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Helpful Self-Control: Autonomy Support, Vitality, and Depletion

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Abstract

Why someone exerts self-control may influence how depleting a task is. Feeling compelled to exert self-control require more self-control strength than exerting self-control for more autonomous reasons. Across three experiments, individuals whose autonomy was supported while exerting self-control performed better on a subsequent test of self-control as compared to individuals who had more pressure placed upon them while exerting self-control. The differences in self-control performance were not due to anxiety, stress, unpleasantness, or reduced motivation among the controlled participants. Additional analyses suggested that the decline in self-control performance was mediated by subjective vitality. Feelings of autonomy support lead to enhanced feelings of subjective vitality. This increased vitality may help replenish lost ego-strength, which lead to better self-control performance subsequently.

Keywords

self-control; depletion; self-determination theory; autonomy support

Are attempts to lose weight more likely to succeed when the person feels that it is his or her free choice to diet or when he or she feels pressure to do so? Extensive research has found that individuals who diet in autonomy supportive situations have an easier time and are more likely to lose weight than individuals who diet in a more controlling environments (e.g., Williams, Grow, Freedman, Ryan, & Deci, 1996). These results suggest that the quality, as well as the quantity, of motivation apparently plays a role in how effortful self-control is. This implies that the type of motivation (either self-driven or externally determined) may affect the degree of ego-depletion (Muraven & Baumeister, 2000). In short, it is possible not all self-control is alike-why someone is exerting self-control may matter.

Self-control is the process of overriding or inhibiting automatic, habitual, or innate behaviors, urges, emotions, or desires that would otherwise interfere with goal directed behavior (Barkley, 1997a; Baumeister, Heatherton, & Tice, 1994; Kanfer & Karoly, 1972). Without self-control, an individual would engage in automatic, habitual, or innate behaviors (Bargh & Chartrand,

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1999; Hayes, 1989; Shallice & Burgess, 1993). Researchers have theorized that self-control depends on, requires and depletes a limited resource (Muraven & Baumeister, 2000). If that is the case, then after exerting self-control, subsequent attempts at self-control should be more likely to fail, as this needed strength is diminished. Indeed, individuals who had to suppress the thought of a white bear (a difficult self-control exercise) subsequently consumed more alcohol in a situation that called for restraint than individuals who solved math problems (a task that requires far less self-control). Individuals who regulated their thoughts did not differ in mood, arousal, frustration, or effort from individuals who solved math problems; the only difference was the amount of self-control required (Muraven, Collins, & Nienhaus, 2002). Similarly, depleted individuals have been found to drink more alcohol (especially when motivated not to drink, Muraven, Collins, Shiffman, & Paty, 2005), regulate physical demands more poorly (Muraven, Tice, & Baumeister, 1998), and have difficulty with complex mental activities (Schmeichel, Vohs, & Baumeister, 2003). However, depletion seems to have no effect on individuals who are not exerting self-control (Muraven et al., 2005; Muraven & Slessareva, 2003). Overall, the effects of exerting self-control generalize to a wide variety of behaviors that require inhibition or self-control.

In summary, research has found that the more self-control individuals report exerting, the more self-control strength they deplete (Muraven et al., 2002). To date, this has been a direct relationship: more self-control leads to more depletion. The present research seeks to explore a moderator of that effect. In particular, individuals' feeling of autonomy (Deci & Ryan, 1985) should play an important role in determining how depleting a self-control activity may be. Feeling forced or pressured by the situation to exert self-control may lead to greater depletion of self-control resources than exerting self-control for more volitional or autonomous reasons. Autonomy support should reduce the magnitude of depletion.

Autonomy Support

A fact of life is that we all must engage in tasks we do not particularly care for or want to do. Sometimes we need to change habits to live healthier lives, or engage in tasks that we do not enjoy doing but that are necessary (e.g., cleaning dishes). This is probably especially true of exerting self-control. However, one can feel more or less autonomous in the engagement of such tasks. Self-determination theory (SDT) provides a framework to understand how these feelings of autonomy (or, conversely, feeling compelled to act) yields different behavioral outcomes (Deci & Ryan, 1985, 2000). At the core, SDT proposes two types of motivation: Intrinsic motivation refers to doing something for its own sake, such as interest or enjoyment, whereas extrinsic motivation refers to doing something for instrumental reasons. These motivations fall on a continuum, ranging from the acts done for the pleasure of it (intrinsic) to acts done to gain rewards or to avoid punishment (extrinsic). Importantly, a persons' motivation for a task can be changed. Situations that are perceived as more controlling (for example, because of deadlines, external rewards, or potential punishments) may reduce intrinsic motivation and lead to a more extrinsic orientation.

Alternatively, situations that are autonomy supportive encourage a more intrinsic motivation. More precisely, SDT suggests that autonomous motivation should be enhanced when basic psychological needs for autonomy, competence and relatedness are satisfied in one's social environment (Deci & Ryan, 1985, 2000). Research has shown that situations where the person's feelings and experiences are acknowledged, where the person is left free to choose a course of action that suits his or her personal needs and desires, and where the person is given information to make the best possible decision, are more conducive to the person's endorsement and commitment to the new course of action, and thus to autonomous motivation (Deci, Connell, & Ryan, 1989; Koestner, Ryan, Bernieri, & Holt, 1984; Williams et al., 1996). Other research has shown that non-pressuring instructions (Ryan, Mims, & Koestner, 1983), or explicit

choices (Zuckerman, Porac, Lathin, Smith, & Deci, 1978), seem to enhance autonomous motivation.

We suggest that exerting self-control in a controlling setting is more depleting of self-control strength than exerting self-control in an autonomy supportive setting. Numerous field studies have found that exerting self-control in an autonomy supportive context leads to better outcomes and decreased likelihood of failure than feeling forced to exert self-control. For instance, Hom and Fabes (1985) found that children were better able to delaying gratification when they had a choice between incentives than when they did not. Likewise, as compared to individuals who felt compelled to exert self-control, individuals who felt more supported in their self-control efforts tend to have better outcomes on activities that require self-control, such as dieting (Williams et al., 1996), smoking cessation (Curry, Wagner, & Grothaus, 1990; Williams, Gagné, Ryan, & Deci, 2002), and alcohol abstinence (Ryan, Plant, & O'Malley, 1995). In short, numerous field studies have found that exerting self-control in an autonomy supportive context leads to better outcomes and decreased likelihood of failure than feeling forced to exert self-control. One reason is that it may be more depleting to exert self-control when under pressure than when it is more freely chosen.

