Motiv Emot
DOI 10.1007/s11031-012-9308-3

ORIGINAL PAPER

Restoration processes after need thwarting: When autonomy depends on competence

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Abstract Like other fundamental needs, recent studies have shown that the need for autonomy elicits goal-oriented behaviors that aim to its restoration when it is thwarted. However, no research has yet examined the factors that moderate the restoration process. In the present studies, we investigated the moderating role of perceived competence in the restoration of autonomy. We monitored autonomy restoration behaviors by assessing the extent to which participants turn away from a controlling function in a computerized puzzle task. Across the two studies, the results suggested that, in comparison with baseline participants, autonomy-deprived participants acted to regain their autonomy but only when their level of perceived competence in the task was high. When perceived competence was low, participants disengaged from autonomy restoration, seemingly to favor competence. These findings are discussed using self-determination theory and models of stress and coping.

Keywords Autonomy · Need restoration · Self-determination theory · Perceived competence · Coping strategies

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Introduction

When individuals act in accordance with their own values and beliefs, and work or play freely without external control, they experience autonomy. Research over the last 20 years have emphasized how autonomy experience is essential for psychological well-being and optimal functioning (see Ryan and Deci 2006 for a review). As such, autonomy is now considered as a human basic psychological need (Deci and Ryan 2000; Ryan and Deci 2006). One of the recurrent points in the literature on motivation is that deprivation of fundamental needs leads to a restoration process (e.g., Fiske 2004; Hull 1943; McDougall 1908; Maslow 1943; Veltkamp et al. 2009). However, very few studies have examined the autonomy-restoration process by which autonomy-deprived individuals regain autonomy. In fact, most of the studies have focused on the consequences of controlling events that thwart the need for autonomy and have shown that, once it has been thwarted, individuals lose their autonomous motivation for an activity. It is only recently that some evidence have came to show that the need for autonomy has motivational force, that it guides cognitive processes and behaviors, and that it aims to restore autonomy when it is thwarted (Radel et al. 2011; Sheldon and Gunz 2009; van Prooijen 2009). An explanation for the scarcity of reports on this phenomenon in the literature could be the presence of important moderators. In the present research, we examine the possibility that individuals restore their autonomy only when they feel competent for the activity in which they are involved.

Consequences of autonomy deprivation

The consequences of exposure to controlling environments that thwart the individual's need for autonomy have been

Published online: 14 June 2012

extensively studied. Hundreds of studies have shown that people lose their autonomous motivation and then experience a wide array of negative outcomes, such as low performance, lack of effort, and negative affects (see Gagné and Deci 2005; Hagger and Chatzisarantis 2007; Reeve 2009; Ryan et al. 2008, for reviews in the domains of work, sport, education, and health care, respectively) when their need for autonomy has been thwarted.

Since basic needs are generally thought to have motivational force (Baumeister and Leary 1995; Fiske 2004; Pittman and Zeigler 2007), some researchers have recently hypothesized that, rather than passively suffering autonomy loss, individuals may try to restore their autonomy. The study by van Prooijen (2009) on individuals' reactions to procedural justice provided a first sign of this restorative process. Across three experiments, he showed that autonomy-deprived participants were more affected by the fairness of procedural justice than those for whom the need for autonomy was fulfilled. Insofar as the fairness of procedural justice can be interpreted as an autonomy-related cue, the observation that autonomy-deprived individuals attend to it more than others can indeed suggest the existence of an autonomy-restorative process. Additional evidence was provided by Sheldon and Gunz (2009), who more directly tested the hypothesis that the three needs postulated by self-determination theory (SDT; i.e., autonomy, competence and relatedness) create a motivation to be satisfied when thwarted. In two studies, they observed that participants' reports of autonomy satisfaction were negatively associated with the desire to experience autonomy-fulfilling situations. Radel et al. (2011) not only provided further evidence for the autonomy-restoration process but also specified the features of this process. Specifically, these authors examined the possibility that the autonomy-restoration process has two distinct components. First, they showed an automatic component, which mobilizes automatic processes. For example, results of a lexical decision task indicated that autonomy-deprived participants automatically had a perceptual readiness for autonomy-related cues. Second, a strategic component was also revealed, which influences behaviors or thoughts that can be controlled by conscious guidance. Specifically, participants exposed to an autonomy threat conformed less than baseline participants in a judgment task, relying more on their personal standards to make their judgment.

