Predicting success in foreign language skills
Skill-specific validity of cognitive and perceptual abilities, biographical, personality, and motivational factors
Meredith M. Hughes, Jared A. Linck, Scott R. Jackson, and Noah H. Silbert
University of Maryland Center for Advanced Study of Language

Abstract
Foreign language aptitude tests maximize language training resources by identifying individuals most likely to succeed in training. While the goal of some test users may be to predict individuals’ overall language proficiency, the validity of a language aptitude test may differ in predicting success in different language skills, such as reading, listening, or speaking. The current study investigated the skill-specific validity of a set of biographical, cognitive, personality, and motivational variables to predict foreign language learning success. We weighted the predictors to maximize prediction of overall proficiency and examined the resulting prediction of each individual skill. Results from regression analyses indicated that the predictors correctly classified individuals above chance in all three skills, but the classification accuracy was higher for reading proficiency than listening or speaking proficiency. Furthermore, the proportion of true successes identified by the predictors for reading was greater than for listening or speaking. These results suggest that while the predictors studied were related to success in all three skills, the relationship of the overall-profilciency model to the outcomes was slightly stronger in reading than in listening or speaking. Those who use language aptitude tests for selection or research are encouraged to match any skill-specific prediction goals with aptitude batteries which have demonstrated an appropriate level of skill-specific validity.

Introduction
Foreign language (FL) aptitude
Classic cognitive components (e.g., Carroll, 1985), including:
- Phonetic coding ability
- Grammatical sensitivity
- Inductive learning ability
- Rote/associative memory

Current study also measured constructs that could influence an individual’s readiness-to-learn (Bunting et al., 2011):
- New cognitive & perceptual abilities
- Biographical/past language experience
- Personality traits
- Beliefs, interests, & motivation to learn

Skill-specific validity
If criterion validity is measured by overall success or by a single skill modality (e.g., just reading), the test user has not shown that the validity generalizes to other language modalities.

Test-users may be concerned with predicting success in a particular skill, especially if a job emphasizes one skill (e.g., listening for translators).

Research questions
1. Does predicting overall FL success predict success in some language skills better than others?
2. Can the prediction of a particular skill be improved by re-weighting the predictors?

Method
Participants
- Military foreign language training program
- 1,667 tested; 1,312 in analysis sample
- 11 languages represented
- Tested within 3 weeks of beginning training
- Selected for training on general and FL aptitude scores

Analysis
Predicted four successful outcomes, required completing course on time and:
- Listening: Passing listening test (DPLT 2)
- Reading: Passing reading test (DPLT 2)
- Speaking: Passing speaking test (OPI 1+)
- Overall: Passing L/R/S tests

Classification accuracy: Compared area under the receiver operating characteristic (ROC) curve (Agresti, 2002).
- Plot false acceptance rates by true success rates; calculate area under curve (AUC).

Results
Predicting overall success
- Figure 1 shows AUC estimates for overall and skill-specific success for the model fit to the overall success criterion.

Results (continued)
Predicting skill-specific success
- Figure 2 shows that the classification accuracy for skill-specific outcomes can be improved by re-weighting the predictors.
- Improvement of classification accuracy was larger in Speaking (+.017) than when re-weighting to predict Listening (+.002) or Reading (+.005) success.

Discussion
Summary of results
1. Does predicting overall FL success predict success with certain language skills better than other skills?
   YES. The model predicting Overall success was best at predicting Reading and Listening outcomes, but worst at predicting success in Speaking.

2. Can the prediction of a particular skill be improved by re-weighting the predictors?
   YES. Although slight improvements were seen in each skill when it was explicitly predicted, this was most evident when predicting Speaking outcomes. The differences in the predictors’ weights, notably for Explicit Induction, Arithmetic Reasoning, and Recognizing Stress Patterns, improved the prediction of Speaking success.

Implications
- Test developers are advised to measure and report the validity of FL aptitude tests across and within skill modalities. If skill-specific validity can be improved by re-weighting, provide alternate weighting schemes.
- Test users should use this information to select FL aptitude tests with demonstrated validities to match their needs, whether they are for overall or skill-specific proficiency.

Future directions
Test developers and users could also examine the use of skill-specific models to predict who might need extra help with certain FL modalities.

References

Disclaimer
This material is based on work supported, in whole or in part, with funding from the United States Department of Defense. Any opinions, findings and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the University of Maryland, College Park, or any agency or entity of the United States Government.