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The influence of task demands on the preparation of spoken word production: Evidence from Korean*

Tae-Hwan Choi · Sujin Oh · Jeong-Im Han**

Abstract

It was shown in speech production studies that the preparation unit of spoken word production is language particular, such as onset phonemes for English and Dutch, syllables for Mandarin Chinese, and morae for Japanese. However, there have been inconsistent results on whether the onset phoneme is a planning unit of spoken word production in Korean. In this study, two sets of experiments investigated possible influences of task demands on the phonological preparation in native Korean adults, namely, implicit priming and word naming with the form preparation paradigm. Only the word naming task, but not the implicit priming task, showed a significant onset priming effect, even though there were significant syllable priming effects in both tasks. Following the attentional theory (O'Séaghdha & Frazer, 2014), these results suggest that task demands might play a role in the absence/presence of onset priming effects in Korean. Native Korean speakers could maintain their attention to the shared onset phonemes in word naming, which is not very demanding, while they have difficulties in allocating their attention to such units in a more cognitive-demanding implicit priming, even though both tasks involve accessing phonological codes. These findings demonstrate that there are cross-linguistic differences in the first selectable unit in preparation of spoken word production, but within a single language, the preparation unit might not be immutable.

Keywords: phonological preparation, spoken word production, task demands, attention, Korean

1. Introduction

Language production involves the operation of a sequence of cognitive mechanisms (Levelt *et al*., 1999). Namely, it starts from concept encoding, which is followed by retrieval of lexical items, retrieval and encoding of segments (phonemes), the segment-to-frame association (syllabification), and finally articulation. Hence, the phoneme-sized segments are selected at the beginning of spoken word form encoding. Previous research following this view, however, mainly based on data from European languages including Dutch and English (e.g., Meyer, 1990, 1991; Rapp & Goldrick, 2000). Recent research has shown that the view as to the role of phoneme segments may not apply to all languages. For example, the syllable has been shown to serve as the phonological preparation unit in Mandarin Chinese (Chen *et al*., 2002; Chen & Chen, 2013; O'Séaghdha *et al*., 2010), and the CV mora is selected in Japanese (Kureta *et al*., 2006; Verdonschot *et al*., 2011).

Given these cross-linguistic differences in the phonological preparation unit, its standing of Korean is still unclear. Only a small numbers of studies have examined the phonological preparation unit of word production in the Korean language, and their results are not consistent. For example, Kim & Davis (2002), and Han & Choi (2016) showed no facilitation of overlapping the onset phonemes, which suggests that the onset phoneme is not a phonological

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** Konkuk University, jhan@konkuk.ac.kr, corresponding author
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preparation unit in Korean. On the contrary, Witzel *et al.* (2013) and Han & Verdonschot (2017) showed a significant effect of onset priming in the masked priming and the phonological Stroop tasks. Kim & Davis (2002) examined the role of phonological properties of the visually presented words in the process of word recognition. The results of the masked phonological priming task during the naming of Korean words demonstrated that there were significant priming effects when visually presented prime-target pairs shared a body (CV) (e.g., <겨>-<결> 'rice bran' - 'grain'), as well as when they shared a complete syllable (e.g., <결>-<결>). However, when prime-target pairs shared just an onset phoneme (e.g., <개>-<결> 'dog' - 'grain'), the effect was marginally significant (p=.06). Later Witzel *et al*. (2013) conducted a similar masked priming task to Kim & Davis (2002), but using disyllabic nonwords written in Hangul script where primes and targets shared an initial consonant-vowel syllable (e.g., <피추>-<피토>) or only an initial onset phoneme (e.g., <페추>-<피토>). Their results showed that in the naming of Hangul words, there was a significant priming effect when primes and targets share only an initial onset phoneme as well as an initial CV syllable, with greater priming at the syllable level than at the phoneme level. More recently, Han & Choi (2016) investigated the roles of syllables and onset phonemes as functional units of production planning in Korean, employing a picture-naming task to prohibit any possible strategic use of orthographic cues which can encourage participants to choose the units which are more compatible with the spellings presented in the task. A significant effect was found for syllables, and a marginally significant effect, for onset phonemes, replicating those of Kim & Davis (2002). Most recently, Han & Verdonschot (2017) replicated the masked priming task of Witzel *et al.* (2013) with more extensive stimuli set and also conducted a phonological Stroop task, latter of which was to avoid any possible influence of orthographic information. Their results showed that in both tasks, significant facilitation effects were observed when the target and the prime shared onset phonemes. Therefore, the previous literature on the preparation unit of spoken word production in Korean reveals inconsistent results.

