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Relations between Select21 Predictor Measures and First-Term Attrition

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Human Resources Research Organization

Selection and Assignment Research Unit
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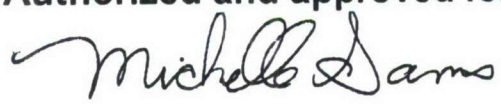

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14. ABSTRACT *(Maximum 200 words)*:

This report is based on a research effort concerned with Soldier accession and job classification and New Predictors for Selecting and Assigning Future Force Soldiers (Select21). The goal of Select21 is to ensure the Army acquires Soldiers with the knowledge, skills, and attributes (KSAs) needed for performing the type of tasks envisioned in a transformed Army. The objectives of the project are to (a) identify Future Force job demands and pre-enlistment KSAs required to meet them, (b) develop measures of job performance and critical KSAs, and (c) validate the experimental predictor measures against valued criteria.

This report summarizes attrition-related findings for Soldiers who participated in three Select21 reception battalion data collections: the pilot test (September-November 2003), faking research (January-February 2004), and field test (August-September 2004). The report provides estimates of the criterion-related validity of early estimates for pre-concurrent validation versions of the Select21 predictor measures for predicting first-term attrition. As such, the results provided in this report speak to the potential of the measures for selecting future Soldiers who are likely to complete their service obligations.

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RELATIONS BETWEEN SELECT21 PREDICTOR MEASURES AND FIRST-TERM ATTRITION

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RELATIONS BETWEEN EXPERIMENTAL SELECT21 PREDICTOR MEASURES AND FIRST-TERM ATTRITION

Introduction

The U.S. Army is undertaking fundamental changes to transform into the future force. In response, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) is sponsoring a project (Select21) concerning future entry-level Soldier selection, with the goal of ensuring the Army selects and classifies Soldiers with the knowledge, skills, and attributes (KSAs) needed for performing successfully in a transformed Army. The ultimate objectives of this project are to (a) develop and validate experimental predictor measures of critical attributes needed for successful execution of future force missions and (b) propose use of such measures as a foundation for an entry-level selection and classification system adapted to the demands of the 21st century. As part of this project, researchers are evaluating the potential usefulness of the experimental predictors by comparing Soldiers' scores on the predictor measures to (a) their scores on criterion performance measures in a concurrent criterion-related validation effort (see Knapp & Tremble, 2006) and (b) subsequent attrition criteria.

Overview of Report

This report provides a synopsis of attrition-related findings from three data collections on Soldiers who had just arrived at Army reception battalions to begin their entry military training: the pilot test (Cohort A, data collected September-November 2003), faking research (Cohort B, data collected January-February 2004), and field test (Cohort C, data collected August-September 2004). The Soldiers obtained at the reception battalions together comprised the Select21 attrition database. Attrition data summarized in this report are current through December 31, 2005. The focus of this report is on five types of first-term attrition: (a) attrition from Basic Combat Training (BCT), (b) attrition from Advanced Individual Training (AIT), (c) attrition that occurred anytime during Initial Entry Training (IET), (d) unit attrition (through 9 months in unit), and (e) all attrition that occurred through 15 months of service. As the three data collections occurred prior to the concurrent validation effort, they contributed findings for development of the final Select21 measures as well as findings on attrition.

The purpose of this report is to provide estimates of the validity of experimental Select21 selection and classification measures for predicting first-term attrition. It is important to note that with few exceptions, the predictor measures examined in this report represent preliminary versions of measures used in later parts of the Select21 project (e.g., the concurrent validation effort, see Knapp & Tremble, 2006). Nevertheless, given the small changes that occurred to most of the measures over the course of the Select21 project (Knapp, Sager, & Tremble, 2005), results

presented here can help inform whether the *types of content* assessed by the Select21 predictor measures hold promise for predicting first-term attrition.[1]

Structure of the Report

The first two sections of this report provide details on the demographic composition of Soldiers in the Select21 Attrition Database, as well as base rates of attrition within and across data collection cohorts. Such information is useful for facilitating comparisons with previous attrition-related findings (e.g., Project First Term; Strickland, 2004). Although most of this information was presented in the first attrition report produced for Select21 (Putka & Le, 2005), it is repeated in this report for the sake of convenience to the reader.

In the third section of this report, correlations between the Select21 predictor measures and five types of attrition: BCT, AIT, IET, unit (through 9 months in unit), and overall (through 15 months of service) are provided. Due to the low base rates of attrition and to the small sample sizes within each cohort, where possible, all correlational results are based on the combined sample of Soldiers across cohorts. The final section contains a summary of the results and suggestions for future use of the Select21 attrition database. Lastly, the appendix to this report provides details on sample sizes and base rates of attrition for the various analysis samples we examined.

Demographic Composition of Select21 Attrition Database Cohorts

Table 1 shows a summary of the demographic composition of Soldiers in the Select21 attrition database by cohort. Because demographic data were missing for a small number of Soldiers, subgroup sample sizes do not always sum to the "totals," and percentages do not always sum to 100%. Also note that actual analysis sample sizes used in later sections of this report may be smaller than the totals listed here due to missing data at the level of individual instruments. Overall, the demographic composition of Soldiers in the Select21 attrition database is very similar to the composition of the FY1999 and FY2003 enlisted accession cohorts (Putka & Strickland, 2004).

Base Rates and Composition of Attrition

BCT attrition was defined as attrition occurring within Soldiers' first 2 months of service. AIT attrition was defined as attrition occurring between Soldiers' third and sixth months of the most mature criterion we could examine given the service entry dates of some Soldiers (as late as September of 2004) and the currency of the latest extract of Enlisted Master File (EMF) (December 31, 2005) used to determine attrition status. Given that Soldiers are in AIT for different amounts of time (depending on the MOS), the time period between a Soldier's

[1] Note that this report does not discuss two Select21 predictor measures (Knapp et al., 2005). The excluded measures are the Army Work Knowledge Survey (AWKS) and the Interest Finder Questionnaire (IFQ). The AWKS is an assessment of Soldiers' expectations regarding the temperament-related requirements of Army work. The trait statements used on the AWKS are identical to those on the Work Suitability Inventory (WSI). Analyses performed on the AWKS in the first Select21 attrition report revealed that it had little validity for predicting training attrition (Putka & Le, 2005). Follow-up analyses examining the validity of the AWKS for predicting the more mature attrition criteria summarized in this report produced similar findings. The IFQ was excluded because it was primarily used as a marker measure to assist in the validation of the Select21 interests measure, the Work Preferences Survey (WPS).

