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THE EFFECT OF METACOGNITIVE STRATEGY INSTRUCTION ON L2 LEARNER BELIEFS AND LISTENING SKILLS

Jennifer A. Lacroix, Boston University
Marnie Reed, Boston University
Allen G. Harbaugh, Boston University

This pilot study investigated the effect of semester-long strategy-based instruction on learner beliefs and skills in the processing of aural input by adult learners of English as a second language at metacognitive and procedural levels. The study addressed two frequently encountered learner beliefs thought to impede L2 processing of aural input: The little words aren't important; intonation is merely decorative. Working on the premise that learner beliefs underpin learner strategies for processing aural input and are reflected in learner productive and receptive skills, pre- and post-instruction instruments measured both learners' awareness of connected speech processes and the functions of intonation, and their ability to segment a continuous speech stream, and to process utterances for speaker intent. Findings using repeated measures analysis of variance support strategy-based metacognitive training in connected speech and stress and intonation to promote listening skills awareness, aid word segmentation, and facilitate understanding utterance content and intended meaning.

INTRODUCTION

This pilot study investigated the effectiveness of semester-long Strategy-Based Metacognitive Instruction (SBMI) to address learner beliefs and improve listening skills in adult second language (L2) learners of English. As noted by Vandergrift and Goh (2012), learner surveys identify two barriers to effective listening comprehension: word segmentation skills resulting in inability to recognize known words in continuous speech, and failure to grasp message meaning despite understanding the words. Learners who have studied words in isolation in their citation form may not be aware that those words will sound different in connected speech. They may attribute their listening challenges to the speed of speech rather than connected speech features (CPSs), which Alameen and Levis (2015) assert must be addressed in second language teaching. This learner belief - native speakers speak too fast; if they spoke slower I could understand them - may restrain learners from rapidly developing parsing strategies to address one of the true listening challenges: segmenting continuous speech. Although learners may not have reflected on these or similar CPSs in their own language, connected speech processes present similar difficulties for learners of any language in which they occur (Pinker, 1995).

Processing listening input also requires interpreting prosodic elements such as stress and intonation in order to understand a speaker's implied or intended meaning. Defined as "the systematic and linguistically meaningful use of pitch movement at the phrasal or suprasegmental level" (Pickering, 2012, p. 280), intonation presents challenges for L2 leaners. Learners who rely on understanding words for message meaning when processing aural input may not realize that in English, intonation can change the meaning of an utterance and add an implication. Awareness

that English employs even wider pitch ranges to convey emphasis, contrastive or new information, and unspoken but implied information allows listeners to go beyond the literal meaning of an utterance and infer what is meant by what is said. However, learners may be unaware of the power of intonation to "undermine the words spoken" (Wichmann, 2005, p, 229). For example, the fact that the affirmative words "You *can*" (with rise/fall pitch contour) in a teacher's response to the request "Can I turn in my homework late?" are sending a negative message—is generally quite revelatory to L2 learners. Learners who are insensitive to prosodic cues to signal speaker intent instead "may think that intonation is simply decorative" (Gilbert, 2014, p. 125). This learner misconception further highlights the need for a metacognitive approach. Potential benefits of metacognition were recognized by Moyer (2014) who identified a metacognitive approach to language learning as one of five critical factors that account for the success of exceptional learners in her study of second language phonology. This study explores the benefits of a metacognitive approach beyond exceptional populations.

Aim of the Study

The aim of this study was to investigate the efficacy of a metacognitive strategy-based approach to address two challenges to effective listening comprehension: segmenting continuous speech, and processing utterances for speaker intent. Specifically, we investigated whether metacognitive training in connected speech increased learner awareness, strategy use, and skills necessary to aid word segmentation, and whether metacognitive training in contrastive stress and intonation improved learners' accuracy with suprasegmental features, including deducing a speaker's intended meaning.

A pre-instruction needs analysis provided a baseline assessment of learner beliefs and strategies (metacognitive level) and learner skills (procedural level) with respect to word segmentation and interpreting speaker intent. Formative assessments consisting of four written metacognitive reflections and accompanying listening tasks were administered during the instruction phase. The summative assessment, consisting of the final metacognitive reflection and listening tasks, was administered at the end of the course. In order to determine the nature of change, we compared results of the pre-instruction baseline assessment of learner beliefs, reported strategies, and skills to the results of both formative and summative post-instruction assessments of metacognition and skills.