These findings might be accounted for in two ways, even though these two do not seem to cancel out each other. One is that the standing of the onset phoneme as a preparation unit in spoken word production might not be solid as those shown in other languages such as Dutch and English. This might be closely related to the nature of the Korean language in that Korean shows evidence demonstrating that either a syllable or a phoneme plays an important role in phonological and orthographic structures, data of speech errors, and/or results of the controlled psycholinguistic studies. First, the syllable structure of Korean is far less complex than English and Dutch, but more complex than Mandarin and Japanese. Dutch, for example, contains syllable types over 12,000 (Schiller, 1997). Their syllable boundaries are not clear, and thus certain word-medial consonants are ambisyllabic and a coda consonant can be resyllabified to an onset of the following syllable. In contrast, Mandarin syllables are not complex, allowing only one consonant in onset as well as coda positions, the latter of which is only nasals. Thus, there are relatively small numbers of syllable types: 400, not counting tone. There is no ambisyllabicity and resyllabification. Korean syllables are maximally CVC, and the number of syllable types are 1,832 (Won, 1986). The coda of the first syllable can be resyllabified to the onset of the second syllable. Second, speech rhythm of Korean shows a mixed picture of stress-timed and syllable-timed languages. Mok & Lee (2008) investigated durational measures including the percentage of vocalic intervals in speech, the standard deviation of vocalic/consonantal duration, and pairwise comparisons of successive vocalic and intervocalic intervals. In their results, these durational measures of rhythm gave a mixed picture of Korean speech rhythm. Furthermore, word games (Sohn, 1987) and results of the controlled psycholinguistics studies (Simpson & Kang, 2004; Lee & Taft, 2009, among others) were shown to respect both syllables and phonemes. For example, there is a word-chain game named kketmaliski, where players are asked to say a word beginning with the final part of the previously heard word. In Korean, the final part is the orthographical syllable of the previous word. On the other hand, Sohn (1987) introduced another language game in which vowels of the two consecutive syllables are switched around without affecting other parts of the syllable (e.g., [ho.pak] 'pumpkin' to [ha.pok]). In this example, only the two vowels in the first and the second syllables are switched, suggesting that a phoneme segment is a functional unit. In addition, the Korean orthographic system (Hangul) has been described as an alphabetic syllabary (Taylor & Taylor, 1995) where each phoneme is represented by a Hangul letter, but these letters are not linearly ordered but grouped into a block which corresponds to a syllable. Thus, Hangul maps letters onto phonemes just as English and Dutch do, but the composition of its letters is shaped into a square-like block, which leads it to its overall shape to be more similar to Mandarin than to the regular alphabetic orthographies. All of these data point in favor of a hybrid phoneme/syllable unit in spoken word production (See Han & Verdonschot, 2017 for more details).

Alternatively, there might be some flexibility depending on task demands in spoken word production (Li & Wang, 2017). Even though the default preparation unit of a language in adults may be largely dependent upon the nature of a language, the preparation unit could be changed temporarily. To evaluate this hypothesis, Li & Wang (2017) recruited three groups of native Mandarin speakers, namely, kindergarten children who have not received formal literacy instruction, Grade 1 children who were more exposed to the alphabetic Pinyin system, and Grade 2 and 4 children who had better Chinese character knowledge, as well as the control group of adults. Interestingly, they showed that the preparation unit of spoken words is influenced by orthographic experience.[1]

1 An anonymous reviewer raised a possibility that not just task demands associated with the orthographic experience, but cognitive abilities of the participants might be responsible for change of the preparation unit. It is based on the fact that the participant groups in Li and Wang (2017) differed not only in their experience of orthography, but in their ages (kindergarten, Grade 1, Grade 2, Grade 4, and adults). We leave it for a future study.

