

The contribution of individual differences to L2 pronunciation learning: Insights from research and pedagogical implications

RELC Journal

1–14

© The Author(s) 2021



Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0033688220987655

journals.sagepub.com/home/rel**Yui Suzukida** 

University College London, UK

Abstract

Adult second language (L2) learning often exhibits great variability in its rate and outcome. Although research shows that learning trajectories are partly shaped by social and contextual factors (e.g. Larson-Hall, 2008), certain learner factors play an important role in enhancing L2 pronunciation learning by helping L2 learners notice and process input efficiently, whereas certain learner factors may impede L2 pronunciation learning by impairing attention control or slowing down L2 input processing. Therefore, in order for language teachers to provide effective instruction and help their students improve their L2 pronunciation proficiency, it is beneficial for them to understand the differential impact of learner characteristics on L2 learning and adapt such understanding to their instruction and learning activities.

The aim of the current article is to provide a review of existing studies that have explored individual differences (IDs) in relation to L2 pronunciation acquisition and to present implications for effective L2 pronunciation teaching. The article begins with an introduction of the paradigm shift in L2 pronunciation research and the conceptual framework of ID proposed by Dörnyei (2009). This is followed by a summary of the processes involved in L2 pronunciation learning. The third section focuses on the characteristics of four IDs that have been found to influence the development of L2 pronunciation. Those IDs include foreign language learning aptitude (e.g. Saito and Hanzawa, 2016), musical aptitude (e.g. Milovanov et al., 2010), L2 learning motivation (e.g. Moyer, 1999) and anxiety (e.g. Baran-Łuczars, 2016). Based on the discussion in the third section, the last section will offer various applications of IDs research findings to L2 pronunciation instruction (e.g. instructional approaches, feedback, and pronunciation syllabi) for successful L2 pronunciation teaching.

Keywords

Individual differences, L2 pronunciation pedagogy, L2 pronunciation acquisition, aptitude, motivation, anxiety, musical aptitude, L2 speech learning

Corresponding author:

Yui Suzukida, Institute of Education, University College London, 20 Bedford Way, London, WC1H 0AL, UK.

Email: yui.suzukida.18@ucl.ac.uk

Introduction

During the last 50 years, there has been a significant shift in the goal of L2 pronunciation teaching from sounding native-like to becoming intelligible for the purpose of successful communication (Levis, 2005). Encouraged by the empirical evidence that adult L2 learners are often foreign-accented (e.g. Abrahamsson and Hylltenstam, 2009) and that being an effective communicator does not necessarily require fully native-like pronunciation (Munro and Derwing, 1995), the paradigm of intelligibility spurred research to identify the key constructs of intelligible pronunciation (Trofimovich and Isaacs, 2012) and learners' individual differences (IDs) that characterise the course of L2 pronunciation acquisition (see Pennington and Rogerson-Revell, 2019, pp.74 ff for a comprehensible overview). According to Dörnyei's (2009) socio-cognitive view, learners' IDs are derived from three domains of human mental functions: cognition, motivation and affect (e.g. Matthews and Zeidner, 2004). Following this three-domain orientation, the present review provides a selective overview of the past research that has explored three types of learner IDs (foreign language learning aptitude and musical aptitude in the domain of *cognition*, L2 learning motivation in the domain of *motivation*, and L2 pronunciation learning anxiety in the domain of *affect*) in relation to L2 pronunciation acquisition. Subsequently, in light of the differential influence of cognitive, motivational, and affective aspects of IDs, I discuss the implications for classroom instruction.

The process of L2 pronunciation learning

Second Language Acquisition (SLA) scholars tend to agree that the pattern for first language (L1) speech acquisition (e.g. the fact that L1 perceptual development starts prior to L1 production development) can also be applied to that of L2 speech learning (e.g. Eckman, 2008; Flege, 1995; Hansen, 2004). Empirical evidence shows a relatively consistent link between perception and production in L2 segmental development (see Saito and Van Poeteren, 2018 for a review). What makes *adult* L2 speech learning unique is the fact that it involves acquiring L2 knowledge on top of the established sensory-motor system based on the L1. According to the Speech Learning Model (Flege, 1995) account of the phonetic learning process, in order for learners to establish new L2 sound categories in the articulatory area of the brain, they need to successfully distinguish the L2 sounds from L1 sounds. To form new sound categories, the model considers the important factors which facilitate sound acquisition (Flege and Liu, 2001) to be: (a) the *quality* of experience (i.e. the exemplars that are salient enough to make the learners aware of the phonetic differences between the L1 and the L2) and (b) the *quantity* of experience (i.e. frequent encounters with the exemplars to enhance the probability of L2 sound perception).

In foreign language (FL) classrooms, compared to an immersion setting, the amount and quality of the available L2 experience appear to be relatively limited (Larson-Hall, 2008). Therefore, how much the learner can develop their pronunciation largely depends on the type of instruction (e.g. Norris and Ortega, 2000), the amount of recent classroom instruction (Saito and Hanzawa, 2016), and the amount of extra-curricular L2 learning (Muñoz, 2014). However, apart from the influence of experience, the research has

revealed considerable differences in the amount and quality of L2 pronunciation development (e.g. Saito and Hanzawa, 2018). While social and contextual factors shape the learning environment (e.g. Toth and Moranski, 2018), SLA researchers attribute the differences in the rates and outcomes of learning to the impact of various learner factors (e.g. Baker-Smemoe and Haslam, 2013; Gonet, 2006; Muñoz, 2014; Saito and Hanzawa, 2016). According to Dörnyei (2009), learners' IDs are the subcomponents of learners' minds – their *cognition*, *motivation*, and *emotion* (i.e. *Trilogy of Mind*). Therefore, the following sections selectively review L2 pronunciation studies that explored the triad: aptitude for *cognition*, L2 learning motivation for *motivation*, and L2 pronunciation learning anxiety for *emotion*.