The role of perceived competence in coping with threat

Research suggests that the frustration of basic needs engenders an experience of stress. For example, it has been well demonstrated that lack of autonomy is one of the main stressors in the workplace (e.g., Spector et al. 1988, 2000). In the same vein, the recent study by Reeve and Tseng (2011) showed that exposure to an autonomy threatening context elevated salivary cortisol, which suggests a biological stress response. As such, reactions to autonomy deprivation could be appropriately analyzed using models of stress. In stress models, much attention is paid to coping strategies because the extent to which individuals invest resources to confront the problem or disengage from attempts to overcome the threat has considerable implications for their performance and well-being (Lazarus and Folkman 1984). Coping strategies are thus generally divided into two forms: approach versus avoidant coping (Anshel and Anderson 2002; Roth and Cohen 1986). While approach coping is described as the direct attempt to resolve the problem, avoidance coping is described as an attempt to reduce the importance of the problem or disengagement from attempts to solve the problem (Anshel and Anderson 2002). Given that approach coping is usually related to positive outcome and avoidant coping is linked to negative outcome (e.g., Herman-Stahl et al. 1995), it is crucial to determine the predictors of the type of coping strategies used by individuals. In this regard, it has been suggested that perceived competence plays a pivotal role in the way individuals cope with problems (Folkman 1984). More specifically, Lazarus (1993) indicated that low perceived competence is related to the choice of coping strategies like avoidance, distraction or denial, rather than to active coping processes that solve the problem and change the environmental circumstances. Numerous empirical studies have supported this assumption (e.g., Folkman and Lazarus 1985; Roberts 1995; Zakowski et al. 2001). In all of these studies, it was shown that when people felt competent they tended to act directly on the problem, whereas when they felt incompetent they preferably used avoidant coping strategies.[1] It is interesting to note that self-efficacy theory (Bandura 1997) also arrives at similar predictions. As elaborated by Bandura (1997, p. 173), efficacy expectancies, which are closely related to perceived competence, "determine how much effort people will expend, and how long they will persist in the face of obstacles and aversive experiences." In sum, it seems well accepted in the coping literature that the extent to which people feel competent in the current situation they are facing determines whether or not they will act to counter the threat.

[1] It should be noted that while some people have used the terms situational appraisal of control and subjective or perceived control, others have used the term perceived competence to refer to this moderator. However, as Skinner mentioned (Skinner 1995; Skinner and Greene 2008), all these labels refer to the same construct. They all come from White's (1959) concept of feelings of efficacy. In the present research, we chose to use the term perceived competence because it is more in line with the SDT framework, and because this prevents any confusions with the terms 'controlling' or 'controlled' used to refer to autonomy threatening contexts in this framework.

The present research

The aim of the present research was to identify the conditions that could inhibit the active restoration of autonomy. As it has been reliably shown in studies on the influence of stressful events that perceived competence influences the selection of coping strategies, we hypothesized that the level of perceived competence for a task would predict whether or not resources would be engaged to restore autonomy when the need for it was thwarted. More specifically, we hypothesized that when participants did not feel competent in a task, they would adopt an avoidant coping strategy and then disengage from the activity. By contrast, when they felt competent, participants would adopt an approach coping strategy and then attempt to restore their autonomy. Two studies were designed to test this hypothesis. With the exception of the manipulation of perceived competence, the two studies were similar. A standard procedure for need deprivation was used to thwart the participants' need for autonomy. This procedure relies on the provision of false feedback about their type of personality (Twenge et al. 2001), which was adapted to the need for autonomy (Radel et al. 2011; Sheldon and Gunz 2009). In order to measure the extent to which the participants would attempt to restore their autonomy, we created a game task that included a built-in feature that allowed them to determine the extent to which they wanted to behave in an autonomous way. Participants played a computerized version of Mahjong (the solitaire version), a traditional Chinese board game where the player has to match pairs of tiles in order to clear the board by finding combinations of tiles, depending of their location and their indication. Our main dependent variable was the participants' motivation to find solutions to the problems by themselves. Past studies (e.g., Vansteenkiste et al. 2008) have shown that when people act in an autonomous manner, they are more persistent and they try to get a deeper understanding of the learning material. Research on help seeking have also indicated that autonomy concerns lead to a resistance to help seeking because of a desire to complete work on one's own without depending on assistance from someone else (Ryan et al. 2001). In the same vein, Butler (p. 630, 1998) noted that: "help seeking may be perceived as a dependent behavior that conflicts with personal needs for autonomy (Deci and Ryan 1987) and with Western social cultural emphases on independent mastery and self-reliance (Markus and Kitayama 1991)". Several studies have supported the fact that individuals are reluctant to ask for help because of strivings for independent mastery (Butler and Neuman 1995; Van der Meij 1988). For these reasons, we presumed that an alienated behavior—i.e., the failure to behave according one's own choices or preferences (see Kuhl and Beckman 1994)—would convey, on the contrary, a renunciation of personal autonomy. In order to assess the autonomy versus alienated behavior of the participants, we left them the possibility of activating a key that provided part of the solution in the form of a controlling command. Previous studies (e.g., Reeve et al. 1999; Reeve and Jang 2006) have shown that disclosing solutions in a directive way is a controlling event, depriving individuals of autonomy. This modified version of the software automatically recorded the number of times the participants pressed the 'alienating key'.