Table 1. Materials for Experiment 1 and 2.
a) Onset condition

	Homogeneous					
	1		2		3	
	/p/		/s/		/n/	
	prompt	target	prime	target	prime	target
Heterogeneous 1	/c^{h}an.sʌŋ/ 'agreement'	/**p**an.tæ/ 'opposition'	/su.so/ 'hydrogen'	/**s**an.so/ 'oxygen'	/næŋ.paŋ/ 'air-conditioning'	/**n**an.paŋ/ 'heating'
2	/u.p^{h}ːjo/ 'stamp'	/**p**oŋ.t^{h}u/ 'envelope'	/c^{h}u.sʌk/ 'Moon festival'	/**s**oŋ.p^{h}jʌn/ 'rice cake'	/pæ.ku/ 'volleyball'	/**n**oŋ.ku/ 'basketball'
3	/nam.kik/ 'South Pole'	/**p**uk.kik/ 'North Pole'	/kwa.cɛ/ 'homework'	/**s**uk.cɛ/ 'homework'	/jʌ.u/ 'fox'	/**n**ik.tæ/ 'wolf'

b) Syllable condition

	Homogeneous					
	1		2		3	
	/p/		/s/		/n/	
	prime	target	prime	target	prime	target
Heterogeneous 1	/co.lip/ 'assembling'	/**pun**.hæ/ 'decomposition'	/mi.sa/ 'mass'	/**sʌŋ**.taŋ/ 'cathedral'	/c^{h}ʌn.sa/ 'angel'	/**nal**.kæ/ 'wing'
2	/a.ki/ 'baby'	/**pun**.ju/ -'powdered formula'	/sil.p^{h}æ/ 'failure'	/**sʌŋ**.koŋ/ -'success'	/kjɛ.cʌl/ 'season'	/**nal**.c'i/ 'weather'
3	/c^{h}il.p^{h}an/ 'blackboard'	/**pun**.p^{h}il/ 'chalk'	/si.hʌm/ 'test'	/**sʌŋ**.cʌk/ 'grade'	/tal.ljʌk/ 'calendar'	/**nal**.c'a/ 'date'

In this paper, we attempt to offer a straightforward explanation for the disparity between the previous studies, investigating a possible influence of task demands on the preparation of spoken words in Korean. Specifically, we report the results of two experiments testing for an onset phoneme as a functional unit in phonological encoding in Korean, the implicit priming task (Experiment 1) and the word naming task (Experiment 2). In Experiment 1, a traditional implicit priming task was administered among native Korean speakers. Many studies of word-form production have used the implicit priming task that is based on the principle that advanced knowledge of parameters of an action can speed performance of another action. Meyer (1990, 1991) first specified this paradigm where participants were asked to memorize sets of small numbers of word-pairs which were semantically associated (e.g., *fruit* - *pear*). The crucial controlled factor was homogeneous versus heterogeneous contexts: In homogeneous context, the response words of each word-pair shared part of their pronunciation ('the implicit prime'), which was originally first syllable (Meyer, 1990) or first onset phoneme (Meyer, 1991). After participants memorized a set, they were presented with a random stimulus member from the set (e.g., *fruit*), and then they were asked to name the other member of the pair (e.g. *pear*) as quickly as possible. The data of interest are the response latencies to initiate the response word in the homogeneous context compared to control, heterogeneous context. If the implicit prime is effective, the homogeneous context is faster than the heterogeneous context, suggesting that activation of the implicit prime can be possible in advance. By examining the production of Korean using implicit priming paradigm in the present study, we try to generalize theory that is based on this paradigm (Meyer, 1990, 1991 for Dutch; Chen *et al*., 2002 for Mandarin; O'Séaghdha *et al.*, 2010 for English; Kureta *et al*., 2006 for Japanese, among others).