Effect of learners' individual differences on L2 pronunciation learning

Cognitive individual differences

Foreign language learning aptitude. One of the most researched cognitive ID variables in the field of SLA is aptitude. Aptitude has been conceptualised as the following set of abilities that enhance foreign language learning: phonemic coding ability (noticing and analysing unfamiliar auditory information), grammatical sensitivity, inductive learning ability, and memory (Ortega, 2013). Since the inception of Carroll and Sapon's (1959) Modern Language Aptitude Test, various versions of aptitude batteries have been developed (see Skehan, 2016, for review) and utilized in SLA research (see Li, 2015 for a meta-analysis).

While existing research has found that L2 grammar, vocabulary, and collocation learning could significantly benefit from greater aptitude in memory, researchers also extended their interest in the aptitude effect to L2 pronunciation learning (Baker-Smemoe and Haslam, 2013; Saito, 2017; Saito and Hanzawa, 2016; Saito, Suzukida et al., 2019). With data from Japanese learners of English, Saito and Hanzawa (2016) reported that overall LLAMA aptitude test¹ scores (Meara, 2005) showed positive correlations with better segmental, word stress, and speech rate performance as evaluated by native judges. Baker-Smemoe and Haslam (2013) found that accurate pronunciation, lower foreign accentedness, and better fluency of L2 learners in English as a second language (ESL) and English as a foreign language (EFL) settings were best predicted by sound discrimination ability but that was not the case with higher comprehensibility. Saito (2017) also demonstrated a strong impact of aptitude on various dimensions of pronunciation. Drawn from spontaneous speech samples elicited from Japanese learners of English, the results illustrated the multifaceted role of aptitude in L2 speech development. The learners' phonemic coding ability was associated with pronunciation and grammatical accuracy; their rote and associative memory contributed to articulation rate and grammatical complexity; and their grammatical inferencing ability was correlated with vocabulary richness. However, sound sequence recognition, which was assumed to measure learners' implicit learning ability, did not correlate with any linguistic variables measured in the study, indicating that while implicit learning aptitude is relevant for unintentional, incidental learning, it may not be influential in the context of intentional, explicit learning – a

characteristic of learning in FL classroom settings. These findings have been re-examined and extended from a longitudinal perspective by Saito, Suzukida et al. (2019), who reported that in the first semester of one academic year, explicit learning aptitude (rote memory and phonemic coding ability) appeared to enhance learners' global comprehensibility through the improvement of fluency and prosodic aspects of L2 speech. In the latter stage of the academic year, the learners with higher implicit learning ability (sound sequence recognition) achieved higher comprehensibility scores due to the impact of incidental learning aptitude on the refinement of segmental accuracy. Therefore, the existing studies suggest that while greater aptitude appears to facilitate L2 learners' phonological development, different types of aptitude enhance different aspects of pronunciation.

Musical aptitude. In relation to foreign language learning aptitude, musical aptitude (superiority in perception of various aspects of music) has been considered to be a crucial factor that affects L2 speech development (e.g. DeKeyser, 2013; Li and DeKeyser, 2017; Moyer, 2014; Piske et al., 2001). Musical aptitude is broadly conceptualised as the potential to learn or achieve in music and is measured through one's sensitivity to various aspect of sounds such as pitch, tone, and rhythm (e.g. Gordon, 1965; Seashore, 1939; Wing, 1970).

Due to the similarities between the processing of music and language, researchers have investigated whether language learning can benefit from superior sound sensitivity (see Nardo and Reiterer, 2009 for an exhaustive research summary; also see Kraus and Chandrasekaran, 2010 for a review of neuroscientific evidence). Concerning L2 pronunciation acquisition research, Kempe et al. (2015), for instance, have demonstrated the mediating effects of tonal and pitch sensitivity to the better processing of non-native sounds (vowel sound discrimination). Scholars have found that the learners' sensitivity to tones, pitch, and rhythm appear to predict better L2 pronunciation learning in an ESL context (e.g. Kempe et al., 2015; Richter, 2018; Slevc and Myiake, 2006) and in an FL classroom context (e.g. Milovanov et al., 2010). Li and DeKeyser (2017) found that native speakers of American English with high sensitivity to pitch could perform well in perception and production tasks after learning how to differentiate Mandarin words with contrasting tone patterns. Saito, Sun et al. (2019) examined the impact of musical aptitude on the speech development of Chinese learners of English in the UK, demonstrating that rhythm sensitivity significantly predicted the learners' improvement in perceived speech rate. Working with adult learners of English in an EFL context, Milovanov et al. (2010) demonstrated that general musical aptitude was strongly and negatively correlated with segmental errors made in a word reproduction task. Furthermore, recent research in domain-general auditory processing suggests that learners' basic ability to process basic auditory information (e.g., frequency, intensity, and duration) is linked to successful L2 learning (e.g., Kachlicka et al., 2019; Saito et al., 2020; Sun et al., 2020; Zheng et al., 2020). Although further research is needed to determine how musical aptitude and domain-general auditory processing influence acquisition of various aspects of L2 speech (i.e. segmental, prosodic, and temporal), the evidence reviewed here indicates that these factors may interact with L2 linguistic ability and enhance L2 pronunciation development.