In order to ensure the efficacy of the autonomy-deprivation manipulation, we added a lexical decision task (Neely 1991) measuring the participants' accessibility for autonomy-related cues. As Radel et al. (2011) showed, autonomy deprivation leads to enhanced cognitive accessibility for autonomy-related cues. Since this cognitive process is considered to be systematic and inflexible (Shiffrin and Schneider 1977), we expected to find enhanced accessibility for autonomy-related cues following autonomy deprivation even if participants did not feel competent in the previous task.

To summarize, the following hypotheses were proposed:

Hypothesis 1 Compared with the control group, participants in the autonomy-deprivation group would show enhanced accessibility for autonomy-related cues.

Hypothesis 2 Perceived competence in a task is a moderator of the motivation to regain autonomy after deprivation. Compared with the other groups, participants in the autonomy-deprivation/high perceived ability group would be more willing to regain autonomy by searching for solutions to problems without using the key that provides the solutions in a controlling way.

Study 1

In Study 1, participants' perceived competence was inferred from their level of experience in the game. Two groups of participants were retained in this experiment: participants who had never played Mahjong before and participants who were experienced players. We assumed that experienced players would have higher perceived competence than novice players when carrying out the game task.

Method

Pilot studies

Two pilot studies was conducted to ensure that the dependent measure really represented the tendency to act autonomously. Forty-eight undergraduates took part in a first pilot study. Participants' global self-determination was

assessed at the beginning of the semester, as part of a mass-test session. This measure was obtained from the Global Motivation Scale (GMS; Pelletier and Dion 2007; Pelletier et al. 2004), an 18-items questionnaire asking participants to rate a number of statements that represent various reasons for why they do things in general. The different reasons depict the six types of motivation that are proposed by SDT: intrinsic (INT; e.g., "for the pleasure of acquiring new knowledge"), integrated (INTEG; e.g., "because by doing them I am living in line with my deepest principles"), identified (IDEN; e.g., "because I choose them as a means to attain my objectives"), introjected (INTRO; e.g., "because otherwise I would feel guilty for not doing them"), external (EXT; e.g., "in order to show others what I am capable of") and amotivation (AM; e.g., "even though I do not have a good reason for doing them"). Each subscale comprises three items, which are rated on a 7-point Likert scale (1 = "not at all true"; 7 = "very true"). Internal consistencies were acceptable for each subscale (i.e., $\alpha s > .74$). Given that these different forms of motivation can be ranked along a continuum of self-determination, we derived a self-determination index (SDI) by weighting the scores of the different subscales using a standard formula: SDI = [3(INT) + 2(INTEG) + (IDEN) − (INTRO) − 2(EXT) − 3(AMO)] (see Pelletier et al. 2004; Guay et al. 2003). Thus, a high score on this index characterizes someone acting autonomously in general. Later in the semester, participants were invited individually to a laboratory session to play a computerized version of the Mahjong game. The experimenter carefully explained all the rules of the game to all participants, including the possibility of using the F1 key in order to see part of the solution. This key was made easily detectable on the keyboard using a green sticker. The experimenter illustrated by pressing this key and a command then appeared in a window saying: "REMOVE THESE TILES NOW!" Once this message appeared, the participant was obliged to execute what the command said to continue the game. The number of times that participants pressed the F1 key was recorded by the computer, without the participants' awareness. The results showed that the frequency of use of the 'alienating key' was only significantly correlated with intrinsic motivation ($r = -.38$, $p < .05$), integrated regulation ($r = -.31$, $p < .05$) and identified regulation ($r = -.29$, $p < .05$). Moreover, the results indicated a significant correlation between the SDI and the frequency of using the 'alienating key' ($r = -.29$, $p < .05$). This indicated that the more people acted autonomously in their lives, the less they used the 'alienating key' of the game, providing support for our dependent measure.