In Experiment 2, a simple word naming task using the form preparation paradigm was administered among native Korean speakers (Chen & Chen, 2006; Roelofs, 2006; O'Séaghdha & Frazer, 2014). Without learning, participants were asked to name the words as quickly and accurately as possible as the letters of the words were unpredictably (randomly) presented. The crucial aspect of the design even in this task is again the context in which the words in a set appear in either homogeneous (the words share some ingredients) or heterogeneous (the words have nothing systematically in common) contexts. If participants name the target words more quickly in the homogeneous context, it can be interpreted as the shared ingredient contributing to advance preparation. These tasks thus can be employed to discover the basic units engaged in advance planning of spoken-word production. For directly comparing the results of Experiment 1 and 2, the same set of words were employed in this task.

2. Experiment 1: Implicit priming task

2.1. Participants

Participants were 24 native Korean speakers with normal or corrected-to-normal vision. There were 17 females and 7 males, whose ages ranged from 19 to 29 years (mean = 22.8). They did not have experience living outside Korea more than 6 months at the time of experiment and all experimental procedures were done in Korea.

2.2. Stimuli

Participants were presented with 9 word-pair items each for the onset and the syllable conditions as shown in <Table 1>. All the

prompts and response words were common Korean disyllabic nouns. For the onset condition, the response words consisted of 3 sets of 3 disyllabic words with the onsets /p/, /s/, and /n/ for the first syllable. For example, in the /p/ set, the 3 target words were /**p**an.tæ/ 'opposition', /**p**oŋ.t^{h}u/ 'envelope', and /**p**uk.kɨk/ 'north pole' that only shared the onset of the first syllable (as represented in bold) but had a different remaining syllable structure. The primary manipulation was whether the response word names were homogeneous (sharing the same onset) or heterogeneous (sharing nothing systematically in common). In the homogeneous context, the first set of three words beginning with /p/, for example, was presented in random order. The remaining sets of words beginning with /s/ and /n/ were also presented in the same way. In the heterogenous context, the first set of words included three words each of which began with /p/, /s/, and /n/ (e.g., /**p**an.tæ/, /**s**an.so/, & /**n**an.paŋ/). Thus, the words in the heterogeneous context did not share the word onsets. As the same set of the materials were presented to the homogeneous and heterogeneous contexts, the frequency of the test words was not controlled. These response words were combined with prompts which were selected to be semantically related to the responses words. In each of the test trials, the prompt (the left-hand member of the pair in <Table 1>) was presented, and the participant had to name the target word (the right-hand member of the pair). For example, the prompt for the target /pan.tæ/ 'opposition' was /c^{h}an.sʌŋ/ 'agreement'. The prompts showed various sounds and sub-syllabic structures. In the task, 3 lists were homogeneous, and the other 3 were heterogeneous. Each list had 3 presentation blocks, and in each block, each item was presented 4 times in a random order. Thus, in each list, each word pair was presented 12 times in total. The sequence of the homogeneous or the heterogeneous set, and the order of four list-pairs were counterbalanced across participants. For the syllable condition, the design was the same as that for the onset condition, except that the target items in a homogeneous list shared the whole syllable (as represented in bold in <Table 1>) rather than the onset for the first syllable. For example, in the /p/ set, the 3 target words were /**pun**.hæ/ 'dismantle', /**pun**.ju/ 'powdered formula', and /**pun**.p^{h}il/ 'chalk'. In total, each participant received 432 trials (2 conditions (onset, syllable) x 3 blocks x 3 onsets (/p/, /s/, /n/) x 3 items x 4 repetitions).

