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Differential Effects of Phonological and Lexicogrammatical Errors on NS and NNS Listeners' Perceptions of Comprehensibility: An Exploratory Study

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This paper investigates how different linguistic features (i.e., phonological vs. lexicogrammatical aspects of language) affect both native speaking (NS) and non-native speaking (NNS) listeners' perceptions of comprehensibility. In the experiment, seven NS and near-native NNS listeners rated the comprehensibility of two types of NNS extemporaneous speech samples: one was carefully transcribed by the researcher and read by NSs, while the other was an unaltered collection of speech tokens recorded by NNSs. The results demonstrated two possible patterns: (a) That NNS listeners tended to show high awareness towards phonological aspects of language rather than lexicogrammatical aspects of language; and (b) the comprehensibility ratings of NS listeners were equally influenced by all kinds of linguistic errors. These findings were carefully discussed in order to inform both theoretical argument and pedagogical inquiries in practice, establishing better understanding of second language acquisition processes.

Key words: comprehensibility, intelligibility, pronunciation teaching, linguistic error analysis

INTRODUCTION

In light of the maturational constraints on second language acquisition (SLA) processes both in the domain of morphosyntactic and phonological development after puberty (Abrhamson & Hyltenstam, 2009; Birdsong, 2006; DeKeyser & Larson-Hall, 2005; Singleton, 2005), it is very important for non-native speaking learners (NNS) to set a realistic goal such as attaining comprehensibility rather than native-like proficiency for the purpose of successful second language (L2) communication (Derwing & Munro, 2005; Piske, Flege, & MacKay, 2001). While various SLA studies have extensively examined what features promote or prevent successful understanding between native speaking and non-native speaking takers (e.g., Derwing & Munro, 1997; Gass & Varonis, 1984; Mackey, Gass, & McDonough, 2000; Munro & Derwing, 1999; Munro, Derwing, & Morton, 2006; Varonis & Gass, 1982), a growing research attention has been directed to the roles of different linguistic elements such as pronunciation, lexis, grammar, semantics and pragmatics in comprehensibility. This topic is of great interest to not only SLA theorists who investigate the complex mechanism of negotiated interaction between NS and NNS but also practitioners such as students and teachers in L2 classrooms who want to know about learning/ teaching priorities.

Acknowledging the complex nature of this issue (i.e., what types of linguistic errors particularly affect comprehensibility), the present study takes a first step towards investigating in detail how both NNSs and NSs perceive the roles of phonological and lexicogrammar aspects of language in comprehensibility. The subsequent sections present literature reviews on the relevant topics, focusing on definitions of comprehensibility in SLA, summaries of previous studies that examined NNSs and NSs' perceptions of comprehensibility, and pedagogical issues regarding pronunciation and grammar teaching in L2 classrooms. Finally, the design and findings of the current research will be described.

COMPREHENSIBILITY IN SLA

Definition of Comprehensibility

While comprehensibility has been recognized and discussed as a highly important concept because it relates to theoretical and practical relevance in SLA, the definition of comprehensibility varies in a wide range of SLA studies. On the one hand, L2 speech studies have explored what speech properties (i.e., segmental and supra-segmental aspects of L2 sounds) constitute intelligible or comprehensible pronunciation (Anderson-Hsieh & Koehler, 1988; Bent & Bradlow, 2003; Field, 2005; Hahn, 2004; Jenkins, 2000, 2002; Munro & Derwing, 2001). Since the focus of these studies was exclusively on the impacts of speech properties, the definition tended to be specific to sounds (for a comprehensive review, Munro, Derwing, & Morton, 2006). For example, since Abercrombie (1949) proposed the idea of comfortably intelligible, emphasizing the importance of "a pronunciation which can be understood with little or no conscious effort on the part of the listeners" (p. 120), others have followed, elaborated, and refined her definition, such as "being understood by a listener at a given time in a given situation" (Kenworthy, 1987, p. 13) and "the extent to which the acoustic-phonetic content of the message is recognizable by a listener" (Field, 2005, p. 401).

