the first step in the cognitive processing of information, cutting off processing at the first stage would seem to be a logical way to regulate the experience (especially the onset) of emotional states. Also relevant is work by Posner and Cohen (1984), who found that once attention is shifted away from a stimulus object to a new target, the original stimulus is actively suppressed
in the cognitive mechanism. The suppression of the original stimulus (perhaps an unpleasant stimulus in the case of emotional regulation) might be further reason why attentional methods for regulating emotional experience are effective. There may be, however, limitations to the use of attention to regulate emotions, limitations that are also directly related to the nature of attention.

Another aspect of attention may also be relevant to the use of attention to regulate emotions, but in a more problematic fashion; that is, most theorists of attention posit that attention is a limited mental resource that may be thought of metaphorically as a type of energy (Kahneman, 1973; Norman & Bobrow, 1975; Posner & Snyder, 1975; Schneider & Shiffrin, 1977). It is generally accepted that individuals have only a certain limited amount of attention which is generally occupied or consumed by some primary stimulus to a varying degree. Research indicates that people do have some limited attentional capability beyond attending to a primary stimulus (the "cocktail-party" phenomenon may be one example; Cherry, 1953; Moray, 1959) but this capability is limited. It is also widely accepted that most people find it difficult to
perform two (or more) tasks simultaneously which demand attention (Anderson, 1990). The notion of attention as a limited resource is important to the study of emotional regulation because one's ability to shift or control their attention at any given time is related to capacity. If one's attention is absorbed by a particular stimulus it may be difficult to shift to (and attend to fully enough to process) a second stimulus. Thus the extent to which one's attention is absorbed by a primary stimulus will affect a person's ability to shift or control attention, thereby also directly affecting the outcome of emotional regulation strategies which involve attention.

Yet another aspect of attention that would appear to limit the use of the process to regulate emotions is the very nature of the cognitive process; that is, attention is, to a certain extent, an automatic process (Schneider, Dumais, & Shiffrin, 1984). In other words, focusing attention on various stimuli in the environment will often occur automatically without the intention or control of the individual. Of course, attention can be controlled to some extent, but under certain circumstances it may be more difficult for people to control attention. One
such circumstance may be when attention has already been focused on a stimulus. Schneider et al (1984) cite a number of experiments which show that attempting to control attention (that is, deliberately trying to continue attending or trying to shift to another stimulus) may result in poorer performance on attention tasks, especially after attention is occupied by a particular stimulus. More generally, Wegner (1994) suggests that attempts to control any mental process that is more or less automatic may result not only in failure but also ironic reversals in what the individual may wish to accomplish. The automatic nature of the attentional process may therefore make it difficult for individuals to intentionally use the process to regulate emotions.

Thus, the fact that attention is generally conceived of as the first step in cognitive processing would suggest that controlling attention might be a particularly effective means of regulating one's emotional experience. If one is able to remove attention from a distressing stimulus, and to do so quickly and without much intention, then one is likely to experience little or no distress. The research cited above, which suggests that many individuals find
emotional regulation strategies which involve attention to be particularly useful, would support this notion. Yet, the second aspect of attention mentioned above, that attention is a limited resource, would suggest that attentional strategies are not always effective in regulating emotion. If individuals are able to shift their attention away from a distressing stimulus, then their regulatory efforts are likely to be successful. If one's attention is already absorbed by a stimulus, however, it may be difficult to shift one's attention away if that stimulus begins to evoke feelings of distress. Finally, the third aspect of attention, that attention is a largely automatic cognitive process, also suggests that it might be difficult to use attention intentionally to regulate emotional states. Attention might therefore be useful for controlling emotions, but the drawbacks to using attention seem quite formidable. What, then, may determine whether people are able to shift their attention to control their emotions?

Situational constraints would almost certainly affect one's ability to shift attention. For example, in the previously cited work by Zillmann and
colleagues (Bryant & Zillmann, 1984; Zillmann et al, 1980) distracting subjects with television programs was not effective in reducing anger if subjects were exposed to "hostile" comedies in which the characters insulted each other. In this case it would seem that subjects were not truly able to remove their attention from an anger-eliciting stimulus (the distracting stimulus being too similar to that which originally provoked the angry feelings). Another possibility is individual differences; that is, certain individuals may be better able to shift their attention from one stimulus to another than others. Davies, Jones, and Taylor (1984) point out that there are a number of individual differences which exist in attentional processing, which include age, intelligence, cognitive style, and personality (which is particularly germane to the current investigation). A study by Treisman (1960) found that individuals who were motivated to shift their attention were able to do so more effectively. Also, Underwood (1974) suggested that the ability to shift attention from one stimulus to another can be learned and made more effective with practice.
Thus, the evidence would suggest that some individuals may be better disposed to use attention as a means to regulate emotion than others. It may be that people who habitually and successfully employ emotional regulation processes are better able to use attention to regulate emotion, and by extension may be better able to shift their attention from one stimulus to another. One individual difference that seems to be related to the ability to control and regulate emotions is trait repressiveness.

**Trait Repressiveness**

For the purposes of the present investigation, trait repressiveness is measured through use of the method described by Weinberger, Schwartz, and Davidson (1979). Individuals who score high on a measure of social desirability (also referred to as defensiveness) and low in a measure of trait anxiety are called repressors. Repressors, as described by Weinberger (1990), are individuals who habitually attempt to avoid the experience of unpleasant emotion. Research suggests that repressors consistently report experiencing lower levels of negative affect than nonrepressors (Weinberger, Schwartz, & Davidson,
1979), demonstrate an impoverished memory for emotional events (Davis & Schwartz, 1987; Hansen & Hansen, 1988), and show poorer memory for negative personality feedback (Baumeister & Cairns, 1992). Thus, repressors appear to regulate their emotional states habitually.

Research also suggests that repressors also employ attentional defenses against the experience of unpleasant emotions. For example, Haley (1974) found that repressors averted their gaze from unpleasant film sequences more often than nonrepressors. Olson and Zanna (1979) found that repressors spent less time looking at paintings which they rated as unpleasant than paintings rated as pleasant. Tublin and Weinberger (1987) found that repressors tended to focus on other thoughts as a distraction in reaction to hearing an unpleasant audio tape. Bonanno, Davis, Singer, and Schwartz (1991) found that repressors will avoid attending to auditory information which is unpleasant in nature. More recently, Boden and Baumeister (1995) suggest that repressors will distract themselves from an unpleasant stimulus by thinking about pleasant thoughts such as happy personal memories. Thus, the evidence suggests that
repressors do employ attentional defenses to avoid unwanted stimuli.

If repressors are particularly motivated to regulate their emotional states, and they tend to use attentional defenses to do so, it may be possible that repressors enjoy some advantage in the use of attentional defenses in the regulation of emotion. That is, it is reasonable to assume that repressors use attentional defenses because these defenses are effective. As stated previously, there may be individual differences in the ability to control and shift attention. For example, Eysenck and Eysenck (1979) found that extraverts demonstrated better performance on divided attention tasks. Similarly, it is possible that repressors are able to shift their attention more easily than nonrepressors from one stimulus to another. Indeed, the ability of repressors to shift their attention more easily may lie at the heart of their successful use of attentional strategies for regulating emotions. It is unclear, however, why repressors are able to use attentional defenses more effectively.

Why, then, might repressors be able to use attention to control emotions more successfully? It
may be plausible that repressors are able to use attentional defenses more effectively because repressors exercise greater control over their attentional resources, perhaps through conserving and hoarding these resources. Such a pattern of conserving and hoarding would seem to fit the profile of a person who is a miser. Thus, the conserving and hoarding of resources in the service of defense might be called defensive miserliness.

