REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
xx-02-2012	Technical Report	Feb 2012

4. TITLE AND SUBTITLE

Trainee Characteristics and Achievement During Special Operations Forces Initial Acquisition Foreign Language Training

5a. CONTRACT NUMBER
H92222-10-D-0017/0007

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

SWA Consulting, Inc.

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

SWA Consulting Inc.
311 S. Harrington St.
Suite 200
Raleigh, NC 27603

8. PERFORMING ORGANIZATION REPORT NUMBER

2012010610

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

HQ USSOCOM, Special Operations Forces Language Office
Attn: FMD-LDEMO-TL
7701 Tampa Point Blvd.
MacDill AFB, FL 33621-5323

10. SPONSOR/MONITOR'S ACRONYM(S)

SOFLO

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

A. Approved for public release; distribution is unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

This report evaluates the importance of trainee characteristics to learning in Special Operations Forces (SOF) initial acquisition foreign language training (IAT). This report focuses on trainees' general cognitive ability and motivation to learn as potential predictors of achievement during IAT. Specifically, this report attempts to answer the following questions: 1) Do trainee general cognitive ability and motivation to learn predict learner achievement during IAT; and 2) Do trainee general cognitive ability and motivation to learn independently or jointly predict achievement during IAT? The sample consisted of 550 trainees who completed foreign language IAT at a U.S. Army base in the southeastern United States between 2005 and 2007. Trainees' general cognitive ability was found to predict achievement on assessments of both listening and readings skills; however, motivation to learn showed an inconsistent relationship with achievement. Trainee cognitive ability and motivation to learn showed independent relationships with achievement. Findings show that trainee characteristics are predictive of learning performance during IAT. Specifically, trainee cognitive ability, and to a lesser extent, motivation to learn are useful indicators of a trainee's performance on listening and reading skills assessments during training.

15. SUBJECT TERMS
Trainee characteristics, initial acquisition training, IAT, cognitive ability, motivation to learn

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			Surface, Eric A.
U	U	U	UU (SAR)	9	**19b. TELEPHONE NUMBER** *(include area code)* 919-480-2751

Trainee Characteristics and Achievement During Special Operations Forces Initial Acquisition Foreign Language Training

SWA Consulting

FEBRUARY 2012

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED
SPONSORED BY: SOFLO, USSOCOM
RESEARCH CONDUCTED BY: SWA CONSULTING INC.

EXECUTIVE SUMMARY

Issue and Overview

The purpose of this report is to evaluate the importance of trainee characteristics to learning in Special Operations Forces (SOF) initial acquisition foreign language training (IAT). This report focuses on trainees' general cognitive ability and motivation to learn as potential predictors of achievement during IAT. The following research questions are examined in this report:

- Do trainee general cognitive ability and motivation to learn predict learner achievement during IAT?
- Do trainee general cognitive ability and motivation to learn independently or jointly predict achievement during IAT?

Findings

Do trainee general cognitive ability and motivation to learn predict learner achievement during IAT?

- Trainees' general cognitive ability (as assessed using the Armed Forces Qualification Test) was found to predict achievement on assessments of both listening and reading skills. Trainees higher in cognitive ability showed greater achievement than those lower in cognitive ability.
- Motivation to learn showed an inconsistent relationship with achievement. After accounting for training language, more highly motivated trainees showed greater listening achievement than less motivated trainees. This relationship was not found for reading achievement.

Do trainee cognitive ability and motivation to learn independently or jointly predict achievement during IAT?

- Trainee cognitive ability and motivation to learn showed independent (or additive) relationships with achievement. We did not find evidence of a higher-order interaction between these two trainee characteristics in the prediction of trainee achievement during IAT.

Conclusions

- Trainee characteristics appear to be predictive of learning performance during IAT. Specifically, trainee cognitive ability and, to a lesser extent, motivation to learn are useful indicators of a trainee's performance on listening and reading skills assessments during training.
    - AFQT scores may be useful for placing trainees into specific training languages, such that higher ability learners could be identified and placed into more difficult training languages. Placing trainees with greater learning potential into more difficult languages could improve learning outcomes (e.g., skill acquisition) and training success in those languages.

This project was conducted by SWA Consulting Inc. under a subcontract with CACI-WGI, Inc. (Subcontract# B11-114482; Prime# H92222-10-D-0017/0007; Sub-CLIN 0003AB). For questions or more information about the SOFLO and this project, please contact Mr. Jack Donnelly (john.donnelly@socom.mil). For specific questions related to data collection or this report, please contact Dr. Eric A. Surface (esurface@swa-consulting.com) or Dr. Reanna Poncheri Harman (rpharman@swa-consulting.com).

CONTENTS

REPORT DETAILS 4
APPENDIX A 8
ABOUT SWA CONSULTING INC. 9

REPORT DETAILS

This report was produced as part of the Special Operations Forces Language Office (SOFLO, USSOCOM) training analysis support initiative. The focus of this report is to document the relationships between Special Operations Forces (SOF) trainees' general cognitive ability (as assessed by the Armed Forces Qualification Test), motivation to learn, and achievement during initial acquisition foreign language training (IAT). This report addressed the following research questions:

- Do trainee general cognitive ability and motivation to learn predict learner achievement during IAT?
- Do trainee general cognitive ability and motivation to learn independently or jointly predict achievement during IAT?