On the other hand, research attention has also been given to investigate how n**o**t only phonological aspects but also morphosyntactic, lexical, semantic, and pragmatic elements of language affect comprehensibility or intelligibility in L2 communication (e.g., Derwing & Munro, 1997; Gass & Varonis, 1984; Munro & Derwing, 1995, 1999; Munro, Derwing, & Morton, 2006; Varonis & Gass, 1982). It is noteworthy that comprehensibility in these studies has been defined in a broader sense, such as "the apprehension of the message in the sense intended by the speaker" (Nelson, 1982), and "the extent to which the native speaker understands the intended message" (Derwing & Munro, 1997, p. 2). Following this inclusive definition of

comprehensibility, the present study approaches how NNSs and NSs perceive various types of linguistic errors in comprehensibility in L2 communication, focusing especially on phonological and lexicogrammatical errors.

Theoretical Issues

From the theoretical perspective, comprehensibility is a crucial construct for proponents of the Interaction Hypothesis (Gass, 1997; Long, 2007; Pica, 1994) who claimed that negotiation for meaning triggered by "unsuccessful" comprehensibility during NS-NNS interaction plays a key role in successful L2 development, due to the lack of comprehensibility pushing NS interlocutors to give feedback to NNS learners through meaningful discourse (see Mackey & Goo, 2007 for meta-analysis on L2 interaction studies). This whole interactional move is believed to induce L2 learners to focus their selective attention on form, and to help them notice the target language in L2 input in the most effective manner (see also Schmidt, 2001).

However, there is no guarantee that NNS learners whose attention is exclusively on meaning can always succeed in perceiving the corrective intention of NS interlocutors' feedback. One of the reasons could be that both NSs and NNSs do not always agree when comprehensibility breaks down. In many cases, when NS interlocutors initiate a feedback move in an implicit manner, such as recasts (i.e., recasting NNS learners' nontargetlike production), NNS learners do not always perceive feedback as language-focused, arguably because their errors (likely with morphosyntactic focus) do not saliently hinder comprehensibility in L2 communication (e.g., Ellis & Sheen, 2006; Lyster & Saito, 2010). As a remedy, while some theorists claim that learners need explicit signals about feedback with some metalinguistic information (e.g., Ellis, 2007; Ellis, Loewen, & Erlam, 2006; Sheen, 2007), others promote output-prompting types of feedback that withdraw correct forms and push learners to self-repair their nontargetlike production (e.g., Ammar & Spada, 2006; Lyster, 2004; Yang & Lyster, 2010). However, the question that still needs to be answered is: How and when do both NS

interlocutors and NNS learners perceive the breakdown of comprehensibility and what kind of linguistic errors tend to lead them to do so?

Whereas a number of observational studies have shown that NNSs tend to be sensitive to their phonological errors than grammatical veracity in order to attain successful comprehensibility (e.g., Carpenter, Jeon, MacGregor, & Mackey, 2006; Ellis, Bastsukmen, & Loewen, 2001; Lyster, 1998; Mackey et al., 2000; Sheen, 2006), it still remains to be open to debate how NSs perceive comprehensibility of NNS speech. Recently, Derwing and Munro conducted a series of experiments to investigate the link between (a) phonemic and phonetic, morphosyntactic, and semantic aspects of language, and (b) NS listeners' perceptions of accentedness, comprehensibility and intelligibility (e.g., Derwing & Munro, 1997; Munro & Derwing, 1995, 1999; Munro et al., 2006). They identified that comprehensibility can be related to not only phonemic and phonetic errors but also to grammatical accuracy (Derwing & Munro, 1997; Munro & Derwing, 1999), semantic unambiguousness (Munro & Derwing, 1995), and listeners' familiarity to particular L2 accents (Derwing & Munro, 1997; Munro et al., 2006). However, this vein of L2 research strongly calls for future research which investigates the relative importance of different types of linguistic errors in comprehensibility. To this day, among very few studies have pursued this topic are a series of studies conducted by Gass and Varonis (Gass & Varonis, 1984; Varonis & Gass, 1982). In Varonis and Gass's (1982) experiment, they examined the impact of pronunciation and grammar errors on comprehensibility by asking NS listeners to measure comprehensibility of grammatical and ungrammatical sentences read by NSs and NNSs. They did not, however, draw any conclusion, suggesting that pronunciation and grammar factors interacted to determine a degree of comprehensibility (see also Gass & Selinker, 2000).

