Building Language Blocks in L2 Japanese: Chunk Learning and the Development of Complexity and Fluency in Spoken Production

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Abstract: This pilot study examined the development of complexity and fluency of second language (L2) spoken production among L2 learners who received extensive practice on grammatical chunks as constituent units of discourse. Twenty-two students enrolled in an elementary Japanese course at a U.S. university received classroom instruction on 40 grammatical chunks through communicative drills and memorization of dialogues that contained the target chunks. The students completed two spontaneous conversation tasks in Japanese at five-week intervals during the semester. Development of their speech between the first and second conversation task was analyzed from three perspectives: 1) the number of accurately used chunks, 2) the complexity of utterances (the number of chunks per t-unit), and 3) oral fluency (pause length and speech rate). Matched-pair t tests revealed significant gains in the number and range of the grammatical chunks produced over time, as well as in the complexity of individual utterances. However, there were no significant gains in the fluency of oral production.

Key words: chunk learning, classroom-based research, fluency and complexity, Japanese as a foreign language, speaking

Language: Japanese

Background
Recent research in second language (L2) development has paid attention to the way in which L2 learners draw on memorized sequences and chunks of language, rather than generating novel utterances based on grammatical rules (Crookes, 1989; de Bot, 1992; Dechert, 1983; N. Ellis, 1996, 1998, 2001, 2003, 2005; Foster, 2000). This lexical- and exemplar-based approach to L2 development originates in a claim that much of language consists of linguistic patterns or chunks that are not always rule-based (e.g., Bolinger, 1976; Nattinger & DeCarrico, 1992; Pawley & Syder, 1983, 2000; Sinclair, 1991). Language consists of thousands of multiword linguistic units or chunks that serve grammatical and discourse functions. For instance, the chunk "I can't + verb" indicates inability of certain action. Language

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development is a process of learning these simple chunks and their associated functions through extensive practice and exposure to language data (N. Ellis, 1996, 2002, 2003, 2005). Native-like linguistic representations are considered to arise as a result of accumulation of simpler, more basic chunks.

The concept of chunks and chunking, which originated in native language (L1) acquisition literature (Pine & Lieven, 1993; Tomasello, 1992), has been applied to explain L2 language development. Previous studies of L2 acquisition among children and young adults showed that formulaic expressions are very common in the early stages, and L2 learners gradually become able to analyze them into more generalizable rules (R. Ellis, 1984; Hakuta, 1974; Huang & Hatch, 1978; Krashen & Scarcella, 1978; Myles, Mitchell, & Hooper, 1999; Vihman, 1982; Weinert, 1994, 1995; Wong-Fillmore, 1976). For instance, Myles and colleagues (1999) examined the development of interrogatives among 16 L2 French beginners (ages 11–12) over two years in the classroom. The study revealed that memorized interrogative formulae broke down over time and served as a basis for the generation of interrogative constructions. Spoken data elicited through a series of communicative tasks showed learners' creative use of interrogative chunks; they sometimes isolated the question word in a chunk and used it productively, or they placed verbs at the beginning of an utterance.

Although these findings suggest a positive role of formulae and chunks in L2 development, a question remains as to how these findings from children and young adults can be applied to adults' L2 development in a formal, classroom setting. Previous research has revealed different characteristics between child and adult learners of L2 and resultant differences in learning outcomes (see Larsen-Freeman & Long, 1991, for a review), and the differences were extended to learning of formulaic sequences (see Wray, 2000, for a review). Due to their cognitive maturity, adults generally are considered to have better metacognitive awareness and analytical ability, and they can understand a language as a formal set of rules. Furthermore, adult learners in a formal learning environment (e.g., foreign language classes in a university) are likely to receive metalinguistic explanation of grammatical rules that underlie chunks through textbooks or other supplementary materials.

N. Ellis (2002) argues that explicit, metalinguistic explanation of grammatical rules that accompany chunk learning could accelerate internalization of the chunks in learners' systems. Explicit instruction could help learners analyze discrete chunks and derive rules from them. Adult learners might be able to use the chunks in a more creative and productive manner, by combining them with other patterns or using them with a variety of word categories. N. Ellis' argument corroborates previous claims that language knowledge involves both memorized chunks and generative rules (R. Ellis, 1999; Nattinger & DeCarrico, 1992; Pawley & Syder, 1983; Skehan, 1998). According to Skehan's dual-coding system, for instance, the linguistic system consists of both rule-based and memory-based systems. The former involves generative rules, while the latter refers to chunks memorized as wholes. Second language learning is a process in which syntactization operates on primarily memory-based chunks, which essentially develops into the rule-based system. Skehan argued that L2 learners do not progress beyond the accumulation of chunks without explicit instruction that forces them to analyze memorized chunks.

Although these claims are plausible, empirical investigations of chunk learning still are underrepresented in L2 research. More studies are needed to document changes in the use of chunks among adults who have access to formal grammatical analysis in class. In addition, the use of chunks should be investigated in less commonly examined languages (e.g., an agglutinative language such as Japanese), because previous claims about chunk learning have
primarily been built on analyses of Indo-European languages.

**Chunking and Complexity Development**

An issue worthy of investigation related to chunk learning and L2 development is whether or not complexity in utterances emerges from learning constituent chunks. There is a claim that a speaker's message consists of previously constructed phrases that function as building blocks for a larger discourse (N. Ellis, 1996, 2003; Rosenbloom & Newell, 1987; Schmidt, 1992). This claim, referred to as the chunking theory of learning, can be applied to L2 learning and hypothesizes that chunking helps learners understand hierarchical structures among individual constructions. While being exposed to massive amount of input, learners understand that discrete chunks are combined with other chunks in a variety of rule-bound ways, and they are used in the construction of more complex utterances. They learn that new, complex representations of language result from juxtaposing previously learned chunks or embedding one chunk within another, which implies the interaction between rule-based and memory-based systems of L2 learning (N. Ellis, 1996; Rosenbloom & Newell, 1987). However, as N. Ellis (2003) notes, empirical findings that support these claims are limited in L2 research.

Mellow (2007) is one of the few studies that revealed the emergence of syntactic complexity out of simpler, component units. The seven-month longitudinal study in a naturalistic setting documented the development of complement and relative clauses in narratives produced by a 5-year-old learner of L2 English. Findings revealed that complex syntactic structures emerged only after the components of those structures already had been acquired. Therefore, it is worth investigating how complexity in L2 actually develops in learners' systems, in relation to the chunking-based learning. Such investigation could add to the existing literature because previously, creative use of chunks was mainly analyzed at sentence level, looking at how learners break down a formula into individual constituents and use them in different expressions. Little research has examined productive use of a group of chunks in an extended discourse, that is, how chunks are combined and added together to produce more complex, extended discourse. Hence, questions remain as to whether learners are able to exploit a pool of memorized chunks and construct complex, extended utterances from those smaller segments.

**Chunk Learning and Development of Oral Fluency**

Another important issue to examine is the development of oral fluency in relation to chunk learning. In the field of cognitive psychology, chunking is considered to reduce processing demands and promote overall oral fluency, because chunks are easier to remember and faster to retrieve and produce (Newell, 1990; Newell & Rosenbloom, 1981). According to Miller (1956), recall is subject to the short-term memory constraints that limit the number of units people can remember to 7 +/- 2. However, information capacity can be increased by chunking, because co-occurring individual units are grouped together as an entity. Patterned sequences are usually easier to remember; for example, people can remember a patterned phone number (e.g., 111-1117) better than a random one (e.g., 251-4983).

