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Running head: THE PARADOXICAL EFFECT OF CONTROLLING CONTEXT

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The Paradoxical Effect of Controlling Context on Intrinsic Motivation in another Activity

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***Highlights (for review)**

Students reported more interest in a class when it was preceded by a controlling class

Controlling instructions led to more intrinsic motivation in the next activity

This effect disappears if the following activity resembles to the first activity

These results can be explained by the presence of an autonomy restoration process

Abstract

Controlling instructions typically undermine intrinsic motivation. However, in line with an autonomy restoration process, we hypothesized that prior exposure to a controlling context could increase intrinsic motivation displayed in a subsequent task if this second task is devoid of autonomy threats. A correlational study in educational context provided support for this effect by showing that students reported more interest in their music class when it was preceded by a class that was controlling. This effect was replicated in an experiment wherein participants who learned to play a game in a controlling context reported more interest in a second game than those who learned the first game in a neutral context. However, this effect disappears when the two tasks were done in a similar environment. Overall, this suggests that autonomy deprived students would display more intrinsic motivation in a subsequent task if this task gives a glimpse of autonomy satisfaction.

Keywords: autonomy, self-determination theory, intrinsic motivation, interest, controlling context.

Intrinsic motivation refers to doing an activity for its own sake, or in other words, for the natural interest and enjoyment that comes with this activity. The students' level of intrinsic motivation has been shown to be one of the most crucial factors in learning and academic success. This is explained by the fact that this psychological state isassociated with many positive cognitive, affective, and behavioral outcomes such as focused attention, higher cognitive functioning, positive affects, enjoyment, creativity, and persistence (e.g., Benware & Deci, 1984; Cordova & Lepper, 1996; Wild, Enzle, & Hawkins, 1992). Therefore, an important endeavor in educational psychology has been to identify where does intrinsic motivation come from and what are the elements that can boost interest in a task. Some research has focused on the content of the task itself, for example, showing that humorous, meaningful or game-related tasks raise interest and intrinsic motivation (Bergin, 1999; Mitchell, 1993). Meanwhile, other research has focused on the influence of the contextual demands showing that the same activity can be considered in completely different ways and generate different levels of intrinsic motivation depending on the context in which it occurs (e.g., Tang & Baumeister, 1984).

Self-Determination Theory and Need Restoration

Research from the self-determination theory framework (SDT; e.g., Deci & Ryan, 2000, 2002) has been especially useful in understanding how situational or contextual factors can influence one's level of intrinsic motivation for a task. According to SDT research, when a task is performed in a controlling environment that threatens the individuals' need for autonomy, intrinsic motivation and interest for the task itself will decline (Ryan & Deci, 2000; Tsai, Kunter, Lüdtke, Trautwein, & Ryan, 2008). The need for autonomy refers to the individual's propensity toward self-governance, and coherence in an organism's behavioral aims (Deci & Ryan, 2000). It has been shown to be a fundamental need that is crucial for individuals' optimal functioning and

well-being (see Deci & Ryan, 2002; Ryan & Deci, 2006). Hundreds of studies have demonstrated that when individuals are exposed to contexts that thwart their autonomy (in other words, a controlling context), a wide array of negative outcomes follow, such as low performance, lack of effort, increased negative affect, and loss of interest (e.g., Valås & Søvik, 1994 ; see also Reeve, 2009, for a review in the educational domain). A context is perceived as controlling when people feel restricted and coerced by environmental forces toward specific outcomes (Deci & Ryan, 1987). The contextual elements that make an environment controlling have been well identified in the literature (Deci & Ryan, 1987; Reeve, 2009; Reeve & Jang, 2006). As such, deadlines (e.g., Amabile, DeJong, &Lepper, 1976), surveillance (e.g., Enzle & Anderson, 1993), tangible rewards (Deci, Koestner, & Ryan, 1999), orders and directives (e.g., Reeve, Bolt, &Cai, 1999), evaluation (Schaffner & Schiefele, 2007) have all been shown to thwart individuals' need for autonomy. It is important to underline here that contexts that are controlling are not necessarily the same as contexts that are not autonomy-supportive (Deci & Ryan, 1985; Soenens, Vansteenkiste, Lens, Luyckx, Gossens, Beyers, Ryan, 2007). Contexts that are not autonomy-supportive or low in autonomy support are contexts that do not provide choice, that do not provide rationale when choice is limited or contexts that generally do not support volitional actions or initiatives (Soenens et al, 2007). Results have demonstrated the existence of a high negative correlation between controlling context and autonomy support (Soenens et al., 2007). This correlation supports the proposition that it is theoretically impossible to feel that autonomy is supported and hindered at the same time on a given moment.

Until recently, the consequences of being exposed to a controlling context were closely associated to the negative effects that occur immediately following the dissatisfaction of the need for autonomy, as if individuals passively accepted the autonomy loss and its consequences.