Vitality

Subjective vitality may help to explain why autonomy support while exerting self-control depletes less strength. Subjective vitality is defined as “a subjective feeling of aliveness and energy” (Ryan & Frederick, 1997, p. 529) that arises from feelings of freedom, autonomy support, and intrinsic motivation. Although it has some similarities, vitality is different than positive affect (Nix, Ryan, Manly, & Deci, 1999). It is a positive, energetic, vital state that increases when people engage in behaviors that feel autonomous or self-driven, and decreases when people feel pressure to act.

Vitality may help in the recovery of lost self-control strength. Usually, after exerting self-control, strength is depleted and this lost strength contributes to reduced self-control performance (see Muraven, Shmueli, & Burkley, 2006). Feeling vital may help replenish strength at a much quicker rate, however. That is, strength is recovered faster when people feel vital, resulting in better self-control performance subsequently. This means that the energizing and positive experience of regulating a behavior for autonomous reasons leads to a more rapid recovery of strength, which leads to better performance on self-control tasks subsequently.

Consistent with the idea that positive experiences lead to a replenishment of lost strength, Tice, Baumeister, Shmueli, and Muraven (2007) demonstrated that positive experiences can nullify the effects of depletion. For instance, participants who watched a pleasant video after exerting self-control (for external reasons) performed just as well on a subsequent self-control task as participants who did not exert self-control at all. These studies did not examine vitality specifically, but the researchers argued that the mediating positive experience lead to a replenishment of lost strength. We build on this idea by arguing that if the depleting task itself is energizing, then the magnitude of depletion should be diminished.

We tested whether vitality mediates the effects of motivational orientation on self-control depletion. We hypothesized that individuals who exert self-control for more autonomous reasons should have more subjective vitality than individuals who exert self-control for more controlled reasons, and these differences in vitality may help explain the differences in self-control outcomes.

Overview of Studies

Individuals who exert self-control in autonomy supportive environments should perform better on subsequent tests of self-control than individuals who exerted self-control in a more controlling environment. Autonomy support should not affect level of motivation, mood, or arousal; only how depleting the task is.

Feeling forced to exert self-control may lead to greater depletion because it undermines feelings of subjective vitality. When individuals are lower in vitality, they should perform worse on tests of self-control. Therefore, feelings of vitality should mediate the relationship between autonomy supportive situations and self-control performance.

These hypotheses were tested in three experiments that differed in their operationalization of autonomy support and measurement of self-control performance. Autonomy support was both enhanced and undermined through different manipulations. Similarly, initial and subsequent self-control was manipulated using a variety of tasks to show the generalizability of the effect.

Experiment 1

In this experiment, participants either were made to feel as if they were a valued member of the research team by an autonomy supportive experimenter or were made to feel as if they were just a "cog in the machine" by a distant and cold experimenter who was controlling. In the autonomy supportive condition, the experimenter went out of her way to explain the purpose of the task, asked them whether they felt like participating, sought their agreement to take part, and tried to alleviate any concerns the participants may have. In the controlling condition, the experimenter instead ordered participants to take part and expressed little interest in participants' concerns. Thus, all participants were told to avoid eating; what differed was how compelling or supportive the social setting was. Engaging in self-control under the supportive condition should be associated with less depletion and better self-control performance subsequently as compared to engaging in self-control under the controlling conditions.

Method

Participants—Thirty-two (11 men and 21 women) University at Albany undergraduates were recruited from introductory psychology courses and participated in return for partial fulfillment of a course requirement. Participants were individually tested in one 30-minute response session.

Procedures—Participants were told that they were signing up for an experiment examining the effects of resisting temptation on cognitive performance. Both the participants and the experimenter were unfamiliar with the tenets of self-determination theory and were unaware of how autonomy supportive or controlling contexts influence motivation orientation. They were similarly unaware that self-control performance was the primary focus of the experiment.

After signing the consent form, participants were presented with a plate of either radishes or cookies (chocolate covered wafers). Consistent with previous research on resisting temptations (Baumeister, Bratslavsky, Muraven, & Tice, 1998), participants were instructed not to eat the cookies or radishes. Research has found that cookies are considerably more tempting than radishes, and therefore resisting the desire to eat the cookies should require much more self-control than resisting the desire to eat the radishes. Thus, participants who were instructed to not eat the cookies should deplete more self-control strength than participants who were instructed to not eat the radishes. All participants were successful in not eating the food.

Crossed with the two food conditions, participants were randomly assigned to either an autonomy supportive condition or a controlling condition. Participants assigned to the autonomy supportive condition were met by a smiling experimenter who explained the initial task to the participants in detail. The experimenter gave the participant a thorough explanation of the cover story and endeavored to make them feel like they were serving a valuable function in contributing to the research. In the autonomy supportive condition, the experimenter went out of her way to explain the purpose of the task, asked them whether they felt like participating (e.g., "We ask that you please don't eat the cookies/radishes. Is that okay?"), and tried to alleviate any concerns the participants may have ("What questions may I answer for you?"). The autonomy supportive condition was designed to present the task in a way to facilitate the adoption of autonomous motivation towards it.

Contrasted with that, the experimenter in the controlling condition instead ordered participants to take part (e.g., "You must not eat the cookies/radishes") and expressed little interest in participants' concerns ("Let's start now."). Participants in the controlling condition were met by a brisk and cool experimenter who emphasized the word *must* in explaining the task to encourage them to feel like they were 'just another participant'. The participants were given only a perfunctory explanation of the experiment. The controlling condition was designed to present the task as something that had to be done therefore undermining their autonomous motivation to complete the task. Thus, all participants were told to avoid eating; what differed was how compelled or supported the situation was.

After participants resisted the temptation of the food for five minutes, the experimenter returned and removed the food. At this point, the experimenter then gave participants several questionnaires. The first was the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988), a well-established measure of mood and arousal. This scale asks participants to rate their current mood using 16 different adjectives. The items are scored on two separate factors that correspond to pleasant versus unpleasant affect and high versus low arousal.

The second questionnaire was the Intrinsic Motivation Inventory (IMI; e.g., Ryan, 1982) to assess their mood, arousal, and motivation orientation. This 22-item scale consists of four subscales rated on a seven-point Likert-type scale: interest/enjoyment (seven items: "I would describe this task as enjoyable"; "I thought the task was very interesting"), perceived competence (five items: "I think I am pretty good at this task"), perceived choice (five items: "I felt that I had to do this task"), and pressure/tension (five items: "I felt pressure while doing this task"). The interest/enjoyment subscale is considered the measure of intrinsic motivation (Ryan, 1982). For that reason, this subscale was our primary focus in the analyses; the other scales are reported for completeness. The coefficient alpha of this subscale was .89 and the possible range was 7 to 49.

