# Stress and Mood: The Moderating Role of Activity Inhibition

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## Abstract

The present research tested the hypothesis that activity inhibition (as measured by the picture-story exercise) moderates the relationship between stress and mood. Based on prior research which shows that (a) individuals high in activity inhibition restrain emotional and motivational impulses and (b) inhibiting negative emotion may lead to further emotional impairments, we assumed that individuals high in activity inhibition show evidence of increased negative mood when they are confronted with stressful events. Study 1 found evidence of increased negative mood-relevant thought among individuals high in activity inhibition who were confronted with the threat of social rejection. Study 2 found high negative mood among individuals high in activity inhibition who experienced many daily hassles. Also, participants high in activity inhibition reported a disproportionally higher amount of daily hassles in the middle (but not at the beginning) of a university semester. We suggest that this pattern of results can be accounted for by Wegner's (1994) theory of ironic effects of the suppression of thought and emotion.

# Stress and Mood: The Moderating Role of Activity Inhibition

Everyday stressors such as fights with friends or family, beginning a diet, time pressure or low grades on exams have been termed "hassles" (Kanner, Coyne, Schaefer, & Lazarus, 1981). Research accumulated over the past three decades has consistently shown that daily hassles predict impairments in emotional well-being and physical health. For example, stressful daily events predict increases in negative mood and decreases in positive mood (van Eck, Nicolson, & Berkhoff, 1998), are associated with increased depressive symptoms (Whisman & Kwon, 1993), lead to reduced life satisfaction (Zika & Chamberlain, 1987), may cause insomnia (Weller & Avibir, 1993), are related to reductions in salivary immunoglobulin-A (Martin & Dobbin, 1988), and have been shown to increase the vulnerability to chronic headaches (deBenedittis & Lorenzetti, 1992) and pain in general (Sternbach, 1986). Indeed, some researchers argue that hassles may be a stronger predictor of emotional turmoil and physical symptoms than major life events (Eckenrode, 1984).

## *Moderators of the Stress-Mood Relationship*

While hassles may generally impair mood and well-being, there is also evidence that some people may be more vulnerable to the detrimental effects of hassles than others. For example, Hahn (2000) found that individuals with an internal locus of control are better able to cope with hassles than individuals with an external control orientation. Vickers and Vogeltanz (1999) found that hassles predicted an increase in depressive symptoms only among individuals low (but not among those high) in positive affect. Dispositional optimism seems to decrease the detrimental effects of daily hassles as indexed by negative mood and immune changes (Segerstrom, Taylor, Kemeny, & Fahey, 1998). On the other hand, individuals high (relative to low) in trait anxiety seem to respond more strongly with negative mood to hassles (van Eck et al., 1998). Also, individuals who are high in emotion perception (who intensely experience their own emotions) respond more negatively to daily hassles (Ciarrochi, Deane, & Anderson, 2002). Identifying potential moderators of the relationship between hassles and well-being is important because it helps us understand why some people cope well with hassles while others suffer significant impairments. In the present paper, we

will argue that *activity inhibition* moderates the relationship between stress and emotional well-being.

### *Activity Inhibition and the Inhibition of Emotion*

According to McClelland (McClelland, Davis, Kalin & Wanner, 1972; McClelland, 1979), activity inhibition can be conceptualized as the degree of restraint an individual exercises over emotional and motivational impulses. Activity inhibition is measured by counting the frequency of the negation *not* in verbal content as derived by the picture-story exercise or TAT (cf. McClelland et al., 1972). Thus, individuals high in activity inhibition often *spontaneously* think in terms of *not doing* something, *not feeling* something and *not thinking* something. The initial research by McClelland et al. (1972) found that individuals high in power motivation resort to alcohol in an attempt to feel strong and powerful only when they were low in activity inhibition. Among individuals high in activity inhibition, power motivation was unrelated to alcohol consumption. Following this initial result, research has consistently found that links between motivation and behavior are weaker or absent among individuals high in activity inhibition. For example, power motivation is related to impulsive or profligate power-related behaviors only among individuals low in activity inhibition (McClelland, 1985). Similarly, power motivation is related to increases in salivary testosterone after winning a competition only among individuals who are low in activity inhibition (Schultheiss & Rhode, 2002). Among women high in affiliation motivation who reported high life stress, only those low (as opposed to high) in activity inhibition reported inflicting high physical and psychological abuse on their partners (Mason & Blankenship, 1987). These results can best be explained by assuming that individuals high in activity inhibition inhibit emotional and motivational impulses, which results in weaker relationships between motivation and impulsive behavior.

Being able to restrain motivational and emotional impulses is often a precondition for successful goal pursuit (e.g., McClelland & Boyatzis, 1982; Schultheiss & Brunstein, 2002). However, accumulating evidence suggests that inhibiting negative emotion may be a less than

optimal strategy to cope with stressful events. For example, Gross and Levenson (1993, 1997) found that inhibiting the expression of emotions while watching an emotionally arousing film (versus watching the same film unconstrained) leads to increased activity of the sympathetic nervous system. Similarly, Muraven, Tice, and Baumeister (1998) demonstrated that the inhibition of emotional responses to an upsetting film and the suppression of forbidden thoughts resulted in decreased self-regulatory capacity. Wegner, Erber, and Zanakos (1993) had participants report a memory which still aroused a strong emotional response and then asked them to suppress or amplify the emotion under either high or low mental load. When participants were instructed to suppress the emotion associated with a sad memory, they became even more sad in the high load condition. A study by Cioffi and Holloway (1993) suggests that the suppression of pain may lead to stronger pain perceptions. They found that participants who were asked to suppress the awareness of painful stimulation during a cold-pressor test reported more actual pain up to 2 minutes after the test than participants who were asked to pay close attention to bodily sensations during the test. More generally, empirical research has found a link between the inhibition of anger and hostility and essential hypertension and coronary heart disease (Diamond, 1982; Wielgosz & Nolan, 2000), which is probably mediated by increased cardiovascular reactivity (Engebretson, Matthews, & Scheier, 1989). Individuals who tend to repress negative affect and who have thus been termed “repressors” (Weinberger, 1990) typically show physiological and behavioural reactions to threatening stimuli which equal or even exceed those of high-anxious individuals (e.g., Asendorpf & Scherer, 1983; Weinberger, Schwartz, & Davidson, 1979). In sum, inhibiting or restraining negative emotion caused by stressful or challenging events is likely to backfire, leading to increased physiological responses and further impairments in emotional well-being.

Research on the inhibition and restraint of emotional processes can readily be applied to the concept of activity inhibition. If (a) individuals high in activity inhibition generally tend to inhibit emotional responses and (b) inhibiting the emotional consequences of stressful events can increase physiological and emotional responses to stress, then one could expect individuals high in activity

inhibition to show stronger emotional reactions in response to stressful events. In accord with this hypothesis, Fontana, Rosenberg, Marcus, and Kerns (1987) found that among participants who had to take a performance test, those high in activity inhibition showed higher increases in systolic blood pressure than individuals low in activity inhibition. Schultheiss and Rhode (2002) found elevated cortisol responses in individuals high in activity inhibition who experienced a defeat in a competition with a fellow student. Additional evidence that individuals high (relative to low) in activity inhibition are more vulnerable to the effects of stressful events comes from research on inhibited power motivation. Individuals high in power motivation *and* high in activity inhibition show increased sympathetic activation when under stress (McClelland, Floor, Davidson, & Saron, 1980), impairments in immune functioning (McClelland, Ross, & Patel, 1985), have an increased risk of cardiovascular disease (McClelland, 1979) and other severe illnesses (McClelland & Jemmott, 1980). High power motivation may have elicited the detrimental effects of activity inhibition because individuals high in power motivation are more likely to be involved in stressful social interactions like fights and arguments (McClelland, 1985). All this research indicates that individuals high in activity inhibition seem to inhibit emotional reactions in response to stress, which may result in a "bottling-up" (cf. Schultheiss & Brunstein, 2002) of stress and negative emotions.

