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Effects of cognitive demands on attention orientation in L2 oral production

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ABSTRACT

In the field of second language (L2) acquisition research, the importance of attention to language form has been supported by many researchers. The *Task* is a critical concept in the field because its features affect L2 learners' attention orientation in L2 performance. This study explored the ways in which two types of cognitive demands (reasoning demand and dual-task demand) influenced the occurrence and orientation of attention in L2 oral production. This was done by analyzing performance scores (accuracy, complexity, and fluency) and verbal protocols (indicators of attention to lexis, syntax, and phonology). The limited-resource model and the multiple-resource model provided theoretical frameworks for this study. The reasoning demand increased accuracy scores, but the dual-task demand did not. Both types of task demands reduced fluency scores, but no effects were found on complexity scores. The verbal protocol analysis suggested that task demands inhibited learners' attention to syntactic encoding. Overall, the results support the limited-resource model, at least in the monologic task condition employed in this study, leading to the suggestion that task demands may need to be eased to help direct learners' attention to linguistic form and thus enhance L2 acquisition.

1. Background

1.1. Attention, instruction, and second-language acquisition

Since Schmidt (1990) challenged Krashen (1982, 1985) view that a second language (L2) is fundamentally acquired by an unconscious process, the role of attention has evoked a great deal of controversy. Schmidt claimed that L2 acquisition is impossible with subliminal learning, and learners must consciously pay attention to formal aspects of a language in input and *notice* them to acquire the language (noticing hypothesis). These theoretical discussions triggered numerous empirical studies. The issue of the possibility of learning without awareness may be controversial (cf., Hama & Leow, 2010; Leung & Williams, 2011; Williams, 2004, 2005), but as to the positive effect of conscious attention, much of the research confirms that those participants who exhibited a greater level of noticing of linguistic form during L2 processing demonstrated greater improvement in L2 acquisition (e.g., Fotos, 1993; Godfroid, Housen, & Boers, 2010; Godfroid & Uggen, 2013; Rosa & O'Neill, 1999). The concept that emphasizes the role of attention to linguistic form in meaning-focused tasks was documented as *focus on form* (e.g., Long, 1991; Long & Robinson, 1998), as one of the most effective ways of L2 teaching.

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Motivated by L2 research on conscious attention to form or noticing, a number of studies have investigated the task characteristics that can change learners' attention allocation during task activities. In this line of studies, it is considered that language instructors can manipulate learners' attention orientation by changing task-inherent cognitive demands. This is achievable through the manipulation of task characteristics or the methods of task implementation. In other words, tasks are seen as a controllable unit that language teachers can deploy for instruction in the classroom. This is considered to be valuable for language teachers because they can control attention allocation during learners' task engagement. Research on the effects of task characteristics can be broadly classified into two traditions based on either the limited (or single)-resource model (e.g., Skehan, 1996, 1998, 2014; Skehan & Foster, 1997, 1999) or the multiple-resource model (e.g., Garcia Mayo, 2007; Ishikawa, 2008; Robinson, 2003, 2011).

1.2. Skehan's limited-resource model

Skehan (1998) postulated that it is difficult for learners to pay attention to all three aspects of performance (complexity, accuracy, and fluency) simultaneously, because of their limited attention capacity. When learners focus on fluency, their attentional resources are devoted to meaning. In contrast, when they pay attention to form, it gives rise to complexity, on the one hand, or accuracy, on the other. Note that they cannot pay attention to both complexity and accuracy simultaneously (Foster & Skehan, 1996; Skehan & Foster, 1999). Skehan and Foster (1997) conducted research to analyze the relationship among the three aspects of learners' speaking performance, and asserted that higher accuracy is associated with lower complexity. They showed the trade-off effect between complexity and accuracy, and proposed that learners have limited resource capacity and must prioritize where they allocate their attention. They also argued that the priority can be controlled by changing cognitive demands. On the basis of this idea, the relationship between various task features and elicited task performance has been investigated (Bygate, 1996; Foster & Skehan, 1996; Skehan & Foster, 1999; Tavakoli & Foster, 2008). Skehan (1998) and Skehan and Foster (2001) argued that learners direct less attention to the language if a task demands substantial attention to its content (e.g., because it is complex, puzzling, or contains unfamiliar information). In addition, learners have great difficulty in attending to both form and content (VanPatten, 1990) because simultaneous attention to meaning and form may result in cognitive overload for L2 learners (McLaughlin, Rossmann, & McLeod, 1983). Hence, according to the limited-resource view, easing task demands, by changing task characteristics, is necessary for successful grammar acquisition.

1.3. Robinson's multiple-resource model

Against Skehan's view, some researchers (e.g., Garcia Mayo, 2007; Robinson, 1995a, 2003, 2005) have argued that attentional resources are not limited and people can pay attention to both accuracy and complexity without trade-offs. Robinson divided the components of task-inherent cognitive demands (which he referred to as *task complexity*) into two dimensions: resource-directing, which represents cognitive/conceptual demands (e.g., +/− few elements, +/− here-and-now, +/− reasoning demands), and resource-dispersing (or resource-depleting), which entails performative/procedural demands (e.g., +/− planning, +/− single task, +/− prior knowledge). Adopting this distinction, the hypothesized model suggested that increasing task complexity along the resource-directing variables leads to the allocation of cognitive resources to language form (Ishikawa, 2008). As a result, although task demands degrade fluency, they simultaneously promote complexity and accuracy of a learner's production without trade-offs. According to Robinson (2003), adult L2 learners are advised to learn how concepts are encoded in the language, lexically, morphologically, and syntactically, through demanding task along resource-directing variables. This directly conflicts with Skehan's limited-resource model.

Robinson (1995b) tested the above hypothesis by comparing the task performance between here-and-now (simple) and there-and-then (complex) conditions. The results showed that complex conditions resulted in greater accuracy, at the cost of fluency. In contrast, the difference in the numbers of clauses per c-unit, which is an index of complexity, was not statistically significant. A meta-analysis has also supported this result (Jackson & Suethanapornkul, 2013). That is, task complexity along resource-directing variable positively affects accuracy and negatively affects fluency, but has no negative effects on complexity. Gilabert (2007) analyzed the effects of cognitive demands on accuracy and self-repairs as measures of learners' attention to form. In addition, Gilabert, Raron, and Llanes (2009) investigated the impact of cognitive demands on learners' oral interaction, focusing on interactional moves (i.e., negotiation of meaning, recasts, language-related episodes, and self-repairs). Both studies concluded that increasing cognitive demands along the resource-directing variable generate more attention to form, even though there were slight differences in each task type. The researchers argued that task demands have the potential to boost learners' L2 acquisition through promoting attention to formal aspects of the target language, and that this provides evidence for the multiple-resource model.

1.4. Gaps in the study of attention orientation in L2 oral production

As the above arguments show, it is still controversial whether task demands promote or inhibit L2 learners' attention to linguistic form. These theoretical differences between the two models are summarized in Table 1.

These two models agree on the point that resource-dispersing task features (less planning time, less prior knowledge, and dual task) degrade learners' attention to language form, whereas they disagree on whether or not resource-directing task