Finally, participants also completed a procedure and manipulation check customized for this experiment. Of particular interest, they were asked how much they engaged in self-control ("how much did you have to stop yourself while working on that task?"). This question was answered using a 25-point Likert-type scale, with anchors of 1 = *not all* and 25 = *very much*.

The experimenter then explained the outcome measure of self-control capacity to participants. These instructions were given in a professional, courteous and cordial manner to all participants, regardless of their prior condition. Self-control performance was assessed using a test of concentration. Research has found that concentration and vigilance-type tasks require self-control (See, Howe, Warm, & Dember, 1995) and that individuals lower in trait self-control tended to perform more poorly on tests of concentration and vigilance (Barkley, 1997b; Quay, 1997). Individuals who have greater difficulty regulating their attention should miss more cues. Thus, individuals lower in self-control strength should be less able to

concentrate and should perform more poorly on a test of vigilance than individuals who have more self-control strength. The present study used a well-validated, computer-based measure of concentration and vigilance. Custom designed software was programmed to present numbers on the screen for 500 milliseconds, one at a time. Participants were instructed to hit the space bar in the event they saw the number six followed by the number four. The maximum number of targets was 30; the number of targets missed was analyzed. The task lasted for approximately 12 minutes. After subjects completed the test of concentration, they were debriefed and dismissed.

Results

Manipulation Check

IMI: Two participants failed to complete the manipulation checks, so these analyses are based on 30 participants. As shown in Table 1, participants assigned to the autonomy supportive condition reported greater intrinsic motivation on the IMI interest/enjoyment subscale than participants assigned to the controlling condition, $F(1, 26) = 4.37$, $p < 05$. Score on the IMI was not related to food condition, $F(1, 26) = .68$, *ns*, nor was it to the interaction between autonomy instructions and food condition, $F(1, 26) = .56$, *ns*. This suggests that the experimental manipulation was successful in creating contexts that lead to autonomous and controlled motivation orientations. The conditions did not differ significantly on the other subscales of the IMI, all Fs < 2.1.

Mood: Participants' mood also did not differ across self-control conditions, $F(1, 26) = .62$, *ns* nor did it vary across autonomy instructions, $F(1, 26) = .89$, *ns*. The same was true for arousal, $F(1, 26) = .078$ and, $F(1, 26) = .66$, *ns*, respectively. Finally, mood and arousal was not related to the interaction between self-control condition and autonomy instructions: mood, $F(1, 26) = .88$, *ns*; arousal, $F(1, 26) = .30$, *ns*.

Finally, participants who were instructed not to eat the cookies reported overriding a stronger impulse to eat (three questions, alpha = .71) than participants who were instructed to not eat the radishes, $F(1, 26) = 3.70$, $p < .05$. The autonomy instructions had no effect on the amount of inhibition required, $F(1, 26) = .26$, *ns*. The interaction was similarly not significant, $F(1, 26) = .059$, *ns*. In other words, not eating cookies requires more self-control than not eating radishes, but the amount of self-control required does not differ based on autonomy support.

There was no correlation between performance on the concentration task and mood, $r(30) = -.24$, *ns* and arousal, $r(30) = .09$, *ns*. There was a significant relationship between the amount of inhibition exerted on the first task and targets missed on the concentration task, $r(30) = .43$, $p < .025$.

Self-Control Outcome—The primary outcome measure was the number of errors made on the concentration task. That is, how many times did the participant fail to press the space bar when the number four followed the number six. This would indicate that they were less successful at regulating their attention. A 2 (resist food temptation: cookies or radishes) X 2 (autonomy support or control) ANOVA was conducted. There was a main effect for food temptation, so that individuals who were instructed to not eat the cookies performed more poorly on the test of concentration than participants who were instructed to not eat the radishes, $F(1, 28) = 4.77$, $p < .05$. This replicates previous research on depletion. Participants who received autonomy supportive instructions made less errors than participants who were in the controlling instructions condition, $F(1, 28) = 10.60$ $p < .01$.

Most tellingly, there was a significant interaction between autonomy support and food condition, $F(1, 28) = 12.51$, $p < .01$. A contrast analysis found that participants who had to

resist the temptation of cookies and who were given controlling instructions made more errors than participants in the other three conditions, $F(1, 28) = 5.18$, $p < .01$. In other words, participants who were instructed not to eat the cookies in a controlling way were less able to regulate their attention subsequently as compared to participants who were asked in an autonomy supportive way to not eat the cookies and participants who were asked not to eat radishes.

Discussion

The conclusions of this experiment are consistent with the hypotheses that feelings of autonomy support while exerting self-control results less depletion of less self-control strength. Individuals who felt controlled while exerting self-control performed more poorly on a subsequent test of self-control as compared to individuals who felt their autonomy was supported while exerting self-control. In short, why the person is exerting self-control matters. This study extends the findings found by Moller et al. (2006) through the use of manipulation of autonomy support, rather than a freedom of choice manipulation.

In addition, this experiment found that the effects of autonomy support and prior exertion of self-control on ability to regulate attention do not seem to be driven by mood, arousal, frustration, or unpleasantness of the initial task. The amount of effort participants put forth on the initial task was not related to the autonomy instructions, either. Put another was, feeling controlled while exerting self-control does not lead to poorer self-control performance subsequently because participants were less motivated, or in a worse mood.

In summary, the present study replicates previous research on depletion that has found that individuals who exert self-control perform more poorly on subsequent tests of self-control relative to individuals who did not exert self-control initially (Muraven et al., 1998). However, the magnitude of this effect was much greater for individuals who had to exert self-control in a controlling environment than for individuals who exerted self-control in an autonomy supportive environment. How depleting an action is depends on how much self-control is exerted and why the person is performing the action.

Experiment 2

The previous experiment suggests that a lack of autonomy support on the first self-control task leads to poorer performance on the subsequent task. Although we took steps to ensure that two task were seen as separate, it is possible feelings of autonomy support on the first task may have carried over to the second. Hence, we designed Experiment 2 to address this alternative explanation, by asking participants to report their motivation orientation for both the initial and second task, as well as their degree of motivation. We predict that feelings of autonomy support on the depleting task should not be related to feelings of autonomy support on the final task. In addition, the outcome measure had a component that did not require self-control, to demonstrate that the effect of exerting self-control is specific to tasks that require self-control and not a general lack of motivation (see also Muraven et al., 2006).

