

USING STRUCTURAL PRIMING TASKS IN AN EAP CONTEXT

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Abstract

Using tasks in second language (L2) classrooms has been shown to create L2 learning opportunities because they encourage students to provide each other with interactional feedback, produce modified output, and attend to language form in the context of meaning. More recently, researchers have suggested that collaborative tasks may be useful because they generate opportunities for structural priming, which is the tendency to produce structures that were present in the recent discourse. This article reports on the effectiveness of structural priming tasks for encouraging students to produce relative clauses. Students in an English for Academic Purposes (EAP) course ($n = 25$) completed two trivia tasks and two summary tasks over a 13-week semester. Each task provided prime sentences with relative clauses, followed by prompts in the form of sentence fragments that the students completed using information in the task materials. The prompt-generated sentences that the students wrote in their task materials and produced while interacting with their peers were analysed in terms of the presence or absence of relative clauses. The findings indicated that the students produced more relative clauses during the trivia tasks than the summary tasks, and that structural priming occurred during the trivia tasks only. Issues in the design and implementation of collaborative priming tasks are discussed.

Although numerous definitions of tasks can be found in the second language (L2) acquisition and pedagogy literature (Ellis, 2003; Long, 2000; Prabhu, 1987; Skehan, 1998; Willis & Willis, 2007), they all emphasize that tasks elicit language for the purpose of communicating meaning. This key characteristic is helpful when differentiating between activities, a general category referring to all types of things instructors ask students to do in L2 classrooms, and tasks, which have a primary focus on meaning. To give a concrete example, an instructional unit about sports might have several activities, such as vocabulary building activities, a grammar review with practice items, and a reading passage with comprehension questions. And at some juncture in the unit, an instructor may ask students to exchange information about their favourite athlete with a partner, and then use the information to create trivia cards for testing their classmates' knowledge about different

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sports and athletes. Because its focus is on the communication of meaning to achieve a goal, this last activity represents a task, whereas the others were not tasks because their primary purpose was to learn or practice language forms or skills. The conceptualization of a task within the broader category of activities is captured in Bygate and colleagues' definition of a pedagogic task as "an activity, susceptible to brief or extended pedagogic intervention, which requires learners to use language, with the emphasis on meaning, to attain an objective" (Bygate, Skehan, & Swain, 2001, p. 11). Put simply, although all tasks are activities, not all activities are tasks. And the key feature of a task is that it focuses on meaning and has a goal, objective or purpose that transcends language or skill practice.

Besides debate about the definition of a task, another topic in the L2 acquisition and pedagogy literature is how to incorporate tasks into L2 teaching. In my own work, I have found Ellis's (2003) three-way distinction among task-based, task-referenced, and task-supported language teaching to be helpful for clarifying the role that tasks serve in a particular instructional context. Task-based language teaching typically follows from a needs analysis to determine what purposes learners have in studying the language and to identify the types of tasks they need to accomplish in the target language. The curriculum is then organized around these tasks, which form the basic unit of syllabus design. In task-referenced language teaching, however, tasks serve as a reference point whose accomplishment serves as the goal of instruction. In other words, being able to do the task is the desired outcome of instruction, and the skills required to accomplish that task become the focus of instruction. However, tasks might not serve as the basic unit of syllabus design and not all of the instructional activities are tasks. Finally, task-supported language teaching involves the incorporation of tasks into an existing curriculum that is neither designed around nor referenced to tasks. In my research in EFL classrooms in Thailand and EAP writing classes in Canada, task-supported language teaching has been the most common approach to using tasks. These courses were organized around benchmarks or program objectives, such as reaching a certain level of proficiency, demonstrating key competencies, or achieving certain skills that are a prerequisite to the next course, and tasks were integrated into a global approach to instruction in ways that supported specific objectives within a unit or lesson.

Having outlined what tasks are and how they can be incorporated into different approaches to L2 teaching, the next important question to address is why L2 instructors should use them. From the perspective of the interaction hypothesis (Gass, 2003; Long, 1996; Mackey, 2012), the meaningful interaction that occurs when learners carry out tasks creates opportunities for them to provide and receive interactional feedback, modify their language use in response to that feedback, and attend to form in the context of meaning, all of which have been associated with L2 development. From the perspective of sociocultural theory (Lantolf, 2011; Swain, 2006), task interaction encourages learners to co-construct meaning by contributing aspects of language and content to the conversation in ways that help them appropriate new knowledge and consolidate their existing knowledge. More recently, my colleagues and I have suggested that task interaction also may be