Pedagogical Issues

From a pedagogical perspective, more research on the roles of different linguistic features in comprehensibility makes significant implications for the

current practice in L2 classrooms. Despite the amount of attention directed at grammar instruction, the value of teaching pronunciation has not been sufficiently recognized by SLA researchers as well as practitioners, such as teachers and learners in L2 classrooms (Derwing & Munro, 2005; Levis, 2005). For instance, recent meta-analyses on various topics in instructed SLA experimental studies published between 1980 and 2008 did not identify any single pronunciation teaching study, revealing surprisingly little research interest in the field (Lyster & Saito, 2010; Norris & Ortega, 2000; Spada & Tomita, 2010). For practitioners, pronunciation teaching has not been discussed within a framework of communicative language teaching, because typical pronunciation exercises likely fall into over-dependency on intensive decontextualized methods such as repetition and mechanical drills (DeKeyser, 1998); these practices being not considered as important to develop learners' communicative competence (Pennington, 1996).

Consequently, as Levis (2005) pointed out, "to a large extent, pronunciation's importance has always been determined by ideology and intuition rather than research" (p. 369). Similarly, Derwing and Munro (2005) noted that "much less research has been carried out on L2 pronunciation than on other skills such as grammar and vocabulary, and instructional materials and practices are still heavily influenced by commonsense intuitive notions" (p. 380). In this regard, Celce-Murcia, Brinton, and Goodwin (1996) stressed that further research is needed to (a) clarify the role of pronunciation for the purpose of successful L2 communication, and (b) enhance both researchers' and practitioners' awareness towards pronunciation teaching research and practice. That is to say, we still need to examine whether NSs and NNSs recognize the importance of SLA processes in phonological domains as much as their exclusive attention to morphosyntactic areas of language.

NS and NNS Listeners

Recently, it was reported that the number of NNSs greatly exceeds NSs and local varieties of English have received attention across *inner*, *outer* and

expanding circle English in which all speakers can equally maintain their own membership in the international community (e.g., Brutt-Griffler, 2002; Kachru, 1992). Consequently, recent L2 education studies have paid ever more attention to comprehensibility not only in NS-NNS but also in NNS-NNS interaction (e.g., Field, 2005; Munro et al., 2006). In conjunction with her observation data in ESL classrooms in England, Jenkins (2002) claimed that, especially in NNS-NNS communication, pronunciation is "by far the most frequent and the most difficult to resolve" (p. 85). That is, whereas NSs can process contextual, syntactic and lexical cues to compensate for their interlocutors' pronunciation errors (i.e., top-down approach), NNSs tend to primarily focus on phonological aspects for meaning (i.e., bottom-up approach) (for further discussion, see also Jenkins, 2000). The current study further examines this point in order to test if NS and NNS listeners process comprehensibility in a different manner.

CURRENT STUDY

Given that the purpose of the current study is to make a very first attempt at finding possible pattern in regard to the impacts of different types of linguistic errors on comprehensibility of NS and NNS listeners, particularly highlighting phonological and lexicogrammatical aspects of language, the intention of this paper is inevitably exploratory in nature. This paper carefully examines the complex issue of how NNS and NS listeners perceive NNS speech with a wide range of linguistic errors by answering the following research question. How do phonological and lexicogrammatical aspects of language promote or prevent NS and NNS listeners' perceptions of comprehensibility?