However, given that it has been shown that experiencing autonomy is crucial for optimal functioning (Deci & Ryan, 2000; Ryan & Deci, 2006), it is hard to believe that people would accept autonomy thwarting passively without any defensive reaction. Since preliminary work by Hull (1943), it has been suggested that living organisms have regulatory process to maintain a state of balance of their fundamental needs. Recent conceptualizations also indicate that psychological needs should elicit active responses aimed at readjusting low levels of satisfaction of one's need (Baumeister & Leary, 1995; Fiske, 2004; Sheldon, 2011). In this perspective, the hypothesis of a restoration process for the need for autonomy has been recently tested. This hypothesis suggests that autonomy deprived participants would invest resources and motivation in an attempt to regain an acceptable level of autonomy satisfaction. In their research, Sheldon and Gunz (2009) investigated if the need for autonomy along with the other needs postulated by SDT (i.e., competence and relatedness) creates a motivation to be restored when thwarted. In two studies, they used questionnaires to assess need satisfaction as well as the desire to experience each of the needs. They found that need satisfaction for each of the needs was negatively associated with the desire to experience that particular need. For example, participants who were low in autonomy need satisfaction were more likely to say that they desired autonomy-increasing experiences. Radel, Pelletier, Sarrazin, and Miliavskaya (2011) provided further evidence for the autonomy restoration process and for its immediate appearance after autonomy deprivation. In two studies, participants first did a game-related task in either a neutral or in a controlling context, which included many directives, commands, deadlines, and surveillance. Immediately after, all participants completed a cognitive task on a computer that was designed to assess their perceptual readiness (Study 1) or implicit approach tendency (Study 2) for autonomy related cues. The results of these studies indicated that participants who were exposed to the controlling

context detected autonomy related cues faster in a lexical decision task (Study 1) and expressed more approach behaviors toward autonomy related cues in a manikin task assessing automatic behavioral predispositions (Study 2) than participants who did the first task in a neutral context. In a third study, the authors also found that participants exposed to an autonomy threat showed more autonomy and conformed less than baseline participants in a judgment task, relying more on their personal standards to make their judgment. The fact that individuals strive to regain autonomy rather than passively accepting the loss resulting from autonomy deprivation can give rise to new research perspectives. Once individuals are no longer exposed to the controlling context, they should display strategies to restore satisfaction/fulfillment of their need for autonomy.

The Present Research

The aim of this research was to extend research on the consequences of autonomy deprivation. Given that a few recent studies have shown that people are more inclined to seek to restore satisfaction of their need for autonomy when this need is deprived (e.g., Radel et al., 2011; Sheldon & Gunz, 2009), we proposed that one strategy to restore satisfaction of this need could be to engage in another activity to make up for the loss of autonomy in a first activity. In other words, if one is in a state of autonomy deprivation and comes upon an activity that does no longer present any controlling features, one's intrinsic motivation in this activity could possibly be increased as this activity could represent an opportunity to satisfy the need for autonomy previously thwarted. Our proposition is in agreement with Deci and Ryan's (1985) assumption that intrinsic motivation is greatly determined by the degree to which an activity can provide satisfaction for the need for autonomy. Similarly, Krapp (2005) indicated that a system of basic needs including the need for autonomy provides continual signals affecting emotional

experience, which in turn determines the level of interest. Krapp (2005) also indicated that individuals are not necessarily aware of this. Rather, they simply experience the resulting emotions without necessarily being aware of the determinants of their interest. This is in congruence with the findings of Radel et al. (2011), which showed that participant's responses relied more on automatic guidance than on individuals' reflection and conscious intention. Thus, an activity that allows individuals to express their need for autonomy would lead to greater intrinsic motivation and interest, especially when individuals desire to regain their autonomy. This reasoning led us to hypothesize that autonomy thwarting environments, or controlling contexts, could have a paradoxical effect on intrinsic motivation in a subsequent task. By depriving individuals of their autonomy, it could provide a motivational force that could lead them to engage in a subsequent activity with heightened intrinsic motivation.

In order to test this prediction, two studies were carried out. While the first study was a correlational study carried out in a real educational setting, Study 2 was an experimental study conducted in the lab. As such, this complementary study package brings both internal and ecological validity. Given that the designs of the two studies are quite distant, we measured the main variables (i.e., controlling context and intrinsic motivation) in the same way in order to facilitate the comparison between the two studies.

The aim of the first study was to test whether such a paradoxical effect of controlling context on the level of intrinsic motivation for a following task could be observed in a real life context. In order to do this, we measured students' perceptions of autonomy satisfaction and intrinsic motivation in two consecutive classes in high school.