useful because it provides learners with language production opportunities in the form of structural priming (McDonough, 2011; McDonough & Chaikitmongkol, 2010; McDonough & Trofimovich, 2008), which is the tendency to produce structures that were present in the recent discourse. Tasks designed to elicit structural priming provide models of target structures (i.e., primes) and elicit production of those structures through fragments that the students use to generate their own utterances (i.e., prompts), but the primary focus remains on the communication of meaning to obtain a goal or objective. Structural priming tasks may help L2 students access language forms during spontaneous, meaningful communication, thereby helping them consolidate their linguistic knowledge and develop automatic procedures for accessing that knowledge. For students who are acquiring developmentally-advanced or complex forms, structural priming activities may encourage production of those forms, as opposed to interlanguage or simple forms.

Structural priming research originated in psycholinguistics and only recently has been applied to L2 acquisition and pedagogy. Originally defined by Bock (1986), structural priming is a cognitive repetition phenomenon, specifically the tendency for a speaker to produce a structure that was encountered in the recent discourse rather than an alternative structure (for an overview of structural priming see Pickering & Ferreira, 2008.) More simply, language users are sensitive to the language forms that occur in their own or their interlocutors' prior speech. The presence of a specific structure in the prior speech (referred to as a prime) essentially leads speakers to subsequently produce that same structure. Even though different lexical items might be used to express new ideas, the underlying structure of a subsequent sentence is more likely to be the same as a sentence that was just spoken or heard. When speakers repeatedly produce their own prior structure, it is called within-speaker priming, but when speakers reuse structures initially produced by an interlocutor, it is called between-speaker priming. In structural priming research, participants are exposed to prime sentences that have a specific target structure, after which they are asked to generate new utterances using prompts that contain a few key words (such as a verb or noun) or a sentence fragment. The expectation is that participants will generate utterances from the prompts that have the same underlying structure as the prime sentences.

An example of within-speaker priming from the data in the current study is provided in (1). Student A received task materials that contained some sentences with relative clauses, which were the primes, and some fragments that needed to be completed using information that had been provided, which were the prompts. In turn (i), the student shared the prime sentence with her partner, who guessed incorrectly that the statement is true, and then she explained why the sentence is actually false. In turn (v), the item in the task materials was a prompt, so it only provided the fragment *people are influenced by being in environments*. She completed the prompt by producing a new relative clause (*where happiness or sadness influences behaviour*). This is taken as evidence of sensitivity to structures in the prior discourse because student A could have produced a variety of forms to complete the prompt, such as a preposition phrase (*with emotions*).

(1) Within-speaker priming

- i A: A test that measures animal intelligence is currently available for several species
- ii B: True?
- iii A: It's false 'cause there's no test for measuring animal's intelligence. This makes it very difficult to compare intelligence across species.
- iv B: okay
- v A: Only people are influenced by being in environments where happiness or sadness influences behaviour. It's true or false?
- vi B: True.
- vii A: It's false because for example happy experience will make a cat friendly.

An example of between-speaker priming is shown in (2). In this example, student A produced a belief statement with a relative clause (*who are first born*) in (i). Student B guessed that the statement is false, and student A confirmed the guess and provided more information. When it was student B's chance to state a belief in turn (iv), he generated a sentence from the prompt in his task materials, which was a head noun (*animals*) without any modifying information. He produced a sentence with a relative clause (*that can understand and use mirrors*). Because other structures could have expressed a similar meaning, such as a prepositional phrase (*with the ability to use mirrors*) or a participle (*using mirrors*), speaker B's use of a relative clause can be considered sensitivity to his interlocutor's previous language form.

(2) Between-speaker priming

- i A: Okay, children who are first born have greater achievements than their later-born siblings.
- ii B: False?
- iii A: Yeah. Birth order does not determine your children's IQ. It's yours.
- iv B: okay. Animals that can understand and use mirrors show the highest sign of animal intelligence.

To create a task that maximizes speakers' tendency to reuse their own and their interlocutors' previous structures, task materials provide primes to model the target structure, and prompts that can be completed using the same structure as the prime or an alternative structure. It is expected that speakers will use the prompts to generate sentences that have the same structure of the prime, even though they could express similar meanings using alternative structures. In order to provide evidence of either within-speaker or between-speaker structural priming, a speaker's production of the target structure should be greater following a prime sentence than in the absence of a prime sentence. Previous classroom-based studies have shown that structural priming tasks were successful at eliciting English *wh*-questions with obligatory auxiliary verbs during face-to-face interaction (McDonough, 2011; McDonough & Chaikitmongkol, 2010) and Spanish nominal clauses during computer chat sessions (Collentine & Collentine, 2013), which suggests that priming tasks may be another way for L2 instructors to provide students with opportunities to access target language structures during meaning-based peer interaction. By eliciting production of a

grammatical structure with a wide variety of lexical items during meaningful communication, structural priming tasks may help L2 students develop automatic procedures for accessing their linguistic knowledge, build and strengthen form-meaning mappings, and move away from lexically-specific constructions toward more abstract representations.