Socio-psychological individual differences

Motivation. Motivation research has revealed a positive correlation between L2 learning motivation and L2 learning success (e.g. Schmidt and Watanabe, 2001). Regarding L2 pronunciation, research revealed that L2 motivation could be an indicator of reduced foreign accent (Elliott, 1995; Flege et al., 1995; Moyer, 1999, 2004; Purcell and Suter, 1980) and comprehensibility (Saito et al., 2017). Moyer (1999) reported that the pronunciation accuracy of native English learners of German in Germany was rated higher for learners who had higher motivation to pursue a native-like quality of pronunciation. Focusing on learners' L2 integrativeness, instrumental motivation, and metacognition about L2 learning, Saito et al. (2017) examined how such factors affect the development of L2 speech comprehensibility and accentedness over one year. Among the motivational factors, learners who were highly motivated to study English for their future career development as a vague and long-term goal, and who had a strong desire to improve their comprehensibility, received higher comprehensibility ratings than those who were not motivated to study English and those who did not have desire to produce more comprehensible L2. In contrast, the learners' accentedness was not associated with any motivational factors.

Another line of research has investigated the link between L2 pronunciation development and the L2 Motivational Self System. The L2 Motivational Self System (Dörnyei, 2009) comprises three components that are measured by a questionnaire: the ideal L2 self (i.e. motivation to learn the target language stemming from one's aspirations), the ought-to L2 self (i.e. a belief that one ought to learn the target language to avoid possible negative outcomes), and L2 learning experience (Dörnyei and Csizér, 2002). Although the number of L2 pronunciation studies that have incorporated the Self System is limited, the amount of evidence supporting it has been gradually increasing (Nagle, 2018; Saito et al., 2018). Saito et al. (2018) explored the links among L2 speech comprehensibility, motivation (ideal L2 self, ought-to L2 self), and emotion (L2 learners' enjoyment of learning foreign language in an FL classroom, foreign language classroom anxiety) in a context involving Japanese high school learners of English. While a cross-sectional investigation revealed that higher comprehensibility was associated with stronger aspiration for becoming their ideal self as an L2 user (i.e. ideal L2 self), greater FL learning enjoyment, past learning experience in preschool (i.e. amount of hours the participants engaged in learning English before they started elementary school), the amount of L2 use during the regular English classes at their high school, and lower anxiety, a regression analysis showed that comprehensibility was impacted mainly by anxiety and strength of the aspiration for becoming an ideal L2 user. In a three-month longitudinal study, the researchers found that comprehensibility gains were correlated with the degree of the learners' aspiration for becoming an ideal L2 user, how positive students felt about learning English in the classroom, lower anxiety, and current L2 experience such as L2 learning at a cram school (e.g. a private-tutoring school where tutors help students prepare for university entrance exams) and conversations with native and non-native speakers. Thus, evidence suggests that L2 learners' strong desire to narrow the gap between their perceived actual selves and ideal selves may be a predictor of successful L2 pronunciation learning.

Anxiety. Anxiety has been recognised since the 1970s as a factor that negatively affects the process of L2 learning, especially in the classroom, (e.g. Horwitz et al., 1986; Scovel, 1978). This type of anxiety is further divided into three components: (a) communication apprehension, (b) fear of negative evaluation, and (c) test anxiety. Anxiety is assumed to manifest in learners as reluctance to use complex structures of the foreign language, a lack of confidence in role-play activities, and being unable to remember learnt language items when taking examinations (Liu, 2006). In addition, it appears to be triggered by particular feedback from the teachers and lesson styles where L2 learners have to stand up and speak the target language in front of peers (see MacIntyre, 2017). Accordingly, a body of research has revealed that anxiety impedes various aspects of L2 achievement (see Teimouri et al., 2019 for an extensive review).

Regarding L2 pronunciation learning, since learners' perception of their own foreign accent tends to cause embarrassment in the classroom setting, it is recognised as the most anxiety-provoking aspect of spoken language performance (Baran-Łucarz, 2013; Price, 1991; Saito et al., 2018). Relatively recently, Baran-Łucarz (2016) has conceptualised pronunciation-specific anxiety, which consists of four main components: fear of negative evaluation, pronunciation self-efficacy and self-assessment, pronunciation self-image, and the learners' set of beliefs related to pronunciation. According to Baran-Łucarz (2016), fear of negative evaluation involves worry and apprehension caused by negative responses or assessments from interlocutors/listeners (e.g. classmates, teachers, and native/non-native speakers of target languages). Pronunciation self-efficacy and self-assessment measures learners' self-perception and comparative assessments of their own prospects of learning accurate pronunciation of the target language versus those of other learners around them. Pronunciation self-image deals with learners' self-image of how they look and sound when they pronounce the target language. The learner's set of beliefs related to pronunciation measures a learner's attitude and perception of the importance of learning the correct pronunciation of the target language. While pronunciation-specific anxiety has not been examined as a predictor of L2 pronunciation learning success, the constructs offer insight into the development of less anxiety-provoking L2 pronunciation instruction (Baran-Łucarz, 2013).