Based on these claims, it is possible that speech production becomes fluent when speakers rely on ready-made memorized chunks rather than novel generation from rules. Because chunks directly mark meaning, chunks reduce the processing load for speakers and free up memory space for processing additional information. Pawley and Syder (1983) wrote:

In the store of familiar collocations there are expressions for a wide range of familiar concepts and speech acts, and the speaker is able to retrieve these as wholes or as automatic chains.
from the long-term memory; by doing this he minimizes the amount of clause-internal encoding work to be done and frees himself to attend to other tasks in talk-exchange, including the planning of larger units of discourse. (p. 192)

Because real-time processing is constrained by memory and time pressure, comprehension and production of speech are considered to operate more efficiently on a simple clause basis, rather than on computation of grammatical rules. Once learners memorize frequent chunks and patterns, it is possible for them to produce them relatively quickly, because they are readily available as units from long-term memory (de Cock, 1998; Sinclair, 1991; Wray, 2000).

Drawing on these claims, several researchers have argued that learning grammatical and lexical chunks could lead to the development of L2 oral fluency (de Bot, 1992; Dechert, 1983; Goldman-Eisler, 1961; Nattinger & DeCarrico, 1992; Pawley & Syder, 1983, 2003; Schmidt, 1992; Towell, Hawkins, & Bazergui, 1996). Towell and colleagues' (1996) study documented fluency development in relation to chunking by showing that fluency improved as a result of efficient constructions of series of syntactic and lexical strings. In their study, 12 learners of French performing an oral narrative task showed significant improvement on a variety of fluency features (e.g., speech rate, pause length, mean length of run) after a period of study abroad in a comparison between pre- and posttest results. Over time, learners were able to construct series of syntactic strings and deliver them at a fluent rate. Because there was an increase in the length and complexity of the linguistic units uttered between pauses, increases in fluency were considered attributable to increases in efficient production of a series of chunks of linguistic units.

L2 Instruction and Practice for Fluency Development

Because empirical findings in chunking and fluency development are largely underrepresented, more studies are needed to look at chunk learning in L2 instruction and fluency development. Previous literature proposed ways to apply chunk practice in the L2 classroom. Some researchers suggested the use of communicative drills in the classroom (e.g., Gatbonton & Segalowitz, 1988, 2005; Littlewood, 1981). Classroom activities could be designed to enable learners to practice many tokens of target chunks repeatedly while engaged in real communication. Gatbonton and Segalowitz (1988, 2005) presented examples of such activities, for instance the Family Tree activity, in which learners repeatedly practice a sentence—"How are you related?"—by asking each other questions. In this activity, learners do not merely repeat a sentence identified by an instructor; repetition of a phrase or pattern is contextualized and driven by learners' own communicative needs.

Another way to contextualize the repetition practice is to have students rehearse and memorize phrases in dialogues. Previous research had demonstrated the effectiveness of such speaking activity in promoting oral fluency. In Stringer's (1998) study, 28 students enrolled in first- and second-year Spanish courses at a university rehearsed dialogues using transcription as a memory aid over a six-week period. They listened to a recording of a naturally occurring dialogue between native speakers and repeatedly read aloud the dialogue in unison with the tape. Then they performed the dialogue aloud without transcriptions. Results showed that features of disfluency (e.g., pauses, false starts) decreased significantly, promoting overall oral fluency. Students began to speak with more native-like standards of pronunciation, inflection, and speed after they became accustomed to the speed of fluent speakers and imitated the model through repeated practice.
As Gatbonton and Segalowitz (1988, 2005) claimed, these repetition practices in a contextualized, communicative manner could contribute to automaticity, a component of performance fluency. Automaticity refers to the state in which underlying component processes operate rapidly, resulting in speedy performance (Segalowitz, 2000, 2001, 2003). When producing an extended speech, with increasing speed and ease of handling individual utterances, learners become able to allocate their attentional resources to other processing, such as “constructing a larger piece of discourse by expanding on, or combining ready-made constructions” (Pawley & Syder, 1983, p. 208). Thus, it is likely that fluent speech, as indicated by typical measures of speech rate and pause length (Ejzenberg, 2000; Freed, 2000; Lennon, 1990; Riggenbach, 1991), results from a great deal of practice of a wide range of chunks and subsequent automatization of the chunks.

Practice effect on oral fluency development is well documented in cognitive psychology literature. Previous L1 research has shown that speech rate gradually increases through practice, because connections of chunks in the neural network system become reinforced through numerous activations of nodes that make up the system (MacKay, 1982). However, in L2 research, only a few studies to date have examined the actual practice effect on the development of overall speed-up in performance. DeKeyser (1997), for instance, examined the longitudinal effect of systematic practice of grammatical rules on comprehension and production performance in a laboratory setting. Sixty-one college students were taught morphosyntactic rules and vocabulary items in an artificial language over 11 weeks. Results showed that repeated practice led to faster reaction times and lower error rates over time for both production and comprehension. However, the practice effect was skill-specific: The participants who practiced in one modality (e.g., comprehension) did not perform as well in the opposite modality (e.g., production).

Based on the findings, DeKeyser (1997) argued that systematic practice of rules could lead to the automatization of rules. He also emphasized the potential usefulness of explicit rule instruction, followed by repeated opportunities to use the rule. However, empirical evidence for the usefulness of practice remains limited, especially in the area of prefabricated phrases and chunks. As DeKeyser (2001) pointed out, although some L2 studies have documented the development of oral fluency among L2 learners (Raupach, 1987; Segalowitz & Freed, 2004; Towell, 2002; Towell et al., 1996), these studies did not adequately explain what aspects of language learning—the amount, nature, and spread of practice—contributed to the fluency gains. Thus, further research should examine conditions for promoting automatization and performance fluency. The chunk learning could help us examine whether consistent, distributed practice of form-meaning mappings in chunks serves as an effective condition for the development of oral fluency. Such investigation also will add to the growing literature on the influences of training effect on fluency development by showing the types of training that best enhance fluency in language performance (Fukkink, Hulstijn, & Simis, 2005; Segalowitz, Segalowitz, & Wood, 1998; Snellings, vanGelderen, & Glopper, 2002).

In summary, previous findings collectively suggest that practicing target-language chunks in a meaningful manner could promote quality L2 production and subsequent development of language competence. Since empirical findings remain limited, particularly beyond the scope of Indo-European languages, further research among adult L2 learners is needed to generalize the claims. Language development should be examined over different indicators of proficiency, particularly in the development of complexity and fluency of spoken output, in relation to chunk learning.

Analysis of complexity and fluency combined would be useful in making inferences about learners' general oral proficiency.
Standardized assessment guidelines, such as the ACTFL Proficiency Guidelines—Speaking (ACTFL, 1999), identify fluency and complexity as important indicators of general oral proficiency, which jointly characterize the natural stages of development. In the ACTFL Oral Proficiency Interview scale, for instance, utterance-level complexity (i.e., increasing utterance length) is considered to characterize Intermediate-Mid level ability, while fluent, hesitation-free command of speech is considered late-emerging, characterizing ability above the Intermediate-Mid level. Because these two aspects of oral production represent different levels of oral proficiency development, separate analysis of the two should provide useful insights about the developmental stages of general proficiency. Because previous research in chunking claimed that chunk learning can be effective for both aspects of language development, given the ACTFL proficiency guidelines, it would be interesting to see whether or not complexity and fluency show different developmental patterns, or whether they develop at a similar speed under the effect of chunk learning.

Research Questions
This study investigated the development of different aspects of speaking ability among adult Japanese learners who received instruction on a set of chunks through repetitive, communicative drills and memorization tasks. The study examined the developmental trends in complexity and fluency of the learners' speech in relation to the number of chunks they accumulated over time. Two research questions guided the study:

1. Do L2 learners improve in complexity of speech as they receive instruction on a set of chunks?
2. Do L2 learners improve in fluency of speech as they receive instruction on a set of chunks?

