



Self-controlled practice: Autonomy protects perceptions of competence and enhances motor learning



Suzete Chiviacowsky*

Federal University of Pelotas, Brazil

ARTICLE INFO

Article history:

Received 1 December 2013

Received in revised form

4 May 2014

Accepted 9 May 2014

Available online 20 May 2014

Keywords:

Motor behavior

Self-control

Autonomy support

Self-efficacy

Feedback

ABSTRACT

Objective: In previous self-controlled feedback studies, it was observed that participants who could control their own feedback schedules usually use a strategy of choosing feedback after successful trials, and present superior motor learning when compared with participants who were not allowed to choose. Yoked participants of these studies, however, were thwarted not only regarding autonomy but also, presumably, regarding perceived competence, as their feedback schedules were provided randomly, regarding good or bad trials. The purpose of the present study was to examine whether self-controlled feedback schedules would have differential effects on learning if yoked participants are provided with feedback after good trials at the same rate as their self-controlled counterparts.

Design: Experimental study with two groups. Timing accuracy was assessed in two different experimental phases, supplemented by questionnaire data.

Method: Participants practiced a coincident-anticipation timing task with a self-controlled or yoked feedback schedule during practice. Participants of the self-controlled group were able to ask for feedback for two trials, after each of five 6-trial practice blocks. Yoked participants received a feedback schedule matching the self-control group schedule, according to accuracy.

Results: Participants asked for (self-controlled group) and received (yoked group) feedback, mainly after relatively good trials. However, participants of the self-controlled group reported greater self-efficacy at the end of practice, and performed with greater accuracy one day later, on the retention test, than the yoked group.

Conclusions: The findings indicate that the autonomy provided by self-controlled feedback protocols can raise learners' perceptions of competence, with positive consequences on motor learning.

© 2014 Elsevier Ltd. All rights reserved.

Autonomy, in general, can be experienced when people act following their own beliefs and values while exercising control over some aspect of the environment. It has been linked with the satisfaction of basic psychological (Deci & Ryan, 2000, 2008) as well as biological needs (Leotti & Delgado, 2011; Leotti, Iyengar, Ochsner, 2010). In fact, individuals provided with freedom of choice have demonstrated superior results, in several domains, while performing and learning (Cordova & Lepper, 1996; Hackman & Oldham, 1976; Tafarodi, Milne, & Smith, 1999).

In the motor learning area, investigations have shown that practice schedules incorporating some form of self-control, or autonomy, can positively impact the acquisition of motor skills. Distinct learning variables as model observation (Ste-Marie, Vertes,

Law, & Rymal, 2013; Wulf, Raupach, & Pfeiffer, 2005), use of assistive devices (Hartman, 2007; Wulf & Toole, 1999), order of trials during multi-task practice (Keetch & Lee, 2007; Wu & Magill, 2011), amount of practice (Post, Fairbrother, & Barros, 2011), task difficulty (Andrieux, Danna, & Thon, 2012), as well as the provision of augmented feedback (Chiviacowsky, Wulf, Medeiros, Kaefer, & Tani, 2008; Janelle, Barba, Frehlich, Tennant, & Cauraugh, 1997; Patterson & Carter, 2010) have shown the benefits of self-controlled protocols for participants' learning, relative to externally controlled (yoked) schedules of practice.

Studies trying to investigate the reasons for the benefits of self-controlled practice for motor learning have detected, however, that besides autonomy, perceptions of competence can play an important role in this process (Chiviacowsky & Wulf, 2002, 2005; Chiviacowsky, Wulf, & Lewthwaitwe, 2012; Ste-Marie et al., 2013). Competence, along with autonomy, is considered a basic psychological need, essential for ongoing psychological growth and well-being (Deci & Ryan, 2000), and the individual's belief,

* Escola Superior de Educação Física, Universidade Federal de Pelotas, Rua Luís de Camões, 625, CEP 96055-630 Pelotas, RS, Brazil. Fax: +55 53 32732752.

E-mail address: schivi@terra.com.br.

regarding his or her competence to produce certain tasks, also defined as perceived self-efficacy (Bandura, 1977), is also linked to enhanced performance in several domains (Bandura, 1993; Feltz, Chow, & Hepler, 2008; Hutchinson, Sherman, Martinovic, & Tenenbaum, 2008). Specifically, the degree an individual believes in his efficacy is considered to affect the quality of his cognitive, affective and decisional processes, impacting his motivation and intention to persist toward planned goals (Bandura, 2012).

In the study of Chiviacowsky and Wulf (2002), the analysis of questionnaires revealed that learners practicing in a self-controlled feedback schedule tend to ask for feedback after good trials, while yoked participants (participants who were each yoked to a participant in the self-control group regarding when feedback was or not presented) would also have preferred to receive feedback information for their best trials. Complementary analysis of feedback trials, in that study, revealed that self-controlled participants are indeed able to discriminate between more and less efficient results, with errors being lower on feedback than in no feedback trials. This situation, in general, is not found for yoked participants, who usually receive feedback randomly, regarding “good” or “bad” trials.