In addition, we examined the role of vitality (Nix et al., 1999; Ryan & Frederick, 1997) as a potential mediator of this effect. Specifically, we predict that individuals who exert self-control in a more autonomy supportive condition should have greater feelings of vitality. These feelings of vitality should lead to better self-control performance, possibly because vitality helps replenish lost strength (Tice et al., 2007).

Method

Participants—Sixty-six (26 men and 40 women) University at Albany undergraduates were recruited from introductory psychology courses and participated in an experiment titled

'Imagination and Response Time' in return for partial fulfillment of a course requirement. Participants were individually tested in one 30-minute session. Participants were randomly assigned to one of three conditions—autonomy supportive instructions, controlling instructions, and a neutral instruction condition. As in the previous experiment, the experimenter did not know the research hypotheses. Moreover, all instructions were given on the computer, except the autonomy manipulation.

Procedure—Participants were unaware that motivation orientation and self-control were the foci of the experiment. Participants were given a brief outline of what the experiment would comprise, including a test of cognitive fluency, questionnaires and a test of visual concentration on a computer.

After signing the consent form, participants were asked to write down any words or thoughts that came into their minds for five minutes. The privacy of what they wrote was assured. Participants were then asked not to think about a white bear while they wrote. After being asked not to think about a white bear, the image of a white bear becomes ironically available, therefore it is difficult to suppress (Wegner, Schneider, Carter, & White, 1987). Suppressing thoughts of white bears has been used successfully in the past as a means of depleting strength (Muraven et al., 1998).

The autonomy supportiveness of the experimental setting was manipulated through wording of instructions and experimenter interaction (Deci et al., 1989). Participants were assigned to one of three conditions that differed in autonomy support. The instructions given to participants in the autonomy supportive and controlling conditions were similar instructions to those given to participants in prior experiments.

In the autonomy supportive condition participants were told, "*Please* try not to think about a white bear. Do your best to put the thought of a white bear out of your head. Any time the thought of a white bear enters your mind, *please* push it aside. If you could, try not to think about a white bear. Any time you do happen to think about a white bear, *please* put a check mark on the paper near where you are writing and continue with the task." Participants in the autonomy supportive condition were met with a cheerful experimenter who emphasized the word "please" in explaining the task to encourage participants to feel involved and make their efforts seem appreciated. The autonomy supportive condition was designed to present the task in a way to facilitate the adoption of autonomous motivation towards it.

Contrasted with that, participants in the controlling condition were told, "You *must* not think about a white bear. Put the thought of a white bear out of your head. Any time the thought of a white bear enters your mind, you *must* push it aside. Don't think about a white bear. Any time you do happen to think about a white bear, you *have to* put a check mark on the paper near where you are writing and continue with the task." Participants in the controlling condition were met by a brisk and cool experimenter who emphasized the word must in explaining the task to encourage them to feel like they were 'just another participant'. The controlling condition was designed to present the task as something that had to be done therefore undermining their autonomous motivation to complete the task.

Participants in the neutral condition were simply told, "Try not to think about a white bear. Put the thought of a white bear out of your head. Any time the thought of a white bear enters your mind, push it aside. Any time you do happen to think about a white bear, put a check mark on the paper near where you are writing and continue with the task" For the neutral condition, the experimenter maintained a professional courteous and cordial tone that was neither autonomy supportive nor controlling.

After giving the instructions, the experimenter left the room for five minutes while participants wrote down their thoughts. On return, participants were shown to the computer where they were told they would answer some questions on the task they just finished and continue on to a test of inhibition for which they would wear headphones. All remaining instructions were presented on the computer with the experimenter out of the room.

On the computer, participants were given four different questionnaires. In particular, they were given the IMI and the BMIS as described in the prior experiment. They also answered the Subjective Vitality scale (Ryan & Frederick, 1997). The Subjective Vitality scale is a seven-item scale designed to assess individuals' feelings of aliveness and positive energy that arises from acting in self-actualizing ways. Items include "I feel alive and vital" and "I have energy and spirit", rated a seven-point Likert-type scale with a possible range of 7 to 49. The coefficient alpha of this scale indicated good internal reliability, .79. Although there is some conceptual overlap with positive affect and arousal, this scale was designed to capture a state that is separate and unique from these feelings (see, e.g., Nix et al., 1999). Finally, they were given a manipulation and procedure check.

After the questionnaires, participants took a stop signal test (Logan, 1994). This is a well-established task in the cognitive literature used to measure inhibition. This task required participants to indicate whether a box appeared to the left or right of a target on the computer screen. Although this performance on this component of the stop signal test should be sensitive to participants' motivation, this sorting task does not require inhibition and hence should not be affected by depletion

On 25% of the 192 trials (spaced randomly throughout the task), a sound came over the headphones that indicated they should not respond to the appearance of the box. The measure of self-control capacity was whether participants were able to inhibit pressing the key at the appearance of the box when the tone sounded (possible range 0–48). For those with more self-control strength, it should be easier for them to inhibit their responses (Muraven et al., 2006). Participants in the autonomy supportive condition should show better ability to stop themselves from responding, whereas participants in the controlling condition should show worse ability to inhibit their responses than participants in the neutral instruction condition.

After completing the stop signal task, participants completed a few additional procedural questions, including a second IMI that assessed their feelings of interest toward the stop signal task. They were then debriefed and released from the experiment. In the debriefing, no participant indicated awareness of the true nature of the experiment nor did any participant express suspicion about the experimenters behavior toward them.

Results

Manipulation Checks

IMI: As would be expected, feelings of autonomy support for the white bear task differed across conditions, $F(2, 63) = 4.15$, $p < .05$ (see Table 2). Moreover, the linear contrast was significant as well, $t(63) = 2.47$, $p < .01$, which suggests that controlling situations lead to feeling less autonomy than neutral settings, which in turn lead to feelings of less autonomy than situations that are supportive.

On the other hand, participants' feelings of interest/enjoyment for the stop signal (dependent variable) did not differ significantly across groups, $F(2, 63) = 1.41$, *ns*. Feelings of interest/enjoyment for the initial task (thought suppression) was unrelated to feelings of interest/enjoyment for the second task (stop signal), $r(64) = .16$, *ns*. The experimenter's instructions to suppress their thoughts did not affect participants' enjoyment of the second task. In other

words, it appears that feelings of autonomy support while suppressing thoughts of the white bear did not carry over to feelings of autonomy support on the stop signal.