Methods
Operationalization of a Chunk
In this study, a chunk was defined as a semi-fixed lexico-grammatical frame that carried a specific grammatical function (called a grammatical chunk throughout the article), based on the previous literature (N. Ellis, 2003; Krashen & Scarcella, 1978; Nattinger & DeCarrico, 1992). It was a linguistic unit that included one or more open slots in which learners could place a variety of words (e.g., “I can + verb,” “It + verb + that-clause”). Previous literature referred to a chunk as a “slot-and-frame pattern” (N. Ellis, 2003, p. 69) or productive speech formula (Nattinger & DeCarrico, 1992). Semi-fixed lexico-grammatical frames were analyzed in this study because previous research showed that the majority of frequent word combinations in oral production contain two or more clause constituents (i.e., frames), rather than full clauses (“I don’t know.”), frozen idioms (“kick the bucket”), proverbs, formulae, or metaphors (Altenberg, 1998). Because the semi-fixed frames are productive construction types with a fixed core with variable slots, they are considered important components to analyze in oral production. In addition, because this study involved adult Japanese learners in a formal classroom environment, instruction was focused on semi-fixed frames that required some degree of grammatical analysis, rather than on unanalyzed, purely formulaic expressions (e.g., “How are you?” or “Thank you.”), which are more common at an early stage of L1 acquisition.

Participants
Participants in this study were 22 college students enrolled in the first semester of a Japanese language course (Elementary Japanese) in a university located in the midwest part of the United States. There were 10 males and 12 females, including nine native English speakers, seven Chinese speakers, and six Korean speakers. Their average age was 19.6 years, ranging from 18 to 22. Although two stu-
dents had three months of prior Japanese study, they were included in this study because the placement exam showed that they were at an elementary level. The participants provided self-assessment of their Japanese abilities at the beginning of the semester. On a 4-point scale ranging from 0 (very poor) to 4 (good), the average rating was .50 for listening, .41 for speaking, .50 for reading, and .50 for writing. None of the participants had lived in Japan. Being in a foreign language environment, as opposed to a second language context, the classroom offered the primary source of input. Eighteen out of the 22 participants reported that they almost never spoke Japanese outside the class. Four students reported speaking Japanese one day a week for less than 30 minutes.

Instruction
The participants (hereafter referred to as L2 learners) were enrolled in an Elementary Japanese course that met four times a week for 50 minutes each time. The course objective was to develop basic, functional communication skills in spoken and written Japanese. The course involved a variety of simple tasks, including self-introduction, information exchange, and brief descriptions of things and people. Through these tasks, instructors emphasized accurate use of grammatical chunks. In each class, instructors briefly provided functional explanations of a target grammatical chunk for the day, such as how it was used and what communicative purpose it served. Structural and derivational explanations of the chunk (e.g., parts of speech, conjugation), followed by introduction and practice of chunk examples, were kept to a minimum (usually about 5 minutes of class time); the grammatical chunk was treated as a quasi-idiomatic expression and usually was included in the textbooks' vocabulary list.

The target chunk was practiced in a structured, repetitive communicative drill in which students repeatedly used the chunk to exchange real information with their classmates. For example, students practiced the chunk "Noun + particle de" to indicate the means of transportation (kuruma-de, meaning by car) by asking a yes-no question to classmates and taking notes (see the box, below).

In this way, students repeatedly practiced the particle de with different nouns, yet the drill was contextualized and driven by their communicative motivation (i.e., trying to find out the real information). Since this oral practice constituted a kind of multiple pair work, students had multiple opportunities to use the focal grammar, which would promote automaticity in language use. It was considered that once students memorized and mastered individual patterns, they would begin to engage in higher-level language processing in a

Sample Activity (simplified and modified from the textbook):
Direction: Ask your classmates whether or not they come to school by car.
Sample dialogue:
A: Kuruma-de daigaku-ni kimasuka? [Do you come to school by car?]
B: Hai, kimasu. [Yes.]
   *Iie, basu-de kimasu. [No, I come by bus.]

Sample interview sheet:

<table>
<thead>
<tr>
<th>Name</th>
<th>Lee*</th>
<th>Name</th>
<th>Tom*</th>
<th>Name</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>kuruma</td>
<td>yes</td>
<td>basu</td>
<td>no</td>
<td>basu</td>
<td>basu</td>
</tr>
</tbody>
</table>

*Student names are pseudonyms
fluent manner. Thus, the practice was kept simple, repetitive, and structured so that the students could concentrate on mastering the target pattern. The oral practice of chunks, which lasted for about 12 to 15 minutes, was a daily classroom activity.

The communicative drill described above is distinctively different from the audiolingual method that was widely practiced in the 1960s. The audiolingual method, informed by behaviorist theory, argued that language is acquired through habit formation, which is brought about by imitation, reinforcement, and the repetition of behaviors. While the drill practice implemented here incorporated repetitive oral practice, it was different from the audiolingual method in that the practice was embedded within the exchange of authentic information. Different from the audiolingual method that forced learners to repeat isolated patterns in a decontextualized manner, the communicative drill in this study had learners produce many tokens of the target patterns while asking and responding to personal questions from classmates.

Another characteristic of the Elementary Japanese course was that it required students to memorize the dialogues that contained the target grammatical chunks. Thus the target grammatical chunks practiced individually in class were also incorporated into lesson dialogues that the students memorized and presented orally in class. Each textbook lesson had a main dialogue between two or three speakers (about 2 to 4 minutes in length, 28 to 42 turns) that contained the target grammatical chunks introduced in the lesson. At the beginning of each class, students watched the videotaped dialogue and practiced it repeatedly in pairs for about 10 to 12 minutes. Upon completion of each lesson, students memorized the main dialogue and presented it to the class orally. The presentations were evaluated based on four criteria—accuracy, clarity, fluency, and nonverbal aspects—which counted toward about 10% of the final grade. Their average presentation score was 9.21 out of 10.00 (SD = .78), indicating that the learners' memorization and recitation of the dialogues were almost perfect.

**Target Grammatical Chunks**
The dialogues that the learners memorized contained the target grammatical chunks introduced in class. Table 1 shows a list of sample chunks introduced in dialogues and repetitive communicative drills in the first two lessons. Approximately 40 chunks were introduced in class. These chunks also served as the units of analyses in this study (see Makino & Tsutsui, 2004, for formation rules of each grammatical pattern).

**Materials and Procedures**
Immediately following the dialogue presentation in the first two lessons, the learners participated in an individual speaking session outside of class that was arranged by the researcher and a trained research assistant (a native speaker of Japanese). The first session took place in the fifth week, following the presentation of Lesson 1 dialogue. The second session took place in the tenth week, following the presentation of Lesson 2 dialogue. In each speaking session, the learners completed a conversation task, receiving situational descriptions in English and developing a free conversation in Japanese based on the situation (see Appendix A). Slightly different situations were used in the first and second conversation tasks to avoid potential practice effects. The situations were similar because both involved having a small talk with someone the learner did not know well (i.e., talking to someone for the first time and talking to someone for the second time). Two native speakers of Japanese checked comparability between the two task situations through discussion.

