

**Measuring ESL Learners' Language Profiles: An Individual Differences Approach**  
CeLTA Fellowship 2017-2018  
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## **Project Description**

The purpose of this project was to chart individual differences in international students' profiles and relate these measures to the students' linguistic knowledge. It is well known that second language (L2) possess different types of knowledge about language, namely conscious (explicit) and unconscious (implicit) knowledge. Implicit knowledge is characterized as intuitive and tacit and is considered to be a key component of communicative competence (Ellis, 2009). Explicit knowledge is conscious and verbalizable (Ellis, 2009) and plays a more contested role in language performance (compare DeKeyser, 2015; N. Ellis, 2005; Krashen, 1981; VanPatten & Rothman, 2015). My current research efforts focus on validating a large battery of nine linguistic knowledge tests, which are hypothesized to measure either implicit knowledge, explicit knowledge, or an intermediary type of linguistic knowledge, known as automatized explicit knowledge (DeKeyser, 2003). With the help of a CeLTA fellowship, I was able to add five individual differences measures to this existing test battery of linguistic knowledge measures. By doing so, I could evaluate the role different cognitive aptitudes play in developing various types of linguistic knowledge. I could also find further evidence for the validity of the different knowledge tests. Specifically, I hypothesize that participants with high implicit-learning aptitude will do well on tests of implicit knowledge (e.g., oral production, elicited imitation, self-paced reading, and word monitoring) and participants with high explicit-learning aptitude will do well on tests of explicit knowledge (e.g., metalinguistic knowledge and different types of grammaticality judgment tests).

A total of 140 international students at MSU participated in this project. All participants had spent a minimum of two years living in an English-speaking country and were high-intermediate to advanced speakers of English (min. TOEFL score of 90). The participants completed five individual differences measures as a part of their participation in this project.

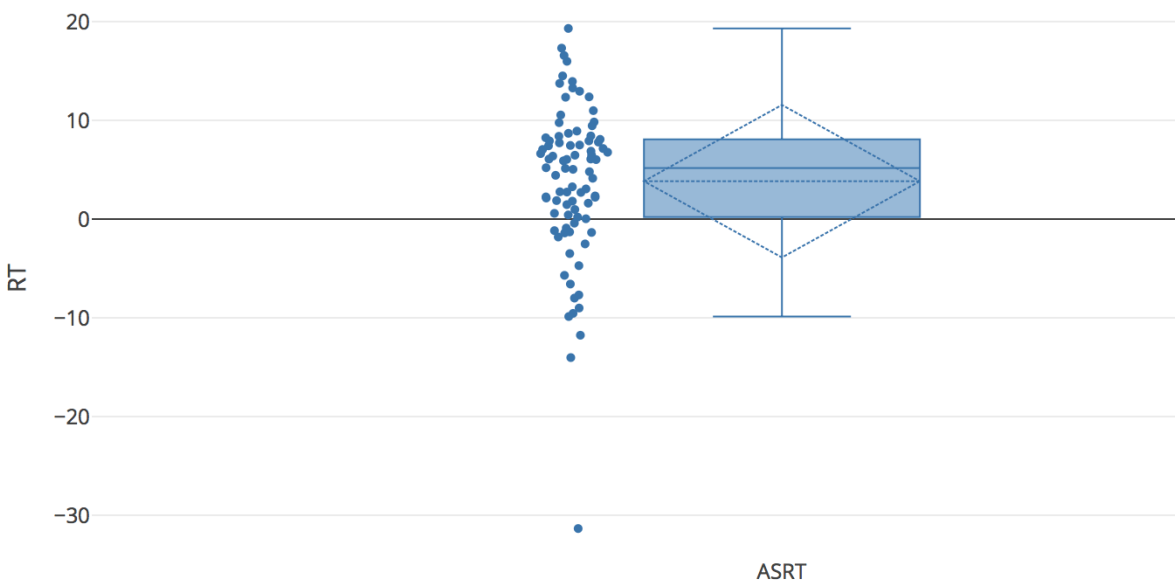
- i. a **Chinese paired-associates learning** task adapted from the MLAT Part V (Carroll & Sapon, 1959). This is a vocabulary learning task that measures individual differences in explicit learning ability.
- ii. the **Tower of London** task (Kaller, Unterrainer, & Stahl, 2012). This is a problem-solving task that measures individual differences in procedural learning ability and executive function.
- iii. an **alternating serial reaction time** task (Morgan-Short, Faretta-Stutenberg, Brill-Schuetz, Carpenter, & Wong, 2014). This is a motor task that measures individual differences in implicit learning ability.
- iv. an **auditory sequence learning** task (Siegelman, Bogaerts, Arciuli, & Frost, under review). This is an auditory task that measures individual differences in aural implicit learning ability.
- v. a **visual sequence learning** task (Siegelman, Bogaerts, & Frost, 2017). This is the visual counterpart of Task 4. It measures individual differences in visual implicit learning ability.