METHOD

Procedure

In the current experiment, NS and near-native NNS interlocutors rated comprehensibility in response to two types of NNS learners' speech tokens whose linguistic variables were systematically manipulated (one was not controlled; the other was clearly transcribed by the researcher and read by NSs). The procedure that the present study adopts was built on that of Varonis and Gass's (1982) study. In order to see which factors (i.e., accurate pronunciation vs. correct grammar) contributed to NS listeners' perceptions of comprehensibility, Varonis and Gass (1982) asked NS listeners to transcribe syntactically-correct and -incorrect sentences read by NSs and NNSs. In the present study, three methodological issues, however, were modified and tailored to meet the research questions. First, the speech tokens that NSs listened to and rated for comprehensibility were more communicative in nature; NNSs were asked to explain a set of two pictures (i.e., a picture description task; e.g., Derwing & Munro, 1997; Munro & Derwing, 1999). Second, to investigate the relative weights of phonological and lexicogrammatical factors of language, these speech tokens were also carefully controlled; while a half of the tokens remained intact (*non-controlled* NNS speech tokens), the other half were clearly transcribed by the researcher and read by NSs (*controlled* NNS speech tokens). Third, a rating task was employed in the listening procedure. Although transcription tasks have been commonly employed to measure comprehensibility/intelligibility of L2 speech (e.g., Derwing & Munro, 1997; Gass & Varonis, 1984), previous studies confirmed that phonological, lexical, syntactical and semantic properties of speech tokens are well correlated with scores of a rating task with a 9-point scale but not with those of a transcription task, because the former task (rating) requires "extra processing time to understand" (Derwing & Munro, 1997, p. 4) which draws the listeners' attention to linguistic properties of L2 speech compared to the latter task

(transcription) (see also Munro & Derwing, 1995, 1999; Munro, Derwing, & Morton, 2006).

Speech Token Preparation

Non-controlled NNS Speech Tokens. Originally, 28 Japanese ESL learners, who were studying abroad at an English-speaking university in New York, participated in the present study, and six of them (four males; two females) who were considered as intermediate learners but with heterogeneous proficiency levels were carefully chosen as participants for the research after initial screening based on their age, length of stay in the USA, and TOEFL CBT scores (see the Table 1 for the demographic data of the six participants).[1] At the time of the experiment, they reported that they had stayed in the target language country (the USA) for about six months (means of their LOR; 6.22 months) and all of them were studying abroad either at undergraduate or graduate level courses.

They visited the researcher's office individually, and were asked to complete a picture description task in front of the researcher orally as if they were in the middle of natural L2 communication. These pictures were about a man and woman who first act together a play, then fall in love with each other, and finally get married. In order to familiarize the participants with the task, all of them were also asked to do one another picture description task as a practice run before the actual data sessions. Their speech tokens were recorded by means of the computer speech recognition software, *Praat* (downloadable at www.praat.org) at 44.1 kHz sampling rate and a 16-bit resolution. Six speech tokens were prepared and stored as "*non-controlled* NNS speech tokens" (6 NNSs × 1 picture description = 6 tokens). Finally, the researcher carefully transcribed all the data and submitted the results to several text analyses developed by Halliday (1992) and Storch (2005), in order to examine lexicogrammatical properties (this point will be discussed in

[1] The purpose of recruiting NNS learners with different proficiency levels was to generate NNS speech tokens which included a wide range of linguistic errors.

the results section).

*Controlled NNS speech Tokens (read by NSs).*One month after the oral data sessions, all the six NNS learners came back to the researcher's office, and performed the same tasks with the same picture again, but in writing instead of orally. They were asked to type by using a laptop computer to complete this task as if they were involved with the Computer-Mediated Communication (CMC; i.e., online-chatting). Note that recent CMC studies empirically showed that lexicogrammatical properties between oral and CMC discourse are substantially similar (for their edited volumes about the CMC, see Waes, Leijten, & Neuwirth, 2006). All of the written data was printed out and arranged (6 NNSs × 1 picture description = 6 written tokens) for two native speakers of English to read. As was the case with the oral data session, the participants were asked to practice before actual data sessions