Sample

The sample consisted of 550 trainees who completed foreign language IAT at a U.S. Army base in the southeastern United States between 2005 and 2007. Training duration was 18 weeks for Category I and II languages and 24 weeks for Category III and IV languages. Tests of learner achievement (also referred to as module tests) were administered on five different occasions throughout training. All items on a given achievement assessment covered material taught in the previous training module. The content of the SOLT course curriculum and associated skills tests were professionally developed and standardized across training languages. Each skills test included both a listening and reading component. Each component consisted of 50 multiple-choice items developed to assess trainees' ability to understand the spoken language and read the written language. Overall scores on each assessment was calculated as the percentage of items answered correctly. Trainees' scores on the five listening assessments were averaged to form an overall listening achievement measure (Cronbach's $\alpha = .76$). Reading assessment scores were also averaged to form an overall achievement measure ($\alpha = .73$).

Trainees' general cognitive ability was assessed using the Armed Forces Qualification Test (AFQT), a composite of four subtests on the Armed Services Vocational Aptitude Battery (ASVAB). AFQT raw scores were obtained from the Defense Manpower Data Center.

Motivation to learn was assessed using a five-item self-report measure obtained prior to training. This measure was developed for the current study to assess trainees' motivation to learn the target language. Sample items from this scale are, "I would like to learn as many languages as possible" and "I am motivated to perform well in language training so that we will be able to perform my missions more effectively." Responses were provided on a 7-point Likert-type scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The coefficient alpha for this scale was .67.

Findings—Full Sample

Two multiple linear regression analyses were conducted using the full sample.[1] For the first analysis, listening and reading overall scores were regressed onto trainee cognitive ability, motivation to learn, and the cross-product (or interaction term) between these variables. Training language was not entered as a control in this analysis. Table 1 presents the results. The results indicate both cognitive ability and

[1] Means, standard deviations, and zero-order correlations for all study variables are provided in Appendix A.

motivation to learn positively predicted listening and reading achievement scores. The interaction between these two variables was not statistically significant.

Table 1. Regression of IAT Achievement Test Scores onto Motivation to Learn and General Cognitive Ability (n = 550)

	Step 1		Step 2	
	B	β	B	β
Listening Achievement				
Motivation	.90**	.12	.90**	.12
Cognitive Ability	1.88**	.25	1.89**	.25
Motivation X CA	-	-	.07	.01
R^2	.08**		.08**	
ΔR^2	-		.00	
Reading Achievement				
Motivation	.66*	.11	.66*	.11
Cognitive Ability	1.48**	.24	1.48**	.24
Motivation X CA	-	-	-.04	-.01
R^2	.07**		.07**	
ΔR^2	-		.00	

Note. CA = Cognitive ability. B = unstandardized coefficient. β = standardized coefficient. Cognitive Ability and Motivation to Learn were standardized for this analysis.

* $p < .05$, ** $p < .01$.

Next, the aforementioned regressions were repeated with training language entered as a statistical control. Table 2 presents these results. Controlling for training language, cognitive ability positively predicted listening and reading achievement scores. Motivation to learn positively predicted listening achievement scores, but not reading scores. The interaction between these two variables was not statistically significant.

Table 2. Regression of IAT Achievement Test Scores onto Motivation to Learn and General Cognitive Ability Controlling for Training Language (n = 550)

	Step 2[a]		Step 3[a]	
	B	β	B	β
Listening Achievement				
Motivation	.67*	.09	.67*	.09
Cognitive Ability	1.64**	.22	1.64**	.22
Motivation X CA	-	-	-.00	.00
R^2	.23**		.23**	
ΔR^2	.06**		.00	
Reading Achievement				
Motivation	.46	.07	.46	.07
Cognitive Ability	1.52**	.24	1.52**	.24
Motivation X CA	-	-	-.02	-.00
R^2	.19**		.19**	
ΔR^2	.06**		.00	

Note. CA = Cognitive ability. B = unstandardized coefficient. β = standardized coefficient. Cognitive Ability and Motivation to Learn were standardized for this analysis.

[a] Training language was dummy-coded and entered in Step 1. Results for Step 1 are not presented for clarity.
* $p < .05$, ** $p < .01$.

Findings—Modern Standard Arabic Trainees Only

To examine the effects of cognitive ability and motivation learn within specific training languages, we evaluated the relationships of interest for Modern Standard Arabic (MSA) trainees (n = 147). MSA represented the largest single training language in the sample. Table 3 presents these results. The results indicate cognitive ability positively predicted listening and reading achievement scores for individuals learning MSA. However, motivation to learn was not predictive of either achievement outcome. The interaction between these two variables was also not statistically significant.