STRATEGY-BASED METACOGNITIVE INSTRUCTION (SBMI)

This study adopted an SBMI instructional approach to teaching listening skills. "Metacognition refers to listener awareness of the cognitive processes involved in comprehension, and the capacity to oversee, regulate, and direct these processes (Vandergrift & Goh, 2012, p. 23). However, in the words of Mendelsohn (2006), "Much of what is traditionally *mis*-named teaching listening should in fact be called testing listening" (p. 75). Thus, the approach adopted in this study employed strategy instruction, the use of meta-language, metacognitive diagnostics and assessments to frame instruction (Reed & Michaud, 2015), and a principled approach to providing corrective feedback in the form of metalinguistic "prompts" (Lyster, Saito & Sato, 2013) to scaffold learning and increase leaners' metacognitive ability to monitor and regulate their progress.

Research Questions

We investigated learners' metacognition and skills with respect to connected speech processes and ability to segment continuous speech, and functions of intonation and ability to process utterances for speaker intent. Our main research question was: What is the nature of change in metacognition and performance before, during, and after the Strategy-Based Metacognitive Instruction (SBMI). To address the aims of the study, the following research questions address learner performance segmenting connected discourse (RQ# 1-3b) and detecting speaker intent (RQ#4).

RQ#1: Will student performance change significantly over time? If confirmed that time is an influential predictor of performance with SBMI:

RQ# 2a: Will there be significant improvement in performance from pre- and post-instruction assessment scores?

RQ #2b: Will student performance on near-immediate assessments show little, if any, significant improvement (thus, change is gradual and not spontaneous).

RQ#2c: Will higher performance persist after the end of the SBMI instructional period (that is to say, will the post-test differ from the mid-intervention measures)?

RQ#3a: Will a moderate to large effect size be observed for time engaged with SBMI.

RQ #3b: Will a moderate to large effect size be observed for increase in performance scores from pre-to post-instruction. Research Question #4: Will a higher percentage of participants respond correctly on the post-instruction assessment?

METHODS

In this study, effects of a metacognitive strategy-based instructional approach on L2 learner beliefs and listening skills were investigated by a pre- and post-assessment comparison.

Participants and Procedures

The study was conducted in a naturally occurring education context under an action research paradigm in one intact elective pronunciation, speaking, and listening elective class taught by the first author. The course was situated within a large, urban, university-based Intensive English Program (IEP) in the United States. The class met semi-weekly for 2.5 hours per session in a 12-week semester.

Subjects

Subjects (n = 14) were in the combined intermediate and low-advanced level section of the course based on their placement scores (56—87 / 100) on the Michigan Test of English Language Proficiency. There were four males; ages ranged from 18-45. Students' national identities were: eight Japanese, two Chinese, one Taiwanese, Korean, Kazakh, and Brazilian.

Instruction

The strategy-based metacognitive instruction was introduced during the first half of the instruction phase, weeks two through six. Practice opportunities were provided; metalinguistic prompts were used to scaffold learning. To facilitate understanding message content, learners were introduced to the following strategy:

Use Three Kinds of Information to Process Aural Input

1) Background (Context) Information
   — what you already know about the topic of conversation
2) Language Information
   — what you know about how the English language works
   (the grammar, vocabulary, and sound system)
3) Acoustic (sound) Information
   — the sounds you actually hear someone saying

Figure 1. Strategy for processing utterance content.

This strategy was represented visually by the instructor, whose corrective prompt consisted of tenting her fingers into a triangle to remind learners to use the appropriate kind of information.

