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Impacts of autonomy-supportive versus controlling instructional language on motor learning

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ABSTRACT

The authors examined the influence of autonomy-supportive (ASL), controlling (CL), and neutral instructional language (NL) on motor skill learning (cricket bowling action). Prior to and several times during the practice phase, participants watched the same video demonstration of the bowling action but with different voice-over instructions. The instructions were designed to provide the same technical information but to vary in terms of the degree of choice performers would perceive when executing the task. In addition to measurements of throwing accuracy (i.e., deviation from the target), perceived choice, self-efficacy, and positive and negative affect were assessed at the end of the practice phase and after a retention test without demonstrations and instructions on Day 2. ASL resulted in perceptions of greater choice, higher self-efficacy, and more positive affect during practice than CL, and enhanced learning as demonstrated by retention test performance. Thus, granting learners autonomy appeared to endow them with confidence in their ability, diminished needs for control of negative emotional responses, and created more positive affect, which may help consolidate motor memories.

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1. Introduction

Over the past few years, converging evidence from various lines of research has highlighted the motivational nature of the influence that different variables have on motor skill learning. Practice conditions that support fundamental psychological needs such as competence, autonomy, and social relatedness (e.g., Deci & Ryan, 2000, 2008) appear to create circumstances that optimize performance and learning (see Lewthwaite & Wulf, 2010a, 2012; Sheldon & Filak, 2008). For instance, the value of satisfying learners' need to feel competent is highlighted by findings showing enhanced learning with feedback after successful trials (e.g., Chiviacowsky & Wulf, 2007), positive social-comparative feedback (e.g., Lewthwaite & Wulf, 2010b), or video feedback about learners' best performances (e.g., Clark & Ste-Marie, 2007). Social relatedness concerns the need for social inclusion and is made possible or threatened in a variety of team, group, or dyadic practice situations (e.g., Shea, Wulf, & Whitacre, 1999; Shebilske, Regian, Arthur, & Jordan, 1992; see Lewthwaite & Wulf, 2012). Motor learning researchers are also increasingly realizing that these benefits of self-controlled, or learner-controlled, practice may be motivational in nature as well, in that they may satisfy the basic psychological need for autonomy (see Lewthwaite & Wulf, 2012; Sanli, Patterson, Bray, & Lee, 2013).

The aim of the present study was to further explore the role of autonomy support in motor learning. Autonomy is related to people's basic need to control or actively participate in determining their own actions and behavior. Allowing individuals to exercise control over the environment may not only satisfy a basic psychological need but may be a biological necessity (Leotti, Iyvengar, & Ochsner, 2010; Leotti & Delgado, 2011). Studies with both animals (Catania & Sagvolden, 1980; Voss & Homzie, 1970) and humans (Tiger, Hanley, & Hernandez, 2006) suggest that exercising control is inherently rewarding (Leotti & Delgado, 2011). The often seen learning advantages of autonomy-supportive (i.e., self-controlled or learner-controlled) practice conditions relative to more controlling (i.e., yoked) conditions (for reviews, see Sanli et al., 2013; Wulf, 2007), are presumably due in part to the positive motivational consequences of perceived control.

In the present study, we extended the inquiry into the role of autonomy support by examining whether the way in which task instructions are worded may have an influence on learning. Would instructions that suggest to learners a certain degree of choice in how they perform a task lead to more effective learning than more prescriptive instructions that imply no room for choice, or even "neutral" instructions? In a study by Reeve and Tseng (2011), instructions related to a puzzle task were worded in an autonomy-supportive, controlling, or neutral way. Participants in the autonomy-supportive group reported higher perceived competence than did participants in either the neutral or controlling-language group, perhaps because autonomy-supportive instructions conveyed a general sense of confidence or trust in learners which in turn might have contributed to task-specific self-efficacy. Unfortunately, the authors did not report performance on the puzzle task as a function of instructional language.

Autonomy-supportive versus controlling language may also have affective consequences that, in turn, may have differential effects on learning. Given that exercising control seems to be inherently rewarding (e.g., Leotti & Delgado, 2011; Voss & Homzie, 1970), autonomy-supportive language might induce greater positive affect. Consistent with this view, in Reeve and Tseng's (2010) study, participants in the autonomy-supportive group (and neutral language group) reported significantly greater emotional engagement (i.e., enjoyment, fun, curiosity, interest) than did participants in the controlling-language group. In contrast, controlling language induced stress, as indicated by increased cortisol levels. It is possible that self-regulatory attempts at controlling negative emotional responses might take attentional capacity away from the task, thereby degrading learning.

Participants in the present study were asked to learn the cricket bowling action. Similar to Reeve and Tseng (2010), we varied the way in which instructions were presented. For one group of participants (autonomy-supportive language), the instructions were designed to convey a sense of choice, while for another group (controlling language), they offered little option for how to execute the skill. A control group with neutral-language instructions was also included. In addition to any immediate effects the different instructions may have on motor performance, we also wanted to measure more permanent effects on learning. Therefore, a delayed retention test without instructions or reminders