Differences in participants' reports of perceived pressure while suppressing thoughts did not reach conventional levels of statistical significance, $F(2, 63) = 2.67$, $p < .07$, although the linear contrast did, $t(63) = 2.28$, $p < .025$. This suggests that the experimenter's behavior put pressure on participants, which undermined their interest. There were no differences in feeling of competence and choice for the thought suppression task. On the stop signal task, none of the IMI subscales differed across groups, all $F < 2.5$.

Overall, these results suggest that the instructions lead to reduced feelings of autonomy support on the initial task, but no differences in feelings of autonomy on the second, dependent measure. Hence, differences in performance cannot be explained by decline in feelings of autonomy support on the performance measure.

Mood, arousal, and perception of future tasks: The instructions were not related to other potential confounds. For example, there were no differences in mood, $F(2, 63) = 1.41$, *ns* or arousal, $F(2, 63) = 1.00$, *ns*, across groups. The groups also did not differ in how confident they felt about future tasks, $F(2, 63) = 1.36$, *ns*, nor how motivated they were to do well on the stop signal, $F(2, 63) = .37$, *ns*. Finally, how many times participants thought of the white bear did not differ across autonomy support instructions, $F(2, 63) = 1.32$, *ns*.

Self-Control Outcome—As outlined above, the critical measure in the present experiment was the number of times participants responded to the stimulus on the computer screen when the tone sounded. Fewer responses indicate better self-control capacity. As shown on Table 2, the three groups differed in stop signal performance, $F(2, 63) = 4.67$, $p < .05$. The linear contrast indicated that the autonomy support group did the best on the stop signal task, followed by participants in the neutral condition, and participants in the controlling group did the worst, $t(61) = 2.16$, $p < .05$.

On the other hand, on trials when the tone did not sound, the groups did not differ in performance, $F(2, 63) = .108$, *ns*. Trials on which the tone does not sound do not require inhibiting a response and hence do not require self-control. Strength should not affect performance on these trials but a lack of motivation should (see, e.g., Muraven & Shmueli, 2006). These results therefore suggest that exerting self-control under controlling conditions leads to greater depletion only.

There was no relationship between self-reported mood, $r(64) = -.15$, *ns* or arousal, $r(64) = -.09$, *ns*, and stop signal inhibition failures. Stop signal inhibition performance was not related to effort on the first task, $r(64) = -.05$, *ns* and was not related to self-reported confidence to do well on future tasks either, $r(64) = -.07$, *ns*. There was a significant correlation between interest/enjoyment (as assessed by the IMI) and the ability to inhibit on the stop signal (number of inhibition errors), $r(64) = -.33$, $p < .01$. Participants who felt less autonomy support on the white bear task were less able to stop themselves on a subsequent task as compared to participants who felt more autonomy support.

Vitality—The differences in instructions had an effect on participants' subjective vitality, as the groups differed significantly on this variable, $F(2, 63) = 3.83$, $p < .05$. Although the linear contrast was not significant, $t(63) = 1.31$, *ns*, a simple t-test indicated that the autonomy support condition differed from the controlling condition, $t(63) = 1.94$, $p < .05$. Individuals high in subjective vitality had fewer inhibition errors on the stop signal task than individuals low in subjective vitality, $r(64) = -.41$, $p < .001$.

If positive experiences help replenish self-control strength, then subjective vitality should mediate the relationship between experimental condition and performance on the stop signal task. As reported above, subjective vitality was significantly related to experimental condition as well as performance on the stop signal task. Hence, subjective vitality meets the initial conditions required for mediation. To fully test for mediation, condition was coded −1 (controlling), 0 (neutral), +1 (autonomy supportive) and entered into a regression equation predicting stop signal performance. Confirming the results already reported, condition was significantly related to stop signal performance, B = −3.077, SE = 1.42, $t(62) = 2.17$, $p < .05$. Inclusion of subjective vitality decreased that relationship, B = −2.41, SE = 1.33, $t(61) = 1.81$, *ns*. This mediation was close to, but did not reach, conventional levels of significance using the Sobel test, $z = 1.93$, $p < .058$. This suggests that participants who exerted self-control for controlling reasons performed more poorly on subsequent tests of self-control because they were lower in subjective vitality.

Discussion

This experiment replicates and extends the previous experiment. Participants who exerted self-control under controlling conditions performed more poorly on a subsequent test of self-control, and participants who exerted self-control under autonomy supportive conditions performed better, compared to participants in a neutral instruction condition.

More significantly, the present experiment demonstrated that the difference in performance was not related to feelings of autonomy support, confidence or motivation for the second task. Indeed, only feelings of autonomy support on the initial task predicted performance on the second task. Feeling pressure to exert self-control also only affected performance on a subsequent task that required self-control. Being forced to exert self-control had no impact on a later task that was sensitive to motivation but did not require inhibition. These patterns of results suggest that the effect is being driven by depletion and not a general lack of motivation, confidence, or effort.

In addition, this experiment included a neutral instructions condition that fell in the middle of the autonomy supportive and controlling groups. This suggests that our instructions were successful in both increasing and decreasing feelings of autonomy, although a closer analysis suggests we were slightly better at undermining it than increasing it. Regardless, there was a significant correlation between being forced to exert self-control and performance on a subsequent self-control task. In other words, across the entire range of instructions, exerting self-control for more controlled reasons is more depleting.

The results of this experiment suggest that the effect of exerting self-control is mediated by subjective vitality (although this result should be interpreted with caution because it fell just short of conventional levels of significance). Experiencing autonomy support while exerting self-control leads to greater feelings of vitality. Similarly, feelings of vitality lead to better self-control performance. This increased vitality associated with autonomy support may help replenish lost self-control strength, which results in better self-control performance. Final self-control performance did not correlate with mood, arousal, confidence, or interest, which suggests that autonomy support (working through subjective vitality) is the key factor in determining how depleting a self-control exercise is.

Experiment 3

The final experiment was designed to address some shortcomings of the previous experiments. In particular, we wished to replicate the test of mediation to help establish its reliability. We also used a different manipulation of autonomy support, to further extend the generalizability of the effect and to help remove potential experimenter bias. In particular, in this experiment,

feelings of autonomy support were manipulated using time and performance pressure on a computer screen. As found in Deci, Eghrari, Patrick, and Leone (1994; see also Ryan & Deci, 2000), time pressure and demands to do well can undermine feelings of autonomy support. Thus, although pressure from the experimental setting was manipulated differently in this experiment than in the previous experiments, the net result should be the same - to increase feelings of control and undermine autonomous motivation.