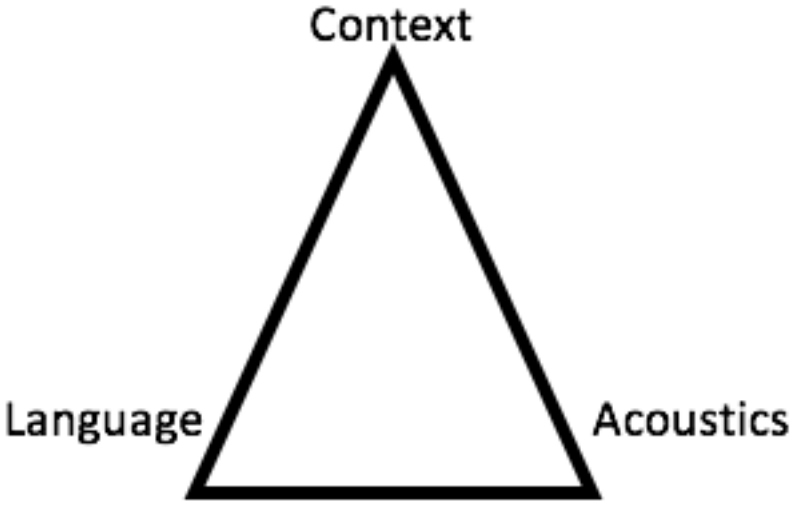

Figure 2. Metalinguistic prompt for using three kinds of information.

To facilitate understanding message meaning, learners were introduced to the following strategy:

Use Three Kinds of Information to Detect Speaker Intent

1) **Detect the Signal**: Marked ("extra") Pitch Range
2) **Locate the Signal**: exaggerated Content or Function word(s)
3) **Interpret the Signal**: Attribute Speaker Intent
   - — **Given vs. New Information**
     - • Known information; New information
   - — **Emphatic Stress**
     - • Same Meaning, just emphasized: $X=X^n$
   - — **Contrastive Stress**
     - • +/- stated, Different Meaning: not X, Y
   - — **Implicational Stress** (Implicational Fall-Rise, Wells 2006)
     - • Unstated & not retrievable from the locution alone: X+Y

Figure 3. Strategy for processing speaker intent.

Assessment

Pre- and post-instruction metacognitive and skills assessments were administered during weeks one and 12 to determine and monitor learner awareness of CPSs and pragmatic functions of intonation, self-reported strategy use, and performance on listening and speaking skills tasks. Both beliefs and skills were assessed since "learner beliefs affect the range of language learning strategies employed and also affect the motivation to learn, thereby indirectly influencing L2 learning outcomes" (Nix & Tseng, 2014, p. 114). Listening tasks and metacognitive reflections were administered at regular intervals throughout the semester.

Metacognitive Assessment

This study used a combination of measures, including open-ended prompts, true/false and likert-scale judgments, to establish pre- and post-instruction learner beliefs and strategies for processing aural input. The metacognitive reflections prompted speculation about listening challenges and the strategies students used to address them, self-assessment of current strengths and areas for improvement at global and local levels, and identification of aspects about speaking and listening learned in the course.

Skills Assessment

Skills diagnostics targeted ability to segment connected discourse and detect speaker intent conveyed via contrastive stress and intonation. Cloze tasks with accompanying multiple choice and true/false comprehension questions were used to assess connected speech processing. For the

pre-instruction diagnostic, students heard a three-sentence (64-word) prologue to a podcast (Glass, 2010). The instructor provided context information in the form of a brief scripted introduction while the students looked over the cloze passage transcript. Of the 64 words, 46 were supplied; 18 were blanks. Unlike conventional cloze passages, wherein blanks occur at intervals of every nth word, here double blanks occurred, consisting primarily of a preposition and determiner *his*, and four instances of pronoun *he* and auxiliary *was*. This double blank format, characterized by selective replacement of function words, e.g., articles and conjunctions, and the occasional auxiliary or main verb, was used throughout the study. Beginning week seven, students heard portions of a 1-minute 19-second self-contained segment of a TED Talk (Robinson, 2010), divided into four sections of roughly equal duration and word count, with roughly the same number and nature of cloze blanks. Task-specific vocabulary words, phrases, and idiomatic expressions were incorporated into curricular material and practiced extensively throughout the first half of the semester to ensure familiarity at the times of testing. The cloze activity provided an opportunity to gauge the extent to which students were applying the strategies practiced during the first half of the semester for decoding connected speech.

Multiple measures were used to assess learner skills vis-à-vis the use of contrastive stress and intonation to convey speaker intent. Assessments included speaking as well as listening tasks premised upon the assertion by Reed & Michaud (2011) that "the route to successful listening comprehension is through auditory feedback wherein the learner's own increasingly target-like speech production facilitates and reinforces perception" (p. 95). We report here on one such task.