Another pilot study was conducted with two classes of undergraduate students ($N = 34$, 22 males) to investigate this question. At the end of a lesson in a computer room, the students were invited to stay to play Mahjong individually on a separate computer. The game and the function were presented in the same way as in the original experiments but collectively using a video-projector. The students played 6 min and then stopped to answer the 3-items *volition* ($\alpha = .75$) and the 3-items *perceived choice* ($\alpha = .79$) subscales of the perceived self-determination scale (Reeve et al. 2003). All items were adapted to the Mahjong task. For example, an example of item from the volition subscale was: "During the Mahjong puzzle, I felt free", and an example of item from the perceived choice subscale was: "I believe I had a choice over which solution to try to solve". The results showed a marginal negative correlation between the number of F1 press and volition ($r = -.29$, $p = .09$) and a significant negative correlation between the number of F1 press and perceived choice ($r = -.37$, $p < .05$). These results provided additional support to our DV, as the less the students pushed the F1 key, the more they felt self-determined.

Participants

Forty-four French-speaking undergraduates at the University of Ottawa participated in this study for course credit. While one group of participants had previous experience with the Mahjong game, having played more than ten times (11 females, 11 males), the other group had never played this game before the experiment (12 females, 10 males). Participants were randomly assigned to receive either autonomy-threatening feedback or no feedback.

Procedure

Participants were told that the study examined the impact of video games on cognitive performance. They were asked to play a video game for 6 min and to perform a short cognitive task. They were also told that due to a decision by the ethics committee, another task had been added to the experiment to ensure that it would be long enough to justify awarding the participant a full credit point. The experimenter then said: "So, we have added a personality questionnaire; it is absolutely unrelated to the rest of the experiment, but it is just to give you a full credit point. We are going to start with this questionnaire, and after that, you will do the real experiment." The experimenter launched the computer program administering the personality questionnaire and left the participant alone. The questionnaire was the short revised version of the Eysenck personality questionnaire containing 22 items (EPQR-A, Francis et al. 1992). Once they completed the questionnaire, all participants were informed by the computer program that they would receive feedback on each of the three subscales of the questionnaire. In accordance with Twenge et al.'s

(2001) procedure, this feedback was based on participants' actual responses in order to increase the credibility of the manipulation. While no feedback was given to the control group, participants in the experimental group received feedback that ostensibly indicated the global type of personality from the crossing of all participants' entries. The following statement appeared:

> You are the type who needs to be directed and who does not really like to make decisions. You are typically oriented toward social environments that are rather controlling. You will find yourself in a job that does not demand initiative, where your commitments are minimal and where your work is well structured. Even if it's not totally true at your age, you will also have a tendency to be controlled in your love relationships.

This feedback was displayed for 1 min on the screen and then disappeared. The experimenter came back and launched the Mahjong game on the computer. The game was introduced in the same way as in the pilot study.

The experimenter came back after 6 min and launched the lexical decision task assessing the accessibility for autonomy (Radel et al. 2011). All the instructions for the task were delivered by the computer. Participants were told that letter strings would be displayed on the monitor, and they were asked to determine if the string was a real word or a non-word. The string of letters remained on the screen until the participant pressed one of the two answer keys. Feedback on the response time was provided before the next trial appeared. Participants started with a four-trial training period. Data was then collected on the 48 following trials. These trials were divided into 24 correct words and 24 non-words, presented in random order. Among the 24 correct words, 16 were unrelated to autonomy and eight were related to it. The neutral words and the autonomy words were similar in size and frequency of use. Words related to autonomy (e.g., *free*, *authentic*, *choice*) were chosen in accordance with the words selected in previous studies to depict the autonomy construct (e.g., Lévesque and Pelletier 2003; Radel et al. 2009, 2011).

Upon completion of this task, the experimenter gave a short questionnaire to the participants. The questionnaire included three items (rated on a 7-point scale from 1 = "not at all true" to 7 = "very true") probing whether they believed the personality feedback was true (e.g., "Do you think that the feedback about your results was appropriate?"; $\alpha = .77$).

Results

The analyses of self-reports indicated that the participants generally thought that the personality feedback was true, as their ratings were significantly greater than the scale's midpoint [$M = 5.11$, $t(43) = 4.80$, $p < .01$]. In addition, there were no differences between the two experimental groups on this variable [$t(42) < 1.5$, *ns*].