Method

Participants—Ninety-six (information on gender was not collected due to a computer error) University at Albany undergraduates were recruited from introductory psychology courses participated in return for partial fulfillment of a course requirement. They were tested in groups of up to 12 people, although they did not interact and could not see each other's responses to the questions.

Procedures—After signing an informed consent form, participants were seated in front of a computer. All instructions and manipulations were given on the computer and the computer randomly assigned participants to conditions. Participants first engaged in a typing task. A paragraph appeared on the screen and participants were asked to retype it as quickly and as accurately as possible. What participants typed was not displayed on the screen, although the computer recorded all key strokes. The instructions on this typing task were varied to manipulate the amount of self-control participants exerted. Participants in the Type All condition copied the paragraph exactly as they saw it. Contrasted with this, participants in the No E's condition were told to not type the letter e or hit the space bar. In other words, their paragraph should have no e's and no spaces in it. Typing is a highly automatic task for many people and therefore regulating what one types should require a good deal of inhibition and self-stopping. Thus, the No E's condition should deplete more strength than the Type All condition.

Crossed with those instructions was a manipulation of motivational orientation through pressure. In the Pressure condition, the time spent typing was displayed in a very large font at the top of the screen and the number of e's typed (for participants in the no E's condition). Participants in this condition were continually reminded of their need for speed and accuracy. Prior research has found that such external pressures, like time pressure and demands to do well can undermine autonomous motivation (Amabile, DeJong, & Lepper, 1976; Deci & Ryan, 1985; Ryan et al., 1983). In the No Pressure condition, participants were not given any information about the time spent typing or number of e's typed.

After typing the paragraph, participants then completed the Intrinsic Motivation Inventory (IMI; e.g., Ryan, 1982) to assess their mood, arousal, and motivation orientation. Following these, they completed the Subjective Vitality scale (Ryan & Frederick, 1997).

Participants also completed a brief manipulation check questionnaire, similar to the one given in the previous experiments. Also included in this manipulation check were questions about participants' level of motivation (e.g., "how much effort do you plan to exert on the rest of the experiment?"), and their confidence (e.g., "how sure are you that you can do well on the rest of the experiment?"). These questions were answered on a 7-point Likert-type scale, with anchors of 1 = *not at all* and 7 = *very much*. They also completed the BMIS.

Finally, participants engaged in a concentration task similar that used in Experiment 1. The number of missed targets was calculated. At the completion of this concentration task, participants were debriefed and released from the experiment.

Results

Manipulation Checks

IMI: As would be expected, participants in the Pressure condition reported less interest/enjoyment on the IMI subscale than participants in the No Pressure condition, $F(1, 92) = 5.27$, $p < .025$ (see Table 3). There was no main effect for self-control demands, $F(1, 92) = .71$, *ns*, nor was the interaction between pressure and self-control demands significant, $F(1, 92) = .454$, *ns*. In short, it appears that the manipulation decreased feelings of enjoyment, which are typically associated with the need to feel autonomous. The main effect for autonomy support on the pressure subscale did not quite reach conventional levels of statistical significance, $F(1, 92) = 3.69$, $p < .058$. No other main effect or interaction was significant. These results suggest that the instructions undermined feelings of autonomy support by adding pressure to participants.

Initial self-control effort: Participants told not to type the letter e did indeed type fewer e's than participants who were told to retype the paragraph as is, $F(1, 92) = 347$, $p < .001$. Pressure alone did not influence how many e's participants typed, $F(1, 92) = 3.05$, *ns*, nor did pressure interact with the typing instructions, $F(1, 92) = .06$, *ns*. This provides evidence that the typing task required self-control. This conclusion was reinforced by the fact that participants in the No E's condition reported restraining themselves more than participants in the Type All condition, $F(1, 92) = 19.8$, $p < .001$. The pressure instructions did not affect how much restraint they had to exert, $F(1, 92) = 2.08$, *ns* and pressure did not interact with typing instructions, $F(1, 92) = .450$, *ns*. The degree of restraint was not related to feelings of interest/enjoyment (a gauge of intrinsic motivation) on the IMI, $r(96) = .16$, *ns*. In other words, individuals in the Pressure and No Pressure groups worked just as hard and exerted as much self-control on the initial task.

Mood: The conditions did not differ significantly in mood. In particular, there was no main effect for pressure, $F(1, 92) = .415$, *ns*, self-control demands, $F(1, 92) = .105$, *ns*, nor was there an interaction between them, $F(1, 92) = .030$, *ns*.

Motivation and confidence: The typing instructions did not seem to reduce participants' self-reported level of motivation for the concentration task, $F(1, 92) = 1.18$, *ns*, and it did not reduce their confidence to do well on future tasks, $F(1, 92) = .572$, *ns*. The pressure instructions also had no effect on level of motivation, $F(1, 92) = .01$, *ns* and no effect on confidence, $F(1, 92) = .027$, *ns*. Finally, the interaction between pressure and previous self-control demands was not related to level of motivation, $F(1, 92) = 2.88$, *ns* and confidence, $F(1, 92) = 1.31$, *ns*. In short, the self-control task and pressure did not reduce participants' self-reported level of motivation for the future nor did it undermine their confidence in their ability.

Self-Control Outcomes—Self-control capacity was assessed by the number of targets found during the concentration task. Consistent with previous research on depletion, there was a main effect for typing condition, $F(1, 92) = 10.7$, $p < .001$. As shown on Table 3, individuals who had to exert self-control (No E's group) missed more targets than individuals who did not exert self-control (Type All group). The main effect for pressure was not significant, $F(1, 92) = 3.11$, *ns*. Finally, there was a significant interaction between pressure and typing condition, $F(1, 92) = 6.72$, $p < .01$. Individuals who received pressure while not typing e's missed more targets on the concentration task as compared to everyone else, as demonstrated by a significant contrast between that condition and the three conditions, $t(92) = 4.26$, $p < .001$.

Subjective Vitality—Individuals who had to exert self-control were lower in subjective vitality, $F(1, 92) = 4.06$, $p < .05$. The main effect for pressure on subjective vitality was not significant, $F(1, 92) = 2.53$, *ns*, but the interaction was, $F(1, 92) = 5.69$, $p < .025$. A contrast

test comparing individuals in the pressure and no E's condition to all other conditions found they were lowest in vitality, $t(92) = 3.27$, $p < .005$. In short, these results suggest that a lack of autonomy support leads to less vitality, especially after exerting self-control.