RESULTS

Results are reported for the listening diagnostic task, administered a second time immediately following the 100% failure rate on the first administration: four of the 14 students scored 50% and the others scored between 0% and 44%. Performance on the comprehension questions, answered after the second administration, was at chance or below. The primary data here focus on the cloze tasks results for learners' ability to partially segment speech and on one of the skills assessments for detecting contrastive stress and interpreting speaker intent. Though it should be noted that more data from this pilot study are yet to be analyzed, here we address the main research questions. To address RQ1, a repeated-measures (single within-subjects factor) ANOVA was conducted to evaluate changes in cloze task scores over time. The within-subjects factor was the testing administration times (one pre-instruction, one post-instruction, and 4 mid-instruction assessments). The dependent variable was the percentage of words correct on a cloze activity (ranging from 14 to 20 items per assessment). Comparable results were obtained running the RM ANOVA with percentages as with arcsine transformations; for ease of presentation, the results reported here are for the untransformed percentages.

There was missing data for three of the n=14 students, and there was a single potential univariate outlier in the pre-instruction assessment. Missing data were imputed (see Appendix for details on imputation protocol), and results were run with and without the imputed data; subjects were deleted list-wise if missing data. Comparable results were obtained in all but one instance; results reported here are for the imputed data set. Regarding the outlier, results were only more strongly supported with the removal of the outlier, and consequently it was retained in all analyses reported here. All other model testing assumptions were confirmed for this data set.

The repeated measures ANOVA indicated a statistically significant within-subjects effect for time with $F(5,65)=8.743$, $p<0.001$; $\omega^2 = 0.228$ suggests this to be a moderate effect. Summary statistics for the time points were $M_{pre} = .34$ (SD=0.27), $M_1 = .63$ (0.13), $M_2 = .58$ (0.17), $M_3 = .62$ (0.24), $M_4 = .61$ (0.19), and $M_{post} = .74$ (0.17). Aggregated results are presented in Figure 4 along with select student exemplars (chosen for low, 30th percentile, 70th percentile and high performance).

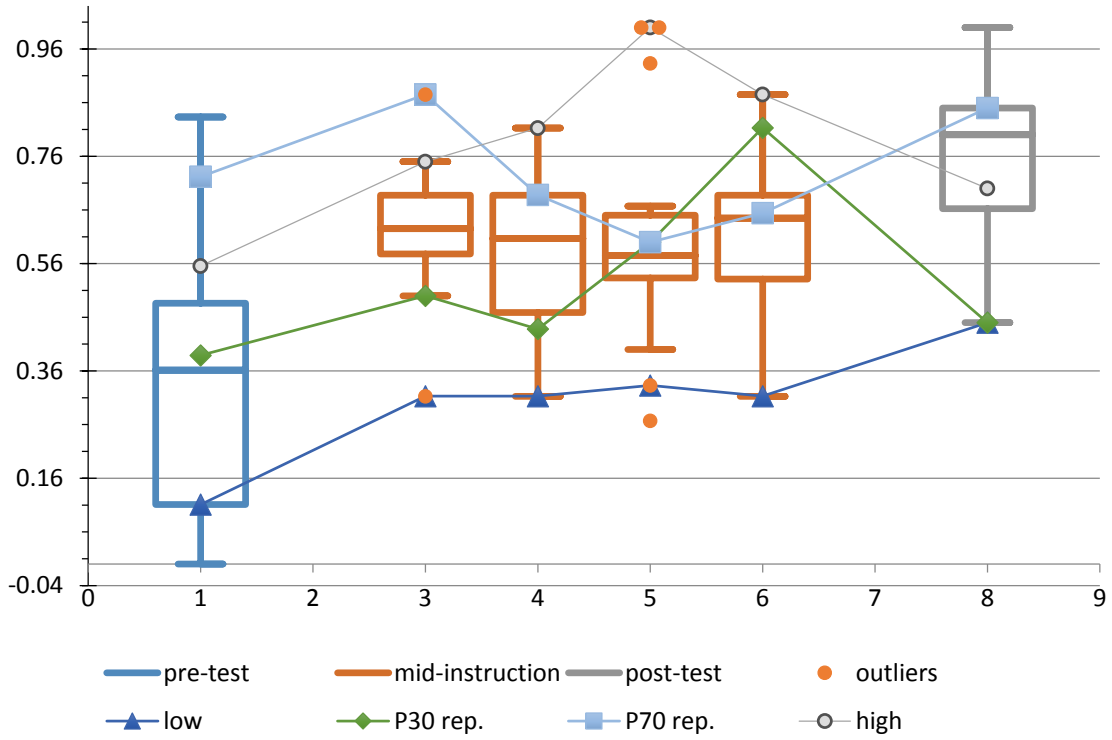

Figure 4. Student performance (as percentage correct) for cloze tasks over time.