Defensive Miserliness

The term defensive miserliness will be used to describe the behavior of repressors regarding the control and allocation of attentional resources. It has been stated previously that attention may be difficult to control and shift under certain conditions, particularly when attention is already occupied by a stimulus. Yet repressors seem to use attentional defenses against unwanted emotions in an effective manner. It may be reasonable to assume that repressors might have learned to control and allocate their attentional resources to defend against unwanted emotions. To be able to control such resources effectively it may be imperative to conserve and hoard
them, perhaps learning to use a smaller amount for most tasks. One way to do this would be to learn to use a smaller amount of resources for tasks requiring attention. Indeed, research demonstrates that the ability to shift attention can be automatized to a certain extent, requiring a reduced amount of effort and resources spent. Schneider and Fisk (1982, 1983) have shown that orienting attention toward a specific stimulus or class of stimuli can be learned and becomes more automatic over time. Furthermore, the automatic attending to such stimuli tends not to interfere with other tasks requiring attention.

Another implication of the notion that repressors might conserve their attention for defense is that attentional resources can be divided. In fact, it may be possible for individuals to learn to divide their attentional resources. Experiments by Hirst, Spelke, Reaves, Charack, and Neisser (1980) and Spelke, Hirst, & Neisser (1976) demonstrated that individuals can be trained in the laboratory to divide their attentional resources effectively. In addition, the training also seemed to enhance performance on tasks requiring simultaneous attention.
Thus it may be possible that repressors have learned to use their attentional resources in ways that might facilitate the division and shifting of attention. One way in which repressors might maintain their ability to shift their attention is to avoid committing their full attention to a particular stimulus, keeping some attentional resources in reserve. The resources may then in turn be used to divert attention away from an unpleasant stimulus whenever encountered. Such behavior might appear to be a bias in the way repressors have allocated their attentional resources, a bias toward conservation and limited use. We hypothesize that repressors are defensive misers, conserving and hoarding their attention to facilitate the regulation of unwanted emotions. The present investigation was designed to test this notion.

**Overview of the Present Research**

We hypothesize that repressors demonstrate a bias in the allocation of attentional resources, being able to shift their attention more easily than nonrepressors from one stimulus to another. The hypothesis will be investigated in the following
manner. If repressors do indeed conserve and hoard their attentional resources, then repressors should have a surplus of attention under normal circumstances. This surplus should allow more efficient switching of attention from one stimulus to another. Repressors should thus appear to be more distractible (that is, switch attention from one stimulus to another quickly) on a task such as a divided attention task. It may be possible, however, that repressors may not always have a surplus of attention. Perhaps at certain times (such as when actively regulating), repressors might appear to be unwilling or unable to part with their attentional reserves.

One reason why it may be possible that repressors may not always appear to have attention to spare is evidence which suggests that at times repressors do not outperform nonrepressors on divided-attention tasks. At certain times, repressors seem to respond poorly to such tasks. Newman and Baumeister (1993) found that repressors were slower than nonrepressors in responding to a distractor in a visual divided-attention task. This occurred, however, when the subjects were reading an
overwhelmingly negative list of words purported to describe them. Thus, at certain times (under threat of negative emotion) repressors may seem to be reluctant to shift their attention, to use the surplus they seem to have under normal conditions, and would thus appear to be less distractible. These varying conditions of apparent surplus and seeming reluctance to use attentional resources are the hallmarks of miserly behavior, hence the name of the hypothesized phenomenon, defensive miserliness. The present investigation was designed to test the idea that repressors show a pattern of defensive miserliness, appearing to have a surplus of attention at certain times. At other times, however, particularly when under the threat of experiencing a negative emotional state, repressors should show a reluctance or inability to shift their attention.

Thus, it was believed that the repressors and nonrepressors would respond differently to the demands of a divided attention task which consisted of a primary task (to which the individual is presumably allocating the bulk of their attention) and a secondary distractor task which occurred simultaneously. It was believed that under normal
conditions repressors would appear to be more distractible, responding more efficiently to the distractor task than under potentially threatening conditions. Nonrepressors, however, were expected to respond in an opposite manner. Under normal conditions, nonrepressors were expected to allocate all their attentional resources to the primary task, responding more slowly to the distractor task than repressors in the same condition. Under potential threat, when nonrepressors attempted to focus their attention on the primary task, it was expected that nonrepressors would ironically be more distractible. Assuming that repressors use attentional defenses more often and effectively, nonrepressors should have more difficulty controlling their attention when it seems particularly important to do so.

The two experiments described below differ in their examination of the defensive miserliness hypothesis. The first experiment served as the initial test of the hypothesis with a single divided attention task. The second experiment attempted to conceptually replicate the first experiment, putting the hypothesis to a more stringent test, as well as attempting to demonstrate that the bias exists across
sensory modalities (visual and auditory attention, which involve differing neuronal pathways; e.g. Underwood, 1976) and in comparison across all groups of the Weinberger (1990) typology.
Experiment One

The purpose of Experiment One was to serve as the initial test of the defensive miserliness hypothesis. The experiment attempted to demonstrate the hypothesized bias in repressors' allocation of attentional resources through use of a divided-attention task (e.g. Anderson, 1990). The divided attention task chosen for the experiment consisted of a primary task, a challenging test of verbal analogies, and a secondary task, for which subjects were asked to respond by pressing the mouse button to one of two tones emitted periodically by the computer. It was believed that the divided attention task would serve as a test of the flexibility of attentional resources in subjects by measuring their ability to turn attention away from the primary task to the secondary task. The test of analogies was made difficult to occupy most subjects' attention for the full amount of time each analogy appears on the screen and also to make the subjects believe they were performing poorly. The ability to shift attention was operationalized in the current experiment as the amount of time subjects take to respond to the
designated tone. Thus latency-to-respond served as the main dependent variable in the experiment. Errors in responding to the distractor tone (that is, pressing the mouse button in response to the wrong tone) served as a secondary dependent variable in the experiment (as it is presumed that being able to shift attention more easily would result in fewer errors).

The first independent variable in the experiment was Trait Repressiveness, with two levels, repressors and nonrepressors. The second independent variable consisted of the manipulated conditions, the first level consisting of a condition which was referred to as no pressure, in which subjects were asked merely to "try hard" to solve the analogies and respond to the tones. The second level of condition consisted of an experimental condition which was referred to as potential threat, in which subjects were informed that performance on the task was related to important intellectual abilities. As subjects were expected to perform poorly (as the task was designed to be too difficult to perform well) the possibility of a negative evaluation and subsequent negative emotions should have been made especially salient. If repressors demonstrate an attentional bias, then
repressors would respond more quickly to the tone under normal (no pressure) conditions and make fewer errors than under potentially threatening conditions. Under normal conditions repressors should demonstrate their surplus of attention by turning their attention from the analogies to the tones relatively quickly. Under potentially threatening conditions, however, repressors should appear miserly, being unwilling or unable to shift their attention from the primary stimulus to the secondary stimulus as quickly.

Presumably, the possibility of a poor evaluation and negative emotions should serve to mobilize repressors' attentional resources to deal with the impending threat, thus slowing the reaction to the secondary stimulus and resulting in more errors.

It was also predicted that nonrepressors, lacking a bias in the allocation of attentional resources, would respond more slowly to the tone under the no pressure condition and make more errors than under potentially threatening conditions. Under no pressure, nonrepressors were expected to commit all of their attention to the analogies task leaving very little to deal with the tones. Nonrepressors should be more willing to commit all of their available
resources to the primary task under normal conditions and therefore will appear to be less distractible.

Under potential threat, however, when nonrepressors attempt to marshal their attentional resources to succeed at the task, the result will be an ironic increase in distractibility and a relatively quicker response to the tones and fewer errors.
Method

Subjects

64 introductory psychology students participated in the experiment in partial fulfillment of course requirements. Repressors and nonrepressors were identified in a pre-screening session through use of the method described by Weinberger, Schwartz, and Davidson (1979). Subjects scoring in the upper third of the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964) and the lower half of the Bendig (1956) Short Form of the Taylor Manifest Anxiety Scale were identified as repressors. All other subjects were identified as nonrepressors. Subjects were contacted by telephone and asked to participate in the experiment. 30 repressors and 34 nonrepressors agreed to participate in the experiment.