TABLE 1
Participants' Information (NNSs)

Six Japanese ESL Students in NY	
Age	*M* = 24.20 years old (*SD* = 5.31)
LOR	*M* = 6.22 months (*SD* = 3.57)
Gender	4 males / 2 females
TOEIC CBT	*M* = 229.33 (*SD* = 15.52)

The two native speakers of English (one male; one female) were asked to read the transcriptions of the six tokens that NNS learners produced in writing. They were graduate students of a department of linguistics at the same university in New York. Both of them had grown up in upstate New York, and spoke English as their first language with north-eastern accents. Three of the six written tokens were randomly chosen and assigned to one of the NSs. The remaining three tokens were given to the other.

Before recording, however, they were first asked to carefully check all the written data in print (the six written tokens) and to practice reading them aloud several times until they felt comfortable doing so. Both of the NSs reported that the six tokens were difficult to read without practice, due to the inaccurate lexicogrammatical usage of language (this point will be discussed

in the results section). After a sufficient amount of practice, they were asked to read three assigned tokens aloud, and all the data were recorded by means of the speech analysis software, *Praat*. Thus, based on the written data sessions, 6 speech tokens were created (i.e., 2 NSs read 3 of 6 NNS tokens = 6 NNS tokens), and the data was stored as "*controlled* NNS speech tokens." In this way, the assumption here is that these six pairs of non-controlled and controlled NNS speech tokens (12 tokens in total) did not essentially differ (same talker and task) except that the former included both various lexicogrammar and phonological errors and the latter contained various lexicogrammar errors without any phonological errors (because NSs read the orthographic versions of the NNS tokens). These two types of speech tokens were intentionally prepared in order to investigate the differential effects of lexicogrammatical and phonological errors on NS listeners' perception of comprehensibility.[2]

Baseline NS speech Token. One native speaker of English (a female) was recruited and asked to do the same picture description task orally. Her data served as a baseline token compared to the other 12 NNS tokens. She grew up in upstate New York, and spoke English as her first language with a north-eastern accent. The data was stored as "*baseline* NS speech token." In total, after the oral, written, and baseline data sessions, there were 13 speech tokens (6 non-controlled NNS tokens + 6 controlled NNS tokens + 1 baseline NS token = 13 speech tokens).

Listening Session

Previous research had shown that various *listener* factors greatly influence both NS and NNS listeners' speech perceptions (e.g., listeners' familiarity to topics, a particular type of accent, experience with L2 accents; Derwing & Munro, 1997;

[2] Given that it is extremely difficult to prepare the latter type of NNS speech tokens (those without any phonological errors), I intentionally made the difference in phonological aspects between the two speech tokens greater than in any other linguistic aspects.

Gass & Varonis, 1984; Kennedy & Trofimovich, 2008) and controlling listeners' heterogeneity is a controversial topic in L2 speech studies. Therefore, the decision was made to carefully select a small number of listeners who had similar listening experiences to accented L2 speech to examine the details of their evaluation instead of recruiting a large number of listeners with diverse backgrounds. Four NS listeners (one male; three females) as well as three near-native NNS listeners (one male; two females) were recruited at another English-language university in NY. All of these listeners (four NS and three NNS listeners) were carefully chosen in light of their familiarity to a wide variety of accented L2 speech (including Japanese learners' accents).[3] One of them was an instructor for Phonetics and Phonology at a department of linguistics while the other three were highly experienced ESL teachers at the same school.

As for the near-native NNS listeners, all of them were graduate students at the department of linguistics specializing in experimental phonetics (they reported that they had taken several phonetics/phonology classes and had a great deal of experience listening to various types of accented L2 speech samples). Two NNS listeners were from Korea, with the other being from Taiwan. All of them reported their LOR around three years (M = 2.84 years). Thus, it could be said that their ability to judge accented L2 speech was highly reliable and trustworthy.[4]

In a quiet room, the four NS listeners were asked to listen to the 13 speech tokens in a randomized order, and to rate them for comprehensibility with a 9-point scale (1. very easy to understand – 9. very hard to understand) adopted by Derwing and Munro's (1997) comprehensibility measure (see

[3] Previous studies revealed that experienced NS listeners are better at understanding accented L2 speech than inexperienced listeners (e.g., Derwing & Munro, 1997; Kennedy & Trofimovixh, 2008).