Pedagogical implications

As shown, different types of IDs (cognitive vs. socio-psychological) differentially influence various aspects of L2 pronunciation development. In order to make the most of the learners' varied ID profiles and engender successful L2 pronunciation acquisition, there are several approaches which practitioners can incorporate into their regular language classrooms. First, research suggests that learners with beneficial cognitive ID factors (language learning aptitude and musical aptitude) are likely to be able to efficiently pick up on the L2 phonetic and prosodic features in the available linguistic resources due to their sensitivity to L2 sounds. In order to facilitate L2 pronunciation learning for those learners with relatively lower degrees of such aptitude as well as those with higher degrees of aptitude, teachers can help them increase the L2 experience qualitatively and quantitatively and introduce pronunciation-focused lessons in syllabi. Second, L2 learners' motivational and emotional states have been found to influence both the amount and quality of their

experience and the quality of L2 pronunciation development. In order to help learners enhance their motivation and induce positive emotional states, teachers can provide pronunciation learning activities and use different types of instruction and feedback during language lessons. In the following sections, I detail the approaches suggested by SLA studies.

Facilitating cognitive processing. As indicated by theoretical and empirical evidence, reinforcing L2 learners' perception of L2 sounds will likely contribute to better L2 speech production. For instance, Bradlow et al. (1997) have demonstrated that the perceptual training of /r/-/l/ with Japanese learners of English improves their segmental production accuracy (see Sakai and Moorman, 2018 for an extensive review of perceptual and production training). Providing the training and feedback on specific pronunciation features may be beneficial as it can help learners direct their awareness towards key aspects of pronunciation and notice less accurate aspects of their performance (see, e.g. studies by Couper, 2011, on epenthesis; Lee and Lyster, 2016, on English vowels; Saito and Lyster, 2012, on English /r/; Sardegna, 2011, on linking). Other studies have examined the effectiveness of both segmental and suprasegmental instruction for reducing pronunciation errors (Couper, 2003) and improving global intelligibility, comprehensibility, and accentedness (Derwing et al., 1998; Derwing et al., 2014). For instance, Derwing et al. (1998) provided 20 minutes of production instruction to ESL learners for 10 weeks: one group received segmentally focused instruction, while another group received suprasegmentally focused instruction (with a control group who did not receive any pronunciation-focused instruction). Performance measured via a sentence reading task revealed that both experimental groups demonstrated improvement in accentedness and comprehensibility. By contrast, only those participants who received suprasegmental instruction showed progress in their extemporaneous performance, which was measured using a picture description task. While the study indicated that the accuracy of suprasegmental features may improve more quickly than for segmentals, it proved that 20 minutes per day of instruction of either type can make a significant difference in the learners' pronunciation performance.

In addition to the explicit learning and deliberate practising of segmental and suprasegmental features, production activities and peer interactions appear to be effective for developing learners' comprehensibility (e.g. Saito and Akiyama, 2017; Trofimovich et al., 2009). A study by Saito and Akiyama (2017) explored the effect of different types of instruction for Japanese learners of English over an academic semester. The control group received instruction focusing on learning grammar and lexical aspects of English, while the experimental group participated in online interaction activities with native speaker interlocutors in the US. The activities were completed in pairs of Japanese L2 learners and native speakers. The native speakers were instructed to give corrective feedback in the form of recasts whenever they felt the learners' speech was difficult to understand. The results revealed a significant improvement in the learners' comprehensibility. In EFL classroom settings, production and interaction opportunities effectively increase L2 speech comprehensibility. In summary, it has been suggested that teachers incorporate various pronunciation-focused types of instruction and activities systematically to

help L2 learners train their perception and production as well as attend to the pronunciation features that are most crucial for communicative success.

Facilitating positive motivation and emotion. The studies of motivation and its link to SLA have revealed that strongly internalised motivation (i.e. a strong aspiration to reduce a self-assessed discrepancy between a learner's current self as an L2 user and the learner's ideal self) plays a pivotal role in increasing L2 learners' opportunities to use the L2 and in helping them attain a higher level of pronunciation. However, goals and motivational orientations may differ considerably among learners, and they often exhibit varied strength of aspiration to achieve their ideal self as L2 users. Particularly in the context of EFL classrooms, many students tend to see studying English as an obligation and appear to have prevention-oriented motivation (i.e. they have a strong orientation to study English to avoid negative consequences such as obtaining low grades and failing to meet their parents' expectation or curriculum requirements) (Li, 2014). Thus, different motivation-stimulating activities such as ones that have a specific goal and that have multiple subtasks in which the learners can see their tangible progress can be introduced into language classrooms (Dörnyei and Kubanyiova, 2014).

Other research (Guilloteaux and Dörnyei, 2008; Moskovsky et al., 2013) has revealed that teachers' behaviour may influence their L2 students' motivational orientations. Moskovsky et al. (2013) demonstrated that teachers' use of motivational strategies (e.g. showing respect and warmth to the learners, knowing the learners well, sharing personal experience and interest with them) in the classroom led to a positive change in the learners' L2 motivation profiles.