### *The Present Research*

In the present research, we further pursued the hypothesis that activity inhibition moderates the relationship between stressful events and negative mood. While research has shown that individuals high in activity inhibition show greater physiological arousal in response to threat, less is known about the role of activity inhibition in moderating the emotional reactions to stressful events. Based on research showing that inhibiting negative emotions may not only increase physiological responses to stressors (e.g., Gross & Levinson, 1993, 1997) but may also lead to further impairments in subjective mood and emotional well-being (Wegner et al., 1993), we expected individuals high (relative to low) in acitivity inhibition to show evidence of increased

negative mood after being confronted with stressful events. In two studies, we tested the assumption that stressful events are associated with stronger emotional impairment in individuals high (relative to low) in activity inhibition. In Study 1, participants who were or were not confronted with an experimental stressor completed an implicit measure of mood and also made explicit appraisals of the experimental situation. We expected individuals high (as compared to low) in activity inhibition to show evidence of stronger negative mood when confronted with stress. In Study 2, we tested whether activity inhibition moderates the relationship between confrontation with daily hassles and explicit mood impairments. Students completed a hassles questionnaire and an explicit measure of mood. Among participants reporting high stress, we expected those high (relative to low) in activity inhibition to report higher impairments of emotional well-being. A subsample of participants of Study 2 completed the hassles questionnaire a second time in the middle of the semester. Having participants rate stress a second time allowed us to test the assumption that individuals high (as compared to low) in activity inhibition may feel disproportionally stressed by the typical challenges of university life.

## Study 1: Activity Inhibition and the Response to an Experimental Stressor

Study 1 tested whether confrontation with an experimental stressor induces negative mood in individuals high in activity inhibition. Participants ostensibly took part in a study on creativity in group processes. They met in groups with the experimenter and were told that they were to solve an anagram task as a group and that the performance of different groups would be compared to find out which groups were most successful. Stress was induced in the experimental condition by making group membership dependent on a sociometric rating of group members. Each participant introduced herself or himself to the group and presented arguments why she or he should be included in the group. Participants then selected other participants to be included in the group or to be excluded from the group. While working on several other tests, participants did not know whether they were chosen or rejected by the rest of the group. This condition hence induced mild stress which presumably aroused a mixture of fear of social rejection, fear of loss of control and

fear of being perceived as less competent than other group members. In the control condition, exclusion from the group was based on chance, which we expected would not arouse stress.

To assess negative mood, we employed a procedure introduced by Weinberger, Kelner, and McClelland (1997) who asked their participants to generate memories of events they experienced before the age of 14. This procedure yields an implicit measure of negative mood which reflects the accessibility of negative mood-relevant thought (Wegner & Smart, 1997, see also Bower, 1981) and which is largely unrelated to explicit mood impairments (see Weinberger et al., 1997). In addition, participants were asked to make explicit appraisals of the group situation. We expected individuals high (relative to low) in activity inhibition to generate more negative memories under stress.

## *Method*

### *Participants and Overview of Procedure*

Sixty students (35 women and 25 men) of the University of Wuppertal, Germany, participated in this experiment. Their mean age was 25 years ($SD$ = 6.85). Participants were randomly assigned to the experimental ($N$ = 30) or the control condition ($N$ = 30). Four participants who took part in the experimental condition were excluded because they were informed about the experiment by former participants prior to taking part in the experiment. The final sample consisted of 56 participants (33 women and 23 men).

The experimental sessions were run in groups ranging from 8 to 12 participants. At the onset of the experiment, participants were told that they were participating in a research study on the effects of group work on creativity. They were informed that they would have to solve creative problems in a group effort and that the results of different experimental groups would be compared to identify the most successful and most creative group.

In the *stressful condition*, participants were told that both cohesion and competence were key factors in determining the success of a group effort. Therefore, participants were asked to introduce themselves to the other participants by telling their name, major, and some hobbies, if any, in order to demonstrate that their inclusion would be crucial to the group's success. After

having introduced themselves, participants were asked to complete a sociometric rating. They were provided with a sketch of the room depicting the various tables and chairs and were asked to choose two persons they thought should be included in the final group and to mark the respective chairs with a plus sign. They were then asked to select another two persons who they thought might not contribute as much to the group's performance and to mark their chairs with a minus sign. The rating forms were then collected and the experimenter announced: 'Since we want to assemble the most successful group possible, I will soon review your ratings and determine whether there are any participants who were not chosen by any other participant or who were excluded by more than two other participants. Participants who meet any one of these two criteria do not have to work on the creativity task with the rest of the group.' We expected this manipulation to induce mild stress by arousing fear of not being selected to participate in the group work.

In the *control condition*, participants were told that we were interested in the creative processes of groups of different sizes. The experimenter announced that not all participants would be able to participate in the group work because she needed a smaller group for the sake of comparison. She announced that she would later randomly assign participants to the group work and that two participants would not be able to take part in it. Thus, the possibility of not being able to participate in the group work was also introduced in the control condition. However, since group membership was based on chance, we did not expect this condition to induce stress.

All participants were then asked to take a picture story exercise similar to the TAT and to complete questionnaires which assessed explicit appraisals of the group situation and implicit mood. After completing these materials, participants in the experimental condition were told that, according to the sociometric rating, all group members would be eligible for the group work. In the control condition, two participants were randomly excluded from the group work. The creative task was to create as many different words out of a German word (Donaudampfschifffahrt) as possible. Participants were carefully debriefed after the completion of the study.

*Activity Inhibition*

To assess activity inhibition, a picture-story exercise similar to the TAT was administered according to the standard group format as described in Smith (1992). Participants were asked to write imaginative stories to each of four pictures and were allowed to spend 5 minutes to write each story. They were instructed to imagine what is going on in each picture and then tell what the situation is, what led up to the situation, what the people in the picture are thinking and feeling, and what will happen next (cf. Smith, Feld & Franz, 1992). The pictures used in this study were taken from Smith (1992) and were depicting (1) an old man and a younger women with two horses, (2) a couple sitting on a bench by a river, (3) a group of five men sitting around a table, and (4) an older woman facing a younger woman (all pictures are contained in Smith, 1992). A score of activity inhibition was derived by counting the frequency of the German negation *nicht* (english *not*, cf. McClelland, 1979) in participants' protocols. Protocols were independently scored by two scorers who reached a high initial inter-rater agreement, $\kappa = .97$. Disagreements due to errors of omission (e.g., one rater overlooking the word *nicht* in a protocol) were resolved and led to a final agreement of 100%. Raw scores of activity inhibition ($M = 2.93$, $SD = 1.95$) were significantly correlated with protocol length ($M = 361$ words, $SD = 88$), $r = .39$, $p < .01$. Thus, following recommendations by Smith, Feld, and Franz (1992), participants' raw scores of activity inhibition were corrected by regression for protocol length and converted to *z* scores. Mean scores of activity inhibition did not differ between the two experimental conditions, $t(54) = .28$, $p > .75$.