However, little is known about what kinds of structural priming tasks are more effective at encouraging L2 students to produce target structures during task-based interaction in classroom settings. Research in laboratory contexts has shown that priming tasks that have the same key lexical item (a noun or verb) in both the prime and the subsequent prompt encourage both L1 (Pickering & Branigan, 1998) and L2 speakers (Kim & McDonough, 2008; McDonough, 2011) to produce more target structures than tasks with more lexical diversity across primes and prompts. However, tasks with more varied lexical items in the primes and prompts may have a longer lasting effect on speakers' subsequent production (McDonough & Kim, 2009). As part of a larger research project (McDonough, Neumann, & Trofimovich, in review; Trofimovich, McDonough, & Foote, 2014), this study further explores the impact of task design on structural priming tasks by comparing the effectiveness of two task types, trivia tasks and summary tasks, at eliciting L2 students' production of relative clauses. The larger project targeted two additional structures (passives and adverbial clauses) and included a comparison group, but the manuscripts to date only have reported the findings for the trivia tasks. Therefore, the current study focuses on comparing the effectiveness of the trivia and summary tasks for eliciting one of the target structures, specifically relative clauses. This study investigates two research questions: (a) which task is more effective at encouraging EAP students to produce relative clauses? and (b) while carrying out both task types, do the students produce more relative clauses after prime sentences?

Method

Participants and Instructional Context

The participants were 25 English L2 students (17 men, 8 women) enrolled in undergraduate (24) and graduate (1) degree programs at Concordia University. Approximately half of the participants were international students who recently had arrived in Canada to pursue academic degrees, while the other half were permanent residents of Canada. Reflecting this difference, their length of residence in Canada varied considerably from two weeks to six years, with a mean of 16.2 months ($SD = 14.2$). Their age ranged from 17 to 25 years, with a mean 20.6 years ($SD = 1.5$). They were studying academic disciplines in the faculties of Business (10), Engineering (10), and Arts and Sciences (5). In terms of their prior amount of English instruction, the students had studied from one to 14 years, with a mean of 8.4 years ($SD = 3.4$). They spoke a variety of first languages (L1), which included Chinese (16), Arabic (3), Spanish (3), and French (3).

The students had fulfilled the university's basic English proficiency requirement for admission to academic degree programs (i.e., a TOEFL iBT score between 75 and 89 or equivalent), but they were required to take an English for academic purposes (EAP) writing

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class due to their performance on a university placement test. The EAP class met for two, three-hour classes per week, and targeted general academic language skills, specifically reading strategies, vocabulary and grammatical structures commonly found in academic texts, and paragraph-level writing. The class did not focus on oral academic English skills, but students had opportunities to speak English with their peers during pair or small group activities, such as when brainstorming ideas before writing and discussing comprehension questions about reading passages in the textbook. The course textbook was organized by themes, and each chapter included metalinguistic information about vocabulary and grammatical structures, along with sentence-level grammar practice activities. However, the grammar practice activities were not integrated with the content or theme of the chapters, and did not have a communicative function. The instructor typically asked the students to read the grammar information in the textbook and complete the practice activities outside class, and then provided correct answers and addressed any questions in a subsequent class period.

Materials

Four collaborative priming activities were designed to provide students with opportunities to discuss two chapter themes (socialization and intelligence) and use relative clauses during their discussions, which was the target structure of those chapters. The task design principles were that the tasks had to elicit meaning-focused interaction (as opposed to mechanical grammar practice), provide content information that complemented the textbook themes, and serve multiple pedagogical functions simultaneously. Representative pedagogical functions included introducing the theme of a new chapter, highlighting key ideas about the topic, soliciting students' prior knowledge and beliefs, and providing ideas that students could refer to in their subsequent writing assignments. Two task types were created, which were a trivia task and a summary task, and one task of each type was designed for use in each chapter, which resulted in a total of four tasks (see Table 1).