Table 1. Demographic Composition of Cohorts

	Cohort A: Pilot Test		Cohort B: Faking		Cohort C: Field Test		Totals	
Group	*n*	%	*n*	%	*N*	%	*n*	%
Gender								
Male	895	77.8	573	71.5	486	70.6	1,954	74.0
Female	229	19.9	228	28.5	198	28.8	655	24.8
Race/Ethnicity								
White	767	66.6	503	62.8	385	56.0	1,655	62.7
Black	142	12.3	146	18.2	109	15.8	397	15.0
Hispanic	125	10.9	73	9.1	86	12.5	284	10.8
Other	42	3.6	24	3.0	16	2.3	82	3.1
AFQT Category								
I	42	3.6	42	5.2	35	5.1	119	4.5
II	368	32.0	265	33.1	204	29.7	837	31.7
IIIa	316	27.5	210	26.2	213	31.0	739	28.0
IIIb	388	33.7	263	32.8	208	30.2	859	32.5
IV-V	8	0.7	7	0.9	10	1.5	25	0.9
Education Tier								
1	960	83.4	644	80.4	576	83.7	2,180	82.6
2	144	12.5	125	15.6	93	13.5	362	13.7
3	10	0.9	12	1.5	0	0.0	22	0.8
Component								
Active Army	795	69.1	531	66.3	477	69.3	1,803	68.3
Reserve	127	11.0	98	12.2	134	19.5	359	13.6
National Guard	222	19.3	169	21.1	76	11.0	467	17.7
Totals	1,151		801		688		2,640	

third and sixth month of service is only an estimate of the time period Soldiers are in AIT. For example, it is possible that some Soldiers in the sample will be in their first unit assignment prior to their sixth month of service, and conversely some Soldiers in the sample may still be in AIT beyond their sixth month of service. Additionally, it is important to note that only Soldiers who survived their first 2 months of service were included in AIT attrition analyses; thus, rates of attrition for AIT are conditional on BCT survival. Although we label this as "AIT" attrition, it also includes attrition among Soldiers in One-Station Unit Training (OSUT) that occurred between their third and 6 months of service. IET attrition was defined as all attrition that occurred within Soldiers' first 6 months of service because this is a common convention. Unit attrition was defined as attrition occurring between 7 and 15 months of service. We limited the unit attrition criterion to Soldiers' first 9 months in unit because it was months of service (i.e., the proxy for IET) that were included in unit attrition analyses; thus, unit attrition rates were conditional on IET survival. Lastly,

overall attrition was defined as all attrition that occurred within Soldiers' first 15 months of service. As was the case with the unit attrition criterion, attrition through 15 months of service was the most mature criterion we could examine based on the data obtained for this project.

Table 2 shows attrition rates of Active Army Soldiers in the Select21 attrition database by cohort and type (i.e., BCT, AIT, IET, unit, overall). Across cohorts, the base rates of BCT attrition (7.0%), AIT attrition (7.2%), IET attrition (13.6%), unit attrition (7.5%), and overall 15-month attrition (20.0%) were quite similar to base rates of attrition observed in recent Army enlisted accession cohorts. For example, rates of attrition of FY1999 accessions were as follows: BCT: 6.6%, AIT: 8.5%, IET: 14.2%, unit attrition (through 9 months in unit): 8.1%, and overall 15-month attrition: 19.5% (Strickland, 2004). More recently, the rates of attrition observed for FY2003 enlisted accessions were as follows: BCT: 5.1%, AIT: 6.5% total IET: 11.1% (Putka & Strickland, 2004).

Table 2. Attrition Rates by Cohort and Phase

		BCT			AIT			IET		
Cohort	*N*	*n*	*n Attrit*	*% Attrit*	*n*	*n Attrit*	*% Attrit*	*n*	*n Attrit*	*% Attrit*
Cohort A: Pilot Test	1,151	803	45	5.6	757	62	8.2	802	107	13.3
Cohort B: Faking	801	539	36	6.7	503	30	6.0	539	66	12.2
Cohort C: Field Test	688	476	46	9.7	430	29	6.7	476	75	15.8
Totals	2,640	1,818	127	7.0	1,690	121	7.2	1,817	248	13.6

	Unit			15-Month		
Cohort	*n*	*n Attrit*	*% Attrit*	*n*	*n Attrit*	*% Attrit*
Cohort A: Pilot Test	697	53	7.6	804	159	19.8
Cohort B: Faking	474	33	7.0	540	99	18.3
Cohort C: Field Test	410	33	8.0	485	108	22.3
Totals	1,581	119	7.5	1,829	366	20.0

Note. N = total number of Soldiers in each cohort. n = number of Soldiers in the cohort with data on the Enlisted Master File (EMF). Only data for Active Army Soldiers are maintained on the EMF. Attrition data were not obtained for National Guard and Reserve component Soldiers. *n* Attrit = number of Active Army Soldiers who attrited.

Tables 3 through 7 provide data on the composition of attritees in the Select21 Attrition Database in terms of Interservice Separation Codes (ISCs). ISCs are administrative codes that generally indicate the official reason for a Soldier's separation from service. Like the FY1999 and FY2003 accession cohorts, the vast majority of training attrition that occurred among Soldiers in the Select21 Attrition Database was linked to two ISCs: entry-level performance and conduct/trainee discharge program (ISC 87) and unqualified for active duty/other (ISC 16). The latter largely reflects disqualifications for medical reasons (Strickland, 2004). Across the Select21 cohorts, these two ISCs accounted for 91.4% of BCT attrition, 73.6% of AIT attrition, and 82.6% of all IET attrition. With regard to unit attrition, findings were also quite similar to the FY1999 cohort. For example, in both the Select21 Attrition Database and the FY1999 cohort, the most common reasons for unit attrition were moral-character related (e.g., discharge in lieu of court-martial, drugs, and discreditable incidents). More specifically, 43.7% of the Select21 cases and 46.2% of the unit attrition cases in the FY99 cohort had ISCs that Project First Term

(Strickland, 2004) had treated as indicative of moral character as a reason for attrition. In sum, the composition of attrition criteria in the Select21 Attrition Database was remarkably similar to comparable attrition criteria for the FY1999 and FY2003 cohorts.

Table 3. Composition of BCT Attrition

	Cohort A: Pilot Test		Cohort B: Faking		Cohort C: Field Test		Total	
ISC	*n*	%	*n*	%	*n*	%	*n*	%
10: Condition existing prior to service					2	4.3	2	1.6
16: Unqualified for active duty, other	25	55.6	21	58.3	19	41.3	65	51.2
17: Failure to meet weight or body fat standards			5	13.9	2	4.3	7	5.5
60: Character or behavior disorder			1	2.8			1	0.8
87: Entry level performance & conduct/ Trainee Discharge Program	20	44.4	8	22.2	23	50.0	51	40.2
91: Erroneous enlistment or induction			1	2.8			1	0.8
Total	45		36		46		127	

Note. ISC = Interservice separation code. *n* = number of Active Army Soldiers with the given ISC who attrited during BCT. % = percentage of BCT attrition accounted for by the given ISC.

Table 4. Composition of AIT Attrition

	Cohort A: Pilot Test		Cohort B: Faking		Cohort C: Field Test		Total	
ISC	*n*	%	*n*	%	*n*	%	*n*	%
10: Condition existing prior to service	1	1.6					1	0.8
16: Unqualified for active duty, other	29	46.8	6	20.0	5	17.2	40	33.1
17: Failure to meet weight or body fat standards	8	12.9	4	13.3	5	17.2	17	14.0
22: Dependency or hardship			1	3.3	2	6.9	3	2.5
60: Character or behavior disorder			1	3.3	1	3.4	2	1.7
67: Drugs	2	3.2			1	3.4	3	2.5
75: AWOL or desertion	1	1.6					1	0.8
78: Good of the service (discharge in lieu of court-martial)	1	1.6			1	3.4	2	1.7
80: Misconduct, reason unknown			1	3.3			1	0.8
87: Entry level performance & conduct/ Trainee Discharge Program	20	32.3	15	50.0	14	48.3	49	40.5
97: Parenthood			2	6.7			2	1.7
Total	62	100.0	30	100.0	29	100.0	121	100.0

Note. ISC = Interservice separation code. *n* = number of Soldiers with the given ISC that attrited during AIT. % = percentage of AIT attrition accounted for by the given ISC.