These tasks were selected based on their good results in previous studies (e.g., Linck et al. 2013; Morgan-Short et al., 2014; Suzuki & DeKeyser, 2017). The battery of individual differences measures was geared more heavily towards implicit knowledge predictors, given that my primary concern was to find predictors of advanced language proficiency. (Advanced language proficiency is assumed to require large amounts of implicit knowledge.) Accordingly,

tasks 2-5 were hypothesized to predict unconscious-implicit knowledge. This means that participants who performed well on Tasks 2-5 were also expected to do well on the tests of implicit linguistic knowledge in the larger project. Conversely, Task 1 was a predictor of conscious-explicit knowledge development. Participants with high paired-associates learning scores were expected to demonstrate strong explicit linguistic knowledge in the main project.

### Outcomes

As of May 2018, approximately 120 international students had participated in the study and the individual differences data from 85 students had been analyzed. I observed a good distribution in students' cognitive aptitudes (Figures 1 and 2), which bodes well for subsequent analyses relating individual differences and linguistic knowledge.



*Figure 1.* Distribution of test scores on the Alternating Serial Reaction Time task. Higher scores indicate more learning.

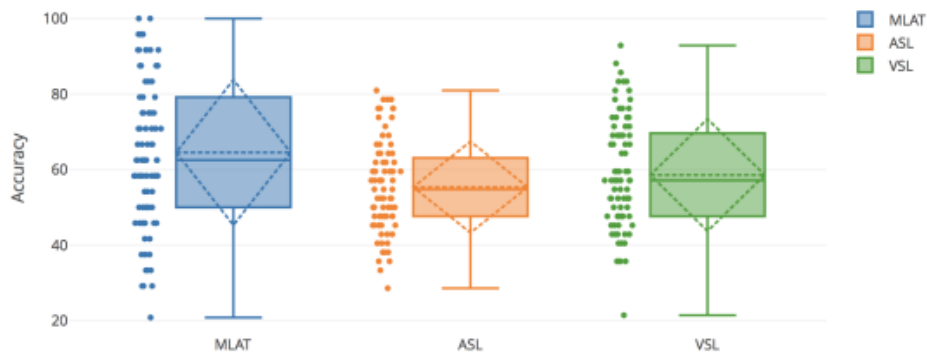


Figure 2. Distribution of test scores on the Chinese paired-associates learning task (MLAT), the Auditory Statistical Learning test, and the Visual Statistical Learning test. Higher scores indicate more learning.

Preliminary correlation analyses between the linguistic knowledge measures and the individual differences measures revealed a number of associations, (i) between the visual statistical learning task and linguistic knowledge measures, and (ii) between the alternating serials reaction time task and linguistic knowledge measures. The correlations provide mixed support for my research hypotheses. Consistent with my predictions, the alternating serial reaction time correlated negatively with the metalinguistic knowledge test (a measure of explicit knowledge) and visual statistical learning correlated positively with self-paced reading (a measure of implicit knowledge). Differently from what I expected, individual differences are mostly correlating negatively with hypothesized measures of implicit knowledge—word monitoring, oral production, elicited imitation, and potentially the untimed auditory grammaticality judgement test. These findings will need to be confirmed once the data from the full sample are in.