The conversation task was designed as an open-ended task to elicit a variety of grammatical chunks and examine creative construction of spoken discourse. Memorized chunks become "alive" once they are used to express personal meaning and construct discourse. Competent speakers are those who possess abilities to steer conversations along the routes of speakers'
<table>
<thead>
<tr>
<th>Grammatical Chunks</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lesson 1</strong></td>
<td></td>
</tr>
<tr>
<td>1. N + wa [topic marker particle]</td>
<td>Watashi-wa gakusei-desu. [I am a student.]</td>
</tr>
<tr>
<td>5. Wh-question with be-verb</td>
<td>Kore-wa nan-desu-ka? [What is it?]</td>
</tr>
<tr>
<td>6. N + mo [particle meaning “also”]</td>
<td>Watashi-mo gakusei-desu. [I’m also a student.]</td>
</tr>
<tr>
<td>9. V in “Let’s” form</td>
<td>Tabe-mashou. [Let’s eat.]</td>
</tr>
<tr>
<td>*10. N + mae [particle meaning “before”]</td>
<td>Juji -mae [before 10 o’clock]</td>
</tr>
<tr>
<td><strong>Lesson 2</strong></td>
<td></td>
</tr>
<tr>
<td>11. ADJ+desu in present-affirmative [pres-aff]</td>
<td>Kore-wa ookii -desu. [This is big.]</td>
</tr>
<tr>
<td>12. Degree ADV + ADJ</td>
<td>Kore-wa totemo ooki -desu. [This was very big.]</td>
</tr>
<tr>
<td>15. N + ni [time marker particle]</td>
<td>Juuji -ni [at 10 o’clock]</td>
</tr>
<tr>
<td>17. CLAUSE + kara [conjunction “because”]</td>
<td>Oishii-kara tabemasu. [I eat because it’s good.]</td>
</tr>
<tr>
<td>18. V in negative request</td>
<td>Tabe-naide kudasai. [Please don’t eat.]</td>
</tr>
<tr>
<td>19. demo + CLAUSE [conjunction “but”]</td>
<td>Demo watashi-wa taberu. [But I eat.]</td>
</tr>
</tbody>
</table>

Notes: BE = copula ‘be’. The chunks with an asterisk were not practiced in class, but appeared in the dialogues and learners’ speech samples. All other chunks were practiced in class. In Japanese, tense, aspect, and affirmative/negative meanings are marked by suffixes to conjugated verbs and adjectives. Thus, individual verbs and adjectives were coded as one grammatical chunk because they included two or more constituents. For example, a verb in a past tense negative form consists of three morphemes, “tabe [verb “eat” in stem] + masen [negative morpheme] + deshita [past tense morpheme].”
interests. Thus, it was important to design the task as relatively open-ended to examine how learners used chunks to exercise their personal manner of speaking and to manage ongoing conversation. In addition, because regular classroom instruction did not involve any open-ended, free conversation-type tasks, learners' functional ability to apply memorized chunks was thought to become more apparent in a task that they had rarely practiced before.

The researcher and the research assistant played the role of interlocutors. To encourage the learners to use their own language skills, the interlocutors refrained from assisting learners, initiating topics, or asking questions. The learners started the task about 20 seconds after they received the instructions and situational descriptions, and the pretask planning time was controlled. They were told to continue the conversation as long as possible, and to say when they could no longer continue. All speech samples were tape-recorded and transcribed.

Data Analysis
Prior to the analyses of the research questions, learners' speech samples were transcribed and coded with respect to different types of chunks (see Table 1), and their frequencies were tallied. Lexical phrases that carried discourse functions (e.g., back-channel cues, discourse markers, interjections) were excluded from the analysis. Disfluency features such as false starts and repetitions also were excluded. Chunks that contained errors (grammatical, lexical, and usage) were coded but analyzed separately. To confirm the accuracy of coding, the regrounding technique (Seliger & Shohamy, 1989) was used, and the original data were sorted twice. In addition, 30% of the data was randomly selected and independently coded by a second rater. The agreement rate between the two raters was 98%.

The first research question addressed the development of complexity in relation to learned grammatical chunks. This study operationalized complexity as the number of correctly used chunks that appeared in a t-unit. Although most previous studies in L2 used the number of words per t-unit as a measure of complexity development (e.g., Ortega, 2003; Wolfe-Quintero, Inagaki, & Kim, 1998), this measure does not fit well with Japanese because there is no agreement on what constitutes a word in Japanese (Fry, 2003). Due to the agglutinating nature of Japanese language, morphemes such as case particles (e.g., the topic marker wa), which do not occur by themselves, are considered to form independent word categories (Tsujimura, 1996; Watanabe, 2000). Therefore, the chunks that included morphemes were considered appropriate as units of speech in this study.

T-unit was defined as a main clause plus all subordinate clauses and nonclausal structures attached to or embedded in it (Hunt, 1966). Here is an example of a Japanese t-unit:

\[ \text{Kinou gakkou-ni itte benkyo shima-shita.} \]

Yesterday to school went and studied

Elements not counted as t-units were sentence fragments, back-channel cues (e.g., "Is that right?"), formulaic phrases (e.g., "Hello." and "Thank you."), utterances that included English, and discourse markers (e.g., "by the way"). T-units that were not intelligible due to excessive errors (6.5% of t-units in the first task and 3.5% in the second task) were excluded from the analysis. Individual t-units were identified in transcribed speech data, and the number of chunks that appeared in each t-unit was tallied. Complexity was obtained by dividing the total number of chunks by the total number of t-units in each speech sample. A matched-pair \( t \) test was used to examine the gains in complexity between the first and second speech samples.

The second research question addressed the development of oral fluency in relation to learned grammatical chunks. This study used two types of oral fluency measures: speech rate and pause length. Fluency analysis was conducted by using the audio
software Audacity for Macintosh. First, all the interlocutors' utterances were removed, and the first three minutes of learners' speech was extracted for analysis. Speech rate was operationalized as the number of morae produced per minute. A mora consists of a vowel, a moraic consonant, or a combination of consonant(s) and a vowel. It is considered the basic timing unit of sound in Japanese and used in previous studies of fluency analysis in Japanese discourse (e.g., Fry, 2003; Tajima, 2003). One mora usually represents one letter of the Japanese alphabet (i.e., hiragana, the Japanese orthographic system). For example, the word ho-n [book], which is written in two hiragana letters, has two morae (ho and n). Repetitions, false starts, self-corrected words, and digression to English were excluded from the analysis. In order to compute speech rate, the total number of morae in each speech extract was divided by the total number of seconds in the extract.

The other fluency measure, pause length (for pauses longer than one second), was analyzed by measuring the length of individual filled and unfilled pauses for the first three minutes of each learner's speech. Following Mehnert (1998), the location and length of all pauses of one second or longer were indicated in the transcripts. The number of pauses was calculated by counting the number of pauses of one second or more that occurred in the first three minutes of speech. Total pausing time was calculated by adding up all the pauses. Because individual speech samples were different in length, average pause length per minute (i.e., the number of seconds for filled and unfilled pauses per minute) was used for analysis. Filled pauses were defined as vocalized pauses, while unfilled pauses were defined as silent pauses. A matched-pair t test was used to examine the gains in each type of fluency between the first and second speech samples. Prior to the statistical analyses, data distributions were checked to see whether or not they met the underlying assumptions for statistical testing (e.g., normality of data). Because this study used two separate t tests, the alpha level was adjusted to .025 to avoid Type I error (Jaeger, 1993).

Results

Frequency and Range of Chunks in Oral Production

This section provides overall trends in learners' use of learned grammatical chunks in spontaneous speech production. The learners were able to sustain a conversation for about 2 to 3 minutes in the first task, while they could continue conversation for 8 to 10 minutes in the second task. The increasing length of conversation also corresponded to the increasing number of chunks produced over time, as shown in Table 2. A total of 757 chunks were identified in the first task, and 1,919 in the second task. The proportion of erroneous chunks (e.g., using wrong particles, tense mistakes) was notably low, 0.05% in the first task and 0.03% in the second. As shown in Table 2, the average number of grammatical chunks increased dramatically: The mean was 33.09 (SD = 14.66) in the first speaking session (Week 5) and 78.91 (SD = 37.45) in the second session (Week 10). Considering that more than 90% of the learners had no previous Japanese study, the findings demonstrate a notable increase in learners' linguistic repertories resulting from the instruction. Because classroom instruction involved mainly repetitive, communicative drills of individual chunks, the findings show that the learners were able to apply memorized chunks in an unfamiliar task situation (i.e., free, spontaneous conversation).