Concerning anxiety, in order to alleviate the fear of speaking in the L2 and to avoid possible fear-inducing situations, teachers may aim to foster learning enjoyment and to create an atmosphere in which teachers and peers all have a respectful, understanding, and tolerant attitude towards making mistakes. This can be achieved by creating a friendly and pleasant classroom environment in which learners are advised to use the target language frequently and freely (Dewaele et al., 2018). Anxiety may be also mitigated by providing learners with a number of communicative activities in low-risk situations in which they complete a task in pairs rather than in a potentially more anxiety-inducing setting involving large groups of peers and observation by teachers (e.g. Baran-Łucarz, 2014).

Lastly, L2 learners' self-confidence can be compromised under certain conditions. This may happen, for example, when communication breakdowns with peers and native speakers are felt to be the result of flaws in their use of language, or when they receive explicit corrective feedback from the teachers in front of their peers in a classroom (e.g. Teimouri, 2017). Therefore, teachers may want to consider using different types of feedback (e.g. positive vs. negative feedback) depending on the students' needs and attitudes, when reacting to their pronunciation errors. Furthermore, researchers have suggested that teachers' support for learners' effective self-training opportunities could help improve the learners' self-confidence and reduce the degree of anxiety they feel while using the target language. This can be done by encouraging them to practise pronunciation by themselves and by providing the learners with various pronunciation learning strategies which they can use outside the classroom (e.g. Sardegna, 2011).

Future directions

Following Dörnyei's three-domain orientation of learner IDs (i.e. cognition, motivation, and emotion), the current review focused on empirical studies concerning the roles of aptitude, motivation, and anxiety. By introducing the theoretical framework of *the trilogy of mind* (i.e. inter-connected nature of three key domains of human minds²) (Buck, 2005; Dörnyei, 2010), the aim of this review was to help teachers avoid exclusively pay attention to a single domain of learners' minds and consider the three domains at the same time for better understanding of their students. The selection of the IDs was also motivated by the IDs' close relationship with L2 pronunciation. In the case of foreign language aptitude and musical aptitude, both types of aptitude reflect learners' ability to process sounds (e.g. phonemic coding ability). For motivation and anxiety, the previous studies have found that certain types of motivation and anxiety in learners are affected by self-perceptions of their L2 pronunciation proficiency (e.g. Baran-Łucarz, 2016, 2017). Although the current review has given exclusive attention to aptitude, motivation, and anxiety, other cognitive and socio-psychological IDs such as working memory (e.g. Hu et al., 2013; Nardo and Reiterer, 2009; Yalçın et al., 2016), willingness to communicate (e.g. Yashima, 2002), and personality (Hu and Reiterer, 2009) have also been found to influence the trajectory and success of L2 pronunciation learning. In order to understand the dynamic and complex nature of second language acquisition, future research may benefit from a broader approach that examines the contributions of multiple ID variables to the acquisition and their interaction (e.g. Moyer, 2014). As another point relating to future directions, for the majority of studies on L2 pronunciation instruction, the interest appears to be in the effectiveness of various types of instruction and to a lesser extent on the ID factors that mitigate or facilitate the effectiveness of instruction (e.g. Kissling, 2014). In other words, research has not yet sufficiently illustrated why there are differences in the degree to which individual learners benefit from particular types of instruction in a given context. Therefore, exploration of the interaction between IDs and instruction types can be another direction that future research can explore. Likewise, teachers can continue to explore pronunciation teaching methods with a goal of enhancing learners' attention and motivation towards pronunciation, while also reducing their language learning and pronunciation anxiety.

Although it is difficult to tailor instruction to fit each learner's ID profile and pronunciation proficiency level, various approaches which help learners make the most of their IDs for effective pronunciation learning can be introduced. In addition, it is crucial for teachers to frequently draw learners' attention to pronunciation features not only in speaking-focused classes but also in listening-focused classes. In doing so, teachers can help learners have regular opportunities to enhance their perception and production of L2 segmental and suprasegmental features. In summary, I recommend that teachers take the following actions:

- increase learners' amount of L2 use;
- increase the L2 input learners receive;
- include perception-focused activities;

- incorporate explicit instruction on segmental and suprasegmental features of pronunciation;
- provide less anxiety-provoking activities (e.g. peer interactions) and motivation-stimulating activities that enable learners to practise the pronunciation features;
- show a positive and tolerant attitude towards learners, especially when they make mistakes; and
- share the personal experience of learning an L2 with your students.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Yui Suzukida  <https://orcid.org/0000-0002-1352-2022>

Notes

1. The LLAMA test is a computer-based aptitude battery developed by Meara (2005). The test comprises four subtests which are designed to measure participants' sound sequence recognition (LLAMA D test), associative memory (LLAMA B test), phonemic coding (LLAMA E test), and grammatical inferencing (LLAMA F test).
2. While various learner IDs have been found to contribute to L2 learning, cognitive psychologists (e.g. Hilgard, 1980; Matthews and Zeidner, 2004) believe that cognition, motivation, and emotion are the fundamental facets of human intellectual functioning. Crucially, human intellectual functioning is thought to operate in a blended manner. That is, according to Buck (2005), 'emotions imply cognitions imply motives imply emotions, and so on'. Therefore, when considering the influence of learner IDs on L2 learning, it is crucial to focus on the three dimensions at the same time rather than a single dimension (e.g. Dörnyei, 2010).