2.3. Procedure

The procedure consisted of two sessions, a learning session and a test session. In the learning session, each participant was presented with 18 cards, each of which had one word on it. Participants were provided with disyllabic names that were related in meaning to each word, and were then asked to memorize the names as provided. Each practice of the test was given to the participants for them to familiarize with the task before the test session. In the practice session, the 18 words were presented on a computer screen in a randomized order and the participants were required to provide the corresponding names as quickly and accurately as possible. When participants' performance indicated that they were ready for the task, the test session began. Both the practice and test sessions were implemented using E-Prime 2.0 Professional (Psychology Software Tools, Inc.). During the test session, each trial began with a 200 ms, 1000 Hz warning beep and a cross ('+') fixation presented at the center of the screen. After the offset of the beep, the prompt word was presented visually in 25-point *Kullim* bold font 600 ms later at the center of the screen for 1000 ms or until a response was provided. All tokens appeared as black characters on white background. The participants were instructed to name the target word as quickly and accurately as possible. A Serial Response Box with Voice Key and a microphone of the E-Prime software was used to record participants' reaction time. After each successive trial, the following trial began 500 ms after a response was given. During the experiment, the experimenter sat next to the participants, recorded their responses using built-in recording function of iPhone 6S and scored their naming accuracy. The participants rested between the onset session and the syllable session for 5 minutes.

2.4. Results

Response times (RT) were calculated based on correct trials only. The participants' incorrect responses, no responses, stuttering, responses beginning with a non-linguistic sounds or repaired responses were considered errors. RTs that fell above or below 2.5 standard deviations away from the mean RT were also removed. In total, 4.8% of the RT data was removed. <Table 2> displays the mean of the valid RTs and error rates for the 3 sets of targets in each homogeneous and heterogeneous contexts, and their differences (context effect). Analyses of variance (ANOVA) were conducted on correct response times. For both onset and syllable sessions, Context (homogeneous and heterogeneous) and Block (Block 1, 2 and 3) were within-subject factors.

Table 2. Mean reaction times to Korean disyllables (ms) in each block, with error rates (E%) standard errors (SE) and preparation effects (Difference)

session	block		Homo-geneous	Hetero-geneous	Difference
onset	1	M	621	619	-2
		E%	3.36	3.7	
		SE	9.77	9.08	
	2	M	613	629	16
		E%	2.89	2.78	
		SE	8.87	11.24	
	3	M	616	608	-8
		E%	2.89	3.36	
		SE	10.69	9.51	
	mean	M	617	619	2
		E%	3.05	3.28	
		SE	8.95	9.03	
syllable	1	M	659	675	16*
		E%	6.83	8.1	
		SE	12.63	12.24	
	2	M	630	661	31**
		E%	3.7	5.56	
		SE	13.84	11.62	
	3	M	629	648	19*
		E%	2.2	4.4	
		SE	14.91	9.79	
	mean	M	640	662	17**
		E%	4.24	6.02	
		SE	12.25	10.15	

Note: * $p < .05$; ** $p < .01$

For the onset session, there were no main effects of Context [$F(1, 23) = .340$, $p = .566$], Block [$F(2, 46) = 2.177$, $p = .125$], and their

interaction F(2, 46) = 2.752, p = .074]. On the contrary, for the syllable session, a significant Context main effect was showed [F(1, 23) = 20.090, p < .001]. A Block main effect was also found [F(2, 46) = 7.287, p < .05]. However, the interaction between these two factors (Context x Block) was not significant [F(2, 46) = .812, p = .450]. The mean RT differences between the homogeneous and heterogeneous contexts were significant in all three blocks. These results suggest that we found significant syllable priming, but onset phonemes did not evoke additional priming.

3. Experiment 2: Word naming task

3.1. Participants and stimuli

Participants were 24 native Korean speakers with normal or corrected-to-normal vision, who were not participated in Experiment 1. There were 9 females and 15 males, whose ages ranged from 21 to 30 years (mean = 24.8). All other conditions were the same as in Experiment 1. The stimuli were the same as in Experiment 1 except the prompts were not provided.

3.2. Procedure

The detailed procedure was the same as in Experiment 1 except that the task format was word naming. Without any learning session, participants were asked to name the word that appeared on the computer screen as quickly and accurately as possible.