Following on from this (omnibus) finding, select post hoc analyses were conducted to confirm which time points differed from others. First, it was confirmed there was indeed a difference between the pre- and post-assessments with $t(13) = 5.085$, $p < .001$; the effect size was

$d = 1.36$ ($M_\Delta = 0.40$, $SD_\Delta = 0.30$). Next, it was observed there was no statistically significant difference across the four assessments that occurred during the instructional phase with $F(3,39) = 0.281$, $p = .839$. A statistically significant finding was observed when comparing pre- and mid-instructional assessments, $F(4,52) = 6.849$, $p < .001$. Additionally, a statistically significant finding was observed when comparing the mid- and post-instruction, $F(4,52) = 2.720$, $p = .039$. (However, it should be noted that this finding was not corroborated when using only non-imputed data, $p = .32$.)

To address RQ 4, a Fisher's exact test, conducted due to the small sample size, found a significant difference between pre- and post-instruction assessments ($p < .001$) on use of prosodic cues to determine speaker intent. Following a pre-test using cardinal numbers, students

practiced throughout the semester producing differential stress and intonation when providing information versus clarifying misinformation (e.g., on tasks involving numbers). In the post-test, students were asked to judge whether a speaker is clarifying misinformation about a zipcode. Answering in the affirmative suggests detection of contrastive stress to signal clarification.

Table 1

Student Responses for the Information Clarification Task

	Pre-instruction	**Post-instruction**	**Total**
Correct responses	1	10	11
Incorrect responses	9	1	10
Total	10	11	21
N/A	4	3	7

The proportion of students answering in the affirmative post-instruction (10 of 11) is higher than the proportion answering in the affirmative pre-instruction (1 of 10), $z = 2.45$, $p = .007$. Contextually, of the 8 students providing both pre- and post-responses, 6 of the 7 indicating no at the pre-test reported yes at the post-test.

METACOGNITION SUMMARY

Regarding CPSs, learners' initial beliefs implicated speed of speech as a primary cause of listening difficulty parsing continuous speech. Thirteen (of 14) subjects agreed that if native speakers spoke more slowly, they could understand utterance content. Diagnostics also revealed a listening strategy, articulated by all subjects: pay attention to content words; little words are not important. This strategy was later revealed to reflect advice from previous instructors in integrated skills and elective classes.

Regarding the communicative and pragmatic functions of intonation, a seven-point true/false questionnaire was used to assess learners' pre- and post-instruction beliefs. As evident from Table 3, most students initially agreed upon two of the functions, but the number in agreement decreased as the complexity of the functions increased.

Table 2

Results of Pre-Instruction Metacognitive Assessment of the Functions of Intonation

Prompt: In English, intonation can . . .			
	True	**False**	
1.	13 (93%)	1	turn a statement into a question
2.	13 (93%)	1	act as oral punctuation, quotation marks, and paragraph breaks
3.	10 (71%)	4	turn a sincere statement into a sarcastic one
4.	10 (71%)	4	signal an implied contrast
5.	9 (64%)	5	change the meaning of a sentence
6.	9 (64%)	5	reduce the number of words needed to convey your meaning
7.	8 (57%)	6	convey information without actually saying the words

In this analysis, we mainly focused on pre- and post-instruction assessments. Below are data for the metacognitive assessment of the pragmatic functions of intonation.

Table 3

Results of Post-Instruction Metacognitive Assessment of the Functions of Intonation

	Mean	SD
Day 1 Metacognition T/F	77.92	20.72
Final Metacognition T/F	84.64	19.04

While there was no significant difference between the pre- and post-test measure, $t(12) = 1.20$, $p = .25$, it was noted that the mean of the students' scores on the metacognition T/F measure did increase and the effect size was $d = 0.32$. Given a small to moderate effect size such as this, it is possible that the reason there was no statistically significant difference was due to the small number of students in this sample.