We examined whether the manipulation affected participants' accessibility for autonomy-related stimuli. As recommended (e.g., Forster et al. 2005), we removed incorrect responses, too fast responses (i.e., <100 ms), and excessively long responses (i.e., >3 SD above the mean) in order to clean the data of accidental and unattended responses (5.7 % of responses). Table 1 displays the means and standard deviations of the average response latencies for neutral and autonomy words for each experimental group. In order to control for individual differences in response latency, we tested the difference between the average response time for neutral words and the average response time for autonomy-related words. The results of the GLM indicated a main effect of the experimental condition on the difference between the average response times for neutral words and for autonomy related words [$F(3, 41) = 5.01$, $p < .05$, $\eta^2 = .113$]. Specifically, the difference was greater for participants who received the autonomy-threatening feedback ($M = 81$ ms) than for those who did not receive any feedback about their type of personality ($M = 7$ ms). Since a greater difference between the response time for neutral words and the response time for autonomy words indicated greater accessibility for autonomy, this finding suggested that receiving autonomy-threatening feedback raised accessibility for autonomy-related stimuli. It is interesting to note that the players' level of experience provided no main or interaction effects [$Fs(3, 41) < 1$, *ns*].

We next tested our second hypothesis that autonomy-deprived participants would follow a behavioral strategy that would help them regain their autonomy. In order to test the effect of the manipulation on the use of the 'alienating key', we regressed the number of time the F1 key was pressed on the dummy-coded variable expressing the condition, on the dummy-coded variable expressing the

Table 1 Mean latencies in the lexical task assessing autonomy accessibility for Studies 1 and 2

	Condition			
	Autonomy deprivation		Neutral	
	M	SD	*M*	SD
Study 1				
Autonomy-related words	777	241	843	240
Neutral words	858	219	850	236
Study 2				
Autonomy-related words	753	219	836	253
Neutral words	824	288	847	278

participants' level of practice (whether or not they had ever played Mahjong), and on the interaction term of the two predictors. The overall model was significant: $F(3, 41) = 5.34$, $p < .01$. No main effect of the autonomy-deprivation manipulation was revealed ($\beta = -.12$, $p = .42$), indicating that the frequency of F1 key use for participants receiving the autonomy-threatening feedback ($M = 2.63$) did not differ from the frequency for participants who did not receive this feedback ($M = 2.45$). The practice level was not a significant predictor of the dependent measure ($\beta = .23$, $p = .11$). The participants who had never played Mahjong did not significantly use the F1 key ($M = 3.00$) more than the participants who had previously played the game ($M = 2.13$). Last, we found a strong significant effect of the interaction term ($\beta = -.47$, $p < .01$), showing that the effect of autonomy deprivation was different according to the personal practice level. Simple slope analyses revealed that the experimental manipulation predicted the dependent variable at the two levels of the moderator, but in different directions. More precisely, the autonomy-threatening feedback engendered greater use of the F1 key for novice players [$\beta = -.59$; $t(41) = -2.73$, $p < .05$], and less use for experienced players [$\beta = .36$; $t(41) = 1.84$, $p = .06$] (see Fig. 1).

Discussion

In this first study, we found that the accessibility for autonomy-related stimuli was greater for the participants who received feedback threatening their autonomy than for those who did not receive the feedback about their general type of personality. This finding suggests that the manipulation of autonomy deprivation was effective, leading to an autonomy-restoration process manifested by the way these participants' cognitive processes were predisposed to perceive autonomy-related stimuli. However, not all autonomy-deprived participants acted to regain their autonomy; that is, the influence of the experimental manipulation on autonomy-seeking behaviors was different for novices and experienced players. The autonomy deprivation seemed to influence experienced players as expected: those receiving the autonomy-threatening feedback tended to make less use of the 'alienating key', playing more on their own than those who received no threatening feedback. It is interesting to note that not only did the novices not engage in autonomy-restoration behaviors, but they also seemed to turn away from autonomy by relying even more on the 'alienating key' that those whose autonomy was not threatened.

Study 2

The main objective of Study 2 was to provide a more systematic test of our first hypothesis by directly manipulating perceived competence. In this study, all participants were novices and their perceived competence was manipulated in addition to the autonomy deprivation. To do so, we provided participants with feedback about their ostensible abilities after a short training period. The possibility of using the 'alienating key' was introduced just after the delivery of this feedback. As we hypothesized that active autonomy restoration would only occur in case of high perceived competence, we expected that the autonomy-threatening feedback would engender a decrease in the use of the 'alienating key' only when the participants received the positive competence feedback.