References

- Abrahamsson N, Hyltenstam K (2009) Age of onset and nativelikeness in a second language: Listener perception versus linguistic scrutiny. *Language Learning* 59: 249–306.
- Baker-Smemoe W, Haslam N (2013) The effect of language learning aptitude, strategy use and learning context on L2 pronunciation learning. *Applied Linguistics* 34: 435–456.
- Baran-Łuczarska M (2013) Phonetics learning anxiety: results of a preliminary study. *Research in Language* 11: 57–79.
- Baran-Łuczarska M (2014) The link between pronunciation anxiety and willingness to communicate in the foreign-language classroom: The Polish EFL context. *Canadian Modern Language Review* 70: 445–473.
- Baran-Łuczarska M (2016) Conceptualizing and measuring the construct of pronunciation anxiety: Results of a pilot study. In: Pawlak M (ed.) *Classroom-Oriented Research*. Cham: Springer, pp. 39–56.
- Baran-Łuczarska M (2017) FL pronunciation anxiety and motivation: Results of a mixed-method study. In: Piechurska-Kuciel E, Szymańska-Czapla E, and Szyszka E (eds) *At the Crossroads: Challenges of foreign language learning*. Cham: Springer, pp. 107–133.
- Bradlow AR, Pisoni DB, Akahane-Yamada R, and Tohkura YI (1997) Training Japanese listeners to identify English /r/ and /l/: IV. Some effects of perceptual learning on speech production. *The Journal of the Acoustical Society of America* 101: 2299–2310.

- Buck R (2005) Adding ingredients to the self-organizing dynamic system stew: Motivation, communication, and higher-level emotions—and don't forget the genes! *Behavioral and Brain Science* 28: 197–198.
- Carroll JB, Sapon S (1959). *Modern Language Aptitude Test*. New York: Psychological Corporation.
- Couper G (2003) The value of an explicit pronunciation syllabus in ESOL teaching. *Prospect* 18: 53–70.
- Couper G (2011) What makes pronunciation teaching work? Testing for the effect of two variables: socially constructed metalanguage and critical listening. *Language Awareness* 20: 159–182.
- DeKeyser RM (2013) Age effects in second language learning: Stepping stones toward better understanding. *Language Learning* 63: 52–67.
- Derwing TM, Munro MJ, and Wiebe G (1998) Evidence in favor of a broad framework for pronunciation instruction. *Language Learning* 48: 393–410.
- Derwing T.M, Munro MJ, Foote JA, Waugh E, and Fleming J (2014) Opening the window on comprehensible pronunciation after 19 years: A workplace training study. *Language Learning* 64: 526–548.
- Dewaele JM, Witney J, Saito K, and Dewaele L (2018) Foreign language enjoyment and anxiety: The effect of teacher and learner variables. *Language Teaching Research* 22: 676–697.
- Dörnyei Z (2009) The L2 motivational self system. In: Dörnyei Z, Ushioda E (eds) *Motivation, Language Identity and the L2 Self*. Clevedon: Multilingual Matters, pp. 9–11.
- Dörnyei Z (2010) The relationship between language aptitude and language learning motivation: Individual differences from a dynamic systems perspective. In: Macaro E (ed.) *The Bloomsbury Continuum Companion to Second Language Acquisition*. London: Continuum, pp. 247–267.
- Dörnyei Z, Csizér K (2002) Some dynamics of language attitudes and motivation: Results of a longitudinal nationwide survey. *Applied Linguistics* 23: 421–462.
- Dörnyei Z, Kubanyiova M (2014) *Motivating Learners, Motivating Teachers*. Cambridge: Cambridge University Press.
- Eckman FR (2008) Typological markedness and second language phonology. *Phonology and Second Language Acquisition* 36: 95–115.
- Elliott AR (1995) Field independence/dependence, hemispheric specialization, and attitude in relation to pronunciation accuracy in Spanish as a foreign language. *The Modern Language Journal* 79: 356–371.
- Flege JE (1995) Second-language speech learning: Theory, findings, and problems. In: Strange W (ed.) *Speech Perception and Linguistic Experience: Issue in cross-language research*. Timonium, MD: York Press, pp. 229–273.
- Flege JE, Liu S (2001) The effect of experience on adults' acquisition of a second language. *Studies in Second Language Acquisition* 23: 527–552.
- Flege JE, Munro MJ, and MacKay IRA (1995) Factors affecting strength of perceived foreign accent in a second language. *Journal of the Acoustical Society of America* 97: 3125–3134.
- Gonet W (2006) Success in the acquisition of English phonetics by Poles. A pilot study. *Dydaktyka fonetyki języka obcego w Polsce VI*, pp. 70–88.
- Gordon EE (1965) *Musical Aptitude Profile Manual*. Boston: Houghton Mifflin.
- Guilloteaux MJ, Dörnyei Z (2008) Motivating language learners: A classroom-oriented investigation of the effects of motivational strategies on student motivation. *TESOL Quarterly* 42: 55–77.
- Hansen J G (2004) Developmental sequences in the acquisition of English L2 syllable codas. *Studies in Second Language Acquisition* 26: 85–124.