Table 1

Tasks by Unit, Theme, Type and Topic

Unit	Theme	Task type	Topic: Student A	Topic: Student B
4	Socialization	Trivia	Domestic violence	Marriage & divorce
		Summary	Canadian residential schools	American boarding schools
9	Intelligence	Trivia	Human IQ	Animal cognition
		Summary	Dolphins & sea mines	Rats & land mines

The goal of the trivia task was for the students to test their partners' knowledge about the topic by asking whether they thought a set of statements about the topic was true or false. The task materials contained ten statements and provided supplemental information that students could use to explain their answers. The goal of the summary task was to consolidate

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a reading passage into a short summary, which was then shared with a partner before comparing how the content of both passages related to a more general topic. The summary task materials consisted of a short passage about the topic, and a series of statements that paraphrased information from the texts. After the trivia or summary components, both task types presented open-ended discussion questions that linked the topics to the theme and activities of the textbook.

In terms of the structural priming design element, all four tasks provided each student with five primes which contained a relative clause and five prompts which were fragments with a head noun. The task materials provided information that the students used to complete the prompts, and they were free to express that information in any way they wanted. The prompts were created to make a variety of responses possible in order to determine whether the presence of a prime sentence would lead the students to generate sentences from the prompts with relative clauses, as opposed to alternative structures, such as prepositional phrases, infinitive clauses, or participial phrases.

An example of a prime followed by a prompt for the divorce trivia task is provided in Table 2. The left column of the task materials contained statements about the topic, while the right column provided supplementary information that the student could use to complete the prompts, explain why a statement was true or false, or elaborate. In Table 2, the first statement is a prime sentence with a relative clause (*who get married again after divorce*), while the second statement is a prompt in the form of a sentence fragment with a head noun (*people*) and main clause that students can modify by using information in the supplementary information column. If students are influenced by the relative clause in the prime sentence, they are likely to modify the head noun in the prompt with a relative clause, such as *people who live together before marriage*. However, alternate structures could be used to complete the prompt, such as a prepositional phrase (*people with live-in partners*) or a participial phrase (*people living together*).

Table 2

Prime-Prompt Sequence: Divorce Trivia Task

Statements	Supplementary information
People who get married again after a divorce presumably have a more successful second marriage.	Although presumably people learn from their mistakes, research shows that the divorce rate of second marriages is higher than the divorce rate of first marriages.
People.....reduce their chance of going through an eventual divorce.	Many studies find that living together before marriage is linked to a considerably higher chance of going through an eventual divorce.
<i>Hint: Before marriage?</i>	

The summary task provided each student with a short text to summarise, along with five primes and five prompts. The primes and prompts consisted of noun phrases that could

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serve as the subjects of students' summary sentences. To help them locate the relevant information in the text, hints about the key ideas to be summarised were provided. However, while the noun phrases of the primes included a relative clause, the noun phrases for the prompts contained head nouns only. For example, the dolphin sea mine task shown in Table 3 contained a prime with a head noun (*enemy mines*) and a relative clause (*that have been left in the ocean*) and the students completed the sentence by stating what happened to those mines. In contrast, the prompt presented a head noun only (*damage*), along with the hint about what information could be used to complete the sentence. If influenced by the prime, the students would complete the prompt by producing a relative clause (*damage that is caused by sea mines*), instead of using an alternate way of modifying the head noun, such as prepositional phrases (*damage to Navy ships*) or an adverbial phrase (*damage since 1950*).

Table 3

Prime-Prompt Sequence: Dolphin Sea Mine Summary Task

Text	Summary sentences
Enemy sea mines on the ocean floor explode when large ships pass by. Since 1950, almost all of the damage to US Navy ships has been caused by sea mines. During the first Gulf War, two Navy ships—the USS Princeton and the USS Tripoli—were severely damaged. Many crew members suffered injuries caused by mines in the Persian Gulf.	1. Enemy mines that have been left in the ocean.... <i>Hint: what happens?</i>
	2. Damage... <i>Hint: To/by what?</i>