The second study was conducted in the laboratory. It involved an experimental design with random assignment to test for the existence of a causal relation between the controlling

context experienced in a first activity and the intrinsic motivation displayed in a subsequent activity. Given that an important element of our proposal is that an increase in intrinsic motivation will only occur if individuals previously exposed to a controlling context expect some sources of autonomy satisfaction in the subsequent activity, Study 2 also aimed to test this question by manipulating indirectly the participants' expectation of autonomy in the second activity. More specifically, although the context of the second activity did not include objective controlling features, we manipulated the participants' expectations by placing them in a context of achievement that was similar or different to the one they experienced when they completed the first activity (i.e., same room, same experimenter vs. different room and different experimenter).

Study 1

The aim of this first study was to provide preliminary evidence in support of the hypothesis that, following initial exposure to a controlling context in the natural setting of a classroom, there would be a rise in intrinsic motivation in a second, subsequent activity. In high school, students go from one class to another all day long, changing teacher each time. It is therefore possible that the nature of the motivational climate in one class can affect students' intrinsic motivation in the following one. To our knowledge, the influence of a preceding class on students' intrinsic motivation or interest in the next class has not been examined. Thus, we measured students' perception of the motivational climate (i.e., the degree to which an instructional climate was controlling) and students' intrinsic motivation using self-reported interest for both a music class and the class that preceded this class. These measures reflected student's perception at the contextual level of the class and not at the situational level of one specific lesson. First, to control for intrinsic motivation in the preceding class, we evaluated

change in intrinsic motivation from the preceding class to the music class. Then, we hypothesized, based on past research on the effects of a controlling context on students' level of intrinsic motivation for a class (e.g., Flink, Boggiano, & Barrett, 1990), that the more the music class was perceived as controlling, the lower the students' level of intrinsic motivation should be (hypothesis 1a). However, we also hypothesized that experiencing a controlling instructional climate in the class preceding the music class would strengthen intrinsic motivation in the music class, controlling for intrinsic motivation for the preceding class. In other words, we expected that the more students perceived that their first class was controlling, the more they would report interest in the music class over and above the effect of the controlling context in the latter (hypothesis 1b).

Method

Participants and Design

Participants were 315 French 6th grade students (181 females, 127 males, and 7 non specified, mean age = 11.5 years). They came from two different French public high schools. The survey was completed by the students on a voluntarily basis upon request from their music teacher. In French high schools music classes are compulsory for sixth graders that have this class in their curriculum for the first time in grade six. The music classes take place once a week, every week for a full year. Given that the schedule is planned for the full year and that the students stay in the same class all year, this class is always preceded by the same other class (another subject) for all students of the same group. Classes that started the morning or the afternoon by a music class were not eligible for the study.

Procedure

Two music teachers were contacted to take part in this study. Following their agreement as well as the agreement of their headmaster, paper questionnaires were sent to them. Given that teachers are not used to administering questionnaires, they received a two-hours training session to teach them how to introduce the questionnaire, and how to handle students' questions. It should be noted that the study hypotheses were not disclosed to teachers at this time so that they could not convey expectations to their students. All items of the questionnaire were carefully explained to the teachers so that they could easily answer any questions from students if they had any difficulties understanding any of the items. The teachers asked their students to fill out the questionnaire at the beginning of one of their lessons. The teachers informed them that the questionnaire was strictly anonymous, and emphasized the necessity to answer as honestly as possible. The teachers also mentioned that the questionnaire was not intended for the teachers, and that they would not be reading any of the answers. The one-sheet long questionnaire took approximately 10 minutes to complete. The questionnaire included two sections, one section that asked questions about the students' perceptions of the music class, and a second section that asked questions about the students' perceptions of the class that preceded the music class. The order was counterbalanced so that half of the participants completed the items on the music class first, while the other half completed the items on the preceding class first. The two parts of the questionnaire included the same scales. In each section, one additional item was added in the middle of the page to control for students' attention during completion. These items simply asked the students to circle a specific number in the scale to answer. Upon completion of the questionnaire, the participants were thanked.

Measures

Intrinsic Motivation: A first scale assessed students' intrinsic motivation in the class using the Interest/Enjoyment subscale of the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, &Tammen, 1989). The six items were adapted to assess the students' intrinsic motivation toward the class in general (e.g., "In general, I would describe the music class as very interesting"; "Usually, I enjoyed attending to the music class very much"; α = .89 for the music class and α = .91 for the preceding class). All of the items in the questionnaire were rated on a 7-point scale (1 = not at all true; 7 = very true).

Perceived Controlling Context: The second scale assessed the extent to which pupils perceived the class as controlling. This scale was comprised of 5 items from the Controlling Interpersonal Style Questionnaire (CISQ, Bartholomew, Ntoumanis, &Thøgersen-Ntoumani, 2010) and of 4 items from the Controlling Teacher Scale (CTS, Jang, Reeve, Ryan, & Kim, 2009). All items were retained according to 1) their capacity to reflect an actual threat to students' autonomy, and 2) their readiness to be understood by young students (e.g., "My teacher uses the threat of punishment to keep me in line during class"; "My teacher tries to control everything I do"; "My teacher puts a lot of pressure on me" ; α = .70 in the music class and α = .74 in the preceding class). All of the items in the questionnaire were rated on a 7-point scale (1 = not at all true; 7 = very true).

