The Effect of Individual Differences on English Learners' Oral Performance

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Abstract

English acquisition for second language (L2) learners may be largely determined based on the complex interplay of individual differences (IDs) with the learners' environment. While ID research has been foundational to second language acquisition theory, it is largely unexplored in its relationship with English pronunciation. To address this gap, the current study investigated the effect of four IDs (i.e., motivation, aptitude, anxiety, and language contact) on instrumentally analyzed pronunciation performance. Ten learners were recruited from a summer term at the Program in Intensive English, and ten learners were recruited from the surrounding community. Speech samples were obtained from each learner, along with their responses to survey items and a test of non-word repetition. Hierarchical multiple regression analyses were conducted to determine the predictive effect of IDs on 1) Segmentals, 2) Fluency, 3) Dynamic Prosody, and 4) Monotone Prosody. IDs predicted 50-86% in segmental and suprasegmental performance. Motivation and aptitude were associated with higher-proficiency pronunciation performance, while anxiety had a debilitative effect. Non-interactive language contact had a positive effect on L2 fluency, while interactive language contact was associated with more monotonous speech patterns. The implications are discussed for how IDs can be addressed in the context of the PIE.

Keywords: anxiety, aptitude, individual differences, language contact, motivation, pronunciation

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Background

Second language acquisition (SLA) theory has long stressed the importance of individual differences (IDs) in predicting variability in language learning. While the definition and scope of IDs is "rather loose," core factors of motivation and aptitude have been of particular interest in ID research since the 1960's (Dörnyei, 2005, p. 7), and very recent research by Saito, Dewaele, Abe, & In'nami (in press, 2018) has given importance to both external (e.g., language experience) and internal (e.g., motivation, emotion) learner IDs. These factors can be especially influential on L2 pronunciation acquisition considering the fact that some learners acquire target-like (and even nativelike patterns of speech) despite the odds of age (see Moyer, 2014). At the same time, anxiety is the most commonly studied emotion in SLA (Gregersen, MacIntyre, & Meza, 2014; MacIntyre, 2017; Teimouri, Goetze, & Plonsky, under review), with an undeniable effect on L2 language performance (Dörnyei, 2005). Because speech is a real-time phenomenon, it would seem that L2 anxiety can have a direct effect on speech performance. Language contact is also thought to have a considerable effect on L2 speech acquisition, not only on how L2 speech is perceived, but also on the speech patterns that are acquired (Hansen Edwards, 2017). Taken together, these IDs (motivation, aptitude, anxiety, and language contact) have been carefully selected for their ability to affect L2 speech performance.

Research Question

The current study is situated within a larger study, which not only considers speaker variance (i.e., IDs), but also listener variance. For this report, only the following research question is addressed:

1. To what extent do individual learner differences (motivation, aptitude, anxiety, and language

   contact) predict phonological performance (i.e., Segmentals, Fluency, Dynamic Prosody, and

   Monotone Prosody) for English L2 learners?

Methods

Participants

Ten students from the Program in Intensive English (PIE) were recruited to participate in

this study. Seven of these students were native speakers (NSs) of Arabic, two were NSs of

Chinese, and one was a NS of Korean. All learners were enrolled in either Level 4 or Level 5 of

the PIE. Other participants included 10 learners living/working/studying in the community

surrounding the PIE (NSs of French, Korean, Turkish, Russian, and Spanish). Together, there

were 20 English L2 learners who participated.

Speech Stimuli

Recordings for each of the participants were obtained in face-to-face meetings with the

researcher. All learners used a headset/microphone to record their speech in Praat. The learners

were given the following speaking prompt:

For approximately one minute, please speak about any similarities or differences in

culture between your hometown and Flagstaff, AZ.

The participants had one minute to prepare their response, and they could take notes if desired.

They could reference their notes while recording.

Measures of Individual Differences

Motivation was measured through a survey and included operationalizations of the Ideal

L2 Self/Own, the Ideal L2 Self/Other, the Ought-to L2 Self/Own, the Ought-to L2 Self Other,

and motivational intensity (adapted from Papi, Bondarenko, Mansouri, Feng, & Jiang, in press,

2018) which can be found in Appendix A. Aptitude was measured through a non-word

repetition test (see Gathercole, 2006) which included forward and backward components (see

Appendix B). The final score was calculated from the total number of correctly repeated non-

words. Anxiety was measured through a survey (see Appendix C) and was a non-classroom-

based measure of anxiety specific to English speaking/pronunciation (adapted from Sardegna,

Lee, & Kusey, 2014; Woodrow, 2006). Finally, language contact (see Appendix D) included

two components: interactive and non-interactive language contact (adapted from Taguchi, Xiao,

& Li, 2016). Interactive language contact measured the average weekly use of English for

communicative situations, while non-interactive language contact measured the average weekly

consumption of media (i.e., TV, movies, etc.). Language contact, in particular, was collected

once a week for three weeks to improve the validity of the instrument.