Procedure

All four tasks were given to the EAP class instructor at the beginning of the semester, and she incorporated them into her lessons based on how she wanted to link the tasks to the other activities in the unit, such as by introducing the chapter theme or to provide additional ideas to supplement a reading passage in the textbook. Depending on when she incorporated the tasks into the unit, the students may or may not have reviewed the grammar information in the textbook. For example, if a task was used to introduce the chapter theme, then the students would not have been asked to review the grammar beforehand. In order to use class time efficiently, she distributed the task materials at the end of a class and asked the students to read the materials and complete the prompts as homework. This created opportunities for within-speaker priming in the written modality to occur prior to the students' peer interaction in the following class period. There was considerable variation, however, in the students' use of the task materials outside of class. While some students read the task materials, completed the prompts, and brought them to the next class, other students failed to complete the prompts or forgot to bring them. In the subsequent class period, the students worked in pairs to carry out the tasks, which

created opportunities for both within-speaker and between-speaker priming to occur in the spoken modality. Once the students had finished sharing information, they then discussed the open-ended questions that further linked the topics to the chapter theme and elicited their opinions. After the students finished the discussion questions, the instructor then transitioned from the tasks to the next activity in the lesson, such as a reading or prewriting activity. The interaction between the students while carrying out the tasks was audio-recorded using individual digital recorders (one recorder per pair), and their written task materials were photocopied.

Analysis

The audio-recordings were transcribed and verified by research assistants. The prompt-generated sentences that the students had written on the task materials and produced while interacting with their peers were coded in terms of their grammatical structure, specifically whether they contained a relative clause. Prompt-generated sentences were coded as having a relative clause if there was an overt relative pronoun (*that, who, which*) or adverb (*where, when, why*) and a tensed verb in a subordinate clause that functioned to modify a head noun. When coding relative clauses, grammar errors unrelated to relative clause formation, such as subject-verb agreement, verb tenses, or articles, were not considered. Examples of prompt-generated sentences coded as having a relative clause are provided in (3). The transcripts were also checked to ensure that the relative clause primes were produced, as students could choose to skip, ignore, or modify the primes when carrying out the tasks.

(3) Prompt-generated sentences with relative clauses

- a. Mine is about Canadian resident school system and the children *that go to the schools*.
- b. People *who listening to classical music* are creative and smart.
- c. Goldfish *who live in small fish bowls* have no awareness of their environment.
- d. If the rat go to the uh place *that has landmine* they will stop and dig.

As part of the larger study (McDonough et al., in review), a research assistant coded a subset of the entire data set (28%) for interrater reliability. Cohen's kappa was .95, which indicates a high level of agreement. There were eight disagreements (out of 442 coding decisions) which were resolved through discussion. The final coding decisions reached through discussion were included in the analysis.

To answer the first research question about the effectiveness of trivia and summary tasks at eliciting relative clauses, the proportion of prompt-generated sentences with relative clauses produced by each student for each task type was calculated, with separate scores obtained for the written task materials and oral peer interaction. Proportion scores were calculated by dividing the number of prompt-generated sentences with relative clauses by a students' total number of prompt-generated sentences. Proportion scores were used instead of raw frequency counts because the total number of prompts that each student

completed varied across the four tasks, and the proportion scores were converted to percentages, which are more intuitive measures. Because the focus of the study was on task types instead of individual tasks, the students’ performance on the two trivia tasks was combined, as was their performance on the two summary tasks.

For the second research question, which asked whether the students produced more relative clauses after primes, proportion scores that reflected two discourse contexts were compared: when the prompt-generated relative clauses were preceded by prime sentences or when they occurred in the absence of prime sentences. The prime sentence could be produced by the same student (within-speaker priming) or a peer (between-speaker priming). Because the prompts in the written hand-outs were always preceded by a prime sentence, only the oral peer interaction data was included in the analysis for the second research question. The proportion scores were converted to percentages to facilitate interpretation. Due to the small sample size and high variability in scores, non-parametric statistics were used. Alpha was set at .05 for all statistical tests.

Results

The first research question asked which task type was more effective at encouraging the students to produce relative clauses. The percentage of target sentences with a relative clause in the students’ written task materials and during their oral task interaction is shown in Table 4. Whereas 16% of the prompt-generated sentences that the students wrote in trivia task materials contained relative clauses, only 4% of their prompt-generated sentences in the summary task materials had relative clauses. The same pattern was found in the students’ oral production while carrying out the tasks with a peer. Whereas 37% of their prompt-generated sentences contained relative clauses during the trivia tasks, only 4% had relative clauses for the summary tasks. Wilcoxon signed-ranks tests (a non-parametric paired-samples *t*-test) indicated that the difference in scores for the trivia and summary tasks was significant for both the written and oral data (see Table 4). The effect sizes (Cohen’s *d*) indicate that the task differences fell within the range of values typically described as large. In sum, the findings for the first research question indicated that the trivia task was more effective at eliciting relative clauses in both in the written task materials and during oral peer interaction.

