

Article

Formal Genre-Specific Knowledge as a Resource-Dispersing Feature of Task Complexity

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Abstract: Recent second language (L2) writing research informed by task-based theories of second language acquisition has enthusiastically adopted task complexity frameworks to describe the specific cognitive demands of a given writing task and the effect of those cognitive demands on written L2 production. However, missing from many studies on the effects of task complexity on L2 written production is a discussion of genre as a potential source of task complexity. This paper examines the potential of genre as a resource-dispersing form of task complexity that is unique to writing. The article summarizes the predictions of task-based theories of second language acquisition particularly the predictions of the Cognition Hypothesis and its intersection with Kellogg's widely-cited model of working memory in writing. It then argues that formal genre-specific knowledge constitutes a resource-dispersing form of task complexity that is distinct from general L2 proficiency and general writing proficiency.

Keywords: cognitive task complexity; genre-specific knowledge; L2 writing; genre; CALF



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1. Introduction

Task complexity frameworks—in particular, the framework proposed by Robinson (2011)—have been enthusiastically applied to second language (L2) writing research despite criticisms that such frameworks were designed primarily to examine the effect of task features on oral L2 production (Manchón 2014; Tavakoli 2014). Many task-based-informed (henceforth TBLT-informed) L2 writing studies have sought to test the predictions of the Cognition Hypothesis as applied to L2 written production and to determine the specific effects of task complexity features on the syntactic complexity, accuracy, lexical complexity, and fluency (often abbreviated as CALF) of L2 production. These studies have reached inconclusive, at times contradictory, results. However, a recent meta-analysis of TBLT-informed L2 writing studies suggests a number of consistent effects of task complexity features on the CALF of L2 written production (Johnson 2017), which Johnson attributes to the unique demands of the writing process, in particular to the “directability of attention” (Ishikawa 2007, p. 151) inherent to the writing process.

Writing makes extensive and specific demands on the working memory/attentional resources of the writer (Kellogg 1996). Thus, many TBLT-informed L2 writing studies have interpreted their findings through the lens of widely cited models of working memory and its involvement in L1 writing processes (Kellogg 1996). Though studies have examined the intersection of task complexity features and the specific demands of the writing process, one feature that is unique to writing—genre—has gone underexamined in TBLT-informed L2 writing research despite recent calls to examine the specific task complexity demands posed by genre and their effects on the CALF of written L2 production (Johnson 2022) and despite corpus-analytic research demonstrating consistent differences in the linguistic complexity of various genres (Biber 1988; Biber and Gray 2010; Biber et al. 2011, 2013).

This paper attempts to articulate the intersection of a component of genre-specific knowledge, specifically formal knowledge (Tardy 2009, 2012; Tardy et al. 2020), cognitive task complexity (Robinson 2011), and working memory in writing (Kellogg 1996), arguing

that formal knowledge of a given genre constitutes a resource-dispersing task complexity feature that is unique to writing. To this end, the following sections first summarize the predictions of the Cognition Hypothesis and the results of research on the effects of task complexity features on the CALF of L2 written production. This is followed by a description of Kellogg’s model of working memory in L1 writing and research to suggest that various genres may make very different demands on the working memory resources of the L2 writer. The paper then examines formal genre-specific knowledge and its role in facilitating the translation process among L2 writers, thus facilitating the fluent, accurate production of complex forms.

2. The Cognition Hypothesis

The Cognition Hypothesis (Robinson 2001, 2005, 2011) conceives of attention/working memory as having multiple resources and proposes two axes of task complexity (see Table 1): (a) a resource-dispersing axis of task complexity and (b) a resource-directing axis of task complexity. Increased complexity along the resource-dispersing axis is thought to affect oral and written L2 production in ways similar to those predicted by the Limited Attentional Capacity Model (Skehan 1998; Skehan and Foster 2001) in that increased resource-dispersing task complexity is thought to diffuse attentional resources, resulting in diminished language production and subsequent decreases in the CALF of L2 production. In contrast, increases in resource-directing task complexity features are thought to promote attention to linguistic forms needed to communicate complex content. Thus, increased resource-directing task complexity features are thought to promote the production of language that is both complex (syntactically and/or lexically) and accurate but less fluent.

Table 1. Resource-directing and Resource-dispersing Features of Cognitive Task Complexity (Robinson 2011).