Phonological Analyses

Approximately the first 45 seconds of each speech file were analyzed. Measures of

segmental deviations, speech rate (i.e., syllables per second, articulation rate, speaking time,

mean length of run, phonation time ratio), pauses (i.e., mean length of pauses and total pause

time), stress (i.e., pace), pitch range, and intonation (rising and falling tones) were coded and

calculated (see Appendix E). The phonological variables (excluding segmental deviations) were

reduced using a principal component analysis. The final phonological features used in this study

were 1) Segmentals, 2) Fluency, 3) Dynamic Prosody, and 4) Monotone Prosody. Segmentals

were explicitly not included in the principal component analysis to keep their effect separate

from suprasegmentals. A faster speech rate and fewer instances of pausing were considered to

be features of high fluency, so these variables were combined and called "Fluency." "Dynamic

Prosody" included two features (pitch range and rising tones). Research has shown that a wider

pitch range and use of more rising tones allow a speaker to be more inclusive of their

interlocutors (see Brazil, 1997; Pickering, 2001; Staples, 2015) and less monotone. On the other

hand, too many falling tones and overuse of stress can not only lead to miscommunication and

non-inclusiveness between a speaker and an interlocuter (see Brazil, 1997; Hewings, 1995;

Kang, 2010; Staples, 2015), but it can also lead to monotonous speech patterns. Therefore, this

component of pace and falling tones was named "Monotone Prosody."

Analyses

To respond to the research question, four series of hierarchical multiple regression

analyses were run for each dependent variable (e.g., components) of phonological performance.

These were 1) Segmentals, 2) Fluency, 3) Dynamic Prosody, and 4) Monotone Prosody. The

independent variables in each model were the IDs of motivation, aptitude, anxiety, and language

contact. For Segmentals, Dynamic Prosody, and Monotone Prosody, motivation variables were

entered into Step 1, and all ID variables were entered into Step 2. Because age had a statistically

significant effect on Fluency, it was controlled and entered into Step 1. Motivation variables

were entered into Step 2, and all ID variables were entered into Step 3.

<div align="center">Results</div>

For Segmentals, the combination of motivation variables in Step 1 predicted a total of

64% of the variance in segmental deviations, and the Ideal L2 Self/Own and the Ought-to L2

Self/Other had negative associations with the dependent variable (i.e., more of these types of

motivation were associated with fewer segmental deviations). When the other IDs were entered

into the model along with motivation in Step 2, 86% of the variance in segmental deviations was

accounted for. The two motivation variables (Ideal L2 Self/Own and the Ought-to L2

Self/Other) still had significant negative associations (more motivation → fewer segmental

deviations), anxiety had a positive association (more anxiety → more segmental deviations), and aptitude had a negative association (more non-word accuracy → fewer segmental deviations).

Age was controlled in the analysis with Fluency as the dependent variable and was therefore entered into Step 1. Age significantly and negatively predicted 25% of the variance in Fluency, with older speakers having less fluent speech. When the motivation variables were entered into the model in Step 2, age was no longer significant, but the Ideal L2 Self/Own positively predicted Fluency. This step accounted for 64% of the variance in the dependent variable. Then when the remaining IDs were entered into the model in Step 3, the variance explained in the model increased to 85%. Age (once again) and anxiety significantly and negatively predicted Fluency features, while non-interactive language contact significantly and positively predicted Fluency features (more non-interactive language contact → more fluent speech).

For Dynamic Prosody, although the motivation variables in Step 1 predicted 40% of the variance in the dependent variable, no motivation variables were statistically significant. Similarly for Step 2, the combination of motivation variables and other IDs did not significantly predict Dynamic Prosody, but the variance accounted for in the dependent variable increased to 50%.

Finally, for the effect of the IDs on Monotone Prosody, the motivation variables entered in Step 1 did not statistically predict the dependent variable, although the model did explain 44% of the variance in this dependent variable. However, once the motivation variables were entered into the model in Step 2, this combination significantly predicted Monotone Prosody and accounted for 77% of variance, with aptitude having a negative association (more aptitude →

less monotonous speech) and interactive language contact having a positive association (more interactive language contact → more monotonous speech).