Table 5. Composition of IET Attrition

ISC	Cohort A: Pilot Test		Cohort B: Faking		Cohort C: Field Test		Total	
	n	%	*N*	%	*n*	%	*n*	%
10: Condition existing prior to service	1	0.9			2	2.7	3	1.2
16: Unqualified for active duty, other	54	50.5	27	40.9	24	32.0	105	42.3
17: Failure to meet weight or body fat standards	8	7.5	9	13.6	7	9.3	24	9.7
22: Dependency or hardship	0	0.0	1	1.5	2	2.7	3	1.2
60: Character or behavior disorder	0	0.0	2	3.0	1	1.3	3	1.2
67: Drugs	2	1.9	0	0.0	1	1.3	3	1.2
75: AWOL or desertion	1	0.9					1	0.4
78: Good of the service (discharge in lieu of court-martial)	1	0.9	0	0.0	1	1.3	2	0.8
80: Misconduct, reason unknown			1	1.5			1	0.4
87: Entry level performance & conduct/ Trainee Discharge Program	40	37.4	23	34.8	37	49.3	100	40.3
91: Erroneous enlistment or induction			1	1.5			1	0.4
97: Parenthood			2	3.0			2	0.8
Total	107	100.0	66	100.0	75	100.0	248	100.0

Note. ISC = Interservice separation code. *n* = number of Soldiers with the given ISC that attrited during IET. % = percentage of IET attrition accounted for by the given ISC.

Table 6. Composition of Unit Attrition (through 9 months in unit)

ISC	Cohort A: Pilot Test		Cohort B: Faking		Cohort C: Field Test		Total	
	n	%	*n*	%	*n*	%	*n*	%
10: Condition existing prior to service	1	1.9			1	3.0	2	1.7
16: Unqualified for active duty, other	2	3.8	3	9.1			5	4.2
17: Failure to meet weight or body fat standards	3	5.7	3	9.1	7	21.2	13	10.9
22: Dependency or hardship	1	1.9					1	0.8
60: Character or behavior disorder	4	7.5	5	15.2	3	9.1	12	10.1
65: Discreditable incidents, civilian or Military	5	9.4	2	6.1	4	12.1	11	9.2
67: Drugs	6	11.3	2	6.1	6	18.2	14	11.8
73: Court-martial	1	1.9					1	0.8
74: Fraudulent entry			1	3.0			1	0.8
75: AWOL or desertion	1	1.9					1	0.8
76: Homosexuality	1	1.9	2	6.1	2	6.1	5	4.2
78: Good of the service (discharge in lieu of court-martial)	15	28.3	2	6.1	3	9.1	20	16.8
80: Misconduct, reason unknown			1	3.0			1	0.8
84: Commission of a serious offense			3	9.1	1	3.0	4	3.4
86: Unsatisfactory performance/ Expeditious Discharge Program	7	13.2	3	9.1	1	3.0	11	9.2
87: Entry level performance & conduct/ Trainee Discharge Program	2	3.8	1	3.0	3	9.1	6	5.0
94: Pregnancy	4	7.5	4	12.1	2	6.1	10	8.4
97: Parenthood			1	3.0			1	0.8
Total	53	100.0	33	100.0	33	100.0	119	100.0

Note. ISC = Interservice separation code. *n* = number of Soldiers with the given ISC that attrited within 9 months of joining their unit. % = percentage of unit attrition accounted for by the given ISC.

Table 7. Composition of Overall Attrition through 15 Months of Service

	Cohort A: Pilot Test		Cohort B: Faking		Cohort C: Field Test		Total	
ISC	*n*	%	*n*	%	*N*	%	*n*	%
10: Condition existing prior to service	2	1.3			3	2.8	5	1.4
16: Unqualified for active duty, other	55	34.6	30	30.3	24	22.2	109	29.8
17: Failure to meet weight or body fat Standards	11	6.9	12	12.1	14	13.0	37	10.1
22: Dependency or hardship	1	0.6	1	1.0	2	1.9	4	1.1
60: Character or behavior disorder	4	2.5	7	7.1	4	3.7	15	4.1
65: Discreditable incidents, civilian or Military	5	3.1	2	2.0	4	3.7	11	3.0
67: Drugs	8	5.0	2	2.0	7	6.5	17	4.6
73: Court-martial	1	0.6					1	0.3
74: Fraudulent entry			1	1.0			1	0.3
75: AWOL or desertion	2	1.3					2	0.5
76: Homosexuality	1	0.6	2	2.0	2	1.9	5	1.4
78: Good of the service (discharge in lieu of court-martial)	16	10.1	2	2.0	4	3.7	22	6.0
80: Misconduct, reason unknown			2	2.0			2	0.5
84: Commission of a serious offense			3	3.0	1	0.9	4	1.1
86: Unsatisfactory performance/ Expeditious Discharge Program	7	4.4	3	3.0	1	0.9	11	3.0
87: Entry level performance & conduct/ Trainee Discharge Program	42	26.4	24	24.2	40	37.0	106	29.0
91: Erroneous enlistment or induction			1	1.0			1	0.3
94: Pregnancy	4	2.5	4	4.0	2	1.9	10	2.7
97: Parenthood			3	3.0			3	0.8
Total	159	100.0	99	100.0	108	100.0	366	100.0

Note. ISC = Interservice separation code. *n* = number of Soldiers with the given ISC that attrited in their first 15 months of service. % = percentage of attrition accounted for by the given ISC.

Correlations with Attrition

In this section we provide series of tables, organized by instrument, that show correlations between the Select21 predictor measures and attrition, as well as key demographic variables and attrition. In addition to reporting raw correlations with attrition, we also report adjusted correlations. Adjusted correlations provide an estimate of what the correlation between predictors and attrition criteria would be if the base rate of attrition were .50 (Kemery, Dunlap, & Griffeth 1988). When base rates of attrition diverge from .50, correlations that index its relationship with other variables are attenuated. The greater the base rate diverges from .50, the more the correlation is attenuated. The purpose of adjusting correlations in this report is not to provide a more accurate estimate of the correlation between each measure and attrition in the population, but rather to facilitate comparisons of (a) correlations with attrition criteria that have different base rates (e.g., BCT and 15-month attrition) and (b) results from Select21 to past and future research. Although, the raw correlations could have been "adjusted" to any common base

rate (e.g., .15), .50 was chosen because it was used in past research (namely, Project First Term) and because it represents a standard that will hold its meaning over time.[2]

Background Variables

Historically, two of the strongest predictors of first-term attrition among Soldiers have been education tier and gender (Laurence, Naughton, & Harris, 1996). To provide a context for interpreting the magnitude of the correlations between Select21 predictor measures and attrition, Table 8 shows correlations between key demographic variables and attrition among Soldiers in the Select21 Attrition Database.[3]

Consistent with past research, gender emerged as a significant predictor of attrition, though the magnitude of the relationship between gender and BCT attrition was about half of what it was in the FY1999 and FY2003 enlisted accession cohorts (Putka & Strickland, 2004). Somewhat surprisingly, education tier showed minimal relationships with the attrition criteria (though low correlations between education tier and attrition were also found in Project First Term; Strickland, 2004). Another key finding is the significant correlation between the ASVAB Assembling Objects (AO) subtest scores and attrition during BCT, during IET, and over the first 15 months of assignment in a unit. Historically, the ASVAB has not been highly predictive of attrition (Laurence et al., 1996). However, to our knowledge, previous Army attrition research has not specifically examined Assembling Objects. Follow-up analysis indicated that the magnitude and significance of the AO-attrition relationship remained after controlling for gender; it also held up well within each of the Select21 Attrition Database cohorts. Although the magnitude of the AO-attrition correlation may seem small in the absolute sense, its magnitude would have placed it among the very top predictors of BCT, IET, and overall attrition based on the magnitudes reported for the several hundred predictors examined in Project First Term (Putka & Strickland, 2004; Strickland, 2004).