Resource-Directing Features of Cognitive Task Complexity	Resource-Dispersing Features of Cognitive Task Complexity
±Here-and-now	±Planning time
±Few elements	±Prior knowledge
±Spatial reasoning	±Single task
±Causal reasoning	±Task structure
±Intentional reasoning	±Few steps
±Perspective taking	±Interdependency of steps

3. Task Complexity and L2 Writing

As previously noted, studies examining the effects of cognitive task complexity features on the CALF of L2 written production have achieved inconclusive results. However, recent meta-analytic evidence applying Robinson’s framework to L2 writing studies suggests that, in the aggregate, increased resource-directing forms of cognitive task complexity promote greater accuracy and lexical complexity of L2 written production (Johnson 2017). In contrast, reduced resource-dispersing forms of task complexity promote greater syntactic complexity and accuracy of L2 written production. Although the role of genre in Robinson’s framework is not specified, Johnson (2017), citing comparative analyses of highly proficient L2 writers composing in two different genres (Yoon and Polio 2017) as well as corpus-based analyses of various genres (Biber and Conrad 2009), classified genre knowledge as a resource-dispersing form of cognitive task complexity, characterizing genre knowledge as similar to task familiarity, which had limited effects on the CALF of L2 written production. However, as will be addressed in the following sections, L1 and L2 writing research suggest that features of the writing task—genre among them—make different demands on the working memory resources of the writer. Further, L2 writing research suggests that it is the writer’s formal genre-specific knowledge rather than any inherent feature of the genre that affects the complexity of the language produced. To that end, the following section summarizes Kellogg’s model of working memory in writing and highlights research that suggests that features of the writing task occupy different working memory resources.

4. Working Memory in L1 Writing

Kellogg was among the first to articulate the intersection of working memory capacity based on the model proposed by [Baddeley \(1986, 2007\)](#) and the systems and processes of composing based on the previous research of [Flower and Hayes \(1980\)](#). According to [Baddeley](#), working memory is a limited capacity system comprising three main components: (a) a visuo-spatial sketchpad, tasked with storing visual and spatial input in such a way that it is easily accessible to long-term memory; (b) a phonological loop, tasked with storing auditory and phonological input in such a way that it is easily accessible to long term memory; and (c) a central executive, which directs the activities of the visuo-spatial sketchpad and phonological loop and provides additional support to each component should it become overburdened. According to [Kellogg et al. \(2013\)](#), recent MRI studies have demonstrated that the visual and spatial components of working memory are physically distinct from one another. Further, as is later discussed here, the two appear to be differently involved in the production of written language, depending on the nature of the writing task.

As can be seen in [Table 2](#), two writing systems, formulation and monitoring, are thought to place the greatest demands on working memory capacity. The formulation system places the greatest demands on working memory capacity as two processes, planning and translation, occupy all three components of working memory. Planning is of particular interest as this process comprises three sub-processes: (a) idea generation, the invention and selection of ideas for inclusion in the text; (b) organization, the arrangement of those ideas in a logical fashion; and (c) goal setting, the consideration of the audience and purpose for the text. If, as [Kellogg](#) has demonstrated ([Kellogg 1987a, 1987b, 1990](#)), participants are given time to plan before writing in the L1, the excess working memory capacity is channeled to the translation process, resulting in greater fluency, improved language use, and improved holistic quality of writing. In fact, despite a handful of studies demonstrating neutral effects of planning on L2 written production ([Johnson et al. 2012](#)) and even studies demonstrating negative effects of planning on L2 written production ([Ong and Zhang 2010](#)), numerous studies on the effect of planning on the CALF of L2 written production have demonstrated consistent positive effects ([Abdi Tabari 2017, 2018, 2021; Ellis and Yuan 2004](#)). These effects are bolstered by meta-analytic evidence of TBLT-informed L2 writing studies ([Johnson 2017](#)). Thus, systems and sub-processes of composing can be isolated to determine the demands they place on working memory resources.

Table 2. [Kellogg’s \(1996\)](#) Model of Working Memory in L1 Writing.

Writing System	Writing Process	Visuo-Spatial Sketchpad	Central Executive	Phonological Loop
Formulation	Planning	✓	✓	
	Translating		✓	✓
Execution	Programming Executing		✓	
Monitoring	Reading Editing		✓ ✓	✓

4.1. Components of Working Memory in L1 Writing

[Kellogg et al. \(2007\)](#) asked L1 writers to compose written definitions of concrete or abstract nouns while performing concurrent tasks designed to strain different components of working memory: (a) verbal working memory, (b) visual working memory, or (c) spatial working memory. Judging from delays in response to the concurrent task, [Kellogg et al. \(2007\)](#) found that participants drew on visual working memory more when composing the definitions of concrete nouns as opposed to abstract nouns. Performance on concurrent tasks suggested that, in contrast, demands on spatial working memory were not affected by whether the participants wrote definitions of abstract or concrete nouns. These findings are corroborated by a later study conducted by [Olive et al. \(2008\)](#), who found that the retrieval of concrete images from long-term memory places greater demands on visual working

memory. Taken together, these studies suggest that abstract task features, such as those imposed by academic genres, place fewer demands on visual working memory resources. Thus, the additional capacity afforded to the central executive may be devoted to the translation or monitoring system of composing, resulting in written language production that is more complex, more fluent, or more accurate. Such a conclusion seems warranted in light of a 2016 study by Kellogg, Turner, Whiteford, and Mertens.