Independent Measures

The Marlowe-Crowne Social Desirability Scale is a 33-item instrument designed to measure socially desirable responding (SD). Each question is answered in a true-false format. The internal consistency reliability of the scale was measured using the Kuder-
Richardson 20 formula and found to be .88. The test-retest reliability was also found to be .88. The construct validity of the measure was determined through a number of tests. For example, scores on the Social Desirability Scale were found to be inversely correlated with scores on the pathology scales of the MMPI. Also, a number of studies conducted by the authors of the scale found that people high in SD would act in ways which demonstrated a need or desire for approval from others, as well as higher levels of conformity to others' behavior (Crowne & Marlowe, 1964). Thus, the Marlowe-Crowne Scale appears to be both reliable and valid.

The Bendig (1956) Short Form of the Taylor Manifest Anxiety Scale is a 20-item scale designed to assess levels of trait anxiety. The scale consists of a subset of items from the original scale, with "nonvalid" (Bendig, 1956, p. 384) items having been removed, improving the content validity of the measure. The internal consistency reliability of the scale was found to be .76, and the correlation between the 20-item scale and the original 50-item scale was found to be .93. Thus, the short form of the Manifest
Anxiety Scale would also seem to be valid and reliable.

**Equipment**

The divided-attention task was prepared specifically for the purposes of the present experiment. The verbal analogies used in the experiment were chosen from practice versions of the Miller Analogies Test. A computer program coordinated the presentation of the verbal analogies and tones and the recording of subjects' responses. The task was presented on a Macintosh 512K computer.

**Procedure**

Subjects who consented to participate in the experiment arrived at the laboratory and were seated at a desk in front of a computer. Each subject was told that the experiment was about verbal reasoning and that he or she would be asked to solve a series of verbal analogies on the computer. Next each subject was asked to read and sign the consent form. At this point the instructions to the subject differed depending upon the condition to which the subject had been randomly assigned prior to the experiment.
In the no pressure condition each subject was assured that he or she was not being personally evaluated in any way in the experiment but the experimenter would appreciate the subject's best effort in solving the verbal analogies. In the potential threat condition each subject was asked was told that the verbal analogies were very similar to those used in standardized tests such as the SAT. Each subject was then told that performance on such tests is related not only to verbal ability but general intelligence as well and as such the subject should try his or her best to solve the analogies. From this point the instructions did not differ according to condition.

The experimenter explained that the computer would present a series of verbal analogies one at a time for a short time each. After reading each analogy, the subject was expected to choose the correct answer from the four choices provided and to press the number on the keyboard corresponding to the answer. The experimenter explained that the analogies were difficult, and if the subject was unable to answer one of the analogies in the time allowed he or she should just go on to the next one. Then the
experimenter explained that there was one additional detail for the subject to consider during the experiment. The experimenter explained that periodically throughout the experiment the computer would emit either a low or high tone. The experimenter asked the subject to rest his or her hand on the mouse button throughout the experiment and to press the mouse button as quickly as possible after hearing the low tone. Then the experimenter explained that he would play the tones for the subject prior to the experiment in order for the subject to be familiar with the tones, and then the subject would have the opportunity to practice solving some analogies and responding to the tone before moving on to the actual experiment. Following the practice session the experimenter asked each subject whether he or she had any questions, instructed the subject how to start the computer program, then left the room for the duration of the experiment. At the conclusion of the program the experimenter reentered the room, fully debriefed each subject and answered any questions the subject might have had. Then the experimenter asked for each subject's SAT or ACT scores to account for any effect of ability on performance in the experiment.
Results and Discussion

The results were analyzed using a between-subjects Multivariate analysis of covariance (MANCOVA) with trait repressiveness and manipulation as the independent variables. Latency-to-respond to the low tone and the number of errors served the dependent variables. The subject's SAT score served as the covariate (to account for any differences in ability, which may relate to performance on the primary analogy task). The MANCOVA revealed a significant interaction between trait repressiveness and manipulation, $F(2, 58) = 3.18$, $p < .05$. There was no effect for the covariate. A separate analysis of covariance using the latency-to-respond data revealed a significant interaction between trait repressiveness and condition, $F(1, 59) = 4.17$, $p < .05$. The table of means (Table 1) may be found in the Appendix.

As predicted, the pattern of results demonstrates that repressors responded more quickly to the tone under no pressure conditions than under potential threat, whereas nonrepressors responded more slowly to the tone under no pressure conditions than
under potential threat (and more slowly than repressors in the control condition). Repressors seem to be able to shift their attention to the secondary task more quickly than nonrepressors under no pressure conditions, demonstrating the surplus of attention which has been hoarded. Under potential threat, however, repressors responded more slowly to the secondary stimulus, being apparently unwilling or unable to shift their attention to the secondary task.

Analyses of the false alarm (error) data were conducted after correcting for unacceptable levels of skewness and kurtosis (greater than 1.5) by using a square-root transformation (as zero values were included a logarithmic transformation was not possible). The analysis of the transformed data revealed a significant interaction between trait repressiveness and manipulation, $F(1, 59) = 4.24$, $p < .05$. The pattern of results conforms to that of the latency-to-respond data: repressors made fewer errors in the no pressure condition than in the potential threat condition, whereas nonrepressors made more errors in the no pressure condition than in the potential threat condition.
Thus, the initial test of the defensive miserliness hypothesis suggested that repressors did indeed show a bias in the allocation of attentional resources. Repressors did appear to be more distractible under normal (no pressure) conditions, suggesting that repressors did set aside a certain portion of their attentional resources under normal conditions. Under the threat of negative evaluation and subsequent unpleasant emotions, however, repressors appeared to be less distractible, presumably having mobilized these resources to deal with the impending unpleasant feelings. The notion of a bias in repressors' allocation of attention seems to fit well with the conception of repressors as individuals with a broadly defensive stance (Weinberger, 1990).

Nonrepressors, who presumably have less practice than repressors at using a broad range of defenses, did not demonstrate a bias in the allocation of attentional resources. Nonrepressors were apparently willing under normal conditions to devote the bulk of their resources to the primary task and were less distractible. Under potential threat, however, nonrepressors ironically appeared to be more
distractable. It may be possible that this finding is due to an ironic effect (Wegner, 1994) of nonrepressors endeavoring to control a cognitive process (attention) that, as previously noted, is difficult to control. Under conditions of threat nonrepressors might have ironically become more distractible, as evidenced by their quicker response to the secondary task in this experiment. Nonrepressors, then, appeared to perform on the divided attention task in a manner which is the opposite of repressors and in a manner which would not seem conducive to controlling the cognitive process of attention.

This initial test of the defensive miserliness hypothesis has a number of weaknesses that should be addressed here. One problem is the lack of an explicit check of the manipulation. Although it is believed that subjects in the potential threat condition are aware of their poor performance and the implications such a performance might have (as the experimenter had explained that performance on the task is related to intelligence) the subjects' feelings and beliefs about the manipulation were not measured. Thus, an adequate check of the manipulation
would strengthen a further examination of the defensive miserliness hypothesis.