3.3. Results

Errors were coded in the same way as in Experiment 1. RTs that fell above or below 2.5 standard deviations away from the mean RT were also removed. In total, 2.8% of the RT data was removed. Analyses of Variance (ANOVA) were conducted on the response times (RT) to the correct responses. For both onset and syllable sessions, Context (homogeneous and heterogeneous) and Block (Block 1, 2, and 3) were within-subject factors. <Table 3> displays the descriptive data of participants' performance with mean RTs, standard errors, and preparation effects by block and session. The preparation effects are represented by the RT differences between the homogeneous and the heterogeneous contexts.

For the onset session, the main effect of Context did reach significance [F(1, 23) = 5.023, p <. 05]. A significant Block main effect was also found [F(2, 46) = 14.105, p < .001]. However, Context did not show a significant interaction with Block [F(2, 46) = .105, p = .856]. In Block 1, the difference between the two contexts was 4 ms; in Block 2, participants showed a 7 ms facilitation effect in the homogeneous context; in Block 3, participants showed 4 ms difference in the same homogeneous context. Post-hoc analysis suggested that the effect of Context was only significant in Block 2, while it was not significant in the first or the third block.

Table 3. Mean reaction times to Korean bisyllables (ms) in each block, with error rates (E%) standard errors (SE) and preparation effects (Difference)

session	block		Homo-geneous	Hetero-geneous	Difference
Onset	1	M	411	415	4
		E%	4.05	4.51	
		SE	7.54	7.78	
	2	M	393	400	7*
		E%	2.43	3.13	
		SE	6.92	6.94	
	3	M	392	396	4
		E%	2.66	3.59	
		SE	9.56	7.62	
	mean	M	398	404	6*
		E%	3.05	3.74	
		SE	7.40	7.13	
Syllable	1	M	399	407	8
		E%	2.20	4.40	
		SE	6.91	7.57	
	2	M	383	393	10*
		E%	1.16	2.20	
		SE	7.69	7.13	
	3	M	382	391	9*
		E%	1.39	2.20	
		SE	8.04	7.09	
	mean	M	388	397	9**
		E%	1.58	2.93	
		SE	6.89	6.35	

Note: * p < .05; ** p < .01

For the syllable session, a significant Context main effect was showed [F(1, 23) = 17.434, p < .001]. A Block main effect was also found [F(2, 46) = 6.564, p < .05], possibly due to a practice effect where participants showed faster RTs in later blocks (Block 1: 399ms; Block 2: 383ms; Block 3: 382ms). Thought there was a practice effect even in the onset session, its effect was not significant. The interaction between these two factors (Context x Block) was significant [F(2, 46) = 24.221, p < .05]. The mean RT differences between the homogeneous and heterogeneous sessions were not significant in the first block, but significant differences were shown in the second and the third blocks.

The main result of this task was that both onset and CV syllable priming were obtained using a word naming, even though the CV syllable priming effect was greater than the onset priming effect.

4. General discussion

The present study examined the influence of task demands on phonological preparation in native Korean speakers. In the implicit priming task, the native Korean speakers failed to benefit from onset phoneme preparation, even though there was a significant effect of sharing the initial syllables. In contrast, in the word naming task, the preparation effect was shown among Korean speakers when the initial phonemes as well as the initial syllables were shared by the prime and the target words. These results indicate that the production process can also vary within the same language, when the task differs. Specifically, we showed that the process of word form encoding in spoken word production is somewhat different between word naming and implicit priming in Korean, even though both tasks involve accessing phonological codes.