Table 4

Percentage of Relative Clauses by Data Source and Task Type

	Trivia task (<i>n</i> = 22)		Summary task (<i>n</i> =24)		Statistics		
	M %	SD	M %	SD	Z	p	d
Written task materials	16	13.29	4	3.47	3.27	.001	1.19
Oral task interaction	37	18.61	4	7.89	3.99	.001	2.26

The second research question asked whether the students' production of relative clauses was greater after prime sentences. Based on the structural priming research, it was expected that students would produce more prompt-generated sentences with relative clauses when relative clause primes had appeared in the previous discourse context. Because the prompts in the written task materials were always preceded by a prime sentence, only the students' oral interaction while carrying out the tasks was analysed for evidence of structural priming. For each task type, the percentage of relative clauses produced from prompts following a prime sentence was compared to the percentage of relative clauses produced from prompts in the absence of primes. As shown in Figure 1, the trivia task elicited a greater percentage of relative clause targets when there was a preceding prime sentence ($M = 22$, $SD = 16.95$), than when no prime had occurred ($M = 11$, $SD = 13.53$). A Wilcoxon signed-ranks test indicated that the difference was significant ($Z = 2.30$, $p = .022$, and the effect size fell in the range of values typically described as medium ($d = .71$).

However, the students' production of relative clause targets during the summary task was minimally affected by discourse context, with a mean of 3% ($SD = 3.58$) following primes and 2% ($SD = 6.94$) in the absence of primes, which was not a significant difference ($Z = 1.08$, $p = .279$) and had an effect size below the value described as small ($d = .17$). In sum, the students' production of relative clause targets showed evidence of structural priming for the trivia task only.

Discussion

The goal of this classroom-based research study was to explore which type of structural priming tasks was more effective for providing students with opportunities to produce relative clauses in meaningful contexts. The trivia tasks were more effective than summary

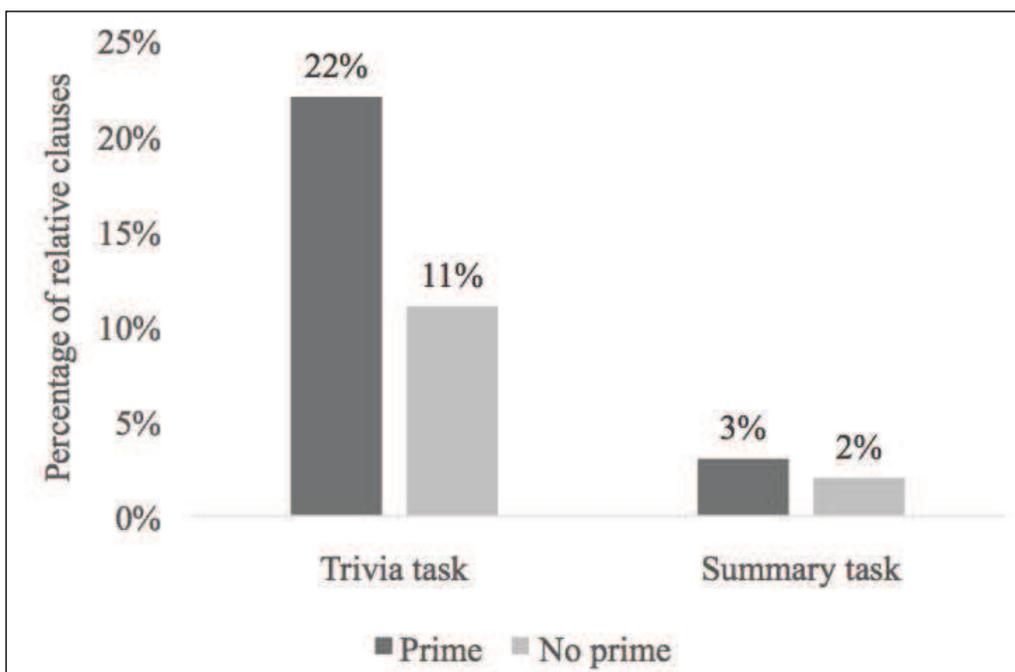


Figure 1. Percentage of prompt-generated sentences with relative clauses by task and discourse context.

tasks at eliciting relative clauses in both the written task materials and during oral peer interaction. Furthermore, only the students' interaction while carrying out the trivia tasks showed evidence of structural priming, which was operationalized as greater production of relative clauses following prime sentences than in the absence of primes. Thus, the study confirmed previous classroom-based studies that described the occurrence of structural priming during computer-mediated peer interaction (Collentine & Collentine, 2013) and the use of collaborative priming tasks to elicit target grammatical structures (McDonough & Chaikitmongkol, 2010). However, the findings revealed a task difference, as trivia tasks elicited more relative clauses and showed evidence of structural priming whereas the summary tasks did not.