A second problem with the initial test of the defensive miserliness hypothesis involves the comparison groups. As stated previously, repressors are classified as individuals who score in the upper third of scores on social desirability and in the lower half of scores on trait anxiety, whereas all other individuals are classified as nonrepressors. In the initial test of the hypothesis repressors are compared to nonrepressors without regard to the group membership of the nonrepressors. Weinberger (1990) points out that it may be useful to compare all groups (that is, low social desirability-low anxiety, high social desirability-high anxiety, and low social desirability-high anxiety) to repressors to determine that experimental effects are truly the result of trait repressiveness rather than merely either social desirability or anxiety. In a further test of the defensive miserliness hypothesis it may be desirable to use all four groups to determine that the bias in attention allocation is unique to individuals classified as repressors.
Thus the initial test of the defensive miserliness hypothesis suggests that repressors do have a bias in the allocation of their attentional resources. Experiment Two was formulated to conceptually replicate the findings of the first experiment, expanding upon the existing findings and putting the hypothesis to a rather more stringent test. Experiment Two was also formulated to address the weaknesses of the initial test of the defensive miserliness hypothesis.
Experiment Two

Experiment Two was designed to replicate and extend the findings of the first experiment in a number of ways, the first regarding the experimental task. In Experiment One, a single divided attention task was used which consisted of a primary task which required visual attention and a secondary distractor task which required auditory attention. Experiment Two was designed to replicate the findings of the first experiment by employing again the divided attention task in the first experiment. The design of Experiment Two also sought to extend the findings of Experiment One by adding a second divided attention task, a variation of a dichotic listening task. In this task, subjects were asked to listen to an audio tape over a pair of headphones. What subjects heard was a different message over the left and right audio tracks. Subjects were asked to attend to the right channel only, but subjects' memory for both the right and left channels was assessed. Bonanno, Davis, Singer, and Schwartz (1991) employed a similar dichotic listening task (although there were important

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differences between that task and the present task) and found that repressors will avoid attending to information which is affectively unpleasant. Thus the dichotic listening task has been used successfully in an area of research similar to the present investigation.

A second change in design for the Experiment Two is the inclusion of a mood measure. The mood measure (Mayer Brief Mood Introspection Scale; Mayer & Gaschke, 1988) was included to provide evidence that the experimental manipulation worked as expected. That is, it was believed that the potential threat condition in the experiment would entail a more unpleasant experience for the subject than the no pressure condition. Thus, subjects who participated in the potential threat condition were expected to report more unpleasant feelings than subjects who participated in the no pressure condition.

The third change in the experimental procedure prior to Experiment Two was the comparison of the four groups of the Weinberger (1990) typology (Repressors, high defensive-high anxious, low defensive-low anxious, and low defensive-high anxious) rather than merely comparing repressors to nonrepressors (the
nonrepressor group including members from each of the three nonrepressor categories mentioned previously). This was accomplished by admitting all volunteers to the experiment and administering the scales prior to the experiment (rather than prescreening for inclusion as in Experiment One). This change was effected to determine that any experimental effects are due to trait repressiveness rather than merely level of socially desirable responding or trait anxiety. The net effect of this change will be twofold: first, the status of experimental subjects as repressors or nonrepressors was not known until after the investigation was concluded (thus the experimenter was blind to level of trait repressiveness), and second, the number of experimental subjects was approximately double that of Experiment One.

A fourth change in the experimental design prior to Experiment Two was the inclusion of questionnaire items designed to assess subjects' reaction to each of the divided attention tasks. Four questions examined whether subjects thought the secondary stimulus in each task was important and if so how important. The purpose of the questions was to account for differences in participants' motivation in performing
the tasks. Two questions pertained to each of the experimental tasks. The first question for each task probed reactions to the distractor task: "While you were working on the analogies (listening) task, did you think the tones (words in the unattended channel) were important?". The second question asked "If you answered YES to the previous question, please rate how important you thought the tones (unattended words) were on a 7 point scale." The scale ranged from 1 (not very important) to 7 (very important).

Finally, minor changes were made to the experimental manipulation to ensure that the manipulation had the desired effect. Subjects in the no pressure condition were assured more strongly that their responses were being measured only to test the experimental task and not for personal evaluation. Subjects in the potential threat condition were told in more explicit detail about the relationship between their performance on the experimental tasks and their level of intelligence and prospects for future success. Subjects in the potential threat condition were also told (falsely) that they would receive a performance score after the experiment (thus making public the inevitably poor performance).
The dependent measures for the analogies test in Experiment Two were the same as those used in Experiment One. The measures included the latency to respond to the distractor tone (that is, the mean amount of time elapsed from the onset of the low tone and the subject pressing the mouse button) and the number of false responses (pressing the mouse button after the high tone rather than the low tone). For the dichotic listening task the dependent variables included subjects' recall for material in the attended channel and recognition for material in the unattended channel, as well as recall false alarms. A recall test was employed for the attended channel because it is assumed that the attended channel material will be processed more thoroughly by subjects. This expectation is due not only to the greater amount of attention that is presumed to be allocated to the message but also due to the nature of the message. The levels-of-processing view of recall memory would predict that messages processed at a deeper level (such as words and their definitions) are remembered better than messages processed at a shallow level, thus requiring a less sensitive test of memory (e.g. Craik & Lockhart, 1972). For the same reason, a
recognition test of memory for the unattended channel was used as it was assumed that even if the unattended message does receive some degree of attention it was unlikely to be processed fully. A recall test might not be sensitive enough to detect memory for the content of a message that has not been fully processed (Underwood, 1976). For the mood measure the dependent variables included each of the four subcales of the Mayer Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988).

For the test of analogies, it was predicted that Experiment Two would replicate the results of the first experiment in that repressors would respond more quickly to the distractor task under normal (no pressure) conditions than under potential threat. Nonrepressors (all three groups), on the other hand, were expected to respond more slowly to the distractor task under no pressure conditions than under potential threat. Furthermore, it was believed that for the dichotic listening task, repressors would appear more distractible under no pressure conditions than under potential threat, demonstrating poorer recall for the list of words on the attended channel and better recognition for words on the unattended channel. It
was expected that the pattern would be reversed for individuals in each of the nonrepressor groups, in that nonrepressors would demonstrate better recall for words in the attended channel and poorer recognition for the words in the unattended channel under no pressure conditions than under potential threat.
Method

Subjects

Subjects included 127 undergraduate psychology students at Case Western Reserve University who participated in the experiment in partial fulfillment of course requirements. Subjects were notified of the experiment name, location, and duration of the study and registered for the experiment at their convenience. Unlike Experiment One no prescreening was required. The only prerequisite for participation in Experiment Two was fluency in English.

Materials

The analogies test was presented in the same manner as the first experiment. The dichotic listening task was presented on a Sony stereo cassette player over a pair of lightweight headphones. Each subject heard the same tape which consisted of a different track for each ear channel. Each track had been recorded by the same person (the experimenter) and were of comparable pitch and volume. The right (attended) channel consisted of a list of ten words
being read aloud. Each word was followed by its definition (derived from Webster's Collegiate Dictionary). The words are as follows: fluoride, nelson, private, balsam, homage, jumble, treatise, shadow, magnet, and dendrite. The left (unattended) channel consisted of a list of fifteen words being read aloud. The two channels were synchronized so that words in the unattended channel were spoken only while the voice was speaking in the attended channel. The words in the unattended channel are as follows: speak, minnow, anchor, pike, iron, window, bulb, next, picture, table, pencil, glue, soda, deal, and given.

Procedure

Each subject participated individually in the experiment. Upon arrival at the laboratory each subject was seated at a desk with the computer used in the analogies task and the cassette stereo used in the dichotic listening task. The experimenter explained that the experiment was about auditory processing and verbal reasoning and that the subject would be asked to solve a series of verbal analogies presented on the computer, to listen to a short audio tape and answer questions about the tape, and to fill out various
questionnaires as well. Consent was obtained, and then the experimenter asked each subject to fill out the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964) and the Bendig (1956) Short Form of the Taylor Manifest Anxiety Scale which were put together to look like two parts of the same questionnaire. The experimenter left the room while the subject completed the questionnaire.