Data Analysis

Because treating the individual as the unit of analysis when there is a hierarchically nested design (i.e., students nested into classroom) can bias the conclusions in either the Type I or the Type II error direction (e.g., Kashy & Kenny, 2000), we conducted a Hierarchical Linear Model (HLM) analysis using MLwiN 1.10 (Rasbash, Browne, Healy, Cameron, & Charlton, 2001) to take into consideration the between-classes differences[1]. Before the analysis was

conducted, all variables representing self-reports were standardized. To test our hypotheses (hypotheses 1a and 1b), the level of intrinsic motivation in the music class was regressed on the level of intrinsic motivation in the preceding class, the perceptions of the controlling climate in the music class, the perceptions of the instructional climate in the preceding class, the order of presentation of the questionnaire and all possible interactions between these variables. To keep the model that best fits the data, we removed all factors from the model that did not bring a significant or marginally significant contribution.

Results

Seven participants were eliminated from the analysis because they provided inadequate answers to the control items. Descriptive statistics and the correlation matrix for all the variables involved in the study can be seen in Table 1. Concerning the HLM analysis, given that no effect of the order of presentation and no interaction effect were found (ts< 1), the analysis was performed another time without these variables. This model was significant (i.e., IGLS = 777.83, χ^2 = 33. 21, df = 3, p<.001) and accounted for 30% of the total variance. Perceiving the music class as controlling was negatively associated with intrinsic motivation in the music class, γ = -.48, t(304) = -9.25, p<.001. However, intrinsic motivation in the preceding class was a significant predictor of intrinsic motivation in the music class, γ =.15, t(304) = 2.35, p<.05, and more importantly, perceptions of the controlling climate of the preceding class turned out to reliably predict intrinsic motivation in the music class. As expected, perceiving the preceding class as controlling was positively associated with greater levels of intrinsic motivation in the subsequent music class, γ =.25, t(304) = 3.65, p<.001. Table 2 summarizes these results and indicates the contribution of each of these independent variables to the adjustment of the model.

Discussion

This correlational study in an educational context provided support for our hypotheses. Concerning the hypothesis 1a, we observed that perceiving the climate of a class as controlling undermined students' intrinsic motivationfor this class. In agreement with past research on the effects of controlling contexts on intrinsic motivation in the educational domain (see Reeve, 2009; Ryan & Niemec, 2009 for reviews), the satisfaction of the need for autonomy represents an important predictor of intrinsic motivation and interest, so when individuals felt that the context of the activity they were doing thwarted their need for autonomy, they reported less interest in this activity.

Besides this well-documented effect, we also observed another predictor of intrinsic motivation. As expected in hypothesis 1b, our analysis showed that the perceptions of the instructional climate in a preceding class predicted the level of intrinsic motivation of students in the following class. These results provide a first support to the existence of a paradoxical effect of controlling context on the level of intrinsic motivation for a following activity. A positive aspect of the present study is that it shows the existence of the proposed effect in natural educational settings with a relatively large sample size. However, a limitation of Study 1 comes from its correlational nature. Given that the controlling nature of the context was not actually manipulated, it is hard to be conclusive on the causal relation linking the type of instructional climate that students face in a first class and the level of intrinsic motivation they displayed inthe second class. Even if this relation could be logically very difficult to reverse, as it follows a temporal sequence, this does not provide conclusive evidence that the instructional climate experienced in the first class "causes" the effect observed in the second class. For example, it is possible that another (not assessed) variable could have affected both the way the instructional

climate of the first subject was perceived and the interest reported in the second subject. Therefore, we conducted a second experimental study in which the controlling nature of the first task was manipulated by the researchers.

Study 2

The aim of Study 2 was to complement Study 1's finding by providing a careful test of the paradoxical effect of controlling environments on subsequent intrinsic motivation for a second task by using an actual manipulation of the controlling nature of the instructional context. In order to provide a better control over the other possible candidates at the origin of the effect, the study was conducted in a laboratory to better control for the factors that could affect the participants' interest for an activity. In this study, participants were invited to do two separate game tasks. In the first task, participants were randomly assigned to play the same game, either in a controlling context or in a neutral context (see Radel et al., 2011). Then, participants were asked to play a second game and their intrinsic motivation in this game was assessed at the end.

