

Motor Learning and Control

Title: Shea & Morgan (1979) 30 years later: Perspectives on contextual interference research

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Shea & Morgan (1979) 30 years later: Perspectives on contextual interference research—Introduction and overview

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In 1979, the *Journal of Experimental Psychology: Human Learning and Performance* published a paper by John Shea and Robyn Morgan entitled, “Contextual interference effects on the acquisition, retention, and transfer of a motor skill.” This paper reported the results of an experiment showing that the random presentation of three tasks degraded performance during acquisition but facilitated learning compared to a blocked presentation of the same tasks. This demonstration of contextual interference effects has had a tremendous impact on research in motor behavior and related disciplines over the past 30 years. According to the ISI database, Shea and Morgan (1979) has been cited over 240 times. In addition, the paper has been cited in over 70 books on topics as diverse as motor learning, exercise science, stroke rehabilitation, industrial engineering, and teaching music to children. This symposium will discuss the impact of the Shea & Morgan paper as well as several perspectives of the ensuing research on contextual interference effects.

Shea & Morgan (1979) 30 years later: Perspectives on contextual interference research—Extensions of contextual interference research

Lee, Timothy D.; McMaster University

The Shea and Morgan (1979) paper is one of the most widely cited publications in motor learning research—*widely*, in the sense that the influence of the paper has extended far beyond the traditional boundaries of the motor skills research literature. My goal is to provide a summary of the research in these diverse areas with an overarching purpose of establishing a set of commonalities that link underlying learning mechanisms.

Shea & Morgan (1979) 30 years later: Perspectives on contextual interference research—The contextual interference effect is generalizable but not ubiquitous

Magill, Richard A.; New York University

An important issue raised by the Shea and Morgan (1979) article concerns the generalizability of the contextual interference effect. Researchers have focused primarily on the extent to which the effect relates to types of motor skills, although other generalizability concerns have been investigated as well, such as learner characteristics and stage of learning. The focus of this presentation is on the types of skills that have and have not demonstrated the contextual interference effect. A survey of the research shows that although the effect has been demonstrated for many laboratory and non-laboratory tasks, no single category of

factors distinguish skills that are and are not influenced by practice schedules predicted by the contextual interference to facilitate learning.

Shea & Morgan (1979) 30 years later: Perspectives on contextual interference research—Disentangling the contextual interference effect from an information processing perspective

Wright, David L.; Texas A&M University

As is evident from one of the other presentations in this symposium, contextual interference (CI) effects, first revealed in the motor domain by Shea and Morgan (1979), have been demonstrated in a wide variety of settings. Less well delineated, and empirically supported, however, are the processes that might account for performance and learning differences resulting from experiencing differential levels of interference during training. In this presentation, I will summarize a number of experiments in which unique paradigms were used to localize the impact of CI to the information processing events preceding movement initiation, namely, perception, selection, and programming. The susceptibility of each of these processes to the CI manipulation will be discussed in the context of (1) the prevailing accounts for this effect in the motor learning literature—namely, the elaboration and reconstruction hypotheses—and (2) more general learning and memory processes, such as chunking, concatenation, and consolidation.

Shea & Morgan (1979) 30 years later: Perspectives on contextual interference research—Some exceptions to the contextual interference effect

Shea, Charles H.; Texas A&M University

The learning advantages of random practice have been illustrated in numerous laboratory and field-based experiments. Studies using multielement tasks, similar to Shea and Morgan, have found contextual interference (CI) effects independent of whether the task required participants to move as fast as possible, meet a certain overall movement time, or produce certain segment times. Moreover, learning advantages for random practice have been shown for aiming tasks, anticipation-timing tasks, movement patterning tasks, and tracking tasks. Thus, the CI effect has proven to be a robust phenomenon. More recently, however, a number of experiments found that blocked practice enhanced the development of a relative timing pattern, whereas random practice facilitated transfer with respect to absolute timing. Because asking participants to focus not only on absolute time, as in Shea and Morgan, but also on the relative times of the elements increased the difficulty of the learning process, a more common, and perhaps more natural, situation would be to provide participants practice with movement sequences and observe how they structured their responses (i.e., in terms of relative timing). It is possible that blocked practice participants would attempt to create a movement structure uniquely effective for the current task without regard to the other tasks whereas random practice participants might find it more efficient to structure all the task variations in a similar manner. Indeed, this was demonstrated by Wilde, Magnuson, and Shea (2005), who reported that random practice resulted in a common response structure when learning three 6-element sequences whereas blocked practice resulted in participants exploiting unique sequential aspects of each task, presumably to enhance immediate performance. Additional examples of task and practice conditions that do not follow the typical CI effect will also be reviewed.

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