The temporary change of the preparation unit between two tasks is likely to be explained by the attentional theory (O'Séaghdha & Frazer, 2014). In O'Séaghdha & Frazer (2014), three different tasks were conducted such as a picture naming, word naming and a traditional implicit priming tasks. In both picture naming and word naming tasks, the preparation effect was observed even when the stimuli included a word that did not share the initial phoneme with the other members (e.g., for /b/-beginning set, *bake*, *bore*, *boot*, & *tail* provided) in the homogeneous context. The native English speakers initially disrupted to the exceptional item relative to the consistent items but later they addressed the exceptional item to the benefit of both. In contrast, this effect was not shown in the traditional implicit priming task. To account for the form preparation observed in picture/word naming and for its absence in implicit priming, O'Séaghdha & Frazer (2014) hypothesized that form preparation is implemented by attention in working memory. Due to its limited capacity, attention to a certain phonological component could be modulated by task demands. As compared to the picture/word naming tasks, the implicit priming task is very resource intensive and demanding because it requires decoding the information of the prime members first and then retrieving the target members. Hence, speakers can attend to the shared initial phonemes in less demanding tasks, but in a more challenging task, it is difficult to direct to their attention to the shared phonological fragments and benefit from them. In light of the attentional theory, word naming was not very demanding in the context of the form preparation task because the target words are directly available and retrieval may not need conceptual engagement. Accordingly, native Korean speakers were able to maintain their attention to the shared word-initial phonemes. In contrast, they had difficulties to allocate their attention to such unit in a more cognitively-demanding implicit priming task, because they should decode the information of the prime members first and then retrieve the target members in a short time. Unlike the actual spoken word production, planning for word production is subject to strict capacity limits. As the focus of attention in working memory is very small (McElree, 2001), attention to the shared phonological component may contend with other task-specific demands.

Together with the previous findings, it is conceivable that there are cross-linguistic differences in the first selectable unit in preparation of spoken word production, but at the same time, within a single language, the preparation unit might not be immutable. Li & Wang (2017) showed that orthographic experience could influence the preparation. O'Séaghdha & Frazer (2014) showed that task demands could affect the participants' responses to the exceptional items. Relatedly, it was shown in Chen & Li (2011) that even Mandarin speakers may involve somewhat different word form encoding in the word naming and word typing tasks. Both tasks require accessing the phonological codes, but Mandarin speakers could flexibly change the functional unit to a phoneme when they were required to type the words. The present results further demonstrate that speakers of the same language may show different responses to the shared phonological components according to the tasks with distinctive task demands.

It is notable that Dutch and English show comparable form preparation with constant sets in picture and word naming (O'Séaghdha *et al*., 2010) and implicit priming tasks (Meyer, 1990, 1991), suggesting that both tasks are equivalent with respect to the phonological phase of encoding (Roelofs, 2006). Thus, the present results might lead to the possibility that the standing of the onset phoneme as a preparation unit in spoken word production in Korean is not solid as those shown in Dutch and English. As discussed in the introduction session, Korean shows hybrid nature of functional units in that there is mixed theoretical and experimental evidence for either onset phonemes or syllables in the literature. Thus, the preparation unit could show more variation than other alphabetic languages such as English and Dutch. Furthermore, even in the significant onset priming effects in the word naming task, the RT differences between the homogeneous and the heterogeneous contexts were 4 ms in the first block, which increased to 7 ms in the second black, which were statistically significant values, but the RT differences decreased to 4 ms in the third block. Even though the mean values across the three blocks were significant, the priming effect of onset overlapping was far smaller and inconsistent than that of syllable overlapping.

In conclusion, the present study showed that speakers are flexible in the selection of the first unit in phonological preparation for spoken word production. As attention may be involved in phonological preparation, task demands could be responsible for the absence/presence of onset priming effect in Korean.

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● **Tae-Hwan Choi**
Verum Liberal College
Catholic Kwandong University
24 Beomil-ro, 579 beon-gil
Gangneung-si, 25601, Kangwon-do, Korea
Tel: 033-649-7354
Email: tchoi@cku.ac.kr
Fields of interest: Phonetics, Phonology

● **Sujin Oh**
Department of English
Konkuk University
120 Neungdong-ro, Gwangjin-gu
Seoul 05029, Korea
Tel: 82-10-8615-6641
Email: cutmirul@konkuk.ac.kr
Fields of interest: Phonetics, Second language acquisition

● **Jeong-Im Han** corresponding author
Department of English
Konkuk University
120 Neungdong-ro, Gwangjin-gu
Seoul 05029, Korea
Tel: 02-450-3339
Email: jhan@konkuk.ac.kr
Fields of interest: Phonetics