There was also an increase in the range of the chunks that the learners produced. In the first speaking session, they used about 10 different types of chunks, while in the second session they were able to employ about 17 different chunks. A chi-square test was used to check whether there was a significant difference in the frequency and range of the chunks between the first and second oral production. The results revealed a significant change over time: chi-
Speaking Sample 1 was collected in the fifth week of the semester, and speaking sample 2 was collected in the tenth week of the semester, approximately. One conversation task was administered per data-collection session. The range of chunks refers to the different types of chunks produced out of 39 target chunks.

**TABLE 2**

<table>
<thead>
<tr>
<th>Frequency and Range of Correctly Used Chunks in Conversation Tasks</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaking Sample 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of chunks</td>
<td>33.09</td>
<td>14.66</td>
<td>16.00</td>
<td>71.00</td>
</tr>
<tr>
<td>Range of chunks</td>
<td>9.96</td>
<td>2.79</td>
<td>5.00</td>
<td>16.00</td>
</tr>
<tr>
<td>Speaking Sample 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of chunks</td>
<td>78.91</td>
<td>37.45</td>
<td>35.00</td>
<td>165.00</td>
</tr>
<tr>
<td>Range of chunks</td>
<td>17.65</td>
<td>3.20</td>
<td>12.00</td>
<td>24.00</td>
</tr>
</tbody>
</table>

$N = 22$. Speaking sample 1 was collected in the fifth week of the semester, and speaking sample 2 was collected in the tenth week of the semester, approximately. One conversation task was administered per data-collection session. The range of chunks refers to the different types of chunks produced out of 39 target chunks.

square = 17.66, $p < .05$ for frequency, and chi-square = 7.87, $p < .05$ for range.

It is also worth noting that the learners produced several complex grammatical forms from an early stage because they memorized them as individual chunks. A good example is the te-form ending of verbs. The te-form is a commonly occurring Japanese verb form that ends in -te or -de. The te-form verb serves a variety of functions (Makino & Tsutsui, 2004). It links two actions (e.g., Arui-te kaeru [I walk home]). It combines with the auxiliary iru [exist] to express continuous actions (e.g., Aruite-iru [walking]). It also combines with the auxiliary kudasai [please] to indicate polite commands (e.g., Arui-te kudasai [Please walk]). When it combines with the auxiliary mooidesu [you may], it functions as an expression for permission (e.g., Arui-te mooidesu [You may walk]). Because of the variety of functions, when coupled with the conjugation process to obtain the te-form, the verb te-form is considered a complex grammatical form.

Despite its grammatical difficulty, in the first speaking session (after the completion of Lesson 1), seven learners with differing L1 backgrounds were able to produce verb-te forms, all of which incorporated the phrase of arui-te [walk]. Because Lesson 1 did not explain the verb te-form, it is likely that the learners reproduced the memorized phrase as an unanalyzed chunk from the dialogue in Lesson 1, namely Arui-te kaeri-masu [I'm walking home]. They used arui-te in a variety of formats, sometimes with a question marker ka (Arui-te kaerimasu-ka? [Are you walking home?]), and other times in a statement (Watashi-wa aruite X-daigaku-ni kimashita [I walked to X university]). These analyses also show the emerging level of complexity and creativity in learners’ utterances. The learners did not merely copy and reproduce the phrase Arui-te kaeri-masu from the dialogue, they adapted it to their own situations and contexts. For instance, they extracted the lexical item arui-te and combined it with other phrases such as daigaku-ni [to the university] and kuru [come] to express how they usually came to school. The findings show the interaction between chunk learning and rule-based learning: In some instances the learners analyzed the chunks by constituents and used them in a productive manner by combining them with other patterns.

**Analysis of Research Question 1: Development of Complexity**

The first research question addressed the development of complexity in learners’ oral production in relation to learned grammatical chunks. Complexity was measured
as the average number of correctly used chunks per t-unit. Table 3 displays the descriptive statistics of the complexity values. The first conversation task yielded a total of 287 t-units from 22 learners, while the second task yielded a total of 517. There was a notable increase in the average number of chunks that appeared in individual t-units—2.58 chunks per t-unit in the first task (SD = .37), and 3.42 chunks per t-unit in the second task (SD = .54). A matched-pair t test showed that the difference was statistically significant, \( t = 8.71, \) df = 21, \( p = .00 \). The effect size, Cohen’s d of 1.87, also showed a large effect, indicating that the complexity of speech increased dramatically over time.

The increasing level of complexity was evident in a variety of linguistic units that the learners used to construct t-units in the second conversation. In the first conversation, the majority of the t-units contained simple declarative word order, consisting of a subject and predicate without adverbial phrases, dependent clauses, or modifiers. The chunks most frequently used were “N + topic marker particle wa,” which served as a subject, and “N or Adj + BE-verb particle desu [be]” which served as a predicate (e.g., Watashi-wa gakusei-desu [I am a student]) (see Table 1). These two chunks occupied about 50% of the total chunks that appeared in the first conversation, while the percentage decreased to about 35% in the second conversation.

These two chunks appeared in a variety of formats, sometimes in an affirmative sentence describing oneself, and other times in an interrogative sentence asking for information. The following excerpt from the first conversation task illustrates the frequent occurrence of “N + wa” and “N/ Adj + desu” constructions. Most utterances followed simple sentence structure and contained very few additional constructions, such as “N + possessive particle of no [of]” and “V + question marker ka.” As shown in line 7, the learner also used the same adjective oishii [delicious] in the “N/ Adj + desu” chunk over three utterances.

**Excerpt 1:**

**Learner #1 Conversation Task #1**

(L = student; I = native speaker interlocutor)


2. I: Shusshin-wa nihon-no Tokyo-desu. [My hometown is Tokyo, Japan.]

   [Yes.]
   [I see. I'm an American. My mother isn't an American. My father is an American. Do you have a child, Ms. Sato?]
6 I: A, iie.
   [I see. Sushi is delicious. It's good. Tempura is delicious, delicious. American food is delicious.]

Excerpt 2 is from the same learner in the second conversation task. The "N + wa" and "N/Adj + desu" chunks did not appear as often; instead, the learner assembled a wide repertoire of chunks, including: "verb present affirmative," "question marker ka," "noun modifier no," "time marker ni [at]," "conjunction kara [because]," "object marker o," "adverb + adjective construction," and wh words such as nani [what] and dou [how]. In line 3, in particular, the learner used nine different chunks in one t-unit. The t-unit contained two clauses connected with a conjunction kara [because], indicating the increasing degree of syntactic and morphological sophistication.

Excerpt 2:
Learner #1 Conversation Task #2
1 L: Sono-san-wa ah . . . hirugohan-o tabe-masu-ka?
   [Do you have lunch, Ms. Sono?]
2 I: Ee, ano, itsumo daitai 12-ji-goro-ni tabemasu.
   [Well, I usually eat around noon.]
   [I see. Because I have a Japanese class at 10, I have lunch at noon.]
4 I: Sou-desu-ka.
5 L: Sumimasen. Watashi-wa nihongo-ga zenzen jouzu-ja arimasen.
   [Sorry, my Japanese is not good at all.]
6 I: Jouzu-desu-yo.
   [It's good.]
7 L: Ah . . . ah . . . nani-o tabe-masu-ka? Hirugohan-o nani-o tabe-masu-ka?
   [Ah . . . what do you eat? Lunch, what do you eat?]
8 I: Itsumo Sandwich-o tabe-masu.
   [I always eat sandwiches.]
9 L: Oishii-desu-ne. Watashi-mo sandwich-o tabe-masu. Ah . . . nihon-no ryouri-wa dou-desu-ka?
   [It's good, isn't it? I also eat sandwiches. Ah . . . how about Japanese food?]

