

Specificity Part V: The Learning Paradigm



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Abstract

Hull (1943) was the first to quantitatively differentiate between performance and learning. Hull's equation demonstrated the temporary nature of performance as well as the relatively permanent nature of learning. In light of this, the learning paradigm is used to infer that learning has taken place and is comprised of acquisition and retention trials. Acquisition refers to initial practice conditions. Retention refers to trials performed after a period of rest to assess learning. The purpose of this paper was to review the learning paradigm.

Recommended Readings

[Hull's Quantitative Equation on Human Performance](#)

Introduction

Learning can be defined as a change in the capacity of an individual to express Skill (Sawyer, 2005). Typically, learning must be inferred from a relatively permanent or stable increase in performance as a result of practice or experience (Sawyer, 2005). In this context, a skill is an act or task voluntarily undertaken with a goal or criterion to achieve. Henry (1968) defined Motor Learning as sensorimotor skill acquisition.

Bachman (1961) suggested that Motor Learning is concerned with the precision, control, and speed of movement, its coordination and effective timing that together make up an effective skill. Sawyer (2005) suggests that learning is learning, meaning that cognitive and motor learning should not be viewed as dichotomous, but rather on a continuum, as most skills have both cognitive and motor components. For example, playing a piano takes both cognitive skills to read the music sheet and motor skills to tap the keys. Moreover, the process that occurs which allows for both cognitive and motor learning are similar in nature.

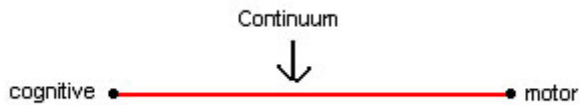


Figure 1.

Motor and Cognitive Learning

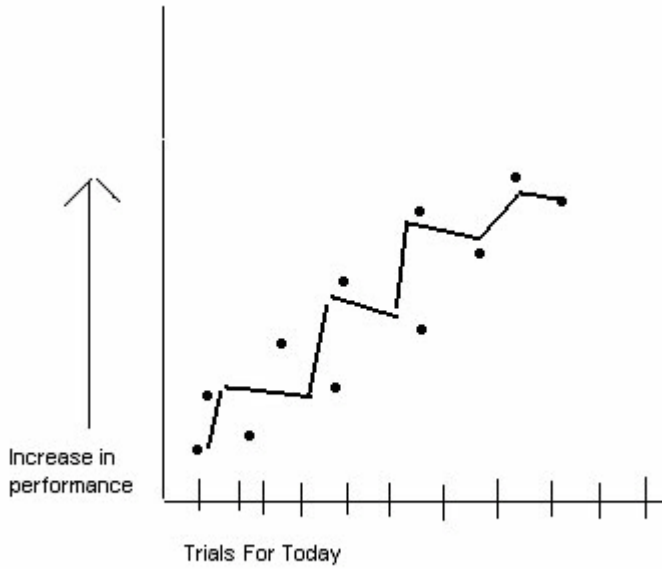
Figure 1 graphically depicts that motor and cognitive learning should be viewed on a continuum.

To elaborate on these definitions, a skill would be typing, shooting a basketball or bench pressing—no matter how proficiently the learner can express these skills, they are all still skills. The level at which the learner can express a skill would be their capacity. As discussed in the previous articles of this historical series by Wilson and Wilson (2005) terms such as 'strength' and 'power' are fallacious. Sawyer (2005) suggests that these should be replaced with the term 'capacity.' Therefore, rather than stating that someone has "mad skills," it should be stated that someone has "a high capacity to express a specific skill or set of skills."

It is important to understand that learning must be inferred, meaning that learning is a hypothetical construct, which is a way to describe something that is not visibly observable. Further, learning must be inferred from a relatively permanent or stable increase in performance. It is now important to distinguish between performance and learning.

Wilson (2005) performed a comprehensive analysis on performance. It was found that Hull (1943) suggested an equation, which could make reliable predictions on performance. Hull defined performance as the 'reaction potential (sEr)' of an organism, which is the probability and speed with which a behavior occurred to a given stimulus. He suggested that performance was determined by seven components that were variable in nature, with the exception of one, which he referred to as "habit strength (sHr)," or learning. An example of a variable component in his equation is known as stimulus dynamism (V), which refers to the clarity of the stimulus. Thus, the clearer the stimulus is, the greater the probability of the response. For example, the probability of staying within the lines of the road when driving at night would be higher with your headlights on, as the lines could be seen clearer. For more information on Hull's equation, refer to, [Hull's Quantitative Equation on Human Performance](#).