Finally, we assessed whether differences in subjective vitality may help explain why feeling compelled to exert self-control is more depleting than exerting self-control for more autonomous reasons. To that end, we conducted a mediational analysis. Experimental condition was entered into a regression equation to predict performance on the concentration task. In this analysis, condition was dummy coded to contrast the pressure/depleted condition against the other three conditions. Overall, subjective vitality was related to concentration performance, B = 5.19, SE = 1.56, $t(92) = 3.22$, $p < .001$. Likewise, condition taken separately was strongly related to concentration task performance, B = .277, SE = .102, $t(92) = 2.71$, $p < .01$. However, this relationship was reduced to non-significant levels when subjective vitality was included in the equation, B = .162, SE = .102, $t(92) = 1.58$, *ns*. The Sobel test of mediation was significant, $z = 2.15$, $p < .05$. In other words, exerting self-control in controlling situations leads to poorer self-control subsequently because controlling situations reduce feelings of subjective vitality.

Discussion

These results suggest that feeling pressure to exert self-control is associated with lower levels of vitality. These lower levels of vitality are, in turn, related to poorer self-control performance. This is consistent with research that has shown that positive experiences help negate the effects of depletion, perhaps by replenishing individuals' level of self-control resource (Tice et al., 2007). This replenish mechanism, working through subjective vitality, may be the mechanism that explains why pressure to exert self-control leads to poorer self-control subsequently.

As in the previous experiment, we found in Experiment 3 that individuals who exerted self-control under controlling pressure performed more poorly on a subsequent test of self-control than individuals who exerted self-control without the pressure and individuals who did not exert self-control at all. Exerting self-control in a controlling setting is apparently more depleting. The reduced self-control performance was not related to mood, arousal, confidence or motivation. Instead, it seems that feeling forced to exert self-control is more depleting.

General Discussion

Taken together, the current set of experiments suggests that being feeling pressure to exert self-control by external forces is more depleting than feeling autonomous while exerting self-control. Participants who exerted self-control under autonomy supportive conditions performed better on a subsequent test of self-control than participants who exerted self-control under more controlling circumstances. Why the person is exerting self-control affects how depleting a task is.

The present findings modify the previously discovered direct relationship between self-control exertion and depletion of self-control strength (Muraven et al., 2002). In particular, it appears that feelings of autonomy moderate how depleting a situation is. When a person feels forced to exert self-control by the situation, he or she may deplete more strength than when the situation feels supportive. Research by Moller, Deci, and Ryan (2006) found a similar result for making choices that are autonomous versus controlled.

Autonomous support may lead to better performance on subsequent tests of self-control than controlled motivation because of the effects of autonomy on subjective vitality. Research has found that a controlled orientation undermines vitality, interest, enjoyment, and other positive states (Nix et al., 1999). Thus, individuals who are exerting self-control for controlled reasons

may experience less vitality than individuals who are exerting self-control for autonomous reasons. Lowered vitality may decrease the amount of self-control strength available to the individuals. For example, positive experiences have been shown to help replenish lost self-control strength (Tice et al., 2007). This replenishment may lead to less concern with conserving self-control strength and hence greater motivation to exert self-control (Muraven et al., 2006; Muraven & Slessareva, 2003). Although the test of mediation suggests that vitality plays a critical role in this process, it also possible that processes other than replenishment of lost strength also underlie this process. For example, it is possible that when self-control is forced, it requires overcoming both the impulse to act and internal resistance (which is lower in autonomously motivated self-control), making it more depleting. Future research may wish to address this mechanism, as well as further explore the replenishing nature of vitality.

The present research thus showed that there is a difference between exerting self-control under situations when one is autonomy supported versus controlled. Autonomous and controlled motivation goes beyond the traditional distinction between intrinsic and extrinsic motivation in several important ways (see, e.g., Gagné & Deci, 2005). For instance, Koestner and Losier (2002) have shown that intrinsic motivation is associated with behavior engagement for tasks that are interesting, but that identified motivation (which represents extrinsic motivation done for autonomous reasons) is a better predictor of engagement for tasks that are less interesting but still important (e.g., giving blood, changing diapers, voting). In the present studies, most tasks were not particularly enjoyable. It was therefore more practical and realistic to use a conceptualization of motivation that considers that not all activities have the potential to be intrinsically motivated (that is, enjoyed), but instead to show how extrinsic motivation can become autonomously regulated through the use of an autonomy supportive context.

This also may help explain why people who have a controlled orientation toward self-change are less likely to succeed at that change than those who have an autonomous orientation. For example, Williams et al. (1996) found that dieters who felt their autonomy was supported lost more weight and maintained that weight loss to a greater extent than dieters who lacked autonomy support. Similar evidence for the role of autonomous motivation exists for smoking cessation (Curry et al., 1990; Williams et al., 2002), alcohol abstinence (Ryan et al., 1995) and adherence to medical treatments (Williams, Rodin, Ryan, Grolnick, & Deci, 1998). Feeling obligated to make changes or exert self-control may require more self-control strength, leaving it vulnerable to failure. For example, stressful situations may deplete self-control strength (Muraven & Baumeister, 2000). Behaviors that require more strength may therefore be more likely to break down in times of stress than behaviors that require less strength (such as autonomously driven behaviors). Externally driven self-change also may require more self-management, because the greater demands on self-control resources may limit the degree to which other behaviors can be controlled.

Although the results are consistent with the self-control strength model, one could argue that Self-Determination Theory alone can account for the results. In particular, one might argue that participants' feelings of autonomy (or feeling of being controlled) on the initial task influenced their motivation on the final task. However, our effects are above and beyond that main effect, as demonstrated by the significant interaction between depletion and autonomy support. That is, for participants who did not exert self-control, autonomy support on the initial task had less of an impact on the final self-control performance.

Moreover, the results of the varied experiments indicated that the difference in self-control performance was primarily driven by participants' feelings of vitality and interest while exerting self-control, not their anxiety, degree of motivation, liking of the experimental tasks, effort or performance on the initial task. Likewise, autonomy support did not carry over from one task to the next. Finally, we showed that autonomy support while exerting self-control had

no effect on later tasks that do not require self-control. In short, it appears that feeling forced to exert self-control results in greater depletion of strength, which leads to poorer self-control.