Study 2 also intended to test an important condition of the autonomy restoration hypothesis: participants should only show higher levels of intrinsic motivation in the subsequent task if they have positive beliefs that a situation can provide them with the opportunity to restore their autonomy. To examine this question, we manipulated the level of similarity of the context to affect participants' beliefs. It is well-known from conditioning and learning theory (see Miller & Grace, 2003) that the perception of environmental cues that have been associated with an aversive situation generates strong expectations about the upcoming situation. As such, even if the second activity is different from the first one, individuals should expect no opportunity to restore autonomy if they perceive elements that could have been associated with the controlling context of the previous activity. These perceptions and expectations, furthermore, do not

necessarily need to be consciously processed, but rather can occur automatically and unconsciously (Krapp, 2005; Radel et al. 2011). These hypotheses are also in line with findings by Ratelle, Baldwin, and Vallerand (2005), which provided a good illustration of this association effect between neutral elements and the controlling context. Specifically, they reported that when a sound that had been associated with a controlling command in a first task appeared in a second unrelated neutral task, participants' intrinsic motivation in the second task decreased. In the current studies, the level of similarity was examined by either doing the second task in the same room and with the same experimenter as in the first task, or in a different room with a different experimenter. According to our hypothesis on the paradoxical effect of controlling context, it was expected that participants for whom autonomy had previously been thwarted would find the second task more interesting, but only when the environments of the two tasks did not share similarities hypothesis 2a). When the environments of the two tasks were highly similar, we expected that intrinsic motivation in the second task would be lower for those who did the first task in a controlling context compared to those who did the first task in a neutral context (hypothesis 2b).

Method

Participants and Design

The sample size was determined by a power analysis carried out with a medium effect size (F=0.25), a power level set at 0.75, and a *p* value set at .05. In agreement with the result of the power analysis, 80 participants were recruited. Because of missing data, two participants were removed from the study. The final sample was composed by 78 French speaking undergraduates (43 females, 35 males) of the University of Ottawa who participated in this study in exchange of course credit. The experiment was a 2 (Instructional climate: controlling *vs*.

neutral) × 2 (Environments similarity: similar *vs*. different) factorial design with both factors manipulated between subjects.

Procedure

Participants were informed that their consent to participate would imply taking part in two separate tasks that were chunked together in order to minimize the amount of students coming into the lab. Upon participant's arrival, an experimenter led him/her into a room to do the first task, which was introduced as a task designed to examine individual differences in ability to effectuate spatial operations. This game task was a computer version of the Tangram puzzle. In this game, players have to construct preset patterns using a limited set of geometrical forms. The experimenter carefully explained the aim and the rules of the game to the participant.

In the *controlling* condition, the experimenter emphasized the necessity to respect the directives played over the loudspeakers throughout the duration of the game. The audio instructions were built to depict the multiple characteristics of a controlling context. As such, instructions contained frequent deadlines to do the figures (e.g., "You have 1 minute to complete this figure"), solutions disclosure (e.g., "Use the big square to complete the top of the figure"), orders and commands (e.g., "Stop working on this figure now, and go immediately to figure number three"). A surveillance manipulation was also added. Before leaving the participant alone to play the game, the experimenter indicated that he would watch him/her via the one-way mirror located on the back wall to monitor if the directives were really followed.

In the *neutral* condition, the experimenter told participants that an audio band was played in order to provide them organizational information. Like the other group, the audio recording also included the same temporal indications to control for any competence manipulation. Nevertheless, these statements included no mandatory component (e.g., "This figure normally

requires 1 minute"). The rest of the speech was a rephrasing of what the experimenter said about the aim of the game for the first (controlled) group, with a description of the software interface and the figures. The same amount of speech and the same speaker's voice was used in both conditions. In this setting, the one-way mirror was covered.

At the end of the task, the experimenter came back and thanked the participant. In the *similar environments* condition, the same experimenter lowered the curtain on the one-way mirror and then he directly introduced the second task to the participant in the same room. In the *different environments* condition, the experimenter led the participant back to the hall where a second experimenter was waiting for him/her. The second experimenter led the participant to another lab room where he introduced the second task.

In both groups, the second task was presented as an experiment on motivation and the determinants of interest. The experimenter introduced the game-task, carefully explaining the aim and the rules of this game, which was a computer version of the Sokoban puzzle, in which the player pushes boxes around a maze, viewed from above, in order to put them in predetermined areas. Even if the game requires thinking, the game was set to be fairly easy, so that all participants could solve several levels during the 10 minutes of practice. No specific instruction was given to the participant, so they were able to play freely at their own pace. Upon completion of this task, the experimenter gave a one-page questionnaire to the participants.

Measures

Intrinsic Motivation: On the front side of the sheet, a first set of questions was devoted to assess participants' intrinsic motivation to the second task. Six items were adapted from the interest/enjoyment scale of the IMI (e.g., "This activity was fun to do"; "I would describe this

activity as very interesting"; α = .87). All the items of the questionnaire were rated on a 7-point scale (1 = not at all true; 7 = very true).

Perceptions of Controlling Context: To check if the manipulation of the controlling context had an impact on participants, two items from the CISQ as well as two items of CTS were put together to assess how controlling the first task was perceived (e.g., "I did not feel free to play this game"; "I found that the instructions were high-handed"; α = .80). All the items of the questionnaire were rated on a 7-point scale (1 = not at all true; 7 = very true).