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[2] For example, although it may have been more meaningful within the context of these analyses to adjust the BCT and AIT correlations to the base rate for all IET attrition observed in the Select21 database, such a rate may not be found in subsequent research, thus making interpretation of these results in the historical context of attrition research more difficult.

[3] ASVAB subtest scores are not available on the EMF. These and the other variables in the table reflect Soldiers' status upon entry into the Army as reflected by historical MEPCOM Integrated Resource System (MIRS) files.

Table 8. Correlations between Attrition and Background Variables

	Cohort			Raw Correlations					Adjusted Correlations				
Variable	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
AFQT Score	X	X	X	-.02	-.01	-.02	-.03	-.04	-.04	-.01	-.03	-.05	-.04
ASVAB Arithmetic Reasoning	X	X	X	**-.04**	-.02	**-.04**	-.03	**-.05**	-.07	-.03	-.06	-.04	-.06
ASVAB Assembling Objects	X	X	X	**-.13**	-.04	**-.12**	**-.06**	**-.13**	-.20	-.06	-.15	-.09	-.15
ASVAB Auto and Shop Information	X	X	X	-.01	-.02	-.02	**-.08**	**-.06**	-.02	-.03	-.03	-.12	-.07
ASVAB Electronics Information	X	X	X	-.01	.00	-.01	**-.08**	**-.05**	-.02	.00	-.01	-.12	-.06
ASVAB General Science	X	X	X	-.03	.01	-.01	-.02	-.02	-.05	.02	-.01	-.03	-.02
ASVAB Mathematics Knowledge	X	X	X	-.02	-.04	**-.04**	-.03	**-.05**	-.04	-.06	-.06	-.05	-.06
ASVAB Mechanical Comprehension	X	X	X	**-.08**	-.03	**-.08**	**-.07**	**-.10**	-.13	-.04	-.09	-.10	-.11
ASVAB Paragraph Comprehension	X	X	X	-.01	.00	-.01	-.03	-.02	-.02	.00	-.01	-.04	-.03
ASVAB Verbal	X	X	X	.00	.03	.02	-.02	.01	.00	.04	.03	-.03	.01
ASVAB Word Knowledge	X	X	X	.01	.03	.03	-.01	.02	.01	.05	.04	-.01	.02
Gender (Female)	X	X	X	**.06**	**.06**	**.08**	**.11**	**.13**	.08	.08	.10	.14	.14
Race (Black vs. White)	X	X	X	.00	.00	.00	.00	.00	-.01	.01	.00	.00	.00
Race/Ethnicity (Hispanic vs. White Non-Hisp.)	X	X	X	-.04	-.02	**-.05**	-.03	**-.05**	-.08	-.04	-.06	-.04	-.06
Education Tier	X	X	X	.01	.04	.04	.04	**.05**	.02	.06	.05	.06	.06
High Quality Recruit (HSG + AFQT Cat I-IIIa)	X	X	X	-.01	.00	-.01	-.02	-.02	-.02	.00	-.01	-.03	-.02

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples, are presented in Appendix A. Correlations between categorical variables (i.e., Education Tier, Race/Ethnicity, Gender, and High Quality Recruit Designation) are Phi coefficients. Gender was coded as 1 = Female and 0 = Male. Race was coded as 1 = Black and 0 = White. Race/Ethnicity was coded as 1 = Hispanic and 0 = White Non-Hispanic. High Quality Recruit Designation was coded as 1 if the Soldier was Education Tier 1 and fell into ASVAB AFQT categories I-IIIa, otherwise it was coded as 0. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Psychomotor Tests

Table 9 shows correlations between psychomotor test scores and attrition. Based on these results, the Precision Composite and Time-To-Fire scores appear to be only modestly related to attrition, particularly in comparison to other predictors as described in subsequent sections.

Table 9. Correlations between Attrition and the Psychomotor Test Scores

	Cohort			Raw Correlations				
Score	A	B	C	BCT	AIT	IET	Unit	15-Mo
Precision Composite		X	X	-.03	**-.08**	**-.07**	-.04	**-.08**
Time-To-Fire		X	X	-.03	-.05	-.05	-.05	**-.07**
				Adjusted Correlations				
Score	A	B	C	BCT	AIT	IET	Unit	15-Mo
Precision Composite		X	X	-.05	-.12	-.09	-.05	-.09
Time-To-Fire		X	X	-.04	-.08	-.07	-.08	-.08

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Predictor Situational Judgment Test (PSJT)

Two forms (A and B) of the Predictor Situational Judgment Test (PSJT) were administered as part of the Select21 predictor field test (Waugh & Russell, 2005). Each participating Soldier only completed one of these forms. The results in Table 10 suggest that there may be differences between Forms A and B.[4] Specifically, the PSJT Judgment score based on Form A was significantly negatively correlated with BCT attrition, whereas the Judgment Composite based on Form B was significantly positively correlated with BCT attrition, and in both cases the magnitude of the correlations compared favorably to those reported in past attrition research (e.g., Project First Term). If these validity differences are attributable to the items that comprise each form, then when the items from each form are pooled into a single measure, the resulting scale may be non-predictive of attrition. Along these lines, in an attempt to maximize sample size for these analyses, we also examined a third PSJT Judgment score (labeled "Z "in the table). This score was formed by standardizing Form A and Form B scores (within the sample of Soldiers that completed those forms) and merging the sets of scores together. We took the resulting vector of standardized scores and correlated it with each attrition criterion. As shown in Table 10, the resulting score had no relationship to attrition.

[4] It is important to note that the correlations for Form A and Form B reported in Table 10 are based on only those items and response options that were carried forward for use in the concurrent validation (CV) version of the PSJT. Reduced versions of these forms were examined here in an attempt to increase the generalizability of the results to the CV version of the PSJT.