- Hilgard ER (1980) The trilogy of mind: Cognition, affection, and conation. *Journal of the History of the Behavioral Sciences* 16: 107–117.
- Horwitz EK, Horwitz MB, and Cope JA (1986) Foreign language classroom anxiety. *The Modern Language Journal* 70: 125–132.
- Hu X, Ackermann H, Martin JA, Erb M, Winkler S, and Reiterer SM (2013) Language aptitude for pronunciation in advanced second language (L2) learners: Behavioural predictors and neural substrates. *Brain and Language* 127: 366–376.
- Hu X, Reiterer S (2009) Personality and pronunciation talent in second language acquisition. *Language Talent and Brain Activity*: 97–130.
- Kachlicka M, Saito K, and Tierney A (2019) Successful second language learning is tied to robust domain-general auditory processing and stable neural representation of sound. *Brain and language* 192: 15–24.
- Kempe V, Bublitz D, and Brooks PJ (2015) Musical ability and non-native speech-sound processing are linked through sensitivity to pitch and spectral information. *British Journal of Psychology* 106: 349–366.
- Kissling EM (2014) What predicts the effectiveness of foreign-language pronunciation instruction? Investigating the role of perception and other individual differences. *Canadian Modern Language Review* 70: 532–558.
- Kraus N and Chandrasekaran B (2010) Music training for the development of auditory skills. *Nature Reviews Neuroscience* 11: 599–605.
- Larson-Hall J (2008) Weighing the benefits of studying a foreign language at a younger starting age in a minimal input situation. *Second Language Research* 24: 35–63.
- Lee AH, Lyster R (2016) The effects of corrective feedback on instructed L2 speech perception. *Studies in Second Language Acquisition* 38: 35–64
- Levis JM (2005) Changing contexts and shifting paradigms in pronunciation teaching. *TESOL Quarterly* 39: 369–377.
- Li M, DeKeyser R (2017) Perception practice, production practice, and musical ability in L2 Mandarin tone-word learning. *Studies in Second Language Learning* 39: 593–620.
- Li Q (2014) Differences in the motivation of Chinese learners of English in a foreign and second language context. *System* 42: 451–461.
- Li S (2015) The associations between language aptitude and second language grammar acquisition: A meta-analytic review of five decades of research. *Applied Linguistics* 36: 385–408.
- Liu M (2006) Anxiety in Chinese EFL students at different proficiency levels. *System* 34: 301–316.
- MacIntyre PD (2017) An overview of language anxiety research and trends in its development. In: Gkonou C, Daubney M, and Dewaele JM (eds) *New Insights into Language Anxiety: Theory, research and educational implications*. Bristol, UK: Multilingual Matters, pp. 11–30.
- Matthews G, Zeidner M (2004) Traits, states, and the trilogy of mind: An adaptive perspective on intellectual functioning. In: Dai DY, Sternberg RJ (eds) *Motivation, Emotion, and Cognition: Integrative perspectives on intellectual functioning and development*. Mahwah, NJ: Erlbaum, pp. 143–174.
- Meara PM (2005) *LLAMA Language Aptitude Tests: The manual*. Swansea: Lognostics.
- Milovanov R, Pietilä P, Tervaniemi M, and Esquef PA (2010) Foreign language pronunciation skills and musical aptitude: A study of Finnish adults with higher education. *Learning and Individual Differences* 20: 56–60.
- Moskovsky C, Alrabai F, Paolini S, and Ratcheva S (2013) The effects of teachers' motivational strategies on learners' motivation: A controlled investigation of second language acquisition. *Language Learning* 63: 34–62.
- Moyer A (1999) Ultimate attainment in L2 phonology: The critical factors of age, motivation, and instruction. *Studies in Second Language Acquisition* 21: 81–108.
- Moyer A (2004) *Age, Accent, and Experience in Second Language Acquisition: An integrated approach to critical period inquiry* (Vol. 7). Bristol: Multilingual Matters.

- Moyer A (2014) Exceptional outcomes in L2 phonology: The critical factors of learner engagement and self-regulation. *Applied Linguistics* 35: 418–440.
- Muñoz C (2014) Starting age and other influential factors: Insights from learner interviews. *Studies in Second Language Learning and Teaching* 3: 465–484.
- Munro MJ, Derwing TM (1995) Foreign accent, comprehensibility, and intelligibility in the speech of second language learners. *Language Learning* 45: 73–97.
- Nagle C (2018) Motivation, comprehensibility, and accentedness in L2 Spanish: Investigating motivation as a time-varying predictor of pronunciation development. *The Modern Language Journal* 102: 199–217.
- Nardo D, Reiterer S (2009) Musicality and phonetic language aptitude. In: Dogil G, Reiterer SM (eds) *Language Talent and Brain Activity*. Berlin: De Gruyter Mouton, pp. 213–256.
- Norris JM, Ortega L (2000) Effectiveness of L2 instruction: A research synthesis and quantitative meta-analysis. *Language Learning* 50: 417–528.
- Ortega L (2013) *Understanding Second Language Acquisition*. New York: Routledge.
- Pennington MC, Rogerson-Revell P (2019) *English Pronunciation Teaching and Research*. London: Palgrave Macmillan.
- Piske T, MacKay IR, and Flege JE (2001) Factors affecting degree of foreign accent in an L2: A review. *Journal of Phonetics* 29: 191–215.
- Price ML (1991) The subjective experience of foreign language anxiety: Interviews with highly anxious students. In: Horwitz EK, Young DJ (eds) *Language Anxiety: From theory and research to classroom implications*. London: Pearson, pp. 101–108.
- Purcell ET, Suter RW (1980) Predictors of pronunciation accuracy: A reexamination. *Language Learning* 30: 271–287.
- Richter K (2018) Factors affecting the pronunciation abilities of adult learners of English: A longitudinal group study. In: Reiterer SM (ed.) *Exploring Language Aptitude: Views from psychology, the language sciences, and cognitive neuroscience*. Cham: Springer, pp. 339–361.
- Saito K (2017) Effects of sound, vocabulary and grammar learning aptitude on adult second language speech attainment in foreign language classrooms. *Language Learning* 67: 665–693.
- Saito K, Akiyama Y (2017) Video-based interaction, negotiation for comprehensibility, and second language speech learning: A longitudinal study. *Language Learning* 67: 43–74.
- Saito K, Dewaele JM, Abe M, and In'nami Y (2018) Motivation, emotion, learning experience, and second language comprehensibility development in classroom settings: A cross-sectional and longitudinal study. *Language Learning* 68: 709–743.
- Saito K, Dewaele JM, and Hanzawa K (2017) A longitudinal investigation of the relationship between motivation and late second language speech learning in classroom settings. *Language and Speech* 60: 614–632.
- Saito K, Hanzawa K (2016) Developing second language oral ability in foreign language classrooms: The role of the length and focus of instruction and individual differences. *Applied Psycholinguistics* 37: 813–840.
- Saito K, Hanzawa K (2018) The role of input in second language oral ability development in foreign language classrooms: A longitudinal study. *Language Teaching Research* 22: 398–417.
- Saito K, Lyster R (2012) Effects of form-focused instruction and corrective feedback on L2 pronunciation development of /ɪ/ by Japanese learners of English. *Language Learning* 62: 595–633.
- Saito K, Sun H, Kachlicka M, Alayo JRC, Nakata T and Tierney A (2020) Domain-general auditory processing explains multiple dimensions of L2 acquisition in adulthood. *Studies in Second Language Acquisition*: 1–30. DOI: 10.1017/S0272263120000467
- Saito K, Suzukida Y, and Sun H (2019) Aptitude, experience, and second language pronunciation proficiency development in classroom settings: A longitudinal study. *Studies in Second Language Acquisition* 41: 201–225.