Perceived Competence: In order to control that the manipulation of the controlling context only affected autonomy and not the level of competence of participants, we assessed perceived competence for the first task with four items. All items came from the perceived competence subscale of the IMI (e.g., "I felt very competent in this game"; α = .83).They were rated on a 7-point scale (1 = not at all true; 7 = very true).

Results

Analyses of self-reports indicated that there were no differences in participants' perceived competence in the first task between participants in the controlling condition and participants in the neutral condition, $t(76) = 1.22$, $p = ns$. By contrast, a significant difference on participants' perception of the instructional climate emerged, $t(76) = 3.70$, $p < .001$, Cohen's d = 0.84. The instructional climate was perceived more controlling by the group who were in the controlling condition ($M = 4.55$, $SD = 1.36$) than those who were in the neutral condition ($M = 3.39$, $SD = 1.40$). This indicates that our manipulation of the instructional climate was effective, affecting participants' perceptions of autonomy thwartingwithout affecting their perceptions of competence.

Next, we examined whether participants' intrinsic motivation in the second task was influenced by our manipulations. The 2 × 2 analysis of variance performed with self-reported intrinsic motivation as the criterion indicated a main effect of environmental similarity $F(1, 74) = 7.57$, $p < .01$, $\eta = .093$, but no main effect of the instructional climate $F(1, 74) < 1$, $p = ns$. Crucially, the interaction between these two factors was significant, $F(1, 74) = 13.04$, $p < .01$, $\eta = .150$. Planned comparisons indicated that while participants in the controlling condition reported less interest in the second task ($M = 4.16$, $SD = 0.77$) than those in the neutral condition ($M = 4.82$, $SD = 1.09$) when environments of the two tasks were similar, $t(37) = -2.20$, $p < .05$, Cohen's d = 0.71, this effect was reversed when the environments of the two tasks were different, $t(37) = 2.89$, $p < .01$, Cohen's d = 0.92. More specifically, when the participants were in a different environment, those who were previously exposed to the controlling climate reported more interest in the second game ($M = 5.56$, $SD = 0.89$) than those who were exposed to the neutral climate ($M = 4.63$, $SD = 1.10$). Figure 1 illustrates this pattern of results.

Discussion

As predicted (hypothesis 2a), we found that exposure to an autonomy-thwarting context led to an increase in intrinsic motivation for a subsequent task. This finding brings evidence of the paradoxical effect that a controlling context can have on a subsequent activity. Nevertheless, this study revealed that the paradoxical effect of controlling contexts does not seem to appear when the two tasks have important features in common. Rather, study 2 showed, in agreement with our predictions (hypothesis 2b), that when participants have done an initial task in a controlling context, and then perceive similarity between the environments of the first task anda second activity, they further lost intrinsic motivation in the second task. In sum, participants reacted as if the context was still objectively controlling even though the elements that appeared

in the second task no longer included autonomy threats. In other words, it seems that participants associated the elements of the second task with the previously controlling context. The results of the second study are in agreement with the results of a study by Ratelle, Baldwin, and Vallerand (2005). Although autonomy restoration has not been assessed directly, a speculation on these results suggests that individuals seek to restore their thwarted autonomy in a following task, but only when this task is devoid of potentially controlling elements.

General Discussion

The aim of this research was to test whether autonomy thwarting instructional contexts could lead to enhanced intrinsic motivation in a subsequent task, when such controlling contexts are usually associated with a loss of intrinsic motivation. More specifically, we hypothesized that individuals would be more interested in a subsequent activity when it follows one in which they faced a controlling context. This assumption was made according to an autonomy restoration process in which one would seek to regain autonomy in another activity when the context of the previous activity was experienced as controlling. Our studies provided support for the existence of a paradoxical effect of controlling contexts on consequent activities.

Study 1 provided preliminary support for this effect in real-world academic setting. Results from this study indicated that perceiving the instructional climate of a preceding class as controlling was associated with greater reports of interest in the following class. While Study 1 provided ecological validity to the paradoxical effect of controlling context, Study 2 aimed to enhance internal validity by directly manipulating the instructional context in a lab setting. In agreement with the results observed in Study 1, Study 2 demonstrated that when individuals faced a controlling context in a preliminary activity, they expressed more interest in a second activity compared to individuals who did not initially face a controlling context. However, this

occurred only when the second activity did not share the main features of the environment with the first activity (i.e., a different room and another experimenter). These findings provide evidence of the paradoxical effect of controlling contexts on intrinsic motivation in subsequent tasks. A possible limitation of Study 2 concerns the fact that the experimenters were not blind to the experimental conditions because of their role in the manipulation. Nevertheless, the influence of this bias on participants' responses should have been minimal as the participants were aware of the anonymity of the questionnaires.