Kellogg et al. (2016) examined sentence writing by L1 writers in response to two related or unrelated nouns while performing concurrent tasks designed to place strain on different components of working memory—either verbal working memory or visual working memory. Further, participants were asked to write a sentence in the active voice or passive voice. The authors hypothesized that unrelated nouns would result in greater planning and that this planning would draw on visual working memory as proposed in the 1996 model (see Table 2) because the writers would use visual working memory resources to plan how the unrelated nouns would be incorporated into the same sentence. Contrary to the authors' expectations, the planning associated with the unrelated nouns in the passive voice condition, placed no significant demands on working memory resources—neither verbal nor visual. Further, the combination of related nouns in the active voice placed significant demands on the verbal working memory capacity of the participants. Taken together, these results lend support to the early conclusion of Passeraut and Dinet (2000) that abstract, argumentative writing tasks pose few demands on visual working memory resources when compared to the demands of descriptive narrative texts. Such a conclusion is supported in part in recent L2 writing research, which suggests that the conceptual demands of a writing task result in greater complexity of L2 written language.

4.2. Components of Working Memory in L2 Writing

Kormos (2011) hypothesizes two forms of demands for the writing tasks used in her study: (a) conceptual demands and (b) translation demands¹. To examine the effects of these demands on L1 and L2 writing production, Kormos devised two narrative tasks: (a) a cartoon description task, which provided a clear visual narrative for the participants to relay in writing, and (b) a picture narration task, which presented six unrelated images for which participants were asked to devise a narrative. Kormos argues that the cartoon description task in her study posed low conceptual demands because the storyline of the narrative was provided. Thus, participants should have been able to devote the additional attentional capacity to translation and verbal processing. In contrast, the picture narration task was thought to place higher demands on conceptualization, thus posing greater demands on planning processes. This was thought to affect verbal processing/translation negatively.

Kormos (2011) found few task-related differences in the written production of L1 and L2 writers in her study. Many of the significant differences noted in her study were related to the participants' status as L1 vs. L2 writers. However, Kormos (2011) noted that the picture narration task elicited more abstract lexis from both L1 and L2 writers in the study, suggesting that the conceptual demands of the task promoted greater translation than did the cartoon description task. While Kormos (2011) found no other task-related differences in the complexity of the participants' writing, it is important to note that Kormos used metrics of syntactic complexity associated with highly nominal styles of production that are common features of academic prose (i.e., mean length of clause, number of words preceding the main verb of clauses, and number of modifiers per noun phrase) and only a single metric of verbal subordination (ratio of subordinate clauses to total clauses). Further, dynamic system theory studies (Spoelman and Verspoor 2010; Verspoor et al. 2008, 2012) and corpus-analytic studies (Biber 1988) have shown dynamic tradeoff effects between lexical complexity and syntactic complexity. Hence, it is possible that the conceptual demands of the picture narration task prompted the retrieval of complex lexis at the expense of syntactic complexity.

In a later study, Kormos and Trebits (2012) examined the effects of aptitude, mode, and task complexity on the CALF of L2 production using the same elicitation materials

as those used in Kormos (2011). As in Kormos (2011), the authors suggest that the elicitation materials make different demands on the writing process of the L2 writers. The authors' hypothesis is partially supported in their findings with regard to the written mode. Participants in the picture narration task produced longer clauses and a greater ratio of relative clauses than participants in the cartoon description task. This result suggests that the conceptual demands of the task free working memory capacity so that it may be devoted to the translation process, resulting in greater complexity of output. This result also indicates that the conceptual demands of a task can be separated from the translation demands of a task and that the conceptual demands of a task promote the retrieval of complex syntactic and lexical forms. However, a more recent study by Cho (2019) provides evidence to the contrary.