Relevance to PIE and Second Language Learning

In this study, IDs accounted for large portions of variance in pronunciation performance. Knowing that pronunciation acquisition varies greatly from learner to learner, PIE teachers can be more equipped to address IDs at the classroom level. Horwitz's (2017) suggestion for targeting motivation is to assist students in developing "realistic and personal goals for language learning and more effective language learning strategies" (p. 40). Teachers can perform a needs analysis at the beginning of any pronunciation (or pronunciation-integrated) class to evaluate the learners' motivation for studying pronunciation. PIE teachers should recognize that there are different types of motivation which drive learners to improve their pronunciation, and if possible, teachers should target these types as often as possible. Teachers and students can work together to increase motivation for short- and long- term goals, for as Dörnyei (2005) states, motivation is a precursor to accomplishing future long-term goals. Accomplishing short-term goals will encourage students' motivation for their long-term goals.

Because the working memory system (and ultimately the processing of information) has its limits, one of the ways in which teachers can address aptitude in the classroom is indirectly through training in automaticity. Automaticity, or the "the absence of attentional control in the execution of a cognitive activity" (Segalowitz & Hulstijn, 2005, p. 371) can be improved through training in frequency and repetition. Frequency driven training can allow learners to engage in more automatic language performance which can free up the working memory system to focus on lower order skills, since most often, the capacity of the working memory system is being used on higher order skills.

Encouraging students to enjoy the learning process will likely automatically reduce their level of anxiety (Dewaele & MacIntyre, 2014). The results of this study showed the debilitative effect of anxiety at the micro level of segmentals and fluency. Teachers should therefore not only try to help learners enjoy pronunciation learning, but they should also focus their help to reduce debilitative types of anxiety.

To ensure the quality of interactive language contact, teachers can incorporate pair or group work in the context of the classroom with a focus on prosody and discourse. With training, teachers can assist students in using prosody to practice pragmatic functions of interaction, such as asking/answering questions, giving/receiving compliments, extending/accepting/refusing invitations, offering/accepting apologies, holding the floor, changing topics, interrupting, etc. Students can (audio/video) record themselves, listen back to their performance, and critically analyze their discourse success. Above all, teachers should focus on the quality of interactive language contact, rather than the quantity (Moyer, 2014).

The results of this study have suggested that non-interactive language contact (i.e., media input from TV, movies, music, and games) can have a positive effect on more fluent speech patterns (faster speech rate, less pausing). On the other hand, for non-interactive contact to have an impact on other phonological features, it is probably best implemented under the instruction of a trained professional with a pronunciation focus for use of that contact. PIE teachers can use media and technology to help students practice different aspects of pronunciation (perhaps focusing on stress, pitch, intonation, and segmentals, since non-interactive contact already has a positive effect on Fluency).

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Appendix A: Speaker Motivation Survey[1]

In the column "motivation," fill in the circles according to how much you agree or disagree with the statement.

1	2	3	4	5	6
Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

Statement	Motivation
Ideal L2 Self/Own	
1. *I can imagine a day when I speak English that is very clear to listeners.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6
2. *I can imagine a day when I speak English that is very easy for listeners to understand.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6
3. *I can imagine a day when I speak English proficiently with international friends/colleagues.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6
4. *I can imagine a day when I have successful English communication with people from all around the world.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6
Ideal L2 Self/Other	
5. *My family hopes that one day that I will speak English clearly.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6
6. *My family hopes that one day my English will be extremely easy to understand.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6
7. *It is my parents' hope that one day I will speak English proficiently.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6
1. *The people who are important to me hope that one day I will master English pronunciation.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6
Ought to Self/Own	
9. *If I don't improve my English pronunciation, it will have a negative impact on my future.*	○ ○ ○ ○ ○ ○ 1 2 3 4 5 6

[1] The items in this survey were shuffled and not arranged according to sub-scale. Neither were sub-scale headings included. They have been arranged in order and according to sub-scale headings for readers' clarity.