Table 10. Correlations between Attrition and PSJT Judgment Scores

	Raw Correlations				
Composite	BCT	AIT	IET	Unit	15-Mo
Judgment (A)	**-.16**	.03	-.08	-.11	**-.13**
Judgment (B)	**.13**	.00	.10	.05	.11
Judgment (Z)	.00	.02	.01	-.03	-.01
	Adjusted Correlations				
Composite	BCT	AIT	IET	Unit	15-Mo
Judgment (A)	-.22	.04	-.10	-.17	-.14
Judgment (B)	.17	.00	.12	.07	.12
Judgment (Z)	.00	.02	.01	-.05	-.01

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. All correlations are based on Cohort C (field test) only. Sample sizes for the correlations between Judgment (Z) and attrition, as well as the attrition rates within those samples are presented in Appendix A. Sample sizes for correlations involving Judgment (A) and (B) ranged from 137-178. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

In an attempt to better understand reasons for the different validity estimates obtained for Form A and Form B, we conducted follow-up analyses that examined validity estimates for items comprising each form. The results of these item-level analyses are presented in Table 11. One hypothesis we had regarding the differences in validity estimates for Form A and Form B was that they may reflect differences in the items comprising the forms. For example, perhaps Form A more heavily comprised items assessing constructs negatively related to attrition, whereas Form B more heavily comprised items assessing constructs positively related to attrition. Based on Table 11, there appears to be little support for this hypothesis. Although, the opposite signs observed for Form A and Form B appear to be driven by a few key items, the opposite signs do not appear to be explained by the Select21 performance dimension that an item was originally written to target.[5] For example, whereas Items 3 and 31 were both written to target Effort and Initiative on the Job, they had significant correlations with BCT attrition in the opposite direction. One implication of these findings is that while the overall PSJT-CV score may not prove to be a valid predictor of attrition, certain types of items that comprise it may be quite predictive.

Given the range of correlations observed across PSJT items, future research could take a closer look at SJT items and response options that were predictive of attrition versus those that were not predictive of attrition (including those items/options dropped for the CV). The purpose of such follow-up work would be to determine if there are any systematic trends in the type of judgments respondents are asked to make, or other substantive content, that may differentiate predictive from non-predictive SJT items/options. Such an analysis could inform creation of a blueprint for an SJT targeted at identifying recruits at risk of attrition.

[5] We should note that PSJT items, as well as their underlying response options, tend to be multi-dimensional. As such, even though a particular item was written to target a given construct, it does not mean that the resulting item provides a unidimensional measure of the given construct.

Table 11. Correlations between Attrition and PSJT Item-Level Scores

Form/Item	Select21 Performance Dimension	Raw Correlations					Adjusted Correlations				
		BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
PSJT Form A		**-.16**	.03	-.08	-.11	**-.13**	-.22	.04	-.10	-.17	-.14
Item 03	Exhibiting Effort and Initiative on the Job	**-.18**	.01	-.11	-.05	-.12	-.29	.01	-.14	-.08	-.13
Item 04	Teamwork	**-.28**	.01	**-.18**	-.10	**-.20**	-.45	.01	-.22	-.16	-.23
Item 05	Relating to and Supporting Peers	-.03	**.14**	.08	-.03	.05	-.05	.20	.10	-.05	.06
Item 06	Effective Self-Management	**-.13**	-.06	**-.13**	.00	-.11	-.21	-.09	-.16	.00	-.12
Item 08	Effective Self-Directed Learning	-.12	.09	-.01	-.04	-.03	-.20	.13	-.01	-.07	-.04
Item 12	Effective Self-Management	.00	.05	.04	-.02	.02	.01	.07	.05	-.02	.02
Item 17	Teamwork	-.02	-.03	-.03	-.11	-.08	-.03	-.04	-.04	-.16	-.10
Item 19	Teamwork	-.03	.05	.02	-.12	-.05	-.04	.07	.03	-.18	-.05
Item 25	Exhibiting Effort and Initiative on the Job	**-.14**	-.08	**-.15**	.07	-.08	-.22	-.12	-.18	.11	-.10
Item 26	Adaptability to Changing Conditions	-.04	.02	-.01	.01	.00	-.06	.02	-.01	.02	-.01
Item 28	Effective Self-Directed Learning	-.07	-.02	-.06	.05	-.02	-.11	-.03	-.08	.08	-.02
Item 31	Adaptability to Changing Conditions	**-.13**	-.05	-.12	-.04	-.12	-.21	-.07	-.15	-.07	-.14
PSJT Form B		**.13**	.00	.10	.05	.11	.17	.00	.12	.07	.12
Item 04	Teamwork	.07	-.12	-.01	-.12	-.07	.09	-.18	-.02	-.17	-.08
Item 06	Relating to and Supporting Peers	.09	-.05	.04	.03	.05	.11	-.07	.05	.04	.05
Item 09	Exhibiting Effort and Initiative on the Job	.05	**-.17**	-.06	-.03	-.07	.06	-.26	-.07	-.04	-.07
Item 10	Relating to and Supporting Peers	**.14**	.03	**.13**	.01	.11	.18	.05	.15	.01	.12
Item 12	Relating to and Supporting Peers	.06	-.04	.03	.08	.06	.08	-.06	.03	.12	.07
Item 13	Adaptability to Changing Conditions	**.17**	.01	**.13**	.02	.12	.21	.01	.15	.03	.13
Item 14	Effective Self-Management	.07	-.03	.04	.01	.04	.09	-.05	.05	.01	.04
Item 18	Effective Self-Directed Learning	-.01	.06	.03	.04	.04	-.01	.09	.03	.06	.05
Item 19	Adaptability to Changing Conditions	.03	-.08	-.02	.09	.03	.04	-.12	-.02	.14	.04
Item 21	Relating to and Supporting Peers	.04	.03	.05	-.02	.03	.05	.04	.06	-.02	.03
Item 22	Adaptability to Changing Conditions	-.02	-.07	-.06	.08	-.01	-.03	-.10	-.07	.12	-.01
Item 23	Effective Self-Management	.08	.05	.09	**.17**	**.17**	.10	.08	.11	.25	.18
Item 28	Adaptability to Changing Conditions	.07	.11	.12	.02	.11	.09	.17	.14	.03	.12
Item 31	Exhibiting Effort and Initiative on the Job	**.15**	.13	**.19**	.02	**.16**	.18	.20	.22	.03	.18

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. All correlations are based on Cohort C (field test) only (n = 137-178). The Select21 performance dimension that each PSJT item was originally written to target is noted in the second column. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Rational Biodata Inventory (RBI)

Table 12 shows correlations between Rational Biodata Inventory (RBI) scales and attrition.[6] Although designed to predict job performance, the RBI does have scales that tap into constructs found to be predictive of early attrition based on past research. For example, several of the top predictors of training attrition in Project First Term (e.g., pre-service fitness, generalized self-efficacy, pre-service positive affect towards the Army, pre-service perceived stress; Strickland, 2004) clearly relate to constructs assessed by the RBI scales such as Fitness Motivation, Self-Esteem, Army Identification, and Stress Tolerance. Interestingly, for the most part, these RBI scales had higher correlations with attrition than their counterparts in the First Term project. Also of interest, the results shown in Table 12 are quite consistent with early research on the Army's Assessment of Individual Motivation (AIM), which indicated that AIM Physical Conditioning (akin to RBI Fitness Motivation) and Adjustment (akin to RBI Stress Tolerance) were the scales most predictive of training attrition (e.g., r = -.15 and -.12, respectively for predicting 6-month attrition; Heggestad, Young, Strickland, & Rumsey, 1999). The results presented in Table 12 reinforce the importance of these constructs for predicting early attrition.