In the present sample, activity inhibition had low internal consistency (Cronbach's alpha = .32). Low internal consistencies have generally been found for TAT-measures of activity inhibition and motive dispositions (Smith, 1992)[1]. To create a more robust measure, activity inhibition was coded as a dummy variable by employing a median-split procedure and using a cut-off score of $z = -.09$ for continuous activity inhibition, which yielded groups of participants either low in activity inhibition (dummy coded 0) or high in activity inhibition (dummy coded 1). This procedure followed the general approach of dealing with scores of activity inhibition, which have frequently been dichotomized (e.g., McClelland 1979, 1985; McClelland et al. 1980). We assumed that

dichotomizing activity inhibition may reduce the effect of random noise which is introduced by the measure's low internal consistency. To substantiate this assumption, we conducted all analyses reported in Study 1 and Study 2 using continuous scores of activity inhibition. Compared with analyses in which dummy coded activity inhibition was a predictor, statistical effect-size decreased in 6 of 7 analyses when continuous activity inhibition was entered instead. Thus, for the present purposes, dichotomized activity inhibition seems to be a more reliable measure than continuous activity inhibition.

*Explicit Appraisals*

Explicit appraisals of the group situation were assessed by a ten-item questionnaire constructed for this study. The ten items were designed to tap positive and negative appraisals of the upcoming situation as well as general attitudes toward group work. Ratings were obtained by using a 5-point response scale ranging from 1 (*strongly disagree*) to 5 (s*trongly agree*). Three items ("I am afraid that the other participants don't like me", "It is important to me that the other participants like me", and "It doesn't matter to me what the other participants think of me", reversed) assessed *threat appraisals* ($M$ = 3.02, $SD$ = .75, $\alpha$ = .70). Another three items ("I feel good with the other participants around", "I would like to participate in the upcoming group work", "I'd be disappointed if I cannot take part in the group work") measured *positive appraisals* of the upcoming group work ($M$ = 3.24, $SD$ = .73, $\alpha$ = .65). The last four items (e.g., "Group work is fun", "Group work facilitates my creativity") assessed *general attitudes* toward group work ($M$ = 3.86, $SD$ = .69, $\alpha$ = .77). We expected a measure which is tailored to the concrete experimental situation to be a more valid indicator of participants' conscious appraisals than a global mood-adjective checklist.

Positive appraisals were significantly related to general attitudes ($r$ = .29, $p$ < .05). Threat appraisals were largely unrelated to general attitudes ($r$ = -.22, $p$ = .10) and unrelated to positive appraisals ($r$ = -.04, $p$ > .75). Thus, the questionnaire seemed to assess three largely independent aspects of explicit appraisals of the group situation.

*Implicit mood*

Implicit mood was assessed by employing the procedure developed by Weinberger et al.

(1997) in which participants are asked to think of six events which happened to them before the age of 14 years and to briefly describe each event. Memory recall was restricted to age 14 and below to preclude recency effects. Participants were asked to decide whether each event had aroused predominantly positive or negative emotions and, in a second step, to rate the intensity of the affect associated with the event. We calculated the *number of negative memories* ($M$ = 2.29, $SD$ = .93) by counting the number of negative events. We also computed an index of *mean valence of memories* ($M$ = 1.15, $SD$ = 1.52) by assigning negative events a negative score and positive events a positive score and then averaging the intensity of affects across the six events. Number of negative memories and mean valence of memories were highly correlated ($r$ = -.92, $p$ < .001). Number of negative memories and mean valence of memories were not significantly related to explicit appraisals (all $|ps| > .20$).

## *Results*

### *Preliminary Analyses*

Neither gender nor age of participants had significant impact on the results reported below.

### *Explicit Appraisal*

Two (activity inhibition: low versus high) × 2 (experimental condition: stress versus control) analyses of variance (ANOVA) of the three variables assessing explicit appraisal of the group situation – threat appraisal, positive appraisal, and general attitudes toward group work – did not yield significant main effects of activity inhibition ($p$s > .50), the experimental condition ($p$s > .15) or the interaction of factors ($p$s > .20). In each of these analyses, power (as defined by Cohen, 1988) to detect a significant interaction of effects ($p$ < .05) was .45 for a medium effect ($f$ = .25) and .84 for a large effect ($f$ = .40) as determined by the GPOWER-program by Faul and Erdfelder (1992).

### *Implicit Mood*

A 2 (activity inhibition: low versus high) × 2 (experimental condition: stress versus control) ANOVA with *number of negative memories* as the dependent variable did not yield significant main effects. However, the Activity Inhibition × Experimental Condition interaction significantly

predicted the number of negative memories, $F(1, 52) = 4.85$, $p < .05$. As Figure 1 illustrates, individuals high in activity inhibition who took part in the stressful condition generated the highest number of negative memories. *Post hoc* tests revealed that, in the stressful condition, individuals high in activity inhibition reported more negative memories than individuals low in activity inhibition, $t(24) = 2.23$, $p < .05$. Also, individuals high in activity inhibition who participated in the stressful condition reported more negative memories than individuals high in activity inhibition who participated in the control condition, $t(27) = 2.16$, $p < .05$.

For *mean valence of memories*, the ANOVA did not yield significant main effects nor a significant interaction. An inspection of the means for the two conditions and for individuals high and low in activity inhibition revealed that the pattern of results was similar to the one illustrated in Figure 1 (i.e., individuals high in activity inhibition who participated in the stress condition had the lowest scores). However, since the variance of valence scores was much higher than the variance of the number of negative events, these differences did not reach significance[2].

### *Brief Discussion*

The results of Study 1 are consistent with the hypothesis that individuals high in activity inhibition respond to stress with stronger negative mood than individuals low in activity inhibition. Individuals high in activity inhibition showed evidence of implicit activation of negative mood by generating more negative memories in a free-response test than individuals low in activity inhibition. However, neither the experimental condition nor activity inhibition were related to explicit appraisals of the group situation. This finding is consistent with research showing that implicit and explicit measures of mood may dissociate. For example, Weinberger et al. (1997) found that subliminal presentation of the message “Mommy and I are one” had an effect on their free-response measure of mood (which was also employed in the present study) but not on a self-report measure. Similarly, Sokolowski (1992) found that an unobtrusive mood induction (having participants judge happy versus sad faces) had an impact on behavioral indicators of mood but not on self-reported mood. Langens (2001-2002) found that imagining the pursuit of personal goals

effected measures of implicit mood (judging the emotional expression of faces) but not on self-reported mood. Hence, if mood is subtly influenced by experimental conditions, indirect measures of mood may be a more valid indicator of emotional processes than self-reported mood.

A shortcoming of Study 1 was the lack of a manipulation check which showed that all participants in the experimental condition did indeed assume they might be rejected from the group work. Thus, we cannot tell whether some of the participants did not expect to be excluded or did not feel threatened by a possible exclusion.

## Study 2: Activity Inhibition, Daily Hassles, and Mood

Study 2 examined the relationship between daily hassles and mood in university students. Participants rated how much they had experienced a number of daily hassles in the past week and reported on their current mood. By asking participants which stressful events had been on their minds for a number of days, we were trying to tap sources of stress which were intense and long-lasting enough to produce increases in negative mood in individuals high in activity inhibition. Hence, while daily hassles are generally related to impairments in mood and emotional well-being, we expected a stronger relationship between hassles and mood among individuals high (relative to low) in activity inhibition. Also, negative mood ratings were expected to be highest among individuals high in activity inhibition who also experienced high stress.