[4] The 9 point scale method was adopted following the similar previous studies (e.g., Derwing & Munro, 1997; Munro & Derwing, 1999) and Flege's justification for the 9 point scale rather than the 5 or 7 point scales to measure goodness of L2 speech (Southwood & Flege, 1999).

also Munro & Derwing, 1999).[5] They were also encouraged to use the 9-point scale as much as possible. With respect to the three NNS listeners, their listening sessions took place individually at the researcher's office. The entire listening task lasted for half an hour in total per listener (summarized in Figure 1).

Results of Linguistic Properties

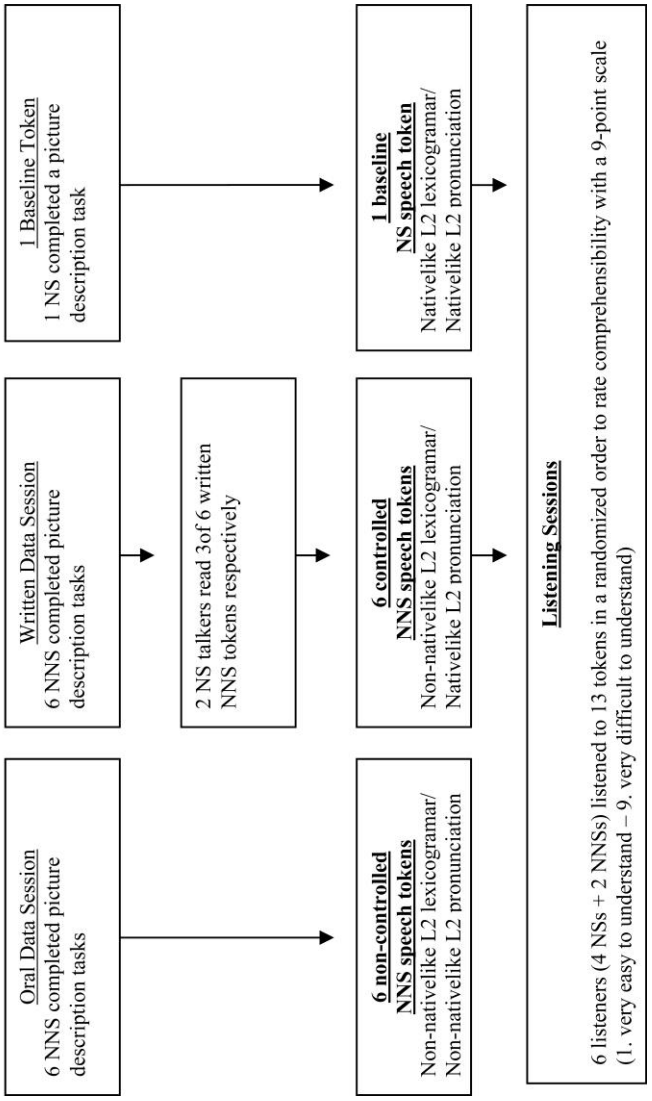
Lexicogrammatical Properties. Following the text analysis method developed by Halliday (1992) and Storch (2005), this section first presents the results of lexicogrammatical properties of both non-controlled NNS speech tokens (the oral data) and controlled NNS speech samples (the written data), focusing on (a) the number of words, (b) the number of clauses, (c) fluency (i.e., *lexical density*; the number of words per clause) (d) accuracy (i.e., the percentage of error-free clauses out of all sentences or words) and (e) complexity (i.e., the percentage of dependent clauses out of all clauses). In the present study, following Derwing and Munro's (1997) transcription methodology, grammatical errors include inappropriate verb tense usage, incorrect use of plurals, incorrect choice of prepositions, and incorrect pronoun assignment.