An interesting question then is why the trivia tasks were more effective than the summary tasks. One possible explanation is that the trivia tasks were more interactive than the summary tasks, and this greater interactivity created opportunities for both within-speaker and between-speaker priming. Similar to other types of communicative tasks, such as jigsaw tasks, the trivia tasks had what Pica and colleagues (Pica, Kanagy, & Faludon, 1993) referred to as a required exchange of information. In other words, it was not possible to accomplish the task goal without each student sharing statements and responding to the statements of a partner. An example of the interactivity typical of the students' interaction while carrying out the trivia task is provided in (4). Student A provided her partner with a prime sentence in turn (i) and clarified the answer in turn (iii). When student B has an opportunity to state a belief, he used a prompt to generate a sentence with a relative clause in turn (iv).

(4) Interactivity during trivia tasks

- i A: Animal don't communicate the same emotion that people experience.
- ii B: true.
- iii A: No it's false. The research show that animal do communicate some basic emotion like joy, anger and grief.
- iv B: Children who first born have greater achievements than their later born siblings.
- v A: uh true?
- vi B: no uh false. First born children do not have more achievements than their later born siblings. It doesn't determine a child's IQ.

In contrast to the interactivity associated with trivia tasks, the summary tasks were characterized by long turns in which each student summarised the entire content of their reading passage while the partner listened, which limited priming opportunities to within-speaker priming only. Because the goal was to summarise the entire content of the reading passage, there was no need for the students to interrupt each other or take turns while they were summarising. In fact, it would have been more difficult to comprehend each other's information if the students had taken turns to state one sentence at a time. Consequently, it was more efficient and comprehensible to deliver the entire summary in a single turn, which resulted in few opportunities for them to "pick up" the language

structures produced by their peers. An example of the long turns commonly found during the summary tasks is provided in (5). After student A finished describing the passage he had read about residential schools for aboriginal children in Canada, student B began to summarise her passage about Native American boarding schools in the U.S. After a single clarification question in turn (ii), student B explained the entire content of the passage for her partner without any interruptions or clarifications. Because student B never produced a single relative clause, including the primes with relative clause that were provided in the task materials, there was no opportunity for within-speaker priming to occur. And because student A did not have any reason to interrupt, clarify, or participate while student B was delivering information, she did not produce any language that could prime student B.

(5) Long student turns during summary tasks

- i B: My story is like similar as yours. Story talk about the Native, Native American.
- ii A: Native American?
- iii B: Canada and United States, two countries like before white people only native people there, so after the white people come from like British and French, they come and built settlement in U.S., and in U.S. it has Native American boarding school. This school is kind of similar as your school. It take student only for native people. They take them from they are very little, and take them to the boarding school and do the haircuts and told them they only can speak in English. Also, they need to wear uniform and they are taken from school, and during the summer vacation, they cannot come back to their family, and they need to work in the farm. And if the family don't want to give their children to the school, they were punished by violence. So, during those time like from the late nineteen century and until nineteen twenty eight, it's like hundreds of thousands of Native Indians are attended Indian boarding school.

Even though the summary task did require that the students exchange information in order to complete the open-ended discussion questions (i.e., *which government eventually showed better behaviour or policy?*), there was no communicative obligation to interact with a partner while listening to the summary. Furthermore, as pointed out by an anonymous reviewer, summarising a text may lend itself to descriptive rhetorical structures that can be accomplished through relatively basic grammatical forms, whereas the trivia task may have required rhetorical structures that involve more complex grammatical forms.

Another possible explanation for the divergent findings for the trivia and summary tasks is prompt design. The prompts for the trivia task were fragments that consisted of a head noun and a main clause, and the information to be supplied functioned to modify the head noun. By creating such a constrained prompt, the students had fewer options for completing the prompt because there are a limited number of grammatical forms that can function as post-nominal modifiers (i.e., relative clauses, infinitives, participles, and prepositional phrases). In contrast, the prompts for the summary tasks consisted of a head noun only. Consequently, the students had more options about how to complete the prompts using the information provided. Although using more constrained prompts may have resulted in greater production of relative clauses during the summary task, it may

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not have been as effective for helping students acquire the ability to summarise. One of the key skills in summarising is deciding which information in the texts is a main idea that needs to be communicated, as opposed to minor details that do not need to be mentioned. Having constrained prompts in the summary tasks, although they might elicit more relative clauses, would not allow students to make decisions about what information is important to mention when summarising.