A subsample of participants of Study 2 completed the hassles questionnaire twice, first at the beginning of the semester and a second time either 8 or 16 weeks later. The amount and intensity of potentially stressful events tends to be low in the beginning of the semester, but typically increases during the course of the semester (e.g., Tice & Baumeister, 1997). If activity inhibition amplifies negative emotion associated with stressful events, then participants high (relative to low) in activity inhibition should report being more occupied by stressful events when the overall stress load is high, that is, in the middle of the semester. No differences between individuals high and low in activity inhibition were expected at the beginning of the semester, while overall work-load was still at a comparably low level.

## *Method*

### *Participants and Overview of Procedure*

Participants were 205 students (90 women and 115 men) of the University of Wuppertal who received course credit for participation. The data of four participants were discarded because of incomplete questionnaires, which yielded a final sample of 201 participants (88 women and 113 men). The average age of the sample was 24 years (*SD* = 4.51). At the initial testing in the beginning of the semester (Time 1, or T1), all participants completed a picture story exercise similar to the TAT to obtain a measure of activity inhibition, a questionnaire assessing daily hassles, a mood-adjective checklist, and some further questionnaires which are not relevant to the present investigation. All cross-sectional analyses are based on this group of participants. Students were tested in groups ranging from 6 to 10 participants. After the first 100 participants were run, all further participants (*N* = 105) were asked to complete the hassles questionnaire a second time in the semester (Time 2, or T2), either 6 weeks (*N* = 50) or 12 weeks (*N* = 55) after the initial session. Longitudinal analyses are based on this subgroup of participants.

### *Activity Inhibition*

As in Study 1, activity inhibition was assessed by administering a TAT-type picture-story test to participants using instructions described in Study 1. The TAT employed in this study consisted of five picture cues which have been used in a number of previous studies (cf. Schultheiss & Brunstein, 2001). The pictures showed (1) a ship captain talking with another man, (2) a man sitting at an office desk, (3) two female scientists in a laboratory, (4) two people sitting on a park bench and (5) a man and a woman on a trapeze (all pictures are contained in Smith, 1992). A score of activity inhibition was derived by counting the frequency of the German negation *nicht* in participants' protocols. Protocols were independently scored by two scorers who achieved a high initial inter-rater agreement, $\kappa = .99$. Raw scores of activity inhibition (*M* = 3.88, *SD* = 2.61) were significantly correlated with protocol length (*M* = 436 words, *SD* = 100), $r = .43$, $p < .01$. As in Study 1, raw scores were corrected by regression for protocol length and converted to *z* scores. In Study 2, which employed 5 pictures to assess activity inhibition, Cronbach's alpha was .45 for this measure. As in Study 1, activity inhibition was coded as a dummy variable by employing a median-split procedure and using a cut-off score of $z = -.03$ for continuous activity inhibition which yielded

groups of participants either low in activity inhibition (dummy coded 0) or high in activity inhibition (dummy coded 1).

*Daily Hassles*

Daily hassles were assessed using the Short Inventory of Stress for Students (SISS), a questionnaire developed as a convenient and short measure of different sources of stress typically experienced by university students (see Langens, 2002). The SISS consists of 13 items which ask for assorted annoyances (3 items), changes in living conditions (4 items), study stress (3 items), and interpersonal stress (3 items), see Table 1. Participants were asked to reflect on the last week and to rate how strongly they had experienced each potential source of stress on 5-point response scales ranging from 1 (*not at all*) to 5 (*very strongly*). Total stress scores were derived by averaging responses to all 13 items (possible range = 1 to 5, $M = 2.43$, $SD = .56$, $\alpha = .64$). In an independent sample of 100 university students, the total SISS-score correlated highly with the Inventory of College Students' Recent Life Experiences (ICSRLE, Kohn, Lafreniere, & Gurevich, 1990), $r = .74$, $p < .001$, which suggests convergent validity of the SISS. In addition, the total score's predictive value was demonstrated in a study in which stress moderated the effects of daydreaming on commitment and goal attainment (Langens, 2002). In the present sample, the SISS-scales showed moderate internal consistency (see Table 2). Moderate (rather than high) internal consistencies should be expected when aggregating items for a single scale because one source of stress (e.g., interpersonal problems with a family member) is not necessarily associated with stress in a different domain (e.g., problems with a spouse or a friend).

*Negative Mood*

The mood adjective checklist employed in this study was taken from Matthews, Jones, and Chamberlain (1990) and consisted of four items assessing elated mood (*happy*, *joyful*, *contended*, and *cheerful*) and four items assessing depressed mood (*sad*, *frustrated*, *depressed*, *dissatisfied*). According to the authors, these eight items reflect the hedonic tone of self-reported moods. Participants were asked to rate on five-point scales ranging from 1 (*scarcely*) to 5 (*very frequently*) how frequently they had experienced this particular mood "in the past few days". Mood scores were derived by averaging responses to the four items of each of the two scales. Elated mood ($M = 3.54$, $SD = .84$, $\alpha = .79$) was highly correlated with depressed mood ($M = 2.38$, $SD = .98$, $\alpha = .68$),

$r$ = -.61, $p$ < .001. Since the focus of Study 2 was on predicting impairments in mood and emotional well-being, the four items assessing elated mood were reversed and combined with the four items assessing depressed mood for a comprehensive measure of *negative mood* (possible range = 1 to 5, $M$ = 2.42, $SD$ = .82, $\alpha$ = .90).

## *Results*

### *Preliminary Analyses*

Neither gender nor age had significant impact on the results reported below.

### *Cross-sectional Data*

*Correlation analyses.* The intercorrelations of stress scores and negative mood at T1 (see Table 2) indicated low to moderate associations among the four SISS-scales. However, each of the SISS-scales was significantly and positively related to negative mood. Interpersonal stress was most strongly related to negative mood, followed by annoyances, study stress and changes.

*Regression analyses.* Negative mood at T1 was analyzed by employing the following hierarchical regression approach: Total stress and activity inhibition (dummy coded) were entered in the first step of multiple regression, followed by the multiplicative interaction term of total stress and activity inhibition in Step 2. In Step 1, activity inhibition did not predict negative mood, $b$ = .09, $se_b$ = .13, $t(198)$ = .73, $p$ > .40, whereas total stress did, $b$ = .38, $se_b$ = .06, $t(198)$ = 5.91, $p$ < .001. This effect, however, was qualified by a significant Total Stress × Activity Inhibition interaction, $b$ = .27, $se_b$ = .13, $t(197)$ = 2.13, $p$ < .05. To probe this interaction, we calculated correlations between total stress and negative mood separately for individuals high and low in activity inhibition. For individuals high in activity inhibition, this correlation ($r$ = .52, $p$ < .001) was significantly stronger than for individuals low in activity inhibition ($r$ = .25, $p$ < .05), $Z$ = 3.21, $p$ < .01. To further explore the nature of this interaction, we calculated predicted values of negative mood using the regression weights from the final regression equation by employing a procedure proposed by Cohen, Cohen, West and Aiken (2003), in which values at one standard deviation above or below the mean of continuous predictor variables are entered in the regression equation. The results of this procedure are illustrated in Figure 2, which suggests that stress may have a

stronger impact on negative mood for individuals high (relative to low) in activity inhibition. Supplementary *post-hoc* analysis which employed a variant of the Johnson-Neyman technique (see Aiken & West, 1991, p. 132) revealed that individuals high and low in activity inhibition did not differ in negative mood when total stress was low (one *SD* below the mean), $t(197) = 1.00$, $p > .30$. However, individuals high in activity inhibition reported significantly higher levels of negative mood than individuals low in activity inhibition when total stress was high (one *SD* above the mean), $t(197) = 2.03$, $p < .05$[3].