DISCUSSION

Preliminary findings of this study suggest that strategy-based metacognitive instruction resulted in improved listening skills awareness, aided word segmentation in continuous speech to facilitate understanding utterance content, and aided detection of contrastive stress and intonation to facilitate understanding message meaning.

The first research question regarding change in student performance over time was affirmed ($p < .001$). Following from this, it was also confirmed that there was a significant improvement in performance from pre- and post-instruction assessment ($t(13) = 5.085$, $p < .001$, $d = 1.36$). As

was expected regarding research question #2b, while it was confirmed that time is an influential predictor of performance with SBMI, student performance on near-immediate assessments showed no statistically significant improvement with regard to time ($p = .84$). Though such a claim cannot be proven, it is noteworthy to suggest that change during instruction was small and incremental, but substantive in the duration. To support this, it was observed via the repeated measures ANOVA that the pre-instruction scores were noticeably different from the mid-instruction scores ($p < .001$). Specifically, addressing research question # 2c, will higher performance persist after the end of the SBMI instructional period, the results were inconclusive ($p = .039$ w/imputed data and $p = .32$ with list-wise deletion of missing data). However, an examination of the data clearly suggests that performance did not worsen after instruction ended. With respect to research questions, #3a & # 3b, a moderate to large effect size, ($\omega^2 = 0.23$) was observed for time engaged with SBMI, and a large effect size ($d = 1.33$) for increase in performance scores from pre- to post-instruction was observed. Addressing research question #4, a change in student performance interpreting speaker intent was observed, with a significantly higher number of participants responding accurately at the post-test.

Qualitative Findings

Though not reported here, qualitative data obtained from learners' post-instruction metacognitive reflection indicated robust awareness of the importance of connected speech processes and stress and intonation along with an articulated use of metalinguistic knowledge closely paraphrasing the SBMI language.

Limitations of the Study

The study consisted of a convenience sample of students enrolled in one section of a pronunciation, speaking, and listening elective course. There was no control group.

CONCLUSION

Learners' mean post-instruction metacognitive awareness of connected speech processes was higher than pre-instruction, and in addition to increased metacognition, listening segmentation skills improved as well. Learners' metacognitive awareness of the pragmatic functions of intonation increased; however, due to the small sample size, while the mean scores increased, the increase was not statistically significant. Although skills data are still under analysis, regarding the information clarification task, a statistically significant difference between pre- and post-tests

was found. The encouraging findings of this study support continued investigation of the efficacy of a strategy-based metacognitive approach.

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ABOUT THE AUTHORS

Jennifer A. Lacroix is a doctoral fellow of education at Boston University in Developmental Studies (language education). She has over sixteen years of ESL teaching experience, including in IEP settings, and has presented widely at international conferences.

Marnie Reed is Associate Professor of Education and affiliated faculty in the Program in Applied Linguistics at Boston University. Dr. Reed's research interests are applied phonology, particularly the role of metacognition in cross-linguistic awareness of the functions of intonation. She is co-author (with Christina Michaud) of *Sound Concepts: An Integrated Pronunciation Course* (McGraw-Hill), and co-editor (with John Levis) and chapter contributor to the Wiley-Blackwell *Handbook of English Pronunciation*.

Allen G. Harbaugh is a Clinical Assistant Professor of Education at Boston University in Educational Leadership & Policy. He previously worked as a community college mathematics instructor for over 15 years and served as the Academic Chair of Tertiary & Adult Education at Murdoch University in Perth, Australia. Dr. Harbaugh is an international scholar who collaborates with many researchers in a variety of disciplines as a statistical analyst.

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APPENDIX

Missing data were imputed in two separate ways. Missing data from the mid-instruction assessments were imputed using a geometrically weighted average for proximal times (e.g., information from time i±1 was weighted 1.00; time i±2 was weighted 0.50; time i±3 was weighted 0.25; etc.). Missing data from the pre-instruction period was imputed using a multiple regression equation with dependent variables consisting of the post-instruction score and the average of the mid-instruction scores.