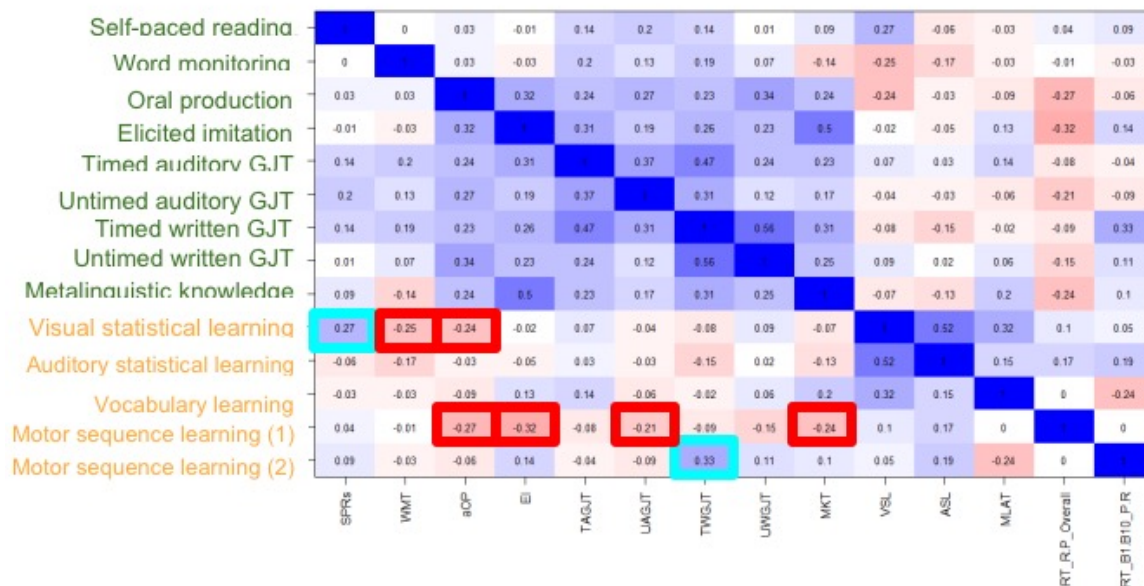


Figure 3. Preliminary correlation analyses ( $n = 85$ ) between linguistic knowledge measures (green) and individual differences variables (orange). Small-to-moderate correlations are highlighted in blue (positive) or red (negative).

### Impact

The present project has the potential to become a new milestone in test validation research in Second Language Acquisition. This is because the project brings together and synthesizes all the test validation research that has been conducted over the last 13 years, since Ellis (2005) first published his landmark psychometric study on measuring implicit and explicit knowledge (Ellis, R. 2005. *Measuring implicit and explicit knowledge of a second language: A psychometric study*. *Studies in Second Language Acquisition*, 27, 141-172. Cited 854 times as of May 2018.)

In academic year 2017-2018, my students and I have reported the findings of this project in two well-attended presentations at large, annual conferences. A third conference presentation at EuroSLA, in Münster, Germany, is forthcoming.

Godfroid, A., Kim, M., Li, W., Lim, J., & Maloney, J. (2017). Synthesizing 12 years of validation research on implicit and explicit knowledge: An interim report. Paper to the Second Language Research Forum, Columbus, OH, October 2017.

Lim, J., Kim, M., Maloney, J., Klem, J., & Godfroid, A. (2018). What do linguistic knowledge tests measure? Comparing the Ellis and Suzuki & DeKeyser models of implicit and explicit knowledge. Paper to the American Association for Applied Linguistics, Chicago, IL, March 2018.

Godfroid, A., Kim, M., Hui, B., & Isbell, D. (2018) Validation research on implicit and explicit knowledge: A research synthesis. Paper to be presented to the European Second Language Association, Münster, Germany , September 2018.

The following manuscripts will be prepared in summer and fall 2018.

Godfroid, A., Kim, M., Hui, B., & Isbell, D. (in preparation). Validation research on implicit and explicit knowledge: A research synthesis.

Godfroid, A., & Kim, M. (in preparation). Validity of implicit and explicit knowledge measures: Evidence from individual differences in cognitive aptitudes.

The second publication was entirely made possible thanks to the CeLTA fellowship, which allowed me to add the second, individual-differences component to the study.

The project has also provided training opportunities for three PhD candidates in Second Language Studies (Bronson Hui, Daniel Isbell, MinHye Kim) and four MA TESOL students (Chad Bousley, Wenyue Ma, Marisol Masso, Yuxuan Zhang). The project originated out of a graduate-level seminar in spring 2016, which resulted in opportunities to present at conferences for another three PhD candidates in Second Language Studies (Wenjing Li, Jungmin Lim, Jeffrey Maloney) and an undergraduate student in German (Melody Klem). Therefore, although I am the principal investigator for this research, it has benefited a sizable number of undergraduate and graduate students within the College of Arts and Letters as well.