To further elucidate the relationship between stress, activity inhibition, and mood, we analyzed negative mood by employing a more detailed regression approach, in which the four scales of the SSIS (annoyances, change, study, and interpersonal) were entered in the first step of regression analyses, followed by activity inhibition in Step 2 and the four multiplicative interaction terms of activity inhibition and stress in Step 3 (see Table 3). Most importantly, the combined interaction terms significantly predicted negative mood, multiple-partial $F(4, 191) = 4.91$, $p < .01$. The Annoyances × Activity Inhibition interaction was significantly associated with negative mood, $b = .37$, $se_b = .13$, $t(191) = 2.81$, $p < .01$, as was the Change × Activity Inhibition interaction, $b = .31$, $se_b = .13$, $t(191) = 2.39$, $p < .05$. In contrast, neither the Study Stress × Activity Inhibition interaction ($b = -.13$, $se_b = .13$, $t(191) = 1.01$, $p > .30$) nor the Interpersonal Stress × Activity Inhibition interaction ($b = -.15$, $se_b = .12$, $t(191) = 1.21$, $p > .20$) significantly predicted negative mood. Further analyses revealed that SISS-annoyance was significantly related to negative mood for individuals high in activity inhibition ($r = .44$, $p < .01$) but not for individuals low in activity inhibition ($r = .03$, $p > .80$), $Z = 4.33$, $p < .001$. Similarly, SISS-change was significantly related to negative mood for individuals high in activity inhibition ($r = .34$, $p < .01$) but not for those low in activity inhibition ($r = .02$, $p > .70$), $Z = 3.37$, $p < .01$. The overall pattern of these two interactions paralleled the finding illustrated in Figure 2, indicating that individuals high in activity inhibition reported higher levels of negative mood than those low in activity inhibition when they also experienced high stress. Among participants who reported high SSIS-annoyance, individuals high

in activity inhibition reported significantly higher negative mood (predicted *z*-score = .42) than those low in activity inhibition (predicted *z*-score = .02), $t(194) = 2.51$, $p < .05$. Similarly, among participants reporting high SSIS-change, those high in activity inhibition reported higher negative mood (predicted *z*-score = .40) than participants low in activity inhibition (predicted *z*-score = -.01), $t(194) = 2.34$, $p < .05$.

*Longitudinal Data*

*Preliminary analyses*. The 105 participants who completed the SSIS a second time later in the semester did not differ from the 96 students completing questionnaires only at the T1 testing in terms of age ($t(199 = .52$, $p > .60$), raw scores of activity inhibition ($t(199) = .46$, $p > .60$), negative mood at T1 ($t(199) = .83$, $p > .40$) and total stress at T1 ($t(199) = .37$, $p > .70$). In addition, the ratio of female to male participants did not differ between the two groups of participants (T1 and T2 testing: 61 females and 44 males; T1 only: 52 females and 44 males, $\chi^2(1, N = 201) = .34$, $p > .50$).

*Repeated-measures ANOVA*. To test for the effect of activity inhibition on reported stress at the beginning and in the middle of the semester, we conducted a 2 (activity inhibition: low versus high) × 2 (duration between measurements: 6 weeks versus 12 weeks) × 2 (time: total stress at T1 and T2) mixed factorial analysis of variance (ANOVA). This analysis revealed a significant main effect of time, $F(1, 101) = 33.54$, $p < .001$. On average, students reported less stress at the beginning of the semester ($M = 2.41$, $SD = .55$) than in the middle of the semester ($M = 2.68$, $SD = .61$). This main effect was qualified by a significant Activity Inhibition × Time interaction, $F(1, 101) = 5.26$, $p < .05$. Duration between measurements did not reach significance as a main effect and did not enter in any interaction between factors. Hence, data were collapsed across the two T2-measurements. Figure 3, which illustrates mean scores for total stress for individuals high and low in activity inhibition, shows that reports of stress increased over the semester, and that this tendency was more pronounced for individuals high (as compared to those low) in activity inhibition. At T1, individuals high and low in activity inhibition reported an equivalent amount of total stress, $t(103) = .62$, $p > .50$. At T2, however, individuals high in activity inhibition reported significantly more

total stress than those low in activity inhibition, $t(103) = 2.38$, $p < .05$. Further 2 (activity inhibition: low versus high) × 2 (time: stress at T1 versus T2) ANOVAs for each SISS-scale suggested that study stress increased the most over the semester ($F(1, 103) = 18.83$), and that the interaction of activity inhibition and total stress was also strongest for study stress ($F(1, 103) = 4.18$, $p < .05$). The pattern of results for study stress was similar to the result for total stress illustrated in Figure 3[4].

*Brief Discussion*

The results of Study 2 are in accord with the hypothesis that daily hassles have a stronger negative impact on mood in individuals high (relative to low) in activity inhibition. In particular, individuals high in activity inhibition who experienced many daily hassles also reported the highest levels of negative mood. Detailed analyses suggested that activity inhibition moderated the association between annoyances and change as measured by the SISS and negative mood. Since these analyses are based on cross-sectional data, they do not rule out the possibility that mood influenced the occurrence of daily hassles. Future research should address this issue.

No moderating effects of activity inhibition were found for interpersonal stress and study stress. Interpersonal stress was directly and strongly related to mood impairments. This might be the case because satisfaction in a stable intimate relationship has been shown to have a strong impact on a person's psychological and physical health (e.g., Taylor, 1990; Burke, 1994). Accordingly, Campbell, Sedikides, and Bosson (1994) found that for most people a satisfactory close relationship is a major component of general satisfaction with life and their subjective well-being. Also, moderating effects of activity inhibition could not be demonstrated for study stress. However, this may be due to the fact that participants filled out the hassles questionnaire in the beginning of the semester, when study stress was still at comparably low levels. We suspect that, as study stress increases, activity inhibition may also moderate it's effect on emotional well-being.

Individuals high in activity inhibition reported significantly more daily hassles in the middle of the semester than individuals low in activity inhibition. This results is consistent with research showing that inhibiting cognitive processing of stressful events tends to increase the physiological

and emotional impact of these events (cf. Cioffi & Halloway, 1993; Weinberger, 1990; Weinberger et al., 1979). No differences between individuals high and low in activity inhibition were present in the beginning of the semester, when work-load was still low. Thus, high activity inhibition might lead to an intensified perception of stress if the amount of stress exceeds a moderate level.

## General Discussion

The present studies provide evidence that responses to both experimental and everyday stressors are moderated by activity inhibition. In Study 1, among individuals who were or were not confronted with the threat of being rejected by a group of fellow students, individuals high in activity inhibition generated more negative memories than all other groups of participants. Study 2 found that (1) individuals high (relative to low) in activity inhibition reported stronger negative mood when confronted with many daily hassles and that (2) stress reports increased disproportionally over the course of the semester among individuals high (relative to low) in activity inhibition. These results are consistent with prior research showing that individuals high (as compared to low) in activity inhibition show stronger physiological responses to stress. Our results extend these findings, showing that high activity inhibition may amplify emotional responses to stressful events.

