Chapter IX
Invested Mental Effort in an Aural Multimedia Environment

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ABSTRACT

This study addresses the views of 9 students on the amount of invested mental effort (Salomon, 1983a) needed to effectively process multimedia annotations (pictorial and written) so as to learn from a second language (L2) aural passage. Initially, 67 college students in a second-semester French course listened to a multimedia based French passage. Participants were randomly assigned to one of four listening treatments that contained either no annotations, written annotations, pictorial annotations, or both annotation types. Follow up vocabulary production and recall protocol tests measured vocabulary learning and aural comprehension. From these 67 students, 9 were selected to participate in interviews based on treatment type and posttest results. After examining anecdotal information and test results of these 9 students, it appears that the amount of invested mental effort applied to processing different annotation types varied in its influence on their abilities to learn French vocabulary and on their aural comprehension.

INTRODUCTION

Research consistently has shown that processing written or pictorial information with an aural L2 passage enhances students’ comprehension and/or vocabulary learning (e.g., Carlson, 1990; Guillory, 1998; Mueller, 1980; Pouwels, 1992; Severin, 1967). For example, Mueller (1980) and Severin (1967) determined that access to pictures in an aural L2 environment better enhanced students’ performance on post-treatment measures than did the absence of pictures. More recently, Guillory (1998) determined that access to written subtitles in limited (one or two words) or expanded
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(complete sentences) form supported students’ comprehension of video presentations.

Research has also consistently shown that accessing both pictorial and written annotations in a multimedia environment leads to greater aural or visual learning than when single or no annotations are available (e.g. Chun & Plass, 1996; Jones, 2003, 2004; Jones & Plass, 2002; Plass, Chun, Mayer & Leutner, 1998, 2003). For example, Jones and Plass (2002) found that students who accessed pictorial or written annotations alone or combined while listening to a French text in an aural L2 multimedia environment outperformed those without access to any annotations, while those who accessed pictorial or written annotated information alone did not differ significantly in terms of their effectiveness for recognizing L2 vocabulary. However, in terms of recall of the aural passage, those who accessed pictorial annotations alone outperformed those without access to pictorial annotations. Plass et al. (1998) explored the effects of pictorial and written annotations on text comprehension and vocabulary acquisition from a written German passage. Students who selected pictorial and written annotations while reading a German text performed better on comprehension and vocabulary tests than did those who accessed pictorial or written annotations alone or no annotations at all. The results of these and other L2 multimedia studies suggest that students meaningfully comprehend text (aural or written) in a multimedia format when they can select relevant pictorial and written information from it, organize the pictorial information into an understandable pictorial mental representation, organize the written information into an understandable written mental representation, and then integrate these mental representations with one another by constructing referential connections (Mayer, 1997, 2001, 2002).

The effects of students’ attitudes toward different forms of media on their learning has been explored in recent years, primarily as it relates to written text and television (e.g. Cennamo, 1993; Cennamo, Chung, Leuck, Mount, & Turner-Vorbeck, 1995; Jones, 2003; Salomon, 1983a, 1983b; Salomon & Leigh, 1984). Most recently, Jones (2003) examined the effects of different annotated modes of information (pictorial and written) on students’ ability to recognize vocabulary from an aural L2 multimedia text. Jones’ (2003) study discovered that students’ attitudes and opinions toward these different processing modes may have affected their comprehension of the aural text and their recognition of vocabulary. However, in this study, Jones (2003) used simple multiple-choice recognition tests to measure students’ vocabulary acquisition. Some researchers (e.g. Cennamo, 1993; Chang & Smith, 1991; Jones, 2006; Kelleher, 1996; Salomon, 1984) have suggested that constructed response and inferential activities may be more sensitive measures for examining students’ attitudes and performance outcomes than multiple-choice measures like that used in Jones’ (2003) study.

Therefore, to further understand the impact of multimedia on L2 learning, researchers must further examine the role students’ beliefs and expectations may have on their ability to process and learn from aural multimedia input. Specifically, one must examine how students’ views on the amount of invested mental effort (AIME) (Salomon, 1983a) needed to process pictorial or written annotations in an aural multimedia environment may influence outcomes on vocabulary production and recall measures. This study explores these issues and begins with a brief review of pictorial and written processing strategies in a multimedia environment. It then examines the theory of invested mental effort and how students apply AIME to pictorial or written annotation modes. This study then concludes with an examination of the findings followed by the limitations and implications of this study for developers, teachers, and students, and suggestions for further research.