Based on the findings of the current study, there are several implications for the design and implementation of collaborative priming tasks in L2 classrooms. One consideration in using structural priming tasks is how to integrate them into a broader instructional sequence, such as a lesson or unit, in ways that maintain a primary focus on the communication of meaning rather than mechanical grammar practice. The tasks described here were used to bridge the gap between the chapter themes and grammar information in textbook by providing students with opportunities to exchange information and opinions about the chapter themes while using target grammar structures. Both tasks were designed to provide students with content that they could use to clarify their ideas about the chapter theme, provide additional information to support ideas expressed in the textbook, or provide examples that could be referred to in their writing assignments. It may be useful for L2 instructors interested in using structural priming tasks to identify key goals or objectives that the tasks should serve besides providing language production opportunities, in order to ensure that the primary focus of the tasks remains on the communication of meaning.

In terms of more specific design principles, when possible, it may be helpful to create priming tasks that are interactive. The inherent interactivity of the trivia tasks may have contributed to their greater effectiveness, which is suggested by previous priming studies that also implemented tasks with a required exchange of information. However, as was the case for the summary tasks, not all tasks lend themselves to interactivity. The rhetorical structures associated with different task types should be considered, as some genres may naturally elicit basic or complex grammatical structures. Another important consideration concerns prompt design. Although constrained prompts may limit the pool of possible structures and elicit more target structures, using more open prompts provides students with greater autonomy in deciding what information to communicate. In terms of the primes embedded in the tasks, a variety of factors will influence how many to include, but incorporating as many primes as possible may be useful. For example, the trivia and summary tasks each had five primes per student, but not all primes were produced when the students interacted with their peers. For both tasks, an average of only three prime sentences were produced by each student per task. Students may have omitted some primes for a variety of reasons, including being unsure of or uninterested in the content, having to share task materials with another student, such as if there were an odd number of students in class, or not having enough time to complete the tasks. In light of all these factors, it can be useful create tasks with enough primes so that each student will have sufficient opportunities to prime themselves and their partner.

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It might be advantageous to mix the primes and prompts into a task in a more varied order than used in the current tasks. These task materials were organized so that students had a prime as their first sentence followed by a prompt, and this alternation between primes and prompts was maintained. It was expected that students would work through the primes and prompts as they were presented in the task materials, and many pairs did so. However, some students chose to share information with each other in ways that deviated from this pattern. For example, some students shared all their prime sentences first, only after which they generated sentences from the prompts. Because it is difficult to predict how students will choose to implement task materials, it can be useful to embed multiple opportunities for priming into the tasks, both between- and within-speaker priming.

And finally, priming tasks may still be useful for eliciting production of target structures even if students do not complete task materials in advance. As evidenced by the greater production of relative clauses during peer interaction (.37) than in the written task materials (.16) for the trivia tasks, the students were able to generate target structures without prior preparation. The divergence between the students' written and oral task performance also suggests that it is not the case that they simply read previously prepared sentences from their task materials to each other. If that were the case, the percentage of prompt-generated sentences with relative clauses would be the same for both data sources. Instead, their production of relative clauses during peer interaction was greater than their use of relative clauses in the written materials, which suggests that they were producing relative clauses spontaneously while carrying out the tasks with their peers.

As is the case with most research, the current study has several limitations that highlight avenues for future research. Because the priming tasks were implemented in a single EAP class, the sample size is relatively small and limited to academically-oriented L2 students. Further studies with more students in a variety of instructional settings are needed to confirm the findings. Even though the larger research project (McDonough et al., in review) included two additional structures (passives and adverbial clauses), the range of English structures targeted in priming research remains fairly limited. Future research that targets additional structures is needed, particularly structures that are taught to students at different proficiency levels or have been shown to be difficult for students to acquire. As mentioned previously, the structural priming tasks in previous studies have been information-exchange tasks, so little is known about which task design elements are most important for creating effective priming tasks. The current study included a new task type, the summary task, but found that it was not as successful at eliciting relative clauses as the information-exchange trivia tasks, which highlights the need to investigate tasks that target a wide range of rhetorical structures. Additional research is needed to identify more diverse priming task types so that instructors across L2 settings have access to tasks that support their objectives and complement their students' proficiency levels. By investigating these issues through classroom-based research, hopefully future studies will be able to identify the key task-design and implementation principles necessary to create effective structural priming tasks.

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