Because of the nature of these tasks (e.g., laboratory experiments), most participants were probably feeling relatively controlled at the start of the experiment. Our attempts at influencing participants' motivation orientation was probably more successful at making them feel even more controlled than at increasing their levels of autonomous motivation (although the overall means suggest little autonomous motivation overall). It may be worthwhile to replicate these results in a group of individuals exerting self-control for very intrinsic reasons. Nevertheless, the present results suggest that across the (likely restricted) range of autonomy, there was a negative relationship between the degree of autonomy and amount of self-control strength required.

In conclusion, these findings continue a line of research that has found that motivation moderates the relationship between depletion and self-control outcomes (Muraven et al., 2006; Muraven & Slessareva, 2003). The results indicate that self-control exerted for controlled reasons leads to poorer performance on subsequent tests of self-control than self-control exerted for autonomous reasons. Autonomous self-control is less depleting than controlled self-control. This is heartening, because this provides hope for anyone exerting self-control: Dieting or quitting smoking or any other self-control activity is easier and less depleting when you want to do it for yourself or if you really believe in the outcomes than when it is forced on you. Anyone who wants to change his or her behavior or the behavior of others may want to take a note of that.

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Table 1

Experiment 1: Responses on key variables based on initial task and autonomy instructions.

Variable	No Radishes				No Cookies			
	Controlling		Autonomy Supportive		Controlling		Autonomy Supportive	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Interest/Enjoyment	16.10_{a}	5.58	18.1_{b}	7.27	15.41_{a}	6.38	19.3_{b}	5.94
Perceived Choice	20.18_{a}	7.92	16.07_{a}	6.85	20.31_{a}	5.15	22.61_{a}	3.23
Felt Competence	18.77_{a}	4.09	16.79_{a}	6.41	18.76_{a}	6.36	15.07_{a}	2.21
Pressure	14.37_{a}	3.11	14.25_{a}	3.98	15.95_{a}	4.39	13.96_{a}	2.64
Mood	$-.50_{a}$	14.0	$-.44_{a}$	8.52	-1.2_{a}	10.6	7.6_{b}	14.9
Arousal	21.7_{a}	5.23	25.4_{a}	6.67	21.7_{a}	5.23	25.4_{a}	6.67
Self-reported Inhibition	73.4_{a}	12.3	$78.7_{a,b}$	12.5	86.8_{c}	6.11	$82.1_{b,c}$	11.9
Missed Targets	6.50_{a}	2.14	6.78_{a}	2.44	12.25_{b}	1.63	5.40_{a}	1.34

Note. $N = 32$. Means with different subscripts differ at $p < .05$.

Table 2

Experiment 2: Responses on key variables across conditions.

Variable	Autonomy Support		Neutral		Controlling	
	M	*SD*	*M*	*SD*	*M*	*SD*
Interest/Enjoyment: Thought Suppression	14.08_{a}	3.89	$13.28_{a,b}$	4.32	10.98_{b}	4.32
Interest/Enjoyment: Stop Signal	13.08_{a}	4.93	15.80_{a}	5.09	13.00_{a}	4.25
Perceived Choice: Thought Suppression	26.21_{a}	6.01	26.60_{a}	5.66	24.70_{a}	5.99
Perceived Choice: Stop Signal	19.5_{a}	8.02	22.60_{a}	4.54	21.90_{a}	6.01
Felt Competence: Thought Suppression	20.92_{a}	6.01	20.75_{a}	5.69	20.85_{a}	4.95
Felt Competence: Stop Signal	19.96_{a}	6.73	21.15_{a}	6.15	24.10_{a}	5.26
Pressure: Thought Suppression	10.13_{a}	4.17	$11.65_{a,b}$	4.75	13.75_{b}	6.58
Pressure: Stop Signal	11.38_{a}	7.60	12.55_{a}	6.49	13.80_{a}	6.10
Subjective Vitality	21.8_{a}	6.12	23.6_{a}	8.08	19.1_{b}	6.04
Mood	$.333_{a}$	8.61	3.25_{a}	7.75	3.31_{a}	6.49
Arousal	22.8_{a}	4.86	22.2_{a}	3.66	21.2_{a}	3.65
White bears	3.38_{a}	2.55	5.00_{a}	3.11	4.45_{a}	4.41
Effort	5.71_{a}	1.16	5.55_{a}	1.50	5.15_{a}	1.42
Confidence	5.33_{a}	1.13	5.40_{a}	1.10	4.90_{a}	1.55
Level of Motivation	3.92_{a}	1.67	3.85_{a}	1.39	4.20_{a}	1.24
Correct Sorts	101_{a}	99.4	123_{a}	95.1	111_{a}	105
Inhibition Failures	24.5_{a}	9.97	$26.9_{a,b}$	9.17	30.7_{b}	9.11

Note. $N = 66$. Means with different subscripts differ at $p < .05$.

Table 3

Experiment 3: Responses on key variables, based on typing instructions and pressure on typing task.

	Type All				No E's			
Variable	**No Pressure**		**Pressure**		**No Pressure**		**Pressure**	
	M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
E's typed	116_a	31.4	125_a	26.74	19.6_b	14.3	21.2_b	36.6
Self-reported Inhibition	3.14_a	1.76	3.42_a	1.71	4.52_b	1.83	5.29_b	1.40
Interest/Enjoyment	16.7_a	2.56	14.9_b	3.14	15.9_a	2.68	14.9_b	2.28
Perceived Choice	19.04_a	6.83	18.39_a	8.25	18.11_a	7.62	18.11_a	8.22
Felt Competence	17.39_a	4.72	18.56_a	6.49	18.06_a	7.67	14.00_a	6.60
Pressure	17.74_a	5.27	20.61_a	6.58	17.25_a	6.47	19.63_b	7.54
Subjective Vitality	20.9_a	5.79	22.4_a	6.18	21.5_a	6.09	16.8_b	6.66
Mood	$.43_a$	9.58	-1.00_a	9.08	1.44_a	9.22	-1.47_a	10.3
Motivation for Future	4.57_a	1.31	5.06_a	1.48	4.75_a	1.34	4.21_a	1.65
Confidence for Future	4.57_a	1.56	5.00_a	1.62	4.69_a	1.41	4.37_a	1.74
Targets Missed	4.30_a	5.17	3.29_a	3.42	5.19_a	5.83	11.1_b	9.05

Note. $N = 96$. Means with different subscripts differ at $p < .05$