Intriguingly, the results of two-tailed paired *t* tests showed that there were no significant differences between the lexicogrammatical properties of non-controlled and controlled NNS speech tokens:

1. the number of words (t (11) = 0.749, p = .469; M = 48.3 words for the non-controlled data; M = 50.5 words for the controlled data)
2. the number of clauses (t (11) = 0.369, p = .719; M = 6.8 clauses for the non-controlled data; M = 8.3 clauses for the controlled data)

[5] The 9 point scale method was adopted following the similar previous studies (e.g., Derwing & Munro, 1997; Munro & Derwing, 1999) and Flege's justification for the 9 point scale rather than the 5 or 7 point scales to measure goodness of L2 speech (Southwood & Flege, 1999).

FIGURE 1
Summary of the Procedure



3. lexical fluency (t (11) = 0.459, p = .655; M = 6.7 words per clause for the non-controlled data; M = 6.4 words per clause for the controlled data)
4. accuracy (t (11) = 0.525, p = .610; M = 68 % for the non-controlled data; M = 71.4 % for the controlled data)
5. complexity (t (11) = 0.583, p = .571; M = 21.6 % for the non-controlled data; M = 28.5 % for the non-controlled data). In short, lexicogrammatical aspects of two types of speech tokens were *similar* to each other (summarized in Table 2).

Phonological Properties. In order to prove the assumption that the phonological properties of the two types of the tokens read by NNSs and NSs were essentially *different* from each other, "speech rate," identified as one of the speech properties that substantially cause foreign accentedness (Munro & Derwing, 2001), was carefully checked. The results noted a significant difference between the two types of data, t (11) = 9.413, p < .0001 (summarized in Table 6). Namely, the speech rate of the controlled speech token read by NSs (M = 0.228 sec per syllable) was significantly faster than that of the non-controlled speech token read by NNSs (M = 0.360 sec per syllable), and the former was considerably closer to the speech rate of the baseline token (M = 0.210 sec per syllable) (summarized in Table 3).

TABLE 3
Summary of Speech Rate

;	Speech Rate (sec per syllable)	
	Oral Data read by NNSs	Written Data read by NSs
Participant 1	0.352	0.215
Participant 2	0.317	0.211
Participant 3	0.418	0.234
Participant 4	0.324	0.213
Participant 5	0.371	0.242
Participant 6	0.380	0.257
Mean	0.360	0.228
Baseline Data	0.210	

Summary of Linguistic Properties. Taken together, both non-controlled and controlled speech tokens were similar in terms of their lexicogrammatical

properties (i.e., the number of words and clauses, fluency, accuracy and complexity), but different in terms of their phonological properties (i.e., speech rate, foreign accentedness).

Results of Subjective Ratings

All seven listeners rated the baseline token as 1 (very easy to understand) without fail, indicating trustworthy intra-rater reliabilities among raters. Subsequently, this section presents the detailed outcomes of how each listener's subjective rating scores (1. very easy to understand – 9. very difficult to understand) were correlated with the linguistic aspects of tokens (lexicogrammatical and phonological properties).

1. The number of words
   Two NS listeners showed a significantly negative correlation between the number of words and their comprehensibility perceptions (r = -.59, and -.70, p < .05).
2. The number of clauses
   None showed any correlation between the number of clauses and their comprehensibility perceptions.
3. Fluency (Lexical Density)
   One NS listener showed a statistically close correlation between the fluency factor and their comprehensibility perceptions (r = -.58, p = .058).
4. Accuracy
   None of them showed any correlation between the accuracy factor and their comprehensibility perceptions.
5. Complexity
   None of them showed any correlation between the complexity factor and their comprehensibility perceptions.
6. Phonological Aspects
   The token types (with or without foreign accents) were significantly correlated to one NS listener (r = .65, p < .01) as well as all of the three NNS listeners (r = .88, .78, and .77, p < .01).