Other instances of syntactic complexity are shown in the examples below. In Excerpt 3, the learner used 13 different chunks in one utterance. He used the conjunction kara [because] twice and demo [but] once, and explained the reason for studying kanji [Chinese characters] and the difficulty in learning them. In Excerpt 4, the learner used different time markers and time expressions to communicate his schedule and the reason why he is busy every day.

Excerpt 3:
Learner #11 Conversation Task #2
   [Kanji homework is very difficult, so I study kanji very hard, but there are many kanji characters, so it's hard.]
Excerpt 4:
Learner #11 Conversation Task #2
L: Boku-wa mainichi getsuyoubi-to,
suiyoubi-to, kinyoubi-wa asa 8-ji,
asa 9, 10-ji-kara 4-ji-made jugyou-
ga arimasu. Ah . . . boku-mo, boku-
wa, ah . . . mainichi isogashii-desu.
[Everyday, I have a class from 10
in the morning till 4 on Monday,
Wednesday, and Friday. I'm busy
every day.]

As shown above, the elementary-level
learners were able to use learned gram-
matical chunks to construct complex and
extended syntactic turns out of simple,
small chunks. Speaking development, in
terms of the increasing degree of complexi-
ty, was observed in learners' ability to weave
a set of memorized chunks into utterances,
by using them with a variety of word cat-
egories and embedding one chunk within
another. The creative use of learned chunks
indicates a linear compositional process of
speech production: Learners went beyond
well-rehearsed routines in class and learned
to produce a longer stretch of utterance by
stitching together preassembled chunks.

Analysis of Research Question 2:
Development of Fluency
The second research question addressed
the development of oral fluency over time.
Fluency was operationalized as speech rate
(average number of morae produced per
minute) and pause length (average number
of seconds of pauses per minute). These
two fluency features were found to be sig-
ificantly correlated to each other—r = .73
(p = .00) in the first sample and r = .63
(p = .00) in the second sample—indicating
that the longer pause length was related
to slower speech rate. Table 4 displays
descriptive statistics for the first and second
speech samples.

As shown in the table, there was no
improvement on speech rate or pause
length over time. Matched-pair t test results
confirmed no statistical difference in flu-
ency between the first and second speaking
samples, t = .70, df = 21, p = .49 for speech
rate, and t = -.16, df = 21, p = .87 for pause
length. The findings suggest that, although
the learners improved dramatically on the
frequency and range of the chunks they
produced, and the chunks functioned as
building blocks for more complex, lon-
ger utterances, their processing speed of
the learned chunks, as shown in the two
oral fluency features, did not show any
improvement. Findings also imply that
knowledge of grammatical chunks and
processing capacity of using the chunks in
real time are two separate aspects of oral
production ability, and do not develop in
a parallel manner in a short period of time.

Two posthoc analyses were conducted
to gain some insights on where disfluency
features occurred and why they occurred.
The number of t-units produced without
any disfluency features (i.e., pauses, false
starts, repetitions) was tallied and com-
pared between the first and second speak-
ing samples. In the first sample, of the 287
t-units produced by 22 learners, approxi-
mately 70% of the t-units were produced
fluently, without any internal pauses, false
starts, or repetitions. The percentage was
about 60% in the second sample. The fact
that the majority of the utterances in both
samples were produced without hesitation
suggests a positive effect of chunk learning.
Most individual utterances were produced
fluently because they contained ready-made
chunks that were not generated from novel
constructions or grammatical rules.

The second speech sample contained
more utterances with internal disfluency
features, probably because the chunks intro-
duced in the second lesson required more
grammatical analysis. For example, a great-
er number of particles were introduced in
Lesson 2, including: mo [also], ni [at] as
time marker, ni [in] as place marker, o as
object marker, and goro [approximately].
The particle de combined with a noun
also had two functions, one as a means of
transportation and the other as a place of
action. Although the learners practiced each
particle in chunks, choosing the correct par-
ticle was difficult and resulted in disfluent production. As shown in the second utterance in Excerpt 5, the learner mistakenly produced the subject marker ga before he produced the correct particle mo [also], although he was able to monitor his speech and self-corrected the mistake promptly.

Excerpt 5:
Learner #17 Conversation Task #2
L: Computer-gaku-no shukudai-wa hontouni muzukashii-desu.
[Computer science homework is really difficult.]
Nihongo-ga, jugyou-ga, ah, jugyou-mo totemo muzukashii-desu.
[Japanese, Japanese class, ah, Japanese class is also very difficult.]

These analyses suggest that, although learners practiced and memorized individual chunks well, choosing an appropriate chunk for a given situation seemed to be difficult, particularly in online production with great processing demands.

Another posthoc analysis examined the placement of filled and unfilled pauses in the first and second speech samples to see whether or not each pause occurred utterance-internally (pauses occurring within utterances) or utterance-externally (pauses occurring before or after an utterance). The ratio was similar between the first and second speech samples. About 75% of the pauses occurred utterance-externally in the first sample, while the percentage was 70% in the second sample. The findings suggest that, at both times, learners paused more often between utterances and turns. The external pauses were probably due to a lack of ability to shift to a new topic or produce novel utterances spontaneously. As shown in Excerpt 6, almost every utterance followed a long pause (see lines 3, 7, and 9), but the utterances themselves were fluent once produced. It seems that the learner needed some time to come up with things to talk about. Even after the ideas were located, it took time for him to translate the thoughts into linguistic units for articulation.

Excerpt 6:
Learner #12 Conversation Task #1
1 L: Sato-san-wa gakusei-desu-ka?
[Are you a student, Ms. Sato?]  
2 L: Iie, watashi-wa sensei-desu.
[No, I’m a teacher.]
3 L: Ah, sou-desu. Ah . . . . (5 seconds) watashi-wa 3-nen-desu. Ah . . . (3 seconds), Sato-san-wa gakubu-wa nandesuka?
[I see. Ah . . . I’m a junior. Ah . . . What’s your department, Ms. Sato?]
It seems that fluency deficits usually occurred at utterance boundaries when learners shifted from one utterance to another to continue and expand conversation. There were some disfluency features at utterance-internal level when searching for vocabulary or appropriate chunks to express meaning. However, it seems that disfluency among learners in this study typically occurred when they conceptualized and formulated novel utterances. Fluency seemed to have suffered most when learners extended beyond chunk-based utterances and attempted higher-order processing of discourse.

Discussion

This study examined the development of speaking ability among L2 learners of Japanese who received instruction on grammatical chunks. Based on the speech samples collected over time, the development of speaking ability was analyzed for complexity of speech (the number of chunks per t-unit) and fluency of speech (speech rate and pause length). The learners produced more than twice as many grammatical chunks over time, indicating that their oral productivity increased dramatically during a short period. Learners used a set of memorized, individual chunks effectively as a way to create meaning and expand and sustain a conversation for a long period of time in a task situation that they seldom practiced in class.

The range of the chunks also doubled over time. In the first conversation, the topic marker particle wa and a linking verb or a copula desu [be] occupied half of the chunks produced, indicating limited variety in linguistic structures. The majority of the utterances were formulaic expressions directly paraphrased from Lesson 1 dialogue, including: Watashi-wa Tom-desu [My name is Tom], X -daigaku-no gakusei-desu [I'm a student at University X], and Shusshin-wa doko-desu-ha [Where are you from?]. Although these two chunks were still predominant in the second conversation, the percentage dropped to 30%. Instead, the learners used different types of chunks to encode a greater variety of language functions. For example, possessive structures (Noun + possessive particle no [of]) appeared about 9% of the time. Action verbs with the formal ending masu, which expresses habitual activities, appeared about 10% of the time.