Although there is accumulating evidence that activity inhibition moderates the relationship between stressful events and emotional and physiological responses to stress, little is known about the processes which exacerbate the consequences of stress in individuals high in activity inhibition. The results of Studies 1 and 2 seem to suggest that high activity inhibition may produce *ironic effects of mental control* as proposed by Wegner (1994). According to Wegner (1994), mental control can produce the opposite of the intended effect, especially when mental capacity is deminished by competing tasks or stress in general. The seminal study by Wegner, Schneider, Carter, and White (1987) found that participants who were instructed not to think about a white bear experienced a *rebound* of thoughts about white bears after the suppression period. A meta-analysis of thought suppression experiments (Abramowitz, Tolin, & Street, 2001) has substantiated

the original finding that the suppression of a thought results in a rebound of the suppressed thought once mental control is relinquished. In addition to provoking rebounds of suppressed thoughts, thought suppression also increases the *accessibility* of the suppressed thought during the suppression period. For example, Wegner and Erber (1992) asked their participants to suppress thinking about a word (e.g., house) while working on a word-association task. When participants were forced to respond quickly, they often responded with the to-be suppressed word to cues which were semantically related to the suppressed word (e.g., home). Similarly, Wegner et al. (1993, Study 2) found that the suppression of thoughts about a highly emotional memory resulted in increased response latencies in an emotional-Stroop paradigm: When people were instructed to suppress thinking about a recent failure, they took longer to name the colors of words which were related to failure.

Ironic effects of mental control can also be demonstrated for the suppression of emotion. This point was illustrated by the Wegner et al. (1993) study which found that individuals trying to suppress negative mood aroused by a negative memory became even more sad under high mental load. Furthermore, Wegner, Shortt, Blake, and Page (1990) asked their participants to think about sex or to suppress thoughts about sex. While participants who were suppressing thoughts about sex indeed had less thoughts about sex, their physiological arousal (as indicated by skin conductance level) was as high as among participants who deliberately thought about sex. Ironic effects of mental control have also been demonstrated for relaxation: Individuals trying to relax under high mental load become more physiologically activated than individuals not trying to relax at all (Wegner, Broome, & Blumberg, 1997).

Summarizing these and other findings, Wegner and Smart (1997) have argued that the suppression of a thought induces *deep unconscious activation* of that thought. In deep unconscious activation, a thought may not be present in consciousness, but is still highly accessible and can influence behavior and cognitive processes. For example, unconscious activation of a thought can bent the meaning of perceptions and other thoughts toward the meaning of the unconsciously

activated thought (see, for an example, Sherman, Mackie, & Driscoll, 1990). Deep unconscious activation of a thought can be measured by indirect tests of construct accessibility such as lexical decision tasks, the emotional-Stroop test, and the content of spontaneously generated memories (Wegner & Smart, 1997). Also, when a thought is activated unconsciously, it has a tendency to spontaneously pop into consciousness (Lane & Wegner, 1995). Typically, then, the suppression of a thought first induces deep unconscious activation (without conscious awareness) which later provokes conscious intrusions of the suppressed thought. Similarly, the suppression of negative emotion may first lead to deep unconscious activation of negative mood-relevant thought which eventually causes rebounds of increased negative mood (Wegner, 1994; Wegner & Smart, 1997).

The pattern of results across Studies 1 and 2 seems to be consistent with the hypothesis that activity inhibition produces ironic effects of suppressing both thoughts about stressful events and the emotional consequences of stressful events. The results of Study 1 seem to suggest that individuals high in activity inhibition respond to a current stressor with deep unconscious activation of negative mood-relevant thought. While individuals high in activity inhibition did not report being consciously disturbed by the experimental procedure, they showed evidence of implicit activation of negative mood by generating more negative memories than individuals low in activity inhibition. This pattern of results is consistent with the assumption that individuals high in activity inhibition suppressed thoughts of being rejected from the group in the stressful condition, which in turn induced deep unconscious activation of negative mood. The results of Study 2 seem to be in accord with the assumption that repeated confrontation with stressful events may ultimately lead to increases in self-reported negative mood in individuals high in activity inhibition. Furthermore, the finding of Study 2 that individuals high in activity inhibition reported significantly more daily hassles in the middle of the semester than individuals low in activity inhibition may be a direct consequence of the suppression of stress-related thought. If individuals high in activity inhibition indeed tend to suppress thinking about stressful events, then it might be expected that they experience rebounds of stress-related thought later in the semester.

Overall, then, our findings are largely consistent with the hypothesis that individuals high in activity inhibition suppress stress-related thoughts when confronted with stressful events, which first induces deep unconscious activation of stress-related thought and which eventually gives raise to a conscious preoccupation with stress and an intensification of the emotional consequences of stress. Although the present studies yielded results which point to activity inhibition as an important moderator of the relationship between stressors and mood, we are far from having answers to all issues which have been raised in this paper. First and foremost, while our data are consistent with the assumption that high activity inhibition provokes ironic effects of the inhibition of stress-related thought, we have no direct evidence that individuals high in activity inhibition actually suppress unsettling thoughts. Second, it would be desirable to demonstrate in a single study that activity inhibition is associated with deep unconscious activation of negative emotion-relevant thought immediately after confrontation with a stressor, and with later explicit impariments in mood and emotional well-being. In addition, the generality of the effects reported here should be examined in future analyses using different outcome variables. For example, the interaction of activity inhibition and stress should be examined by collecting behavioral data and by assessing different components of well-being, such as physical symptoms or somatization (e.g., Karoly & Lecci, 1993).

From a broader view, our research illustrates the perils of inhibition of negative affect as a way of coping with stress. Inhibiting negative emotion may be effective in temporarily removing emotional experience from conscious awareness. However, the long-term consequences of emotion inhibition clearly involve hightened physiological arousal and impairments in mood and emotional well-being (Weinberger, 1990; Gross, 1999). Also, while it may be easy to suppress thoughts about neutral events, suppressing stress-related thoughts is bound to fail because stress and cognitive load reduce the effectiveness of mental control and increase the probability of paradoxical effects (Wegner, 1994; see also Ansfield, Wegner & Bowser, 1996; Wegner et al., 1997). If individuals respond to such a paradoxical effect by trying to suppress even harder, a downward-spiral may be initiated which cycles back and forth between an intensification of mental control and even stronger

paradoxical effects (cf. Wenzlaff & Wegner, 2001). Long-term suppression of negative thought and emotion has been implicated in a variety of psychological disturbances such as depression (Beevers, Wenzlaff, Hayes, & Scott, 1999), obsessions (Wegner, 1994) and anxiety (Purdon, 1999). If our conclusions hold, then individuals high in activity inhibition may be at a higher risk to develop such psychological disturbances.

A major methodological issue related to our research is the measure of activity inhibition which is, of course, a very crude measure of inhibition. Compared to self-report measures of restraint (e.g., Tellegen, 1985), inhibition (Clark & Watson, 1991) or thought suppression (Wegner & Zanakos, 1994), it has low internal consistency. To account for low internal consistency, we employed dichotomous activity inhibition as a predictor of thought and emotion in the present studies. Since internal consistency of activity inhibition depends heavily on the number of pictures employed to assess activity inhibition (see, for example, Schultheiss & Brunstein, 2002, who report an alpha of .55 when using six TAT-pictures), internal consistency might be improved by employing up to 8 or 10 pictures. In addition, more research is needed to clearly establish what is being measured by assessing the frequency of using the negation "not" in spontaneous thought-flow[5]. McClelland's (McClelland et al., 1972; McClelland, 1979) assertion that the measure taps restraint over motivational and emotional impulses relies mostly on correlational data and should be substantiated by experimental studies which demonstrate that individuals high in activity inhibition not only think about "not thinking" or "not doing" something, but actually suppress emotional responses. For example, in an experiment in which participants are confronted with a stressful event and are either asked to suppress emotional responses or are asked not to suppress, we would expect individuals high in activity inhibition who were not instructed to suppress to show similar responses (e.g., evidence of deep unconscious activation of negative emotion-relevant thought) as participants low in activity inhibition who were instructed to suppress.