Following completion of the questionnaire the experimenter reentered the room. At this point the experimenter began the experimental manipulation. For the no pressure condition, the experimenter explained that the purpose of the experiment was to test materials for a test of auditory processing and verbal reasoning. The experimenter explained that he was trying to put together an effective test and wanted to find out which materials worked well and which did not, and the subject was being asked to help with this. The experimenter then said that the subject should be aware that he or she was not being personally evaluated in any way but that he would appreciate the subject's best effort on the tasks. For the potential threat condition the experimenter explained that the analogies test was similar to
portions of the SAT. The reason verbal analogies are included in the SAT, the experimenter explained, was that verbal analogies served as indicators of verbal ability, an important ability related to the ability to perform well in school and general intelligence. The experimenter also explained that the listening task was similar to tasks that tried to determine how well individuals could process auditory information. The experimenter explained that the ability to process auditory information was also an important ability related to performance in school and also general intelligence. Finally, after explaining how to do each of the tasks, the experimenter explained that the subject would be able to receive a performance score for each of the tasks at the conclusion of the experiment.

The experimenter then began to explain how to perform the experimental tasks. Each subject was asked either to do the analogies test first or the listening test first. The order of the experimental tasks was counterbalanced and determined randomly before the subject's arrival at the experiment (the analogies first order will be used to illustrate the procedure). For the analogies test, the instructions
and procedure were the same as in Experiment One. After explaining how to do the analogies task, the experimenter left the room while each subject performed the task. At the conclusion of the analogies task the experimenter reentered the room and then began to explain how to perform the listening task. The experimenter explained that he would play a short audio tape that he would like the subject to listen to over a pair of headphones. The experimenter explained that the subject would hear a different message in each ear. The experimenter explained that what he would like the subject to do is to pay close attention to the information in his or her right ear. The experimenter explained that he would leave the room while the tape was playing but would test the subject’s memory for the right-ear message at the conclusion of the tape (the subject was not informed that his or her memory for the unattended channel would also be assessed). The experimenter asked the subject to put the headphones on, waited for the subject to adjust the headphones to his or her comfort, began the tape and then left the room. At the conclusion of the tape the experimenter reentered the room and handed the subject a blank piece of
paper. The experimenter asked the subject to write down as many words as he or she could recall from the right channel. The experimenter left the room for 90 seconds while the subject wrote the words. The experimenter reentered the room after 90 seconds, collected the recall sheet, then handed the subject the recognition test for the unattended channel. The recognition test consisted of a list of 40 words in which were embedded the 15 which had been spoken on the unattended channel. The experimenter explained that he would like to learn whether the subject could remember any of the words from the left channel. The experimenter explained that 15 words had been spoken in the left channel, and asked the subject to mark the 15 words he or she might have heard. The subject was asked to mark words of which he or she was certain of having heard with an X and to mark words at which he or she was just guessing with a check mark. The experimenter explained that he would leave the room while the subject marked the sheet and the subject should indicate when he or she had finished.

Following the recognition test the experimenter reentered the room and explained that the experiment was not really about auditory processing and verbal
reasoning but about attention and the way in which people control and shift their attention. The experimenter explained that he would allow the subject to read about the purpose and hypotheses of the experiment in a moment but first he would like the subject to complete a questionnaire. The experimenter handed the subject a questionnaire which consisted of the questionnaire assessing the perceived importance of the tasks and the mood measure, then left the room while the subject completed the questionnaire. Following completion of the questionnaire the experimenter reentered the room and fully debriefed the subject, answering any questions the subject might have.
Results and Discussion

Trait Repressiveness

The Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964) and the Bendig (1956) Short Form of the Taylor Manifest Anxiety Scale were analyzed in the same manner as in the prescreening prior to Experiment One. Individuals scoring in the upper third on social desirability (defensiveness) and the lower half on anxiety were classified as repressors. The other groups (low defensive-low anxious, high defensive-high anxious, and low defensive-high anxious) were determined also by the range of scores. The cutoff points for the upper third and lower half of the scales were based on the current sample; the anxiety cutoff was the same (a score of 8) as the cutoff in the first experiment, whereas the social desirability cutoff was 15, having been 16 in the first experiment. Application of these cutoff scores resulted in a sample consisting of 35 repressors, 36 low defensive-low anxious individuals, 23 high defensive-high anxious individuals, and 33 low defensive-high anxious individuals. For the analyses
of Experiment Two the independent variables were generally trait repressiveness (4 levels) and condition (2 levels). Certain additional analyses, however, were conducted using a two-levels factor for trait repressiveness that merely collapsed the three nonrepressor groups into a single group and compared that group to repressors. The use of this strategy in analyses will be noted below.

The mean Social Desirability (SD) and Anxiety (ANX) scores for each of the groups were as follows: Repressors, SD = 18.82, ANX = 3.42, low defensive-low anxious, SD = 10.14, ANX = 4.69, high defensive-high anxious, SD = 16.70, ANX = 11.13, and low defensive-high anxious, SD = 10.30, ANX = 12.42.

**Manipulation Check**

The Mayer Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988) served as the manipulation check for Experiment Two. The BMIS consists of four subscales, including pleasant/unpleasant, arousal/calm, positive/tired, and negative/relaxed. The authors assessed the construct validity of the measure by determining the degree to which the four subscales mapped onto the dimensions of emotion as
described by Watson and Tellegen (1985). Confirmatory factor analyses determined that the BMIS mapped onto the Watson and Tellegen model almost perfectly. Cronbach's Alpha determined the reliability of the subscales to range from .76 to .83 except for Arousal/Calm, which performed less well at .58. The authors stated that using a seven-step response format (as was used in the present investigation) yields more reliable scores (Mayer & Gaschke, 1988).

Scores for each of the subscales of the BMIS were used as a dependent variable in an analysis of covariance. The analyses were conducted using both the four level factor for trait repressiveness (Weinberger, 1990) and a two level factor consisting of repressors and individuals in each of the three nonrepressor groups (collapsed into a single level of the factor). Furthermore, each analysis employed SAT score, gender, handedness, perceived importance (for both tasks), and task order as covariates. The analyses are reported below by subscale.

Pleasant/ Unpleasant. An analysis using the two level trait repressiveness factor found a marginal main effect for condition, $F (1, 117) = 3.67, p < .10$. Subjects in the potential threat condition reported a
more pleasant mood after the experiment \(M = 9.43\) than subjects in the no pressure condition \(M = 5.64\). The analysis also revealed a significant main effect for group, \(F(1, 117) = 4.11, p < .05\). Repressors reported a more pleasant mood following the experiment \(M = 10.57\) than nonrepressors \(M = 6.15\). The results of the analyses suggested that individuals who have participated in the potential threat condition felt better afterward (perhaps the subjects are glad to hear that the test really is not an indicator of their intelligence and prospects for future success) and repressors felt better than nonrepressors (which might be due to their low anxious nature, as the unpleasant dimension of the BMIS includes several anxiety-related negative emotion terms). The results, however, did not tend in the predicted direction. It had been expected that subjects in the potential threat condition would report higher levels of negative emotion than subjects in the no pressure condition.

**Arousal/Calm.** Analyses of the arousal/calm subscale revealed no significant or marginal main effects or interactions. When employing the four level trait repressiveness factor the covariate
handedness was significant at $F(1, 117) = 4.47$, $p < .05$.

Positive/Tired. Analysis of the positive/tired subscale using the four level trait repressiveness factor revealed a significant main effect for condition, $F(1, 113) = 4.48$, $p < .05$. Subjects in the potential threat condition felt a more positive mood following the experiment ($M = 11.10$) than subjects in the no pressure condition ($M = 9.17$). This finding mirrors that of the pleasant/unpleasant subscale and again was not in the predicted direction.

Negative/Relaxed. Analysis of the negative/relaxed subscale using the four level trait repressiveness factor revealed a significant main effect for group, $F(3, 113) = 3.33$, $p < .05$. The means were as follows: Repressors, $M = 7.91$, low defensive-low anxious, $M = 7.58$, high defensive-high anxious, $M = 10.74$, and low defensive-high anxious, $M = 11.58$. The results suggested that the trait anxiety level of the subjects is related to their self-reported negative feelings following the experiment. Again, the data were not in the predicted direction.