Subsequent research found a similar pattern of results regarding preferences for feedback after good trials in different populations and tasks (Chiviacowsky et al., 2008; Fairbrother, Laughlin, & Nguyen, 2012; Patterson & Carter, 2010), as well as reasserting the effectiveness of the learners' strategy of confirming good performance after estimated successful trials (Chiviacowsky & Wulf, 2005). More recently, participants practicing with a self-controlled feedback schedule were more directly examined regarding perceived competence and self-efficacy levels (Chiviacowsky et al., 2012). In this experiment, it was verified that depriving learners of the opportunity to feel competent, by the use of a high performance criterion for success that produced few observed “good” trials when feedback was requested, resulted in detrimental effects on their perceived competence, self-efficacy levels and motor learning. So, the opportunity to select when to receive feedback and confirm good performance seems to be critical for the benefits regularly observed for self-controlled feedback schedules on motor learning.

Together, these findings suggests that both variables, autonomy and competence, play an important role during self-controlled motor learning. This appears to be especially true when considering the effects of feedback, as feedback normally carries competence information. This observation raises the question if the benefits of practice with self-controlled feedback on motor learning would be present if yoked participants also receive feedback after their most successful practice trials. In previous studies, yoked participants typically received feedback in the same temporal order of trials asked by their self-controlled counterparts, but randomly regarding good or bad performance. Thus, the self-controlled groups probably experienced, besides autonomy, higher feelings of perceived competence or self-efficacy during practice than the yoked groups, as they were provided with a greater opportunity to confirming successful results.

As perceived competence can be considered one of the reasons for the benefits of self-controlled motor learning (e.g., Chiviacowsky et al., 2012), it seemed important to further examine the effects of autonomy provided by practice with self-controlled feedback, dissociated from potential perceived competence effects. The purpose of the present study was to test if the advantages previously observed for self-controlled groups would also be present if yoked participants are provided with a feedback schedule mirrored to their self-control counterparts regarding trial accuracy. If perceived competence is the critical condition for the observed benefits of practice with self-controlled feedback, then equalizing participants of the self-controlled and yoked groups with the same

opportunity to feel competent would be expected to result in similar learning. However, if the autonomy provided by the chance to choose when to receive feedback also plays an important role in the typically seen advantages of this kind of practice, self-controlled groups would be expected to show better learning than yoked groups.

Two groups of participants practiced a novel anticipation timing task. While participants of one group (self) were able to choose when to request feedback, choosing two trials after each of 6-trial blocks, participants of the other group (yoked) received feedback in the same trials of the block as their self-control counterparts, but using a criterion of trial success. Questionnaires were completed, by all participants, at the end of the practice phase, and were used to determine participants' levels of self-efficacy, as well as their preferences for feedback after good trials. We were also interested in whether self-efficacy ratings would be able to predict learning, as observed in previous research (Chiviacowsky et al., 2012; Stevens, Anderson, O'Dwyer, & Williams, 2012).

Taking into account previous results of the literature demonstrating the motivational benefits of autonomy support for motor performance and learning (for reviews, see Lewthwaite & Wulf, 2012; Sanli, Patterson, Bray, & Lee, 2013; Wulf, 2007), we hypothesized that participants of the self-controlled group would show superior motor learning than yoked participants. Moreover, as the need for competence has been considered a basic psychological need (Deci & Ryan, 2000), we expected that participants of the self group would ask for feedback mainly after good trials, in agreement with previous literature results (Chiviacowsky & Wulf, 2002; Chiviacowsky et al., 2012; Patterson & Carter, 2010). In addition, considering that both groups would receive equal feedback regarding trial accuracy, it would be expected to find similar results in self-efficacy levels for self and yoked participants after the end of the practice phase. However, as previous findings have been suggesting the existence of an inherent reward with the exercise of control (Catania, 1975; Catania & Sagvolden, 1980; Leotti & Delgado, 2011; Tafarodi et al., 1999; Tiger, Hanley, & Hernandez, 2006), there was a possibility that participants allowed to choose when to receive feedback would present a higher level of self-efficacy than participants not provided with the possibility of choice.

Method

Participants

Twenty-eight college students (16 males, 12 females), with a mean age of 22.5 years ($SD = 3.32$), all right-handed, participated in this experiment. Calculation of the sample size was carried out, with an α level of 5%, effect size of .57, and a power of 80%. Participants had no prior experience with the experimental task and were not aware of the specific purpose of the study. The participants gave their informed consent and the study was approved by the university's institutional review board.

Apparatus and task

The task involved anticipatory coincident timing. The Bassin anticipation timer (Model 35575, Lafayette Instruments, Lafayette, IN), an apparatus consisting of 228-cm long track with 48 light-emitting diodes (LEDs) on its surface, was used to measure temporal accuracy. The sequential illumination of the LEDs were temporally scheduled in order to create the perception of a luminous red light moving down the runway, with the (perceived) running light moving at a constant speed of 20 MPH. A barrier was placed on the top of the trackway to increase the difficulty of the

Download English Version:

<https://daneshyari.com/en/article/894405>

Download Persian Version:

<https://daneshyari.com/article/894405>

[Daneshyari.com](https://daneshyari.com)