Despite these shortcomings, the picture-story measure of activity inhibition is a non-reactive behavioral indicator of an individual's spontaneous inclination to think in terms of not doing and

not thinking, and may therefore be successfully employed in research of inhibition and restraint. A long tradition of measuring personality variables in spontaneous thought-content launched by McClelland and his associates (Atkinson, 1958; McClelland, 1985; Smith, 1992) has demonstrated that such implicit measures of personality are not confounded with a person's conscious self-concept and are valid predictors of behavioral trends (McClelland, Koestner, & Weinberger, 1989) and physiological processes (e.g., Schultheiss, Campbell, & McClelland, 1999). These arguments also apply to activity inhibition as measured by the picture-story exercise, since research has shown that it is unrelated to self-report measures of neuroticism (Schultheiss & Brunstein, 2001 report a correlation of $r$ = -.18, *ns*., in a sample of 111 participants) and predicts physiological responses to stress (Fontana et al., 1987; Schultheiss & Rhode, 2002). Thus, we are confident that activity inhibition can successfully be employed in research on stress and psychological responses to stressful events.

In sum, our research yielded encouraging results which enhance our understanding of the processes moderating between stressful events and an individuals psychological responses to stress. By extending the scope and using different methodologies in future research, we may better be able to help people find more adaptive ways of coping with stress.

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## Footnotes

[1] While internal consistency of activity inhibition is typically quite low, test-retest stability of this measure is reasonably high: Schultheiss and Brunstein (2002) report correlations of $r = .57$ for 2-week interval and $r = .51$ for a 4-week interval.

[2] We also tested how the results changed when continuous activity inhibition (CAI) was employed as a predictor in the analyses of Study 1. For *mean number of negative memories*, the effect size of the interaction of dichotomous activity inhibition (DAI) and the experimental condition increased from $d = .60$, $p = .03$ to $d = .68$, $p = .02$ (CAI). For *mean valence of negative memories*, the effect size of the interaction was $d = .29$, $p = .29$ for DAI and $d = .28$, $p = .28$ for CAI. We also tested for non-linear relationships between continuous activity inhibition and dependent variables in Study 1 (probing quadratic trends) and in Study 2 (probing quadratic and cubic trends). However, there were no indications for significant non-linear relationships in both studies.

[3] Two separate hierarchical regression analyses were run to estimate the relative contribution of elated mood and depressed mood to the relationship between activity inhibition, total stress, and negative mood. For elated mood, the interaction of activity inhibition and total stress was marginally significant, $b = -.26$, $se_b = .14$, $t(197) = 1.93$, $p = .055$. Participants high in activity inhibition indicating high total stress reported the lowest levels of elated mood. For depressed mood, the interaction of activity inhibition and total stress also was marginally significant, $b = .24$, $se_b = .13$, $t(197) = 1.84$, $p = .067$. Participants high in activity inhibition reporting high stress reported the highest levels of depressed mood. These findings are consistent with the results illustrated in Figure 2. The results for the overall measure of negative mood might have been stronger because negative mood had higher internal consistency than its composite measures.

[4] When continuous activity inhibition (CAI) was employed as a predictor instead of dichotomous

activity inhibition (DAI), the effect sizes of the analyses of Study 2 generally decreased. For *negative mood*, the effect size of the interaction of activity inhibition and total stress decreased from $d = .28$, $p = .03$ (DAI) to $d = .16$, $p = .23$ (CAI). For the hierarchical regression reported in Table 3, the effect size of the interaction of activity inhibition and SISS-annoyance decreased from $d = .35$, $p = .005$ (DAI) to $d = .25$, $p = .07$ (CAI), and the effect size of the interaction of activity inhibition and SISS-change decreased from $d = .29$, $p = .02$ (DAI) to $d = .16$, $p = .20$ (CAI). For *total stress* at T2, the effect size of activity inhibition decreased from $d = .47$, $p = .02$ (DAI) to $d = 36$, $p = .07$ (CAI). And finally, for *study stress* at T2, the effect size of activity inhibition decreased from $d = .51$, $p = .01$ (DAI) to $d = .45$, $p = .03$ (CAI).

[5] Activity inhibition seems to be unrelated to the big five personality traits, extraversion, neuroticism, openness, conscientiousness, and agreeableness (Schultheiss & Brunstein, 2001).

Table 1.

*The Short Inventory of Students' Stress (SISS). Participants Respond to the Sentence-Stem "In the last days, I have experienced…" (Study 2).*

| *Item* | *Scale* | *M* | *SD* |
|---|---|---|---|
| …money troubles | Annoyances | 2.76 | 1.43 |
| …strains in the family live | Interpersonal | 2.06 | 1.20 |
| …high work load in school | Study | 2.93 | 1.33 |
| …time pressure (not having enough time for my studies) | Annoyances | 3.45 | 1.24 |
| …change of personal habits (e.g., quit smoking) | Change | 1.98 | 1.34 |
| …strains because of exams, take-homes, or tests | Study | 2.53 | 1.52 |
| …problems with girlfriend/boyfriend or spouse | Interpersonal | 2.29 | 1.48 |
| …change of sleep habits (e.g., significantly less sleep) | Change | 2.60 | 1.34 |
| …health problems (colds, sores, illness, etc.) | Annoyances | 2.32 | 1.24 |
| …change in spare-time habits (e.g. new hobbies) | Change | 2.79 | 1.33 |
| …low performances in my studies | Study | 1.70 | .95 |
| …arguments or fights with friends | Interpersonal | 1.77 | .96 |
| …change of eating habits (e.g., began a diet) | Change | 2.37 | 1.33 |

Table 2.

*Descriptive Statistics and Two-Tailed Correlations Among Variables (Study 2).*

| | 1 | 2 | 3 | 4 | 5 | 6 | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|
| 1. Annoyances | (.42) | .21** | .34** | .20** | .64** | .25** | 2.85 | .82 |
| 2. Change | | (.61) | .27** | .13 | .71** | .16* | 2.43 | .90 |
| 3. Study | | | (.49) | .15* | .67** | .17* | 2.38 | .91 |
| 4. Interpersonal | | | | (.45) | .53** | .45** | 2.04 | .85 |
| 5. Total Stress | | | | | (.64) | .38** | 2.43 | .56 |
| 6. Negative Mood | | | | | | (.90) | 2.42 | .82 |

*Note.* $N = 201$. Figures in parentheses are reliabilities estimated by coefficient alpha.

* $p < .05$. ** $p < .01$.

Table 3

*Hierarchical Regression of Negative Mood at Time 1 on Stress at Time 1 and Activity Inhibition (Study 2).*

| Block | Variable | $\Delta R^2$ | *df* | $\Delta F$ | *b*[a] |
|---|---|---|---|---|---|
| 1 | Sources of Stress | .238 | 4, 196 | 15.29** | |
| | Annoyances | | | | .13+ |
| | Change | | | | .07 |
| | Study | | | | .04 |
| | Interpersonal | | | | .41** |
| 2 | Activity Inhibition (AI) | .001 | 1, 195 | 0.39 | .04 |
| 3 | Interaction Terms | .057 | 1, 191 | 4.91** | |
| | Annoyances × AI | | | | .28** |
| | Change × AI | | | | .20* |
| | Study Stress × AI | | | | -.09 |
| | Interpersonal Stress × AI | | | | -.11 |
| | Cumulative $R^2$ | .298 | 9, 191 | 9.02** | |

*Note.* [a] *b* is the standardized regression coefficient in the regression equation.