Method

Participants and design

The participants were 96 French-speaking undergraduates (49 females and 47 males) at the University of Ottawa who were compensated with course credits. None of the participants had ever played Mahjong before the experimental

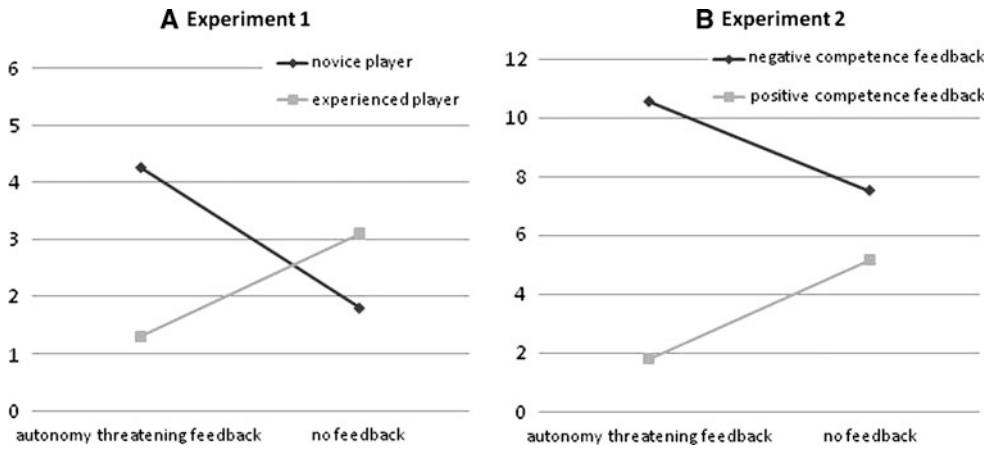

Fig. 1 Frequency of 'alienating key' use as a function of autonomy deprivation and the level of competence in Studies 1 and 2

session. The experiment was a 2 (*autonomy threatening* vs. *neutral* personality feedback) × 2 (*negative* vs. *positive* competence feedback) between-subjects factorial design. Each cell included 24 participants.

Procedure

With the exception of the manipulation of perceived competence, the procedure was exactly the same as in the first study. The perceived competence was manipulated at the beginning of the Mahjong task. After explaining the rules to the participants, the experimenter left them alone for a 1-min training period. Unlike the procedure used in Study 1, the possibility of using the F1 key was not given at this time. When the experimenter came back, he carefully looked at the screen, which indicated what the participants had done during the training period, and then provided feedback on their ostensible competence. In the negative competence feedback condition, the experimenter said: "Ouch! You're not progressing very fast; you don't seem to be very skilled at this activity. But don't worry, keep going, I'm sure you can do better." In the positive feedback condition, the experimenter said: "Wow! You're going very fast. You seem to be very skilled at this activity; keep going like that, you're already really good!" Immediately after the feedback, the experimenter informed the participants about the possibility of using the F1 key in a similar way as in Study 1. The rest of the procedure was exactly the same, with the exception of the addition of three items assessing the perceived competence (e.g., "I felt very competent in this game", $\alpha = .84$). These additional items were rated on a 7-point scale (1 = not at all true; 7 = very true).

Results

All participants generally thought that the personality feedback was true (as reflected by their ratings, which were significantly greater than the scale's midpoint [$M = 5.10$, $t(95) = 7.38$, $p < .01$]. No differences were observed between the two conditions on this variable [$t(94) < 1.5$, *ns*]. We checked for the efficacy of the competence feedback manipulation by examining the self-reported ratings of perceived competence for the game. The results indicated that the participants who received positive competence feedback reported significantly more perceived competence ($M = 3.83$) than those who received negative feedback [$M = 2.63$; $t(94) = 3.16$, $p < .01$].

The data collected on the lexical decision task were analyzed in the same way as in the first study. Table 1 displays the means and standard deviations of the mean response latencies for neutral and autonomy words. The results of the GLM performed on the difference between neutral and autonomy-related words indicated that the delivery of autonomy-threatening feedback significantly affected participants' accessibility for autonomy-related words [$F(3.93) > 6.512$, $p < .05$]. The response time difference was greater for participants who received the autonomy-threatening feedback ($M = 71$ ms), indicating higher accessibility for autonomy-related stimuli for these participants than for those who did not receive any feedback about their type of personality ($M = 13$ ms). Perceived competence to play Mahjong provided no main or interaction effects [Fs$(3.93) < 1$, *ns*].