Summary of Rating Results. On the one hand, phonological aspects of language seemed to clearly affect the comprehensibility judgment of all of the three NNS listeners but not that of NS listeners (only one NS listener was sensitive to the phonological factor). On the other hand, two lexicogrammar factors (number of words and lexical density) impacted a few NS listeners' comprehensibility assessment but not that of NNS listeners.

DISCUSSION AND CONCLUSION

The current study investigates how phonological and lexicogrammatical errors affect NSs' and NNSs' comprehensibility by asking four NS and three near-native NNS listeners to rate comprehensibility of two types of 12 NNS speech tokens (n = 6 for non-controlled tokens including both various lexicogrammar and phonological errors, and n = 6 for controlled tokens including various lexicogrammar errors without any phonological errors). On the one hand, phonological aspects of language (i.e., non-controlled vs. controlled speech tokens) clearly affected the comprehensibility judgment of all of the three NNS listeners but impact that of NS listeners to much lesser degree (only one NS listener was sensitive to the phonological factor). On the other hand, the lexicogrammar factors (i.e., 12 NNS tokens contained various types of lexicogrammar errors) influenced NS listeners' comprehensibility rating scores to some degree (two listeners for the number of words, one listener for fluency) but without much effects on those of NNS listeners.

The findings in the current study provide some empirical support for Jenkins' claims regarding the differential decoding patterns between NS-NNS and NNS-NNS communication: (a) NS listeners use various types of cues (lexical, syntactic, contextual factors) to comprehend NNS speech; and (b) NNS listeners pay a priority to phonological information of NNS speech. Intriguingly, these suggestions directly or indirectly echo previous studies but conducted in a wide variety of research paradigms:

- NNS learners tend to be sensitive to their own phonological errors (especially compared to grammatical errors) due to their relatively high communicative values (Carpenter, Jeon, MacGregor, & Mackey, 2006; Ellis, Bastsukmen, & Loewen, 2001; Lyster, 1998; Mackey et al., 2000; Sheen, 2006).
- It still remains unclear which linguistic (and paralinguistic) errors interfere with NS listeners' comprehensibility perceptions more likely than others (e.g., Derwing & Munro, 1997; Munro & Derwing, 1995, 1999).

However, the results of the current study needs to interpreted with much caution and considered as tentative suggestions due to the obvious limitation such as a small number of listeners and tokens. Hence, further research is still called for to delve into this topic by using larger speech samples from various types of NNS learners and adopting a wide variety of NS and near-native NNS listeners. In order to do so, more innovative research designs and methods will be necessary.

To close, several relevant topics worthy of future studies need to be spelled out. First, although the present study found that phonological aspects of language does play a pivotal role in comprehensibility (especially for near-native NNS listeners), few SLA studies have actually investigated the mechanism of L2 phonological development in instructed settings, making little contribution to research-based practice in L2 classrooms. As mentioned earlier, most of the current instructed SLA studies have exclusively concerned learners' developing system of L2 morphosyntax rather than L2 phonology (Lyster & Saito, 2010; Norris & Ortega, 2000; Spada & Tomita, 2010). Thus, in order to meet NNS learners' need for effective pronunciation teaching techniques and learning materials (for detailed discussion of pronunciation instruction especially in NNS-NNS communication, Jenkins, 2000, 2002), time is ripe for the current SLA researchers to move ahead with their research agenda and approach SLA processes not only in morphosyntactic but also phonological domains in a more interdisciplinary manner (cf. Saito, in press; Saito & Lyster, in press). Second, although the present research as well as previous studies confirmed that various types of linguistic errors interact to

contribute to comprehensibility, more refined analyses need to be conducted to further investigate which linguistic areas (i.e., pronunciation, lexis, grammar, semantics, and pragmatics) relatively impact comprehensibility by employing a range of NS listeners (i.e., experienced vs. inexperienced learners) and asking them to listen to different types of tokens (i.e., sentence, picture reading, monologue; see Derwing, Rossiter, Munro, & Thomson, 2004 for their discussion on the relationship between comprehensibility and types of tokens).

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