+ $p < .10$. * $p < .05$. ** $p < .01$.

*Figure Captions*

*Figure 1.* Mean number of negative memories and 95% confidence intervals for means for individuals high and low in activity inhibition (AI) in the stressful condition and in the control condition (Study 1).

*Figure 2.* Negative mood at Time 1 as a function of activity inhibition and total stress, computed for values one *SD* below (low) and above (high) the mean of total stress for individuals low in activity inhibition (dashed line) and individuals high in activity inhibition (solid line) (Study 2).

*Figure 3.* Mean total stress in the beginning of the semester (Time 1) and in the middle of the semester (Time 2) and 95% confidence intervals for means as a function of activity inhibition (AI, Study 2).

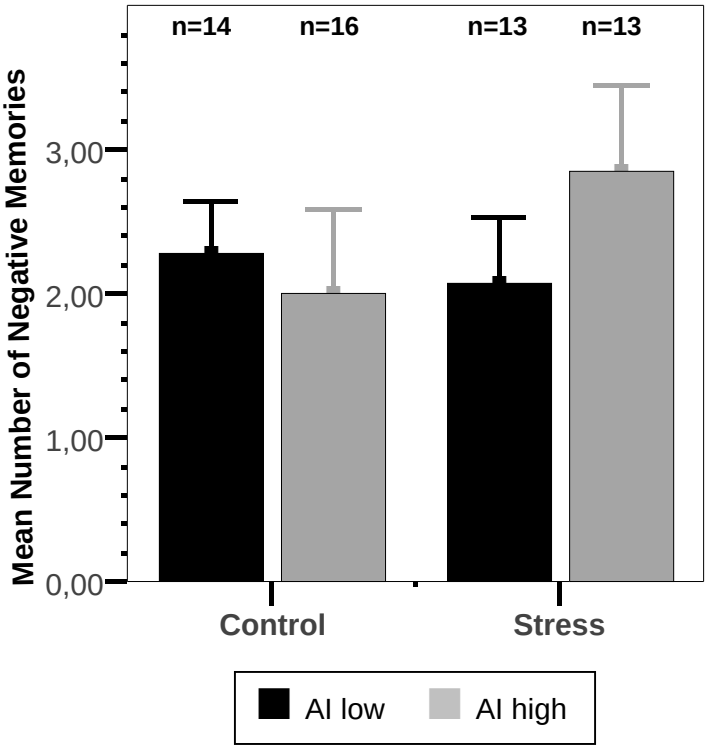
n=14
n=16
n=13
n=13
Mean Number of Negative Memories
3,00
2,00
1,00
0,00
Control
Stress
AI low
AI high

*Figure 1*

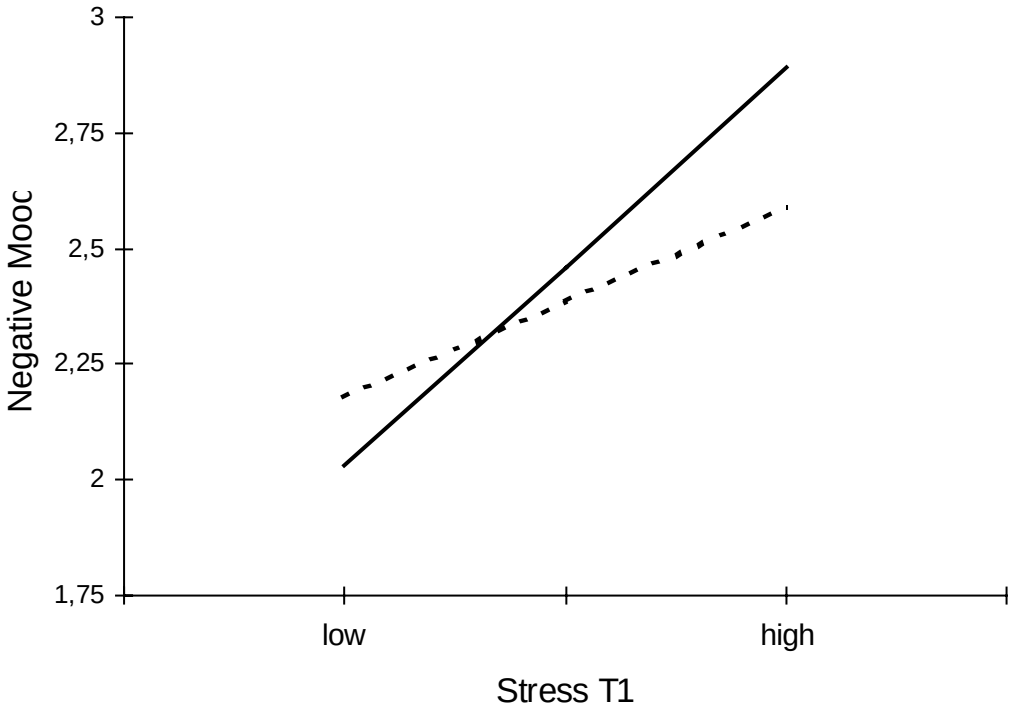


*Figure 2*

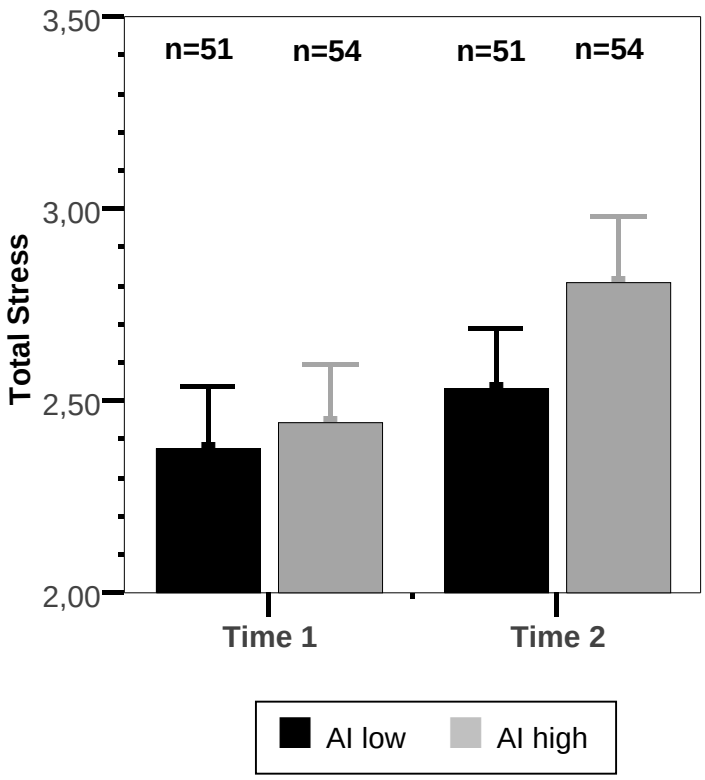
3,50
3,00
2,50
2,00
Total Stress
n=51
n=54
n=51
n=54
Time 1
Time 2
AI low
AI high

*Figure 3*