Thus, it must be concluded that the mood measure data, intended to serve as the primary check of the
manipulation, indicated the failure of the experimental manipulation instead. The mood measure data suggested that subjects who participated in the potential threat condition felt better after the experiment than subjects who participated in the no pressure condition. As the potential threat condition was designed to engender negative feelings about one's performance on the experimental tasks, the mood measure data suggested that the manipulation did not work as intended.

**Analogies Test**

As in Experiment One, the test of analogies produced two dependent variables for analyses: the average latency-to-respond to the low tone distractor and the number of false alarms (erroneous responses to the high tones rather than the low). Frequency analyses revealed that the latency data were skewed and kurtotic beyond the recommended levels of 1.5. Thus, the latency data were subjected to a logarithmic transformation prior to analysis which brought levels of skewness and kurtosis to acceptable levels. Analyses of both the transformed and untransformed variables, however, will be reported here.
Each of the variables was analyzed in a separate analysis of covariance using trait repressiveness (4 levels) and condition as the independent variables. Effects of SAT score, gender, task order, handedness, and whether the subject thought the tones were important (the first item on the post-experiment questionnaire) were covaried out prior to computing effects. Analysis of the transformed latency-to-respond variable revealed no significant effects. Analysis of the untransformed variable also revealed no significant effects.

The same analyses were carried out again using the two level group factor (repressors and nonrepressors) rather than the four level factor and retaining condition as the second independent variable. Analysis of the transformed latency variable revealed a significant interaction between trait repressiveness and condition, F (1, 118) = 3.91, p = .05. The table of means (Table 2) may be found in the Appendix. The pattern of means suggested that repressors responded more slowly to the distractor under no pressure conditions than under potential threat, which is in opposition to the finding of the first experiment (and the hypothesis).
Analysis of the untransformed variable revealed a marginally significant interaction between trait repressiveness and condition, $F(1, 118) = 3.18, p < .10$. The table of means (Table 3) may be found in the Appendix. Again, the pattern of means suggested that repressors responded more slowly to the distractor under no pressure conditions than under potential threat, which is also in opposition to the findings of the first experiment and the hypothesis.

An analysis of covariance using the false alarm data, the number of incorrect responses to the distractor (pressing the mouse button for the wrong tone), as the dependent variable and trait repressiveness (4 levels) and condition as the independent variables (and the same covariates as the latency-to-respond data) revealed a significant main effect for manipulated condition, $F(1, 114) = 5.31, p < .05$. Subjects in the potential threat condition made significantly fewer errors ($M = .96$) than subjects in the no pressure condition ($M = 2.09$). No other effects were detected.

Thus the results for the test of analogies failed to support the defensive miserliness hypothesis and also failed to replicate the results of the first
test of the hypothesis. The analyses show that repressors were slower to respond to the distractor in the no pressure condition than in the potential threat condition, whereas nonrepressors show the opposite pattern. In fact, the pattern of results is almost a reverse of the results found for the same task in Experiment One. Discussion of the implications of this finding will be reserved for the General Discussion.

The significant effect found for condition with the false alarm data suggests that subjects did seem to react differently to the experimental manipulation (at least for the analogies task). Subjects in the potential threat condition made significantly fewer errors in response to the distractor than subjects in the no pressure condition. The pattern corresponds to that of nonrepressor subjects in Experiment One, suggesting that the instruction to try one’s best was followed by a slower response to the distractor (lower distractibility) whereas the instruction that the test was important was followed by a quicker response to the distractor (greater distractibility). Again, this pattern corresponds to the hypothesized bias in the allocation of attention but only for nonrepressors,
thus failing to replicate the findings of Experiment One.

**Listening Task**

The dichotic listening task produced a number of dependent variables for analysis. These include recall memory for the attended channel (simply the number of words recalled correctly), intrusions (number of words in the attended channel recalled incorrectly), recognition memory for words in the unattended channel (number of words recognized correctly), and recognition memory for words in the unattended channel including guesses (as above, including self-reported guesses). Each of the dependent variables was analyzed in the same manner as the variables from the analogies test; the only difference being that responses to the question "Did you think the words on the unattended channel were important?" replaced responses to the similar question related to the analogies test as a covariate for this set of analyses. Otherwise, SAT score, gender, task order, and handedness were covaried out as in the analyses conducted for the analogies test.
Recall data. Analysis of the number of words recalled correctly revealed no significant or marginal effects. This was true when using either the 4 level factor for trait repressiveness or the two level factor for trait repressiveness. Analysis of the number of words recalled incorrectly also revealed no significant or marginal effects. The analysis did reveal, however, significant effects for the covariate SAT score when employing the two level factor for trait repressiveness. SAT score was significant at $F(1, 118) = 6.21$, $p < .05$. In order to determine the nature of the covariation, the Pearson correlation between SAT scores and number of words correctly recalled was computed. The correlation was significant ($r = .23$, $p < .05$), indicating that subjects possessing higher combined SAT scores correctly recalled a greater number of words from the attended channel. Thus, analyses of the recall data did not seem to support the defensive miserliness hypothesis. In fact, the recall data did not demonstrate significant effects in any interpretable direction.

Recognition data. Analyses of the recognition data (correct recognition without guessing) revealed
no significant or marginal effects using either the four level trait repressiveness factor or the two level factor. Three covariates, however, including perceived importance of the unattended channel, task order, and handedness were found to be significant for both analyses. Perceived importance was significant at $F(1, 114) = 18.81, p < .001$. Task order was significant at $F(1, 114) = 8.14, p < .01$. Handedness was significant at $F(1, 114) = 5.41, p < .05$. Both perceived importance and task order were entered as a third independent variable in a further analysis to determine the nature of the variation (handedness was not examined as there were too few left-handers to conduct an interpretable analysis). A significant main effect for perceived importance was revealed, $F(1, 100) = 20.97, p < .001$. Subjects who perceived the unattended message as being unimportant correctly recognized fewer words ($M = 3.58$) than subjects who perceived the message as being important ($M = 5.02$). A significant main effect was also found for order, $F(1, 100) = 9.59, p < .01$. Subjects who had performed the listening task second correctly recognized fewer words ($M = 3.69$) than subjects who had performed the listening task first ($M = 4.39$).
Analysis of the recognition data including guesses (using the 4 level trait repressiveness factor) revealed a marginal main effect for condition, \( F(1, 114) = 2.97, p < .10 \). Subjects in the threat condition correctly recognized more words (\( M = 7.78 \)) than subjects in the control condition (\( M = 7.22 \)). The effect was also marginally significant for the analysis conducted employing the two level trait repressiveness factor.

As was the case with the recall data, the recognition data did not seem to support the defensive miserliness hypothesis. No significant interactions were detected and the main effects that were detected were of little relevance to the hypothesis. Subjects who thought the unattended message was important seemed to recognize more words from the message (this may be due to the subjects reflecting upon the words' importance in the experiment) which makes intuitive sense but again is not important to the hypothesis being tested. The finding that subjects who did the listening task second correctly recognized fewer words from the unattended channel may be related to fatigue or decreased effort at the end of the experiment. The failure of the recognition data combined with the
failure of the recall data demonstrates ultimately the failure of the dichotic listening task to support the defensive miserliness hypothesis.
General Discussion

The two experiments reported in the current investigation were designed to show a bias in repressors' allocation of attentional resources, a bias believed to facilitate the regulation of emotional states through use of attentional strategies. The findings of Experiment One support the defensive miserliness hypothesis by demonstrating that repressors were more distractible under no pressure conditions than under potential threat. A more complex and rigorous test of the hypothesis conducted in Experiment Two, however, failed to support the hypothesis. We will discuss first the implications of the findings of the first experiment and possible future directions for research. We will then discuss briefly the failure of the second experiment.

