Research Requirement:

Backward Fading to Speed Task Learning

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Executive Summary

The United States Army requires effective and efficient training. However, what is effective and efficient varies from group to group and individual to individual. Research indicates that prior knowledge is a major determinant of performance (Schmidt, Hunter, & Outerbridge, 1986; Schmidt & Hunter, 1992, 1993), with low prior knowledge individuals performing better with more scaffolding (i.e., instructional support) and high knowledge individuals performing better with less scaffolding (Kalyuga, Chandler, & Sweller, 1998). If a trainer is dealing with populations who are naïve (that is, there simply is no prior knowledge) with respect to a task, what is needed is a systematic method to move everyone from a naïve state to a more proficient state. One such method involves graduating individuals from worked examples to problem solving, with worked examples defined as providing learners with a complete demonstration of a multistep task and problem solving defined as the student completing the task from beginning to end without instructional support. An effective and efficient means of facilitating such a transition from examples to problem solving is known as *backwards fading* (BF; Renkl, Atkinson, Maier, & Staley, 2002).

Procedure:

Subject matter experts (SMEs) examined a number of different Army tasks to determine the feasibility of using backwards fading (BF) to train Initial Entry Training (IET) Soldiers in a variety of Army field settings (e.g., concurrent training during marksmanship qualification). The tasks chosen were both hands-on and cognitive in nature. Based on the task selection criteria, five (5) tasks were chosen. Four of the tasks were hands-on and the fifth task was cognitive. In Experiment 1, Soldiers (n = 120) received BF training on tasks that ranged in complexity. The goal was to see if judgments of task complexity based on SME judgment yielded results comparable to judgments of tasks whose complexity was more straightforwardly assessed, as is typical of the research literature. In Experiment 2, Soldiers (n = 95) received BF training in which Soldiers either gradually (*step* fading) or rapidly (*block* fading) assumed responsibility for performance without instructional support.

Findings:

Analyses revealed weak but largely consistent trends in the hypothesized directions. In Experiment 1, tasks judged more complex by SMEs exhibited higher error rates, lower Go rates,

longer times to complete, and fewer completed steps (i.e., more unattempted steps) than tasks judged to be less complex. A similar, albeit less consistent, pattern held in Experiment 2: block faded tasks were performed more poorly than step faded tasks. Regardless of task condition, BF was largely successful: 'Go' rates ranged from approximately 77% to 99%. We discuss some potential theoretical interpretations of this pattern and propose some rules of thumb for determining whether BF is a viable training approach from situation to situation.

Utilization and Dissemination of Findings:

The findings demonstrate the potential utility of BF as a means of training Army relevant tasks in concurrent and other field training settings. The materials required for training this task can be quite minimal (depending on the task). These findings were briefed to the Battalion and Company Commanders of the 1-50th Infantry Battalion, 198th Infantry Brigade at Fort Benning, GA on March 19, 2013.