In addition to showing scale-level correlations, Table 12 also shows correlations between the attrition criteria and five unit weighted composites of RBI scales we constructed to predict each attrition criterion. The method for forming these composites mimicked the method used to form the empirical Work Suitability Inventory (WSI) composites described in the Select21 concurrent validation report (McCloy & Putka, 2006). Specifically, for each of the five attrition criteria, an RBI composite was formed by:

1. Correlating each RBI scale score with the target attrition criterion.
2. Identifying those RBI scales with the highest absolute validity for predicting the given attrition criterion.
3. Entering the scales identified in Step 2 as predictors in a logistic regression model targeting the given attrition criterion, and pruning back the model using a backwards stepwise elimination.
4. Taking the scales that survived the modeling process in Step 3 and using them to create a unit weighted composite targeting the given attrition criterion. Each scale in the composite was assigned a weight of + 1 or -1 depending on the direction of its relationship to the criterion.

[6] A table containing item-level correlations between attrition and each of the RBI items administered between the pilot and field test is available upon request. It is important to note that several RBI items actually showed higher correlations with attrition than the scales presented above, and many of these items were dropped prior to finalizing the concurrent validation version of the RBI (Kilcullen, Putka, McCloy, & Van Iddekinge, 2006). As discussed in the final section of this report, such item-level validity data might be very valuable for future efforts to construct measures of attrition risk.

Table 12. Correlations between Attrition and RBI Scores

	Cohort			Raw Correlations					Adjusted Correlations				
Scale/Composite	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
Scale													
Achievement	X	X	X	-.06	-.04	**-.07**	.02	-.04	-.08	-.07	-.09	.02	-.05
Army Identification			X	**-.17**	**-.08**	**-.18**	.04	**-.12**	-.25	-.13	-.23	.05	-.14
Cognitive Flexibility	X	X	X	.01	**.07**	.05	.00	.04	.01	.11	.06	.01	.05
Cultural Tolerance	X	X	X	**-.09**	**.09**	.00	**.08**	.05	-.13	.14	.00	.11	.05
Fitness Motivation	X	X	X	**-.16**	**-.13**	**-.20**	-.06	**-.18**	-.23	-.20	-.25	-.09	-.21
Gratitude		X		.07	-.03	.03	.04	.05	.10	-.04	.03	.06	.05
Hostility to Authority	X	X	X	.05	-.03	.02	-.01	.01	.08	-.05	.02	-.01	.01
Internal Locus of Control	X	X	X	-.06	-.02	-.06	-.02	-.06	-.09	-.03	-.07	-.03	-.06
Interpersonal Skills- Diplomacy	X	X	X	-.04	.00	-.03	.06	.01	-.07	.00	-.04	.09	.01
Lie Scale	X	X	X	-.04	-.01	-.03	-.01	-.03	-.06	-.01	-.04	-.02	-.04
Narcissism	X	X	X	.05	.02	.05	.02	.05	.07	.03	.06	.03	.05
Peer Leadership	X	X	X	-.03	**.09**	.04	.05	**.06**	-.04	.15	.05	.06	.07
Respect for Authority			X	.01	.06	.04	-.01	.03	.01	.10	.06	-.01	.04
Self-Esteem	X	X	X	**-.10**	-.04	**-.10**	.04	-.05	-.14	-.06	-.12	.05	-.06
Stress Tolerance	X	X	X	**-.18**	-.04	**-.16**	**-.10**	**-.18**	-.27	-.06	-.20	-.14	-.20
Composite													
BCT Composite			X	**.21**	**.13**	**.24**	.03	**.21**	.31	.20	.30	.05	.23
AIT Composite	X	X	X	**.11**	**.18**	**.20**	**.09**	**.20**	.17	.28	.25	.12	.23
IET Composite			X	**.21**	**.13**	**.24**	.03	**.21**	.31	.20	.30	.05	.23
9-Mo Unit Composite	X	X	X	.05	**.10**	**.10**	**.14**	**.16**	.07	.16	.13	.20	.18
15-Mo Overall Composite	X	X	X	**.22**	**.12**	**.23**	**.10**	**.24**	.33	.19	.30	.14	.27

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. "Boxed" correlations reflect correlations between a given RBI composite and the specific attrition criterion on which its development was based. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

The composition of the composite optimized on each criterion is presented in Table 13. Specifically, Table 13 shows standardized odds ratios for RBI scales that entered into each composite based on the final logistic regression model for each attrition criterion (per Step 3 above). Standardized odds ratios are interpreted as the change in odds of attrition associated with a one standard deviation change on the given predictor of interest. Odds ratios less than one indicate that the odds of attrition decrease as the predictor score increases, whereas odds ratios greater than one indicate that the odds of attrition increase as the predictor score increases. For example, every one standard deviation increase on RBI Fitness Motivation was associated with nearly a halving of the odds (0.56) that a Soldier attrited during BCT (holding RBI Army Identification constant). Conversely, every one standard deviation increase on RBI Cultural Tolerance was associated with a 1.51 times increase in the odds that a Soldier attrited during their first 9 months in-unit (holding RBI Stress Tolerance constant). Although the direction of this latter finding seems counterintuitive, it is consistent with the direction of the zero-order correlation between RBI Cultural Tolerance and unit attrition (.08) presented in Table 12.

Table 13. Standardized Odds Ratios for Components of RBI Attrition Composites

	Cohort			Standardized Odds Ratio				
Scale	A	B	C	BCT	AIT	IET	Unit	15-mo
Achievement	X	X	X					
Army Identification			X	0.65		0.70		
Cognitive Flexibility	X	X	X					
Cultural Tolerance	X	X	X				1.51	
Fitness Motivation	X	X	X	0.64	0.55	0.65		0.62
Gratitude		X						
Hostility to Authority	X	X	X					
Internal Locus of Control	X	X	X					
Interpersonal Skills- Diplomacy	X	X	X					
Lie Scale	X	X	X					
Narcissism	X	X	X					
Peer Leadership	X	X	X		1.76			
Respect for Authority			X					
Self-Esteem	X	X	X					
Stress Tolerance	X	X	X				0.64	0.69

Note. If no odds ratio is listed for an RBI scale, it means that the scale was not part of the final composite targeting the given attrition criterion. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in when fitting the logistic regression model for the given criterion.

Returning to the validity estimates in Table 12, several RBI composites showed good levels of validity for predicting attrition. Given the levels of validity observed for the individual RBI scales that comprise these composites, this finding is not surprising. For example, a unit weighted composite of RBI Fitness Motivation and Army Identification had estimated validities for predicting BCT, IET and 15-month attrition that exceeded .20 in magnitude. The emergence of Army Identification, coupled with results regarding affective commitment in Project First Term, suggests that pre-service feelings of "emotional attachment" may be an area of content the Army may wish to consider in attempts to identify Soldiers at heightened risk for attrition.

Also of note, a unit weighted composite of RBI Fitness Motivation and Stress Tolerance had estimated validities for predicting BCT, IET, and 15-month attrition that exceeded .20 in magnitude. Interestingly, the latter unit weighted composite appears to be very similar to the AIM Reduced Adaptability composite described by Heggestad et al. (1999) in terms of constructs assessed. Specifically, the AIM Reduced Adaptability composite was a combination of AIM Physical Conditioning and Adjustment. Heggestad et al. reported that composite as having an unadjusted estimated validity of -.16 for predicting 6-month attrition.