10. If I don't improve my English pronunciation, I will fail in my future career.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
11. If I don't improve my English pronunciation, I will fail in my social life.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
Ought-to Self/Other						
12. If I don't improve my English pronunciation, I will disappoint my parents/teachers.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
13. My family puts a lot of pressure on me to improve my English pronunciation.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
Motivational Intensity						
14. I work hard at studying English pronunciation.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
15. I spend a lot of time studying English pronunciation.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
16. I put a lot of effort in studying English pronunciation.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
17. I constantly think about my English pronunciation activities.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6
18. Studying English pronunciation is very important to me these days.	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5	◯ 6

Appendix B: Speaker Phonological Short-Term Memory Test

Forward Phonological Short-Term Memory Test

Level 2	zæbə / fuloʊ
	fɛvə / tiʒeɪ
Level 3	wasə / zʌfeɪ / kɪbə
	mabeɪ / dæzə / funaɪ
Level 4	pifeɪ / ruvə / ʃɛdeɪ / wifə
	gakə / tibeɪ / pɪtə / lupoʊ
Level 5	jʌdeɪ / lævə / huseɪ / gumə / daʊzɔɪ
	vɛgə / paveɪ / witə / tʃɪmɔɪ / manə
Level 6	weɪzə / fʌnɔɪ / sitʃə / fæbaɪ / gatə / pizeɪ
	wɛfə / fɪkaʊ / bupə / ʃinɔɪ / hɛkə / pædaɪ
Level 7	lʌpə / hutoʊ / mɛpə / rʌkaʊ / dɛlə / fibeɪ / hæpə
	laɪtoʊ / vætə / tɪfɔɪ / sɪkə / nɛkeɪ / jælə / dikaʊ
Level 8	vɛtə / wadoʊ / rævə / ruloʊ / paʒə / zalaʊ / vugə / tʃɪsɔɪ
	tɪsə / vɛkɔɪ / mævə / zʌkɔɪ / bɪvə / raʊsɔɪ / vumə / mɛboʊ
Level 9	falɔɪ / wæpə / mufoʊ / kɪnə / bɪvaʊ / tæfə / poʊtʃɔɪ / zatə / mɪpɔɪ
	foʊbə / loʊpɔɪ / rɔɪzə / jibɔɪ / gʌkə / zɛbeɪ / rakə / fikoʊ / hɪpə
Level 10	wɛʃoʊ / nɛfə / dʒuboʊ / fɪsə / zɪtaʊ / likə / vælaʊ / poʊtə / fʌboʊ / tidə
	mæsaʊ / sæmə / balaʊ / kuzə / hakoʊ / rʌzə / loʊpoʊ / gɛvə / fizoʊ / bæfə

Diphthong symbol:

[ɑɪ]: I, bite, Stein, aisle
[aʊ]: bout, brown, doubt
[ɔɪ]: boy, rejoice, annoy
[oʊ]: oh, boat, beau, grow
[eɪ]: bait, reign, great

Backward Phonological Short-Term Memory Test

Level 2	pizeɪ / kɪbə
	tʃɪsɔɪ / vɛgə
Level 3	zɑlaʊ / bupə / laɪtoʊ
	ruvə / falɔɪ / wɛfə
Level 4	fibeɪ / vætə / mufoʊ / wæpə
	tʃɪmɔɪ / hɪpə / wɛʃoʊ / kuzə /
Level 5	mæsaʊ / gʌkə / loʊpɔɪ / gevə / wadoʊ
	rɔɪzə / ruloʊ / vɛtə / tɪfɔɪ / rʌzə
Level 6	mɛboʊ / sitʃə / fɪkaʊ / rakə / rʌkaʊ / gatə
	mɪpɔɪ / vugə / balaʊ / sæmə / dikaʊ / bæfə
Level 7	fuloʊ / paʒə / poʊtʃɔɪ / foʊbə / fʌboʊ / wifə / fizoʊ
	weɪzə / fikoʊ / gakə / zɪtaʊ / witə / daʊzɔɪ / zæbə
Level 8	dʒuboʊ / jælə / pædaɪ / lʌpə / bɪvaʊ / tidə / tiʒeɪ / mɛpə
	paveɪ / fɛvə / hutoʊ / dɛlə / funaɪ / dæzə / zɛbeɪ / wasə
Level 9	huseɪ / lævə / zʌkɔɪ / hæpə / vɛkɔɪ / manə / raʊsɔɪ / rævə / jibɔɪ
	pɪtə / zʌfeɪ / sɪkə / mabeɪ / kɪnə / lupoʊ / tɪsə / ʃɛdeɪ / hɛkə
Level 10	loʊpoʊ / gumə / pifeɪ / tæfə / tibeɪ / fɪsə / jʌdeɪ / mævə / fæbaɪ / bɪvə
	fʌnɔɪ / vatə / ʃɪnɔɪ / vumə / hakoʊ / nɛfə / nɛkeɪ / poʊtə / vælaʊ / likə

Diphthong symbol:

[ɑɪ]: I, bite, Stein, aisle
[aʊ]: bout, brown, doubt
[ɔɪ]: boy, rejoice, annoy
[oʊ]: oh, boat, beau, grow
[eɪ]: bait, reign, great

Appendix C: Speaker Anxiety Survey

In the column "anxiety," fill in the circles according to how anxious you feel <u>when you speak English</u> in the following situations.