Cho (2019) found that when L2 proficiency was controlled as a co-variate, participants who composed narrative essays asking them to recall a past success produced more syntactically complex, less accurate language than did participants who composed narrative essays asking them to imagine a future success. Cho attributes this to (a) the high translation demands posed by the recollection task as opposed to the high conceptualization demands posed by the prediction task and (b) the conditions under which the writing tasks were produced. Cho (2019) examined the free writing of her participants, whereas Kormos and her colleague examined the final draft of the participants' attempts at the picture narration tasks. Further, Cho argues that the personal nature of the topic in the study—as opposed to the content dictated in Kormos' two studies—may have affected the results as well. In the discussion, Cho (2019) proposes that writing tasks that ask the L2 writer to recall a past event pose cognitive demands in linguistic formulation, thus facilitating the production of more complex language. However, missing from a comparison of Cho's (2019) results to those of Kormos (2011) and Kormos and Trebits (2012) is a discussion of the metrics selected in each study. The metrics examined in Kormos (2011) and Kormos and Trebits (2012) were metrics of nominalization and phrasal elaboration more commonly associated with academic prose (Biber 1988; Biber and Gray 2010; Biber et al. 2011, 2013). In contrast, the metrics examined by Cho (2019) were metrics of length and subordination more commonly associated with narrative prose (Yoon and Polio 2017; Biber et al. 2011, 2013). Thus, there is evidence to suggest that the formal genre-specific knowledge of the participants in each study affected the linguistic complexity of the narratives composed. Further, as discussed in the following section, it is likely that formal genre-specific knowledge is independent of L2 proficiency and general writing proficiency.

5. Formal Genre-Specific Knowledge

One of the limitations in applying Kellogg's model to L2 writing is its assumption that lexical and syntactic retrieval is an automatic process. Because many L2 writers have varying degrees of control over the developing interlinguistic system, it is likely that the translation process of writing makes extraordinary demands on the working memory resources of these writers. If, as is widely accepted, writing places heavy demands on the attentional resources/working memory capacity of the writer, these demands are likely compounded for L2 writers (Johnson 2017; Johnson et al. 2012; Johnson and Nicodemus 2016) and are likely even heavier for L2 writers composing in a genre with which they have limited experience. If, as Tardy (2012) proposes, "genres provide contexts for learning new lexicogrammatical features or discourse structures in a second language" (p. 169), it stands to reason that practice with the linguistic resources and conventions associated with various genres automatizes lexical and syntactic retrieval of forms so that L2 writers may transfer formal knowledge among "adjacent genres" (Tardy 2009) as they gain control over the "meaning-making resources" associated with a given genre (Byrnes 2012, p. 193). This transfer would then result in the fluent production of complex forms that conform to the norms of the genre. Indeed, L1 and L2 writing research would support such a conclusion.

6. Genre and L2 Production

Among the more nuanced treatments of genre in TBLT-informed L2 writing research are those of [Yoon and Polio \(2017\)](#) and [Polio and Yoon \(2018\)](#). [Yoon and Polio \(2017\)](#) provide a longitudinal analysis of L1 and L2 writing in response to a narrative prompt and an argumentative prompt. The results of their analysis of L2 writing provide few significant effects of time on the L2 writers' texts. In fact, mean sentence length was the only significant difference associated with L2 writing development over time. However, the authors found a significant effect of genre on metrics of syntactic and lexical complexity. In particular, the authors note significant increases in phrase-level metrics of syntactic complexity as well as metrics of lexical sophistication associated with argumentative texts. In contrast, narrative texts were associated with a significant increase in lexical diversity. The authors' comparison of L1 writers composing under the same conditions was consistent with their comparison of the L2 writers' texts. [Polio and Yoon \(2018\)](#), in a comparison of two different automated text analysis tools and a partial replication of their earlier study ([Yoon and Polio 2017](#)), provide a longitudinal analysis of L2 writing in two genres: narrative and argumentative. In their analysis, the authors highlight significant differences in syntactic complexity associated with genre and less so with time.

[Yoon and Polio \(2017\)](#) and [Polio and Yoon \(2018\)](#) provide a functional explanation for the differences between the two genres. Central to this argument is that the functional demands of each genre regulate the linguistic forms associated with the manifestation of complexity in each genre. Advocating for the use of a multidimensional analysis framework ([Biber 1988](#); [Biber and Conrad 2009](#); [Biber and Gray 2010](#); [Biber et al. 2011, 2013](#)), the authors argue that the genres are complex in different ways and should not be directly compared. [Yoon and Polio \(2017\)](#) and [Polio and Yoon \(2018\)](#) are quite right in asserting that linguistic complexity is affected by the functional demands of the genre. However, the participants' formal knowledge of each genre should not be discounted as a potential explanation.