Work Suitability Inventory (WSI)

Table 14 shows correlations between attrition and several "full scores" from the WSI. The WSI asks respondents to rank order 16 different types of work in terms of how successfully they think they would perform them. Each type of work on the WSI is linked to a different personality trait. "Full scores" represent the number of times a given WSI trait (e.g., Cooperation) was chosen over all other traits (McCloy & Putka, 2005). Unlike many of the other measures summarized in this report, it is important to note that the version of the WSI examined here is identical in content to the one examined in the concurrent validation effort.

Several WSI full scores appeared to be modestly predictive of attrition. Soldiers who thought they would be better at types of work requiring Stress Tolerance and Leadership Orientation, as compared to types of work requiring other characteristics, were less likely to attrit during BCT and IET. Conversely, Soldiers who thought they would be better at work requiring Adaptability/Flexibility, Concern for Others, Cooperation, and Independence, as compared to other characteristics, were more likely to attrit during BCT and IET. Soldiers who thought they would be better at work requiring Cultural Tolerance compared to other types of work were more likely to attrit within 9 months of joining their units. In terms of differences across attrition criteria, Persistence was related to AIT attrition (greater endorsement of Persistence was linked to lower AIT attrition) but not BCT attrition, whereas Energy, Adaptabilty/Flexibity, and Leadership Orientation were more related to BCT attrition than to AIT attrition. None of the aforementioned scales were predictive of unit attrition.

In addition to examining the validity of the WSI full scores for predicting attrition, we also examined evidence for the validity of several WSI composites. Table 15 shows validity estimates for several types of WSI composites. The Spearman *r* fit index is a measure of similarity between a Soldier's profile of full scores on the WSI and the mean profile of Army SMEs' Work Styles Suitability Survey (WSSS) scores. The WSSS is a measure designed to assess the degree to which the work of first-term Soldiers requires each of the traits comprising the WSI (Van Iddekinge, Putka, & Sager, 2005). The "CV" composites shown in Table 14 were developed for predicting the attitudinal criteria gathered during the concurrent validation effort (McCloy & Putka, 2006). Lastly, Table 15 shows results for five unit weighted composites of WSI dyad-level scores we constructed to predict each attrition criterion. The method for forming these composites mimicked the method used to form the empirical WSI composites in the Select21 concurrent validation report (McCloy & Putka, 2006). The general steps followed in constructing these composites were outlined in the RBI section presented earlier.

Table 14. Correlations between Attrition and WSI Scale Scores

	Cohort			Raw Correlations					Adjusted Correlations				
Scale	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
A: Achievement/Effort	X	X	X	-.03	-.05	-.05	.00	-.04	-.04	-.09	-.07	.00	-.05
B: Adaptability/Flexibility	X	X	X	**.07**	.04	**.08**	-.01	.05	.10	.06	.10	-.01	.06
C: Attention to Detail	X	X	X	-.02	.03	.00	-.01	.00	-.03	.05	.00	-.02	-.01
D: Concern for Others	X	X	X	**.07**	**.07**	**.10**	.04	**.10**	.11	.11	.12	.06	.11
E: Cooperation	X	X	X	**.06**	**.09**	**.11**	-.05	.05	.10	.15	.14	-.07	.06
F: Dependability	X	X	X	-.04	-.03	-.05	-.06	**-.07**	-.06	-.04	-.06	-.08	-.08
G: Energy	X	X	X	**-.07**	.02	-.04	.01	-.03	-.11	.03	-.05	.01	-.03
H: Independence	X	X	X	**.06**	.06	**.08**	-.06	.03	.09	.09	.11	-.08	.03
I: Initiative	X	X	X	.06	-.02	.03	-.03	.00	.09	-.04	.04	-.05	.00
J: Innovation	X	X	X	.02	-.04	-.01	-.01	-.01	.04	-.06	-.01	-.01	-.01
K: Leadership Orientation	X	X	X	**-.07**	-.03	**-.07**	.05	-.02	-.10	-.05	-.09	.06	-.03
L: Persistence	X	X	X	-.02	**-.07**	-.06	.06	.00	-.02	-.11	-.07	.09	.00
M: Self-Control	X	X	X	-.04	-.01	-.04	-.05	-.06	-.06	-.02	-.05	-.07	-.07
N: Social Orientation	X	X	X	-.01	-.06	-.04	-.05	**-.07**	-.01	-.09	-.06	-.08	-.07
O: Stress Tolerance	X	X	X	**-.07**	**-.07**	**-.10**	.06	-.03	-.11	-.11	-.13	.09	-.04
P: Cultural Tolerance	X	X	X	.01	.06	.05	**.09**	**.09**	.01	.10	.06	.13	.10

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Table 15. Correlations between Attrition and WSI Composite Scores

	Cohort			Raw Correlations					Adjusted Correlations				
Composite	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
Spearman *r* WSI-WSSS Profiles	X	X	X	**-.07**	-.03	**-.07**	-.03	**-.08**	-.11	-.05	-.09	-.05	-.09
CV General Technical Proficiency	X	X	X	-.04	**-.06**	**-.07**	.00	-.05	-.06	-.10	-.09	.00	-.06
CV Achievement & Effort	X	X	X	-.03	-.05	-.06	.02	-.03	-.05	-.08	-.07	.03	-.03
CV Physical Fitness	X	X	X	**-.07**	-.04	**-.08**	.02	-.04	-.10	-.06	-.10	.03	-.05
CV Teamwork	X	X	X	**.07**	**.06**	**.09**	-.03	.05	.10	.10	.12	-.05	.06
CV Future Expected Performance	X	X	X	-.01	-.04	-.04	-.01	-.03	-.02	-.07	-.05	-.01	-.04
CV Satisfactions with Army	X	X	X	**-.08**	-.04	**-.08**	-.03	**-.08**	-.12	-.06	-.11	-.04	-.09
CV Perceived Fit with Army	X	X	X	**-.07**	-.06	**-.09**	.00	**-.07**	-.11	-.09	-.12	.00	-.08
CV Attrition Cognitions	X	X	X	**.09**	**.09**	**.12**	.01	**.10**	.13	.15	.16	.01	.11
CV Career Intentions	X	X	X	**-.08**	-.05	**-.09**	.05	-.04	-.12	-.08	-.12	.07	-.04
CV Future Army Affect	X	X	X	-.02	.00	-.01	.03	.01	-.03	.00	-.02	.04	.01
BCT Composite	X	X	X	**.18**	**.07**	**.18**	**-.10**	**.07**	.27	.12	.23	-.15	.08
AIT Composite	X	X	X	.06	**.19**	**.16**	.03	**.14**	.08	.31	.21	.04	.16
IET Composite	X	X	X	**.16**	**.16**	**.22**	-.05	**.14**	.24	.26	.28	-.06	.16
9-Mo Unit Composite	X	X	X	**-.07**	-.01	-.06	**.14**	.05	-.10	-.02	-.07	.20	.05
15-Mo Overall Composite	X	X	X	**.07**	**.14**	**.14**	**.08**	**.15**	.10	.23	.18	.11	.18

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. "Boxed" correlations reflect correlations between a given WSI composite and the specific attrition criterion on which its development was based. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Table 16 shows the composition of each WSI composite we created for targeting the attrition criteria. Specifically, Table 16 shows raw odds ratios for the WSI dyads that entered into each composite based on the final logistic regression model for each attrition criterion. Rather than reporting standardized odds ratios as we did for the RBI, here we report raw odds ratios given the ease with which they are interpreted for dichotomous variables such as the WSI dyads. Raw odds ratios for dichotomous variables reflect the odds of attrition for a given group (e.g., females) relative to the odds of attrition for another group (e.g., males). For example, based on Table 16, the odds of AIT attrition for Soldiers who thought they would be better at work requiring Attention to Detail compared to work requiring Initiative were about 2.96 times greater than the odds of AIT attrition for Soldiers who thought the opposite (holding other WSI dyads in the AIT composite constant). Conversely, the odds of AIT attrition for Soldiers who thought they would be better at work requiring Attention to Detail compared to work requiring Concern for Others were about half as great (0.51) as the odds of AIT attrition for Soldiers who thought the opposite (again, holding other WSI dyads in the AIT composite constant).