The greater number and range of the chunks the learners accumulated over time seems to have contributed to the development of utterance complexity. The number of chunks produced per t-unit increased significantly over a short period of time, from 2.58 chunks to 3.42 chunks, on average. The increasing level of complexity in individual utterances was evident in a variety of grammatical chunks the learners used to construct sentences in the second speech sample. Excerpts 3 and 4 in the previous section clearly illustrate that learners learned to use a large number of chunks per utterance (13 chunks in excerpt 3 and 4 chunks in excerpt 5) over time. Learners used individual chunks creatively and skillfully, by adding them together.
and embedding them within larger clausal units. Individual component chunks introduced earlier in class were retained and used as extensions toward more complex, longer utterances.

These findings lend support to previous claims that learners' linguistic systems develop by building larger units from small modular components (N. Ellis, 1996, 2003; Rosenbloom & Newell, 1987; Schmidt, 1992). Longer and more complex utterances are constructed by using modular elements as building blocks, and chunks are integrated into a larger discourse structure by juxtaposition and embedding. Repeated practice of correct production of target-like chunks seems to be a prerequisite for the deployment of higher-level language use. These interpretations also imply that chunk learning could assist production of complex forms from an early stage, when learners are not developmentally ready for the forms, and when their capacities in noticing the forms in input are also limited.

Researchers have questioned whether learning individual chunks really contributes to the development of grammatical competence, giving learners the competence to deal with creative and novel utterances. The findings of this study, although not conclusive, shed some light on the issues related to chunk learning and creative language use. The increasing level of syntactic complexity and utterance length suggests that learners who practiced individual chunks through drills and memorization were able to reassemble individual chunks and produce longer stretches of utterances; this had not been modeled for the learners, nor had the learners rehearsed such activities. Thus, chunks seem to have supported creative and novel constructions of utterances because the grammatical explanations were kept to a minimum. The learners were able to reassemble individual grammatical chunks to produce a variety of utterances.

Despite the increase in complexity, learners did not show any improvement in oral fluency. The results, then, do not fully support previous claims (e.g., de Bot, 1992; Dechert, 1983; N. Ellis, 1996, 2003; Gatbonton & Segalowitz, 1988, 2005; Goldman-Eisler, 1961; Pawley & Syder, 1983) that speech production becomes fluent when learners rely on ready-made chunks that are memory-based. Based on the previous research, it was hypothesized that, because chunks directly mark meaning and do not generate from grammatical rules, they would economize learners' processing efforts and free up memory space for processing additional information, consequently promoting overall speed in oral production. Despite this premise, although the store of available chunks expanded over time, there were no fluency gains in learners' production at discourse level. There was even a slight decrease in learners' fluency over time: Average pause length was almost the same between the first and second speech samples, but the average speech rate decreased by three morae in the second sample. The results suggest that availability of a greater number of chunks did not directly lead to fluent access and use of the chunks in spontaneous conversation.

The findings suggest a potential interaction between fluency and complexity in speech production. The learners in this study improved greatly in terms of chunk size, chunk number, and utterance length, largely on the basis of consolidation of chunks and vocabulary upon which the chunks were built. The notable increase in overall productivity shows that the learners accumulated a larger stock of grammatical chunks and phrase expressions, and used them to expand their utterances. However, because of the great amount of linguistic repertoires accumulated, the pool of chunks from which learners chose widened. Due to the greater range of linguistic expressions available in stock, it is possible that the learners faced greater demand in surveying a range of chunks and choosing the most appropriate ones to express their thoughts. As a result, overall speaking process slowed. As MacKay (1982) claimed, in speech production, conceptual, lexicogrammatical, phonological, and muscle
timing nodes are connected, and they are triggered simultaneously. As the size of linguistic stock expands, and as learners try at the same time to express more complex thoughts, activation of conceptual and lexico-grammatical nodes might take a longer time, resulting in an overall slowing in speaking. It seems that, among the beginning-level learners in this study, fluency and complexity demands competed for limited resources.

Towell and colleagues' (1996) analyses of fluency development among advanced French learners also lend support to the potential interaction between complexity and fluency development in L2 spoken output. Qualitative analyses of narrative productions revealed that, over time, learners were able to construct a series of syntactic units efficiently. The length and complexity of the linguistic units increased over time, as did the speed with which those units were produced. Hence, increases in oral fluency were considered attributable to increases in efficient sentence building and packaging of linguistic units in utterances. The beginning-level learners studied here were probably at the stage where the learned linguistic units appropriate for the task situations were present, but they were not skilled enough to locate and produce them in a fluent manner. There seems to be a three-way interaction among complexity, fluency, and proficiency.

Fluency, as Lennon (2000) defines it, refers to the state in which communicative intention is translated into language rapidly, efficiently, and accurately under the temporal constraints of online processing. This definition also subsumes four dimensions of fluency introduced by Fillmore (2000)—encompassing purely temporal aspects (e.g., few pauses), as well as coherence and appropriateness of speech, and creative and imaginative aspects of speech. These definitions imply that fluency is a holistic, discourse-level competence that reflects one's ability to communicate efficiently, intelligently, and appropriately. It is possible that the chunk learning enforced in this study worked in a purely temporal dimension of oral fluency alone at utterance-level, but did not contribute to other dimensions of fluency, particularly coherence and creative dimensions of speech production. As a result, even after individual chunks were automatized, fluency deficits still occurred at discourse level, when learners responded to what the speaker said and shifted from one topic to another to develop and expand conversation. Disfluency at discourse level probably became apparent in this study due to the open-ended nature of the conversation tasks.

This interpretation seems to be supported by the posthoc analyses: In both speaking samples, the majority of single utterances were produced without hesitation, and more than 70% of filled and unfilled pauses occurred between utterances, not within utterances. As Pawley and Syder (1983) noted, fluent discourse is characterized by an optimal mix between highly automatized chunks and the utterances that speakers compose creatively to express their speech intentions. Although novel constructions of utterances were observed in the increasing level of syntactic complexity in learners' production, a five-week term was probably too short to achieve fluidity and spontaneity in producing those novel utterances in an open-ended conversation. Processing limitation across utterance boundaries is also a common phenomenon among native speakers. Previous research showed that fluency tends to suffer at or near clause boundaries, and more instances of disfluency occur in novel clause sequences than in conventional expressions (Chafe, 1980; Pawley & Syder, 2000). The number of between-utterance pauses found among learners in this study suggests that the learners' disfluency was observed mainly beyond chunk level; disfluency occurred when the learners moved from one idea unit to another and tried to locate appropriate chunks to encode their ideas in real-time interaction.
Implications for Teaching

In summary, learners in this study were able to accumulate a greater number and range of grammatical chunks over time and reproduce the chunks in spontaneous speech to exchange meaning. Accumulation of the chunks seemed to have served as a basis for the production of accurate, longer, more complex utterances. However, the increase in the knowledge of grammatical chunks did not translate directly to the efficient and speedy use of the chunks: Learners' fluency in oral production showed no improvement over time.

This study has implications for the nature and format of practice in chunk learning. The study enforced the value of repetitive communicative drill for the practice of individual chunks in the classroom based on previous claims that repetitive practice leads to faster response times. However, the findings did not support fluency gains resulting from repetitive practice, suggesting that practice on isolated chunks alone may not contribute to fluency at discourse level. Thus, future research should combine practice for lower-order fluency (fluency practice on component units such as words, phrases, and sentences) and higher-order fluency (fluency practice on discourse level). Token practice on individual chunks should be supplemented by frequent free conversation practices in which learners practice using a group of learned chunks in tandem to construct discourse.