A meaningful difference should be noted between Study 1 and Study 2. While Study 2 demonstrated a situational effect by probing intrinsic motivation in a novel activity, Study 1 reports a contextual effect by probing general intrinsic motivation in a recurrent activity, a weekly class that pupils have already had during two terms. It is very interesting to see that the effect can also be observed at the contextual level. This means that when individuals are repeatedly exposed to a controlling teaching climate before following another class, the former can influence their intrinsic motivationfor the latter. This finding illustrates how this effect can last over time, and gives rise to stable differences in the way individuals evaluate the important activities of their life, such as the academic interest and pursuit.

Study 2 also examined whether the paradoxical effect of a controlling context could occur when the following activity shares similarities with the first activity. When using the same room and the same experimenter for the two following activities, our results demonstrated that individuals who were exposed to the controlling context in the first activity reported less interest in the second activity than control participants who did the first task in a neutral context. These results are intriguing because the undermining effect of intrinsic motivationappeared while the context of the second activity showed no controlling features. Remember that in the 'different

environment' condition, neither the room nor the experimenter displayed objective autonomy threats in the second game task, but participants' interest in this game decreased. In other words, it is likely that the observed decrease in intrinsic motivation is more related to individuals' expectations of autonomy satisfaction than in actual exposure to objectively controlling events. Indeed, individuals often have expectancies about the extent to which a situation will support their autonomy before engaging in this situation, and these expectancies strongly determine the level of intrinsic motivation they will display for this activity. For example, Radel, Sarrazin, Legrain and Wild (2010) showed that students' intrinsic motivation for a lesson delivered by a new instructor depended more on the expectations they developed from preliminary information received about this instructor than on the actual teaching style he displayed. More importantly, this tends to support our rationale concerning autonomy restoration as the underlying process of the paradoxical effect of controlling contexts. Specifically, when individuals expect no opportunities to regain autonomy in an activity, no increase of intrinsic motivation occurs in this activity. Even if individuals have an opportunity to restore the low level of autonomy, no effort would be invested in an activity that seems unfavorable to nurture their need for autonomy.

Although these two studies supply important results on the paradoxical effect of controlling context on intrinsic motivation, future research however will have to provide a more direct approach to test the mediating role of the autonomy restoration process in this effect.The present research does not allow us to be conclusive on this point because we never actually assessed participants' motivation to experience autonomy. It is possible that the paradoxical increase of intrinsic motivation simply comes from a "contrast effect" biasing perception, in which an instructional context would appear more autonomy supportive than it really is in comparison to the prior controlling context. Therefore, a measure of the motivation to experience

autonomy should be included in future replications in order to conduct an analysis of mediation. Given that the present research only measured motivation using self-reports of interest, it will also be interesting to add a behavioral indicator of motivation to examine the consequences of the exposure to controlling context.

Several important theoretical implications can be extracted from these findings. First, our results provide new elements to the literature on interest and intrinsic motivation. To study interest, psychological research has particularly examined the characteristics of the activity itself,as well as the characteristics of the context in which the activity is performed. The research described in the present article goes a step further as it shows that the preceding context to which individuals were exposed could also be a significant predictor of interest. This can open up new perspectives on research examining the factors that influence interest. Here, we paid attention to the role of autonomy deprivation, but other factors could be examined in the same way. For example, thwarting other basic needs (i.e., competence or relatedness) in a first activity should, in principle, have a similar impact on a subsequent unrelated activity. In addition, our findings support Krapp's (2005) assumption that the development of interest results from experience of need satisfaction.

Second, our findings can also broaden the scope of the self-determination theory. To date, the impact of autonomy thwarting contexts has mostly been observed proximally and immediately. This research invites researchersto extend their scope and look for some effects outside the primary thwarting context. As our results showed, the impact of controlling context could go beyond the context where the threat takes place and affects individuals' behaviors in their subsequent activities. It is possible that some effects would continue for a long while and could even lastuntil successful restoration or until individuals' depletion of energetic resources.

As such, future studies might also examine the evolution of individuals' needs restorative strategy over time.

Even if the paradoxical effect of controlling contexts that we report herein suggests that controlling events could potentially lead to positive outcomes, this should be interpreted with caution. First, controlling contexts do still imply negative consequences, as individuals lose their intrinsic motivation in the activity occurring within this controlling context. Moreover, it is possible that succeeding in autonomy restoration in another domain facilitates relinquishment of the activity in which the deprivation occurred. For example, if we talk about such restoration at a relatively high level of generality, such as making up for the lack of autonomy one can experience in school by a greater involvement in the leisure life such as in the sport domain, this could lead to dramatic repercussions as it would imply disengagement from an important sphere of one's life. It would be very important to investigate carefully if restoration in a second activity increases or decreases the probability of disengaging from the first activity. Finally, it is also possible that restoration in another activity is not as beneficial for individuals as true restoration of autonomy in the activity in which deprivation occurred. If restoration elsewhere could be interpreted simply as a relief from the negative effects generated in the initial, controlling task, restoration in the same activity could rather be interpreted as a full victory against the threat. In this line, research on need balance has shown that experiencing high levels of need satisfaction in one life domain is not sufficient to compensate for need thwarting in other domains (Miliavskaya et al., 2009). Specifically, Miliavskaya et al.'s results indicates that compensation for need thwarting in another life domain may help but the total effect (need thwarting + compensation) is less positive than a situation where needs were satisfied in the first place.