The learning paradigm is used to infer that learning has taken place and is comprised of acquisition and retention trials. Acquisition refers to initial practice conditions. Retention refers to trials performed after a period of rest to assess learning. For example, if a student takes a final, and then is tested 3 months later on the same material, the student most likely would not do as well. Since learning is considered a relatively permanent or stable increase in performance, some of the material must therefore not have been learned. However, the information that was retained was stable, and therefore inferred to be learned.



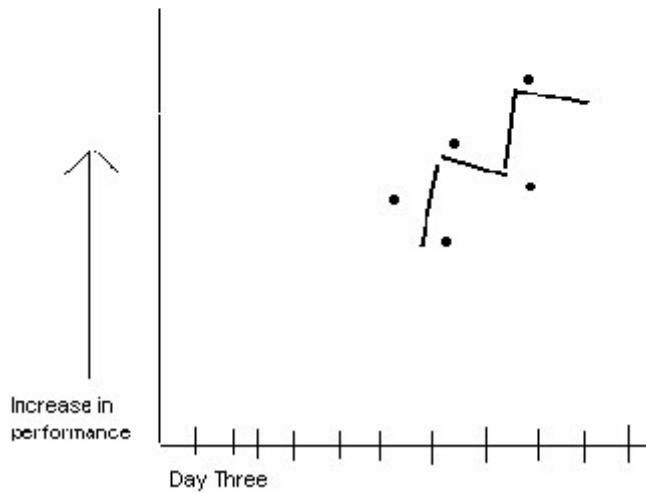
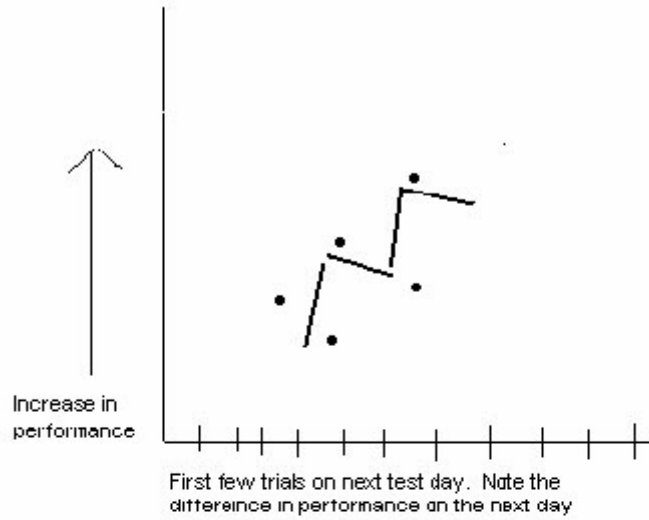


Figure 2.

The Learning Paradigm

Figure 2 graphically depicts the learning paradigm. The trials performed can represent any skill, such as bench pressing. The finishing points of each graph were relatively temporary in nature. However, note that at the beginning of day two, performance was greater than at the beginning of day one. Further, at the beginning of day three, performance was greater than at the beginning of day two, suggesting that learning had occurred. Also, note that at the beginning of day two, performance was less than at the end of day two. And that at the beginning of day three,

performance was less than at the beginning of day 2, suggesting that some of elements of performance seen were temporary, and not learned. This graph clearly demonstrates the effectiveness of the learning paradigm to tease out the temporary nature of performance from the relatively permanent nature of learning.

The learning paradigm will be discussed and elaborated on continually throughout this series.

Lastly, learning is a result of practice or experience. The purpose of the following papers was to review practice variables which affect performance and learning.

Conditions of Practice

Wilson and Wilson (2005) have previously established that the most important practice variable in terms of sensory motor skill acquisition is *practicing the criterion task itself*. However, it is imperative that the reader understand that there is much more to skill acquisition than endless repetitions. Indeed, there are multitudes of ways to manipulate the effectiveness of practice. The following papers will therefore analyze four conditions of practice as follows:

- Mass vs. Distributed Practice
- Blocked vs. Random Practice
- Part vs. Whole Practice
- Programmed Variations

These conditions of practice are covered in part [eight](#) and [nine](#) of the specificity series.

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