The results of the first experiment indicated that repressors do indeed demonstrate a bias in the way their attentional resources are allocated. The bias caused repressors to appear as though they had a surplus of attention, being more flexible in their
response to distractions in the environment, but only as long as the environment seemed unthreatening. The introduction of a threat of negative emotions caused repressors to appear unwilling or unable to part with their surplus of attention and become less flexible in their response to distractions in the environment. These periods of apparent surplus and stinginess are the reason the bias is referred to as defensive miserliness.

The existence of the bias may be one important reason why repressors seem to be successful at controlling their emotional states. The bias would seem to serve as a way for attention to be used to control emotions in a relatively effortless manner. If repressors are able to attend less (or not at all) to unpleasant stimuli, unpleasant emotions are less likely to occur. Thus repressors would seem to have developed an efficient and effortless means for defense against unpleasant feelings. Such a finding fits well with the view of repressors as individuals exhibiting a broad defensive stance (Weinberger, 1990).

The bias in the allocation of attentional resources may also suggest the most efficient way
attention may be used to control emotions. Attention, as stated previously, may be difficult to control at times and therefore may not serve to control emotions effectively. If, however, the control of attention has to some extent become automatized (and therefore less effortful) then its use as a means of controlling emotions may be more effective. In fact, it may be that the use of attention must be automatized to some extent in order for it to be used successfully.

What are the implications of this apparent relationship between a personality style, trait repressiveness, and a bias in cognitive processing? One implication is that individual differences manifest themselves as differences in the way basic processes of the mind operate. That is, trait repressiveness would appear to be not merely a preference for avoiding unpleasant things but a broad defensive web constructed to keep unpleasant things out of awareness. Such a web would include not only preferences (such as a dislike for sad movies) but also automatically activated defenses such as the attentional bias. Previous research (see Cantor and Zirkel, 1990, for a review) has suggested that personality differences can indeed influence the
cognitive structure and functioning of the individual. The current investigation suggests that the preference for emotional stability which is the hallmark of trait repressiveness may direct the operation of such basic processes as attention.

Another implication of the defensive miserliness hypothesis is that emotions may be controlled through automatic cognitive processes. Although it is known that many methods of regulating emotional states consist of overt, intentional behaviors, the role of less intentional behaviors in emotional regulation is unclear. The results of Experiment One suggest that attention, a relatively automatic cognitive process, may be a vital link in the experience (and therefore the regulation) of emotion.

The defensive miserliness hypothesis may also help to address a number of previous research findings. For example, a number of studies (e.g. Baumeister & Cairns, 1992; Davis & Schwartz, 1987; Hansen & Hansen, 1988) have found that repressors demonstrate poorer memory for emotional stimuli, both in the laboratory and in personal recollections of emotional events. The defensive miserliness hypothesis might help to explain the apparent gaps in
the memories of repressors. If repressors are consistently paying less attention to ordinary events, then their recollection of events may exhibit a certain poverty of detail. For example, Hansen and Hansen (1988) found that repressors demonstrate a less elaborate associative network of memories than nonrepressors. Repressors were able to recall memories about emotional events, but seemed unable to connect these events with other events or emotions. In this case, the defensive miserliness hypothesis might suggest that while repressors were able to process that certain events had occurred (such as the death of a family member), their failure to attend fully would result in the poverty of associations that were found.

Empirical evidence for the defensive miserliness hypothesis, however, would leave certain questions about the nature of the bias unanswered. One such question involves the apparent surplus of attention under normal conditions evidenced by repressors; that is, does it involve a smaller investment of attention to the primary task (thus leaving resources available to deal with the secondary task) or simply an enhanced ability to shift attention due to practice? Measuring
performance on the primary task may be one way to answer the question (performance was measured on the analogies test in the current investigation but all subjects performed equally poorly due to the difficulty of the task). Answering this question may be very important to the investigation of the phenomenon as it might provide evidence as to the true nature of the bias. That is, repressors may show the bias because they can shift their attention easily and do it often (thus developing an apparent bias), in which case repressors might not perform particularly well on the primary task. It may also be possible that repressors do divide their attentional resources effectively (evidence of an actual bias in allocation), in which case performance on the primary task should not suffer.

Yet another question that would remain unanswered is what repressors are doing during the potential threat condition when they appear unwilling or unable to shift their attention; that is, are they unwilling or are they unable? Evidence that the potential threat condition is experienced as being truly threatening and unpleasant might help to clarify the point. If the experience is truly threatening and
unpleasant, it may be possible that repressors are attending to distracting thoughts of their own generation rather than the experimental task or the distractor, as has been suggested by Boden and Baumeister (1995). In such a case repressors might be unable to shift their attention to the secondary task as efficiently due to their preoccupation with their own thoughts. It may also be possible that repressors are merely unwilling to shift their attention as it becomes apparent that the task is going to be unpleasant or stressful, perhaps attending instead to the primary task and shutting out other thoughts. If, however, the threat condition is not particularly threatening or unpleasant, it may be that repressors, in their desire to be "good subjects", might concentrate on the primary task to perform especially well. These are possibilities which the current investigation does not address but would be important areas for further exploration of the defensive miserliness hypothesis.

A third question is whether the bias demonstrated by repressors has any negative consequences. That is, does the fact that repressors seem to pay less attention to stimuli in the
environment hurt them in any way? Baumeister and Cairns (1992) found that repressors showed a poorer memory for a range of stimuli (pleasant and neutral as well as unpleasant) when defenses had been invoked. Also, Weinberger (1990) has suggested that repressors may indeed suffer negative consequences due to the avoidant manner in which they appear to process information. It is unclear exactly how defensive miserliness might harm individuals (other than perhaps compromising the content of their memories) but is a question which also merits further study.

Another question the current investigation leaves open is the behavior of nonrepressors. It is assumed that repressors are more sensitive to laboratory inductions of emotion than nonrepressors (that is, will react strongly and defensively in response to relatively innocuous stimuli) and therefore will demonstrate the bias more clearly. Yet the evidence cited previously suggests that many individuals will use attentional strategies to regulate their emotional states, not just repressors. If nonrepressors use these strategies outside the laboratory, are the mechanisms the same as those used by repressors in the laboratory? If so, do
nonrepressors fail to show the bias because they are less invested in regulating their emotional states at all times? Again, further investigations may shed light on these aspects of the defensive miserliness hypothesis.

Alternative Explanations of Findings

It may be possible that the findings of the current investigation are due to factors other than defensive miserliness. For example, Weinberger (1990) points out that repressors, due to their high degree of socially desirable responding, often appear eager to please and will put extra effort into completing tasks. In the case of the first experiment, such a view would suggest that in the no-pressure condition repressors would be working harder than nonrepressors and thus perform better on both tasks. The experiment did indeed find that repressors performed better than nonrepressors at responding to the distractor tone (the difficulty of the analogy tasks rendered performance comparisons impossible; all subjects performed equally poorly).

In the potential threat condition, the stakes would seem to be higher for subjects, demanding
greater effort to avoid the unpleasant implications of failure at the task. Nonrepressors might respond to such provocation by increasing their effort at the task and demonstrating improved performance. If repressors, however, are already expending the optimal effort to succeed at the task in the no pressure condition, the extra effort expended in the potential threat condition might actually cause repressors to perform more poorly on the task. Indeed, repressors did respond more slowly to the distractor tone than nonrepressors in the potential threat condition. Thus, the first experiment, as formulated, cannot discount the possible influence of differences in effort on the task. Further investigations would benefit from the inclusion of a task in which differences in effort might be detected more easily (such as through differences in performance on the primary task).