Table 3. Regression of IAT Achievement Test Scores onto Motivation to Learn and General Cognitive Ability for MSA Trainees (n = 147)

	Step 1		Step 2	
	B	β	B	β
Listening Achievement				
Motivation	-.19	-.03	-.19	-.03
Cognitive Ability	1.54**	.23	1.56**	.23
Motivation X CA	-	-	-.37	-.05
R^2	.05*		.06*	
ΔR^2	-		< .01	
Reading Achievement				
Motivation	.05	.01	.05	.01
Cognitive Ability	1.59**	.21	1.60**	.22
Motivation X CA	-	-	-.25	-.03
R^2	.05*		.05*	
ΔR^2	-		< .01	

Note. CA = Cognitive ability. B = unstandardized coefficient. β = standardized coefficient. Cognitive Ability and Motivation to Learn were standardized for this analysis.
* $p < .05$, ** $p < .01$.

Findings—French Trainees Only

We next evaluated the relationships of interest for French trainees (n = 115). French represented the second largest training language in the sample. Table 4 presents these results. The results indicate cognitive ability positively predicted listening and reading achievement scores for individuals learning French. Motivation to learn was not predictive of either achievement outcome. The interaction between these two variables was also not statistically significant.

Table 4. Regression of IAT Achievement Test Scores onto Motivation to Learn and General Cognitive Ability for French Trainees (n = 115)

	Step 1		Step 2	
	B	β	B	β
Listening Achievement				
Motivation	1.15	.14	1.11	.13
Cognitive Ability	3.03**	.36	3.06**	.36
Motivation X CA	-	-	.22	.03
R^2	.15**		.15**	
ΔR^2	-		< .01	
Reading Achievement				
Motivation	.07	.01	.09	.02
Cognitive Ability	2.77**	.52	2.75**	.51
Motivation X CA	-	-	-.15	-.03
R^2	.27**		.27**	
ΔR^2	-		< .01	

Note. CA = Cognitive ability. B = unstandardized coefficient. β = standardized coefficient. Cognitive Ability and Motivation to Learn were standardized for this analysis.
* $p < .05$, ** $p < .01$.

Conclusions

The objective of this report is to document the relationships between SOF trainees' general cognitive ability, motivation to learn, and achievement during IAT. The findings point to several conclusions:

- General cognitive ability showed a robust positive relationship with achievement across all analyses.
    - This finding suggests trainee AFQT scores may be useful for language placement, such that higher ability learners could be identified and placed into more difficult training languages. Placing trainees with greater learning potential into more difficult languages could improve learning outcomes (e.g., skill acquisition) and training success in those languages.
- Motivation to learn showed an inconsistent relationship with achievement. After accounting for training language, more highly motivated trainees showed greater listening achievement than less motivated trainees. This relationship was not found for reading achievement.
    - This pattern of findings suggests trainee motivation (assessed prior to training) may not be a reliable indicator of achievement in the IAT training context examined in this report.
- The relationships between cognitive ability, motivation to learn, and achievement were largely independent. That is, the relationship between cognitive ability and achievement did not appear to vary as a function of trainee motivation to learn. Similarly, the influence of motivation to learn did not appear to vary as a function of trainees' cognitive ability.
    - This finding suggests the potential positive influences of cognitive ability and motivation to learn in this learning context are additive (as opposed to multiplicative).

APPENDIX A

Means, Standard Deviations, and Zero-Order Correlations for Study Variables

Variable	Mean	Std. Dev.	1	2	3	4
1. Motivation to Learn	5.71	0.86	-			
2. Cognitive Ability (AFQT)	227.74	17.82	.06			
3. Overall Listening Achievement	86.66	7.51	.14**	.26**		
4. Overall Reading Achievement	88.46	6.28	.12**	.24**	.57**	-

Note. $n = 550$.

ABOUT SWA CONSULTING INC.

SWA Consulting Inc. (formerly Surface, Ward, and Associates) provides analytics and evidence-based solutions for clients using the principles and methods of industrial/organizational (I/O) psychology. Since 1997, SWA has advised and assisted corporate, non-profit and governmental clients on:

- Training and development
- Performance measurement and management
- Organizational effectiveness
- Test development and validation
- Program/training evaluation
- Work/job analysis
- Needs assessment
- Selection system design
- Study and analysis related to human capital issues
- Metric development and data collection
- Advanced data analysis

One specific practice area is analytics, research, and consulting on foreign language and culture in work contexts. In this area, SWA has conducted numerous projects, including language assessment validation and psychometric research; evaluations of language training, training tools, and job aids; language and culture focused needs assessments and job analysis; and advanced analysis of language research data.

Based in Raleigh, NC, and led by Drs. Eric A. Surface and Stephen J. Ward, SWA now employs close to twenty I/O professionals at the masters and PhD levels. SWA professionals are committed to providing clients the best data and analysis upon which to make evidence-based decisions. Taking a scientist-practitioner perspective, SWA professionals conduct model-based, evidence-driven research and consulting to provide the best answers and solutions to enhance our clients' mission and business objectives. SWA has competencies in measurement, data collection, analytics, data modeling, systematic reviews, validation, and evaluation.

For more information about SWA, our projects, and our capabilities, please visit our website (www.swa-consulting.com) or contact Dr. Eric A. Surface (esurface@swa-consulting.com) or Dr. Stephen J. Ward (sward@swa-consulting.com).