We investigated the effects of both manipulations on the use of the F1 key using a regression model. The dummy-coded variable representing the autonomy feedback condition, the dummy coded variable representing the perceived competence feedback condition, and the interaction term of these two variables were used as predictors. The overall model was significant: $F(3, 93) = 10.84$, $p < .001$. We did not find any significant effect of the autonomy feedback condition ($\beta = .02$, $p = .88$), indicating no differences in the frequency of F1 key use between participants receiving the autonomy-threatening feedback ($M = 6.08$) and those who did not receive this feedback ($M = 6.34$). The type of competence feedback was a strong significant predictor ($\beta = -.44$, $p < .001$). The participants who received negative feedback on competence used the F1 key ($M = 9.00$) more than the participants who received positive feedback ($M = 3.48$). Last, we also found a significant effect of the interaction term ($\beta = .25$, $p < .005$). We further tested the significance of the experimental manipulation at the two levels of the moderator. The two simple slopes were significant. As can be seen on Fig. 1, the autonomy-threatening feedback tended to engender greater use of the F1 key when negative competence feedback had been provided [$\beta = -.24$; $t(93) = 1.90$, $p = .06$], whereas it engendered less use of the alienating key when positive competence feedback had been provided [$\beta = .27$; $t(93) = 2.14$, $p < .05$].

Discussion

As in Study 1, we found that the accessibility for autonomy-related stimuli was greater for participants whose autonomy was threatened than for control participants who did not receive feedback about their general type of personality. These results confirmed that, at the cognitive level, the autonomy-restoration process effectively occurred.

Crucially, we found that the behavioral manifestation of the autonomy-restoration process was conditional on the participants' level of perceived competence. While participants who received positive competence feedback effectively engaged in behavioral attempts to restore their

autonomy by playing more on their own just after receiving an autonomy threat, those receiving low competence feedback did not attempt to restore their autonomy after the threat. In fact, the autonomy-deprived participants who received negative competence feedback relied more on the 'alienating key' than other participants. It should also be noted that, in contrast to Study 1, perceived competence had here a main effect. This can result from the fact that perceived competence was not directly manipulated in Study 1 but indirectly assessed using the level of experience as a proxy. This possibly led to lessen its effect.

In sum, results of Study 2 suggest that individuals only attempt to restore their autonomy in an activity when they feel competent in this activity. When they feel incompetent in this activity, they seem to relinquish their need for autonomy in this activity and accept to be controlled.

General discussion

The aim of this research was to investigate the factors that inhibit behavioral attempts to regain autonomy when it has just been deprived. We assumed that people would act to restore autonomy only when they felt competent in the current situation. The results from the two studies supported this hypothesis. First, Study 1 showed that after autonomy deprivation only experienced players tended to engage in autonomy-restoration behaviors by relying on their own resources instead of mobilizing the 'alienating key'. As perceived competence is likely linked to the level of experience, this suggests that perceived competence matters when it comes to regaining autonomy. Study 2 provided stronger evidence because competence was actually manipulated. While the participants who received negative competence feedback relied more on the 'alienating key' in the game task when their autonomy had been threatened, those who received the positive competence feedback acted more autonomously by playing more on their own when their autonomy was threatened. In sum, these results clearly indicate that active restoration of the need for autonomy is conditional on the perception of competence for the activity. In line with the traditional models of stress (Lazarus and Folkman 1984), it seems that the level of competence plays an important role in the way people cope with autonomy threat. As predicted by Lazarus (1993), high competence was related to approach coping as the participants attempted to regain autonomy, and low competence was related to avoidant coping as they turned away from their autonomy-related concerns. This research shows that stress models can be relevant for studying how individuals respond to threats to their needs, such as the need for autonomy. Our results are also in line with research on self-enhancement that suggest that disengagement from an activity is likely to occur when one doubts one's capacity to perform due to poor self-regard (Newman and Wadas 1997) or disbelief in the possibility of improvement (Ommundsen 2001), research on self-affirmation that suggests that, following a threat people may disengage from an activity by focusing on other aspects of one's life irrelevant to the threat, or engaging in another activity that makes salient important values unconnected to the threatening event (Sherman and Cohen 2002), and research on mental contrasting that posits that when people realize that there is a discrepancy between their present reality and their desired future, they only try to overcome this discrepancy when they have high expectancies of being successful in doing so (Oettingen et al. 2001, 2009).