Another explanation for the findings of the current investigation may involve the experience of negative affect. That is, the potential threat condition was designed as a challenge which may engender unpleasant feelings about one's performance on the task and the implications to the self of a poor
performance. Nonrepressors, who seem willing to experience the typically small levels of negative affect engendered in the laboratory, may not be especially motivated to avoid such feelings. Repressors, on the other hand, have been shown to be especially motivated to avoid unpleasant feelings, no matter how minor. It may be that in the potential threat condition, when negative emotions are engendered, repressors may be too busy regulating their feelings to attend to the experimental task any further. Nonrepressors would not be occupied in this manner and thus might be expected to perform better in the potential threat condition. Again, however, the current investigation is not designed in such a way to address this question. Evidence that the potential threat condition actually engenders (or does not engender) negative affect may help to shed light on this problem.

The Failure of Experiment Two

It was mentioned previously that Experiment Two failed to replicate the findings of Experiment One. Indeed, not only did the second experiment fail to replicate the first experiment, it also contradicted
the findings of the first experiment on the analogies task. The listening task failed outright to support the defensive miserliness hypothesis. It is believed that technical problems related to changes in the experimental setting from Experiment One to Experiment Two may have led to the failure of the second experiment. It is also believed that technical difficulties with the design of the listening task may have led to its failure to support the defensive miserliness hypothesis. These technical difficulties will be discussed briefly here.

One factor that might have affected the outcome of the second experiment is the apparent failure of the experimental manipulation. Prior to Experiment Two, the experimental manipulation had been changed subtly in order to strengthen its effect. The intended effect was that subjects in the potential threat condition should experience unpleasant feelings as a result of their apparent poor performance and the implications of that performance. The mood measure administered in Experiment Two, however, failed to show that subjects in the potential threat condition felt worse after the experiment than subjects in the no pressure condition. In fact, subjects in the
potential threat condition actually reported feeling better than subjects in the no pressure condition. As there was no manipulation check employed in Experiment One, it is impossible to draw a definitive conclusion whether the apparent failure of the manipulation is the primary reason for the failure of Experiment Two.

Another factor which might have affected the outcome of the second experiment is the inclusion of two tasks instead of the single task used in the first experiment. Although task order was generally not a significant covariate (except in one case) it is possible that the use of two tasks (and the knowledge that two tasks would be performed) changed the manner in which subjects would have approached the tasks if they had been in separate experiments. For example, in Experiment One, participants were aware prior to beginning the experiment that the duration of the procedure would be approximately 20 minutes. In Experiment Two participants were informed that the entire procedure would require 35 minutes. It is possible that factors such as fatigue or the expectation of a long and somewhat boring procedure might have affected the behavior of participants in Experiment Two.
A related problem is the failure of the listening task in Experiment Two. An important factor which may have led to the failure of the listening task is the use of a single sensory modality, hearing, rather than the dual modalities (vision and hearing) of the analogies task. Experiments by Allport, Antonis, and Reynolds (1972) and Shaffer (1975) found that shifting attention within a sensory modality (either vision or hearing) was considerably more difficult that shifting between modalities (from vision to hearing or vice versa). Previous research, such as that of Bonanno et al (1991), also used a single modality, but in most cases participants were asked to actively ignore one channel or stimulus. Such instructions would therefore require a fundamentally different type of process (that is, focusing and maintaining attention) than the one used in the present investigation. In the present investigation, shifting attention within modality might have been so difficult (especially as subjects were wearing headphones and so could not turn their heads to favor one ear or the other) as to be virtually impossible.
Yet another possible reason for the failure of the listening task to support the defensive miserliness hypothesis is the difficulty of the primary task. In the analogies task, subjects were given a difficult test but were allowed only ten seconds to solve each problem. Thus while most subjects could solve a few of the analogies, most of the analogies were too difficult to solve. As stated previously the reason for making the task very difficult was twofold; first, to ensure that subjects' attention would be occupied by the analogies for majority of the time each analogy appeared on the computer screen, and second, to make subjects feel as though they were performing poorly. The primary task in the listening test, however, consisted of a series of ten words followed by their definitions, and subjects were informed that their memory for the words would be tested following the presentation. Attention would of course have been occupied by listening to the words and definitions, but the second aspect of task difficulty, to inform subjects that they were performing poorly, may not have been adequately incorporated into the listening task. At first glance this task would not seem to be as difficult as the
analogies task, nor would subjects have feedback about their performance during the task. That is, subjects were tested on each analogy as it appeared (thus creating a sense that one is performing poorly), but the test of memory did not occur until after the conclusion of the audio tape. Subjects would therefore have little idea that they were performing poorly until after the experimental procedure had concluded. Thus, the relative difficulty (or lack thereof) in the listening task and the differing manner of assessment may have contributed to the listening task's failure to support the defensive miserliness hypothesis.

Given the contradiction in the findings of the current investigation, future investigations of the defensive miserliness hypothesis will employ the original manipulation instructions and the analogies task. First, the initial test of the hypothesis will be conducted exactly as reported above in order to replicate the finding of Experiment One. Tests of the manipulation will be employed (such as the mood measure used in Experiment Two) to ensure that the experimental manipulation is having the desired effect.
Summary and Conclusions

The results of the first experiment, that repressors show a bias in the allocation of their attentional resources, support the defensive miserliness hypothesis. Defensive miserliness refers to the notion that repressors will conserve and hoard their attentional resources to use them effectively for controlling emotions. In this way, repressors are able to use attention to avoid unwanted emotional states in a manner that is efficient and relatively effortless. The results of the second experiment, a more complex and rigorous test of the hypothesis, failed to support the defensive miserliness hypothesis, but that failure is thought to be due to technical difficulties with the study.

It seems then, although the evidence is somewhat equivocal, that repressors might have taken Grandmother's advice to heart. That is, to keep things from bothering them, repressors may simply try to ignore the unpleasant aspects of daily life. In order to accomplish this, repressors may have developed a bias in the way their attention is paid to
stimuli in the environment. This bias toward conservation and limited use, a form of defensive miserliness, might be of particular benefit to repressors in their efforts to remain as untroubled as possible during the course of their daily lives. There may of course be short-term drawbacks or perhaps even long-term detrimental effects of such a broadly defensive stance, but defensive miserliness seems to be one way for people to conduct their daily affairs with a minimum of difficulty.
References


Hirst, W., Spelke, E.S., Reaves, C.C., Caharack, G., & Neisser, U. (1980). Dividing attention without


of the Western Psychological Association, Long Beach, CA, April.


Appendix

Tables of means for dependent variables.

Table 1: Mean latency to respond, Experiment One (in milliseconds).

<table>
<thead>
<tr>
<th>Manipulation</th>
<th>No Pressure</th>
<th>Potential Threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Threat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait Repressiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repressors</td>
<td>612.0</td>
<td>860.7</td>
</tr>
<tr>
<td></td>
<td>n = 15</td>
<td>n = 15</td>
</tr>
<tr>
<td>Nonrepressors</td>
<td>748.0</td>
<td>631.9</td>
</tr>
<tr>
<td></td>
<td>n = 17</td>
<td>n = 17</td>
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Table 2: Transformed Mean Latency to Respond.

Experiment Two (in log (seconds/100)).

<table>
<thead>
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<th>No pressure</th>
<th>Potential threat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trait Repressiveness</strong></td>
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<td></td>
</tr>
<tr>
<td>Repressors</td>
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<td>1.73</td>
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<tr>
<td>n = 23</td>
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<td>n = 12</td>
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<tr>
<td>Nonrepressors</td>
<td>1.85</td>
<td>1.84</td>
</tr>
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<td>n = 46</td>
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<td>n = 46</td>
</tr>
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</table>
Table 3: Mean Latency to Respond, Experiment Two (in milliseconds).

<table>
<thead>
<tr>
<th>Manipulation</th>
<th>No pressure</th>
<th>Potential threat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Repressors</td>
<td>Nonrepressors</td>
</tr>
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<td>Trait Repressiveness</td>
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<tr>
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<tr>
<td>n = 12</td>
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