1	2	3	4	5
Not at all anxious	Slightly anxious	Moderately anxious	Very anxious	Extremely anxious

Situation	Anxiety				
1. Communicating with a native English speaker whom I do not know.	○ 1	○ 2	○ 3	○ 4	○ 5
2. Making mistakes when I speak English.	○ 1	○ 2	○ 3	○ 4	○ 5
3. Participating in a group discussion in English.	○ 1	○ 2	○ 3	○ 4	○ 5
4. Repeating speech that was not clear to listeners.	○ 1	○ 2	○ 3	○ 4	○ 5
5. Receiving correction on my English speech.	○ 1	○ 2	○ 3	○ 4	○ 5
6. Speaking on the phone in English.	○ 1	○ 2	○ 3	○ 4	○ 5
7. Speaking English sounds, words, or phrases which are difficult for me.	○ 1	○ 2	○ 3	○ 4	○ 5

Appendix D: Speaker Language Contact Survey

Interactive Contact: In the column "Hours per week," please write the amount of time you spend using English in the following activities, according to your own experience in the United States. Please think of your normal week. If the activity does not apply to you, please write "0" hours per week. Please only write one number in the column.	
	Hours per week
1. I spend approximately_____hours per week communicating with native speaker friends in English.	
2. I spend approximately_____hours per week communicating with non-native speaker friends in English.	
3. I spend approximately_____hours per week communicating with boyfriend /girlfriend / husband / wife in English.	
4. I spend approximately_____hours per week communicating with professionals (at banks, post offices, restaurants) in English.	
5. I spend approximately_____hours per week communicating with roommate(s) in English.	
6. I spend approximately_____hours per week communicating with people during online gaming (PlayStation, Xbox, etc.) in English.	
7. I spend approximately_____hours per week communicating with customers/patients/clients in English.	
8. I spend approximately_____hours per week communicating with student and/or work colleagues in English.	

Non-Interactive Contact: In the column "Hours per week," please write the amount of time you spend with English in the following activities, according to your own experience in the United States. Please think of your normal week. If the activity does not apply to you, please write "0" hours per week. Please only write one number in the column.	
	Hours per week
1. I spend approximately_____hours per week watching TV in English.	
2. I spend approximately_____hours per week watching movies in English.	
3. I spend approximately_____hours per week watching videos (YouTube, DailyMotion, Facebook, etc.) in English.	
4. I spend approximately_____hours per week listening to music in English.	
5. I spend approximately_____hours per week listening to game content in English.	

Appendix E

Summary of Phonological Features, their Calculations, and Intra-Class Correlations

Feature	Description	ICC
Segmentals	Calculated by determining all auditory instances in which vowels or consonants deviated from what would be expected in Standard American English (e.g. consonant deletion/substitution/addition; vowel deletion/substitution/addition; or syllable addition/deletion). Deviations were normalized by dividing the number of segmental errors by the total number of syllables in the speech sample.	.942
Rate		
Syllables per second	Calculated as the number of syllables produced in the speech sample divided by the total length of the speech sample and normalized to one minute.	1.00
Articulation rate	Calculated as the number of syllables produced in the speech sample divided by the total length of the speech sampled (excluding pause time) and normalized to one minute.	.996
Speaking time	Calculated by subtracting the amount of pause time from the total time spent speaking.	.987
Mean length of runs	Calculated as the average number of syllables produced in utterances between pauses of 0.1 seconds and above. The mean length of runs is calculated by dividing the total number of syllables by the total number of runs.	.995
Phonation time ratio	Calculated by dividing the total length of the time spent speaking (excluding pauses) by the total length of the speech sample.	.992
Pauses		
Mean length of silent pauses	Calculated by dividing the total length of silent pauses by the total number of silent pauses.	.996
Total pause time	Calculated by taking the total sum of all the pauses.	.998
Stress		
Pace	Calculated by dividing the total number of prominent (stressed) syllables by the total number of runs.	.889

Pitch

Pitch range	Calculated by determining the difference between the F_0 minima and maxima appearing on prominent syllables per task.	.861

Tone

Rising tones	Calculated by determining the percentage of use of rising or fall-rising tones in the speech sample.	.99
Falling tones	Calculated by determining the percentage of use of falling or rise-falling tones in the speech sample.	.94