There are several ways to exercise lower-order fluency and higher-order fluency together. For example, class instructors can encourage learners to ask follow-up questions while practicing individual chunks. In this study, learners practiced a chunk in a format of brief information exchange consisting of two or three turns. For example, to practice the chunk “noun + particle de” [by means of], the learners asked classmates yes-no questions to find out how they usually come to school (for example, by bus or by car). Instead of making this exercise a yes-no question exchange, instructors could encourage learners to ask additional (i.e., follow-up) questions based on their classmates’ answers to expand and sustain conversation, as the following example illustrates:

Directions: Ask your classmate how he/she usually comes to school.

Example:

A: Taiitei daigaku-ni kuruma-de kimasuka? [Do you usually come to school by car?]
B: Hai, kuruma-de kimasu. [Yes, I do.]
lie. Bus-de kimasu. [No, I don’t. I come by bus.]

Examples of follow-up questions:

le-kara daigaku-made donokurai-desuka? [How long does it take from home to the university?]
Nanji-ni kimasu-ha? [What time do you come?]
Hitori-de kimasuka? [Do you come alone?]

The use of follow-up questions makes the drill activity more of a discourse-level activity. By asking personalized follow-up questions, learners will be engaged in more sustained communicative interaction, resulting in enhanced negotiation of meaning. The use of follow-up questions also will help learners practice a prompt shift from one idea unit to another. They will develop the ability to make relevant contributions to the ongoing topic and elaborate on the topic. Chunk learning in different format and practice types is worthy of future investigation to understand whether or not chunk learning could help learners develop efficient network connections at lexical, syntactical, and phonological levels, as well as at propositional and conceptual levels.

Another useful activity is to have learners practice a group of chunks together, rather than practicing individual chunks in an isolated manner. Instructors could introduce a structured conversation activity. A typical
activity sheet could include a few questions followed by a list of grammatical chunks that the learners can use. Taking turns in pairs, learners could ask and answer the questions, and practice a group of learned chunks in tandem while exchanging information in pairs, as shown in the simplified sample activities below (see Table 1 for the list of the grammatical chunks):

Directions: Take turns with your partner asking questions below. Use follow-up questions.

1. **Nigongo-no jyugyou-wa dou-desu-ka?**
   [How is your Japanese class going?]
   Japanese-no class-wa how-copula be-question marker ka

   Useful grammar: adjective affirmative and negative, adverbs, because clause kara

2. **Mainichi jyugyou-ga arimasu-ka?**
   [Do you have a class every day?]
   Everyday class-ga exist-question marker ka

   Useful grammar: subject marker ga, time marker ni, particles -kara -made) (from-to-), adjectives

3. **Shyumatsu-sa-nani-wa shimasu-ka?**
   [What do you do on weekends?]
   Weekend-wa what-o do-question marker ka

   Useful grammar: Wh questions ("nani, itsu, doko"), object marker "o," basic verbs, all adjectives

Limitations of the Study and Implications for Future Research

This study was limited to a small sample of beginning-level learners \((N = 22)\) and to two data-collection sessions over a short period of time. In order to generalize the findings, future research should examine a larger participant population over an extended period of time to capture incremental development of learners' speaking ability in relation to chunk learning. Such longitudinal analysis is important, particularly because there was no change in oral fluency between the first and second speaking samples. A study with a longer time span could capture the development of processing capacity of using chunks in real time. In addition, the findings gleaned from this study should be interpreted with caution because the study used an intact group and did not use a control group. Future research should employ a quasi-experimental design and reveal the effectiveness of the chunk-learning method on the development of speaking abilities.

This study is also limited because it used only two measures of oral fluency, namely speech rate and pause lengths, and did not analyze other measures such as mean length of run or features of disfluency (e.g., number of false starts, self-corrections). Future research should apply a wider range of oral fluency measures to confirm the generalizability of the findings.

Another shortcoming relates to the rather limited analysis of form-function mappings in learner production. One form could fulfill multiple functions. For instance, the chunk "noun + de" indicates a means of transportation in one context, but it indicates a place of action in another context. Understanding the usage of a variety of chunks serving different functions is an important aspect of language ability. Previous research (e.g., R. Ellis, 1984; Myles et al., 1999) also showed that learners initially tend to assign one form to one function and only later extend the number of functions it encompasses. Future research should include more advanced-level learners, and examine how learners develop the ability to handle a variety of functions served by the same chunk and how they expand their repertoire of chunk-function mappings.

Finally, because the focus of this study was to analyze the development of L2 speaking ability in relation to the specific set of grammatical chunks introduced in class, a question remains as to what extent the speaking ability that the learners demonstrated corresponds to descriptions of general oral
proficiency, such as the ones provided in the *ACTFL Proficiency Guidelines–Speaking* (ACTFL, 1999). For instance, in the ACTFL scale, the ability to handle a variety of social situations is considered an indicator that a student is at an Intermediate-Low level; however, this study could not measure this ability because it used only one type of social situation. Similarly, this study analyzed complexity and fluency separately, but in the ACTFL guidelines, these features are considered to jointly characterize the natural stages of development. In the descriptions for the Intermediate-Mid level, for example, increasing utterance length serves as an indicator of proficiency, but fluency does not; fluency is still strained at this level, and speech includes frequent long pauses. This study's findings, in part, lend support to the ACTFL guidelines because the learners showed notable gains in complexity, but not in fluency, revealing different patterns of development. In future research, a separate proficiency test, such as the Oral Proficiency Interview, should be administered in conjunction with the tasks used in this study to make inferences about the learners' general functional ability and staged development, beyond the level of use of learned grammatical chunks.

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**Notes**

1. Chi-square analyses revealed no significant L1 group differences in the frequency of the grammatical chunks produced: chi-square = 1.35, *p* > .05 in the first speaking session, and chi-square = 3.10, *p* > .05 in the second speaking session. Similarly, Krusical-Wallis test revealed no significant group differences for the complexity, speech rate, and pause length in both the first and second speaking sessions at the alpha level of .05.

2. No initial speaking task was administered at the beginning of the semester because more than 90% of the learners indicated they had had no previous Japanese study; hence it was thought that the learners would not be able to produce a measurable amount of speech at the beginning of the instruction. They were considered to be true beginners, as reported by the class instructors.

3. Some chunks serve more than one function in Japanese. For instance, the chunk "noun + ni" has multiple functions, including time marker, place of action, and destination. In such cases, separate instruction was given on each chunk-function pair with metalinguistic information followed by a communicative drill. Because the learners in this study were at an elementary level, the number of multifunctioning chunks introduced in class was small (i.e., three).

4. The research assistant received a one-hour explanation and training on how to interact with the Japanese students in the conversation sessions. Recordings of her initial speaking session also were checked for consistency.

5. It is fairly common in L2 fluency analysis for researchers to analyze a portion of speech rather than the whole speech (e.g., Segalowitz & Freed, 2004).

6. The sample activities described here are designed for the level of learners examined in this study, namely true beginners who do not have previous experience studying Japanese. Hence, the use of authentic language materials or extended discourse over numerous turns was not included. As learners become more advanced, such activities should be incorporated into class.

**References**


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**APPENDIX A**

**Task Situations Used in the Two Speaking Sessions**

**Speaking Session #1 Situation**
You’re at a student party in the University Center at X. You see a woman sitting alone in the room. You have never seen her before. You approach her and start a conversation.

**Speaking Session #2 Situation**
You are taking a Japanese class this semester. Last Friday you went to the tutoring session, and the Japanese tutor, Mari Sono, helped you with your homework. Mari is a third-year student. It is Monday afternoon, and you see Mari reading a book in the University Center. You go to talk to her.