- Saito K, Sun H, and Tierney A (2019) Explicit and implicit aptitude effects on second language speech learning: Scrutinizing segmental and suprasegmental sensitivity and performance via behavioural and neurophysiological measures. *Bilingualism: Language and Cognition* 22: 1123–1140.
- Saito K, Sun H, and Tierney A (2020) A longitudinal investigation of explicit and implicit auditory processing in L2 segmental and suprasegmental acquisition. *Studies in Second Language Acquisition* 41: 1083–1112.
- Saito K, van Poeteren K (2018) The perception–production link revisited: The case of Japanese learners’ English/x/performance. *International Journal of Applied Linguistics* 28: 3–17.
- Sakai M, Moorman C (2018) Can perception training improve the production of second language phonemes? A meta-analytic review of 25 years of perception training research. *Applied Psycholinguistics* 39: 187–224.
- Sardegna VG (2011) Pronunciation learning strategies that improve ESL learners’ linking. In: *Pronunciation and Intelligibility: Issues in research and practice*. Proceedings of the 2nd Pronunciation in Second Language Learning and Teaching Conference. Iowa State University, pp. 105–121.
- Schmidt R, Watanabe Y (2001) Motivation, strategy use, and pedagogical preferences in foreign language learning. *Motivation and Second Language Acquisition* 23: 313–359.
- Scovel T (1978) The effect of affect on foreign language learning: A review of the anxiety research. *Language Learning* 28: 129–41.
- Seashore CE (1939) Revision of the Seashore measures of musical talent. *Music Educators’ Journal* 26: 31–33.
- Skehan P (2016) Foreign language aptitude, acquisitional sequences, and psycholinguistic processes. In: Granena G, Jackson D, and Yilmaz Y (eds) *Cognitive Individual Differences in L2 Processing and Acquisition*. Amsterdam: John Benjamin, pp. 15–38.
- Slevc LR, Miyake A (2006) Individual differences in second-language proficiency: Does musical ability matter? *Psychological Science* 17: 675–681.
- Teimouri Y (2017) L2 selves, emotions, and motivated behaviors. *Studies in Second Language Acquisition* 39: 681–709.
- Teimouri Y, Goetze J, and Plonsky L (2019) Second language anxiety and achievement: A meta-analysis. *Studies in Second Language Acquisition* 41: 363–387.
- Toth PD, Moranski K (2018) Why haven’t we solved instructed SLA? A sociocognitive account. *Foreign Language Annals* 51:73–89.
- Trofimovich P, Isaacs T (2012) Disentangling accent from comprehensibility. *Bilingualism: Language and Cognition* 15: 905–916.
- Trofimovich P, Lightbown PM, Halter RH, and Song H (2009) Comprehension-based practice: The development of L2 pronunciation in a listening and reading program. *Studies in Second Language Acquisition* 31: 609–639.
- Wing HD (1970) *Tests of Musical Ability and Appreciation*. Cambridge: Cambridge University Press.
- Yalçın Ş, Çeçen S, and Erçetin G (2016) The relationship between aptitude and working memory: An instructed SLA context. *Language Awareness* 25: 144–158.
- Yashima T (2002) Willingness to communicate in a second language: The Japanese EFL context. *The Modern Language Journal* 86: 54–66.
- Zheng C, Saito K, and Tierney A (2020) Successful second language pronunciation learning is linked to domain-general auditory processing rather than music aptitude. *Second Language Research*. DOI: 10.1177/0267658320978493