As Radel et al. (2011) demonstrated, autonomy restoration not only comprises a strategic component but also an automatic one. It should be noted that we also closely monitored the automatic component of autonomy restoration in order to ensure that the absence of active autonomy restoration did not mean an absence of a manipulation effect. Our results showed that the autonomy-deprivation manipulation led to a rise in cognitive accessibility for autonomy for all participants, even those who did not engage in active restoration. This suggests dissociation between the two components of the autonomy-restoration process. Since the early-stage cognitive processes of the automatic component are typically defined as inflexible (Shiffrin and Schneider 1977), being systematically triggered in response to threatening cues, this component seems to be less dependent on context. For example, it seems that the detection of autonomy-threatening cues always shapes the cognitive processes of the automatic component in order to facilitate the process of restoration. Nevertheless, whether or not individuals actually act to restore their autonomy depends on the way the situation is appraised. These assumptions are consistent with the dual information-processing model in anxiety proposed by Beck and Clark (1997). Indeed, this model suggests a first stage of immediate preparation occurring after the detection of threatening cues. The authors indicated that this stage is dominated by automatic processes, which are systematic and inflexible. Then, the model suggests that "a secondary appraisal process occurs in which the individual engages in a more reflective consideration of the current context and their coping resources" (Beck and Clark 1997, p. 53). It will be very interesting in future studies to design an empirical procedure to test this sequence dissociating the automatic and controlled processes implied in the restoration process.

An important result of our studies was that, instead of simply reducing active autonomy restoration, low feelings of competence led to the relinquishment of the need for

autonomy. Participants who were inexperienced in the game or who got negative feedback on their competence relied much more on the 'alienating key' when autonomy had been deprived than when autonomy was not manipulated. The over-utilization of the key providing the solution seems to correspond to a form of "dependent help seeking". In help seeking research, two kinds of help seeking behaviors have traditionally been distinguished: adaptive or autonomous help seeking and dependent help seeking (Nadler 1997, 1998; Butler 1998). While autonomous help seeking reflects a request for help under the form of cues or hints arising after a substantial time of work alone, dependent help seeking is characterized by passivity on the task, i.e., an absence of effort to work on one's own, and by a systematic recourse to help in an attempt to get the solution directly and terminate the problem quickly (see Nadler 1997, 1998). This kind of behavioral pattern is thought to appear when individuals' self-efficacies are low and when the situation is highly stressful (Nadler 1998; Ryan et al. 2001). Therefore, it is possible that the deprivation of the need for autonomy associated with the low perceived competence on the task generated a high level of stress that led to dependent help seeking. The systematic request of solution could represent a mean to cope with the stressful situation. If it did not allow them to restore their autonomy, it could give them the illusion to progress in the task in an attempt to get rid of it. In a future study, it would be very interesting to have a hint provision function in addition to the solution disclosure function in order to clearly distinguish dependent help seeking from adaptive help seeking.

In sum, the interplay between autonomy and competence have turned to be very meaningful. Indeed, acting autonomously in the presence of external pressure requires a certain sense of self-confidence. For example, affirming our own stance against a controlling authority requires confidence in our capacity to defend a position. Regaining autonomy surely provides satisfaction for individuals but, in the balance, the harmful effect of failing to restore autonomy might be even greater than the salutary effect of regaining autonomy. In other words, in line with self-enhancement, self-affirmation, and mental contrasting research, we think that people implicitly prefer to avoid behavioral attempts at autonomy restoration when their likelihood of failing is high. Therefore, autonomy-deprived individuals may temporarily relinquish autonomy in the activity in which their perceived competence is low and then delay their restoration efforts for the next situation, or they may attempt to compensate for the thwarted need by engaging in a different activity. When their attempts to restore autonomy in the domain where the threat took place and their attempts to compensate for the need for autonomy in another domain both fail, individuals may then experience a sense of helplessness. At this point, when all restoration attempts have turned to be unfruitful, it is possible that people will turn to less optimal ways of functioning (i.e., controlling regulatory styles, need substitutes, and rigid behavioral patterns) (see Deci and Ryan 2000).

The interpretation of our findings is however limited by some aspects of our methodological choices. First, it is possible that our dependent variable (i.e., alienating key use) is certainly not perfectly negatively associated with strategic autonomous restoration. It can certainly be influenced by other variables as shown by the main effect of the perceived competence in Study 2. In addition, a bias is that participants could choose to use the alienating key, which could have lowered its controlling nature. In spite of these limits, the present research provides a first probable explanation for the relatively weak representation of the autonomy-restoration process in the literature by identifying the moderating role of perceived competence. Beside this effect, it is possible that other moderators could also affect this crucial restoration process, such as other context-dependent variables (e.g., presence of supporting individuals should lead to more active restoration) or personality traits (e.g., anxious individuals could set more avoidant coping strategies; autonomous persons could be more inclined to restore their autonomy). Further studies might help to determine the boundary conditions for the restoration of autonomy.

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