For these reasons, direct applications of this effect in applied domains should be examined more extensively. For instance, if teachers are more controlling in a first task of low importance and then switch to an autonomy supportive style to introduce the second task of great importance, they could possibly ruin all their efforts simply because having the same teachers interacting with the same students may lead the students to associate the perception of control and pressure that they experienced in a first activity in the second activity. Study 2 indeed revealed that similarity of the environments prevented the occurrence of the paradoxical effect of controlling context on intrinsic motivation. Nevertheless, it should be noted that there was still some similarity in the controlling context and the subsequent when we observed the paradoxical effect of controlling context on intrinsic motivation. For example, in Study 1, the two different classes took place in the same school, and in Study 2, the two different activities took place in the same building. This means that some factors would be certainly more important than others to shape participants' expectations of control. As most effects of controlling context come from person-related factors (Deci & Ryan, 1987), it seems that the change of instructor would be the main parameter that can modify students' expectations of control. This is consistent with our results.

To conclude, the present studies suggest that although exposure to a controlling context decreases the level of intrinsic motivation for an activity associated with the controlling context, it may trigger a restoration process that leads participants to be more intrinsically motivated for doing another activity as long as the latter does not include subjective autonomy threats.

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Footnote

1. A first empty model including only the constant as predictor of the students' interest in the music class provided support to the decision of analyzing the data through a multilevel approach as 11% of the total variance of this variable was explained by the class level (ICC = 0.11).

Table 1: Descriptive statistics and zero-order correlations of the main variables of Study 1

	Descriptive statistics		*Correlations*		
	M	*SD*	2.	3.	4.
1. Intrinsic motivation in the music class	4.49	1.61	-.43***	.08	.05
2. Controlling climate in the music class	3.63	0.96	-	-.15**	.30***
3. Intrinsic motivation in the preceding class	4.17	1.82		-	-.64***
4. Controlling climate in the preceding class	3.76	1.21			-

Table 2: Main predictors of the students' music class intrinsic motivation as determined in the HLM analysis ofStudy 1.

	Parameter estimates			
Fixed Effects	Estimates	*SE*	*t*	*ΔIGLS*
Constant	-0.019	0.091	-0.99	
Controlling climate in the music lesson	-0.481	0.052	-9.25***	75.21
Intrinsic motivation in the preceding lesson	0.153	0.065	2.25*	5.45
Controlling climate in the preceding lesson	0.248	0.068	3.65***	13.17

Notes : $p < .05$; ** $p < .01$; *** $p < .001$. ΔIGLS refers to the difference in the adjustment index of the model by comparing the IGLS (Iterative Generalized Least Square) with or without the specified predictor.*
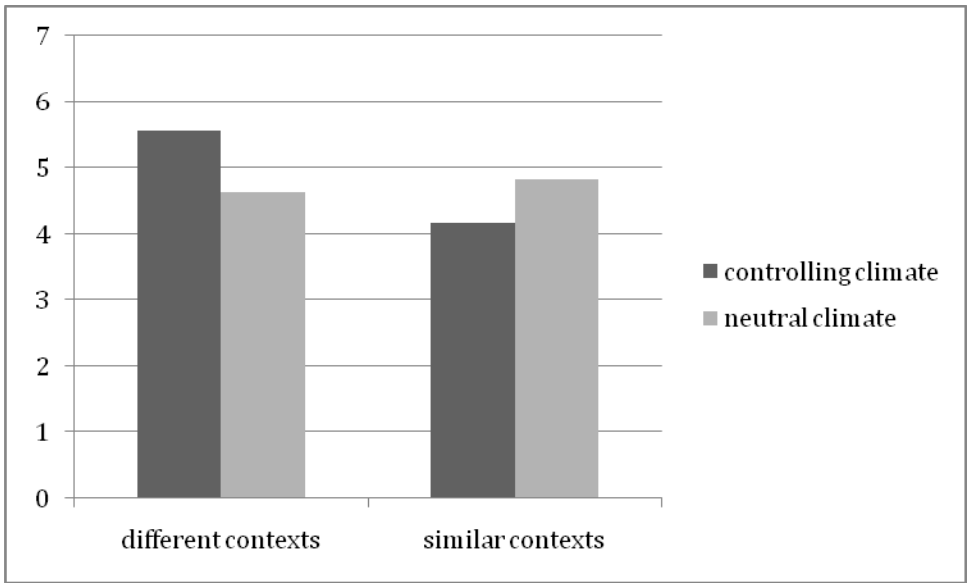
Figure 1: Self reported interest in the second task as a function of environments similarity and types of instructional climate of the first task.