Formal knowledge of argumentative texts is often learned through education and experience. Thus, it is possible that L1 and L2 writers without formal knowledge of argumentative genres may compose such texts using linguistic forms that more closely match the verbal style associated with narrative texts. Given that the participants in Yoon and Polio's studies were college students, they likely had a good deal of formal knowledge of the linguistic resources associated with each genre as well as the audience expectations in each of the genres, a conclusion which is supported in part by recent longitudinal corpus-analytic studies of L1 writing development among college students in the US ([Staples et al. 2016](#)).

Additional research evidence from comparisons of L1 and L2 writing suggests that the development of formal genre-specific knowledge is likely distinct from general proficiency in the L2 as well as L1 and L2 writing proficiency. For example, [Collins et al. \(2021\)](#) looked at the writing performance of 1819 adolescent students (both L1 writers and L2 writers) in 127 different classrooms at a school in the western United States. The participants all performed two different writing tasks, both of which were argumentative essays: (a) a source-based task that required the integration of four sources and (b) a non-source-based task that required no such integration. The participants' writing performance was then analyzed using multiple metrics of overall quality, syntactic complexity, and lexical complexity. A comparison of descriptive statistics of performance metrics on the non-source-based task indicates that the "fully proficient" L2 writers outperformed the L1 writers in several metrics, most saliently metrics of lexical complexity and syntactic complexity. Thus, it would appear that formal genre-specific knowledge develops independently of general proficiency in the target language, a conclusion supported by [Safavi et al. \(2022\)](#) in a later study.

[Safavi et al. \(2022\)](#) examined the L1 and L2 writing of 50 MA TEFL students at an Iranian university to determine the relationship between L1 writing proficiency, L2 proficiency, and genre. Using an analytic rubric, the authors rated the participants' writing performance in four conditions: (a) an L1 argumentative task, (b) an L2 argumentative

task, (c) an L1 descriptive task, and (d) an L2 descriptive task. All writing tasks were on similar topics, were taken from IELTS writing practice tasks, and were counterbalanced by language and task. The authors then examined correlations between the participants' scores in four areas: (a) task response, (b) coherence and cohesion, (c) lexical resources, and (d) grammatical range and accuracy. Correlations among the participants' scores in the L1 and the L2 suggested that L1 writing proficiency transfers to the L2. Further, analysis of participants' scores in the lexical resources and grammatical range and accuracy category indicated that the participants' language production was more complex when composing the descriptive text than when composing the argumentative task, regardless of the language in which the text was composed.

7. Conclusions and Future Directions

While TBLT-informed L2 writing research has sought to account for the unique attentional demands posed by the writing process, one unique feature of task complexity remains relatively under-examined: the role of formal genre-specific knowledge and its effect on the CALF of L2 written production. As has been argued above, formal knowledge of the linguistic resources common to a given genre constitutes a resource-dispersing form of task complexity similar to task familiarity proposed in Robinson's (2011) framework. L1 writing research suggests that abstract features of the writing task free up visual working memory, allowing the additional capacity to be devoted to the translation process of composing (Kellogg et al. 2007, 2016; Olive et al. 2008). However, research among L2 writers suggests that formal genre knowledge facilitates the retrieval of complex syntactic and lexical forms associated with a given genre. It would appear that this knowledge, while related to the functional demands of a given genre (Yoon and Polio 2017; Polio and Yoon 2018), is distinct from general proficiency in the L2 (Collins et al. 2021) and from writing proficiency, whether in the L1 or the L2 (Safavi et al. 2022). The possibility that formal genre-specific knowledge constitutes a resource-dispersing feature of task complexity opens a number of avenues for future research.

In particular, future TBLT-informed writing research on the interaction of formal genre-specific knowledge, general L2 proficiency, and general writing proficiency would allow for a better understanding of the specific nature of formal genre-specific knowledge, its dependence on general L2 proficiency, its contribution to general writing proficiency, and its effect on L2 written production. However, operationalizing formal genre-specific knowledge poses a challenge in such research. More research is needed to better understand the nature of formal genre-specific knowledge so that it can be observed more accurately in future TBLT-informed L2 writing research. Research in this area may rely on the use of concurrent tasks such as those employed in L1 writing research on the role of working memory in composing (e.g., Kellogg et al. 2007; Olive et al. 2008) to understand the specific demands placed by genre on the working memory of L2 writers. Future research may also rely on the use of retrospective interviews to better understand how L2 writers employ formal genre-specific knowledge in response to various writing tasks.

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Note

- ¹ Kormos (2011) uses the term "formulation demands" to describe the distinct form of task complexity that places demands on the retrieval of syntactic and lexical forms needed to complete the task. However, in Kellogg's model, formulation comprises both planning and translation. For clarity, the term "translation" rather than "formulation" is used.

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