Returning to the validity estimates in Table 15, several WSI composites showed good levels of validity for predicting attrition, particularly the composite targeting IET attrition. Interestingly, in contrast to the RBI composites which had only slightly more validity than individual RBI scales, the WSI composites performed notably better than the WSI scale scores. Based on the pattern of validity among these empirically keyed composites, WSI content appeared to be more related to training attrition than unit attrition. Compared to the empirical RBI composites, the empirical WSI composites showed similar levels of validity for predicting AIT, IET, and unit attrition, and slightly lower levels of validity for predicting BCT and 15-month attrition. However, it is important to note that we would expect more shrinkage in validity estimates for the WSI composites upon cross-validation compared to the RBI composites given that the number of dyads considered in optimizing each composite was 120 (relative to only 14 RBI scales). Additionally, given the dichotomous nature of both the WSI dyads and attrition criteria, there is a heightened probability that results for the WSI reflect capitalization on chance due to the potentially small number of Soldiers in cells comprising the 2 x 2 matrices underlying correlations between each WSI dyad and the dichotomous attrition criterion variables. Thus, while the WSI shows promise for predicting attrition, caution should be taken in interpreting these results.

Work Preferences Survey (WPS)

The Work Preferences Survey (WPS) is an assessment of Soldiers' work related interests based on Holland's RIASEC taxonomy of vocational interests (Holland, 1985). Table 17 shows correlations between attrition and scores from the WPS. Along with a scale score for each interest dimension, Table 17 also provides correlations for facet-level scores underlying each interest dimension.

Although none of the WPS scale scores were predictive of AIT and unit attrition, Artistic interests were significantly positively related to BCT (.08), IET (.08), and 15-month attrition (.09), and Enterprising interests were significantly negatively related to BCT and 15-month attrition (both -.06). Examination of the facet-level correlations underlying Realistic and Enterprising interests suggests that their correlations with BCT, IET, and 15-month attrition may specifically relate to interests in physical work activities and work that offers opportunities to lead others, respectively. Though statistically significant, all of the aforementioned correlations

Table 16. Odds Ratios for Components of WSI Attrition Composites

	Cohort			Odds Ratio				
Dyad	A	B	C	BCT	AIT	IET	Unit	15-mo
Achievement/Effort ranked higher than Adaptability/Flexibility	X	X	X			0.65		
Achievement/Effort ranked higher than Independence	X	X	X		0.51			
Attention to Detail ranked higher than Concern for Others	X	X	X		0.46	0.66		0.63
Attention to Detail ranked higher than Initiative	X	X	X		2.96			
Attention to Detail ranked higher than Cultural Tolerance	X	X	X				0.46	
Concern for Others ranked higher than Independence	X	X	X				2.94	
Energy ranked higher than Social Orientation	X	X	X	0.44			2.28	
Leadership Orientation ranked higher than Adaptability/Flexibility	X	X	X	0.53				
Leadership Orientation ranked higher than Independence	X	X	X			0.61		
Leadership Orientation ranked higher than Self-Control	X	X	X				2.25	
Persistence ranked higher than Cooperation	X	X	X		0.42	0.64		
Persistence ranked higher than Initiative	X	X	X				2.27	
Social Orientation ranked higher than Initiative	X	X	X	0.36		0.50		
Social Orientation ranked higher than Cultural Tolerance	X	X	X		0.43			0.54
Stress Tolerance ranked higher than Cooperation	X	X	X	0.42		0.51	2.30	

Note. If no odds ratio is listed for a WSI dyad, it means that the dyad was not part of the final composite targeting the given attrition criterion. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in when fitting the logistic regression model for the given criterion.

Table 17. Correlations between Attrition and WPS Scale and Facet Scores

	Cohort			Raw Correlations					Adjusted Correlations				
Scale/Facet	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
Realistic	X	X	X	-.05	.00	-.04	-.03	-.05	-.08	.01	-.04	-.04	-.05
Mechanical Facet	X	X	X	-.04	.00	-.02	-.05	-.05	-.05	.00	-.03	-.07	-.05
Physical Facet	X	X	X	**-.08**	-.01	**-.07**	-.01	**-.06**	-.11	-.02	-.08	-.02	-.07
Investigative	X	X	X	-.02	-.03	-.03	.01	-.02	-.03	-.04	-.04	.02	-.02
Conduct Research Facet		X	X	.00	-.01	.00	-.02	-.01	.01	-.01	.00	-.02	-.01
Critical Thinking Facet	X	X	X	-.04	-.03	-.05	.02	-.03	-.06	-.05	-.06	.03	-.03
Artistic	X	X	X	**.08**	.04	**.08**	.04	**.09**	.11	.06	.10	.06	.10
Artistic Activities Facet	X	X	X	**.09**	**.06**	**.10**	.05	**.11**	.12	.09	.12	.07	.12
Creative Facet		X	X	.03	.03	.04	.02	.04	.04	.04	.05	.02	.04
Social	X	X	X	-.05	-.02	-.04	.01	-.03	-.06	-.03	-.05	.01	-.04
Help Others Facet	X	X	X	-.02	-.02	-.02	.02	-.01	-.02	-.02	-.03	.02	-.01
Work with Others Facet	X	X	X	**-.06**	-.02	-.05	.00	-.04	-.08	-.02	-.06	-.01	-.05
Enterprising	X	X	X	**-.06**	.00	-.05	-.04	**-.06**	-.08	.00	-.05	-.05	-.06
Lead Others Facet	X	X	X	**-.09**	.01	**-.06**	**-.06**	**-.08**	-.12	.01	-.07	-.10	-.09
Prestige Facet	X	X	X	-.02	-.01	-.02	.00	-.02	-.03	-.02	-.03	-.01	-.02
Sales Facet	X	X	X	-.03	-.01	-.03	-.02	-.04	-.04	-.02	-.04	-.03	-.04
Conventional	X	X	X	-.01	**-.06**	-.04	.01	-.03	-.01	-.09	-.05	.01	-.03
Detail Orientation Facet	X	X	X	-.05	-.06	**-.07**	.02	-.05	-.07	-.08	-.09	.03	-.06
Office Management Facet	X	X	X	.04	-.04	.01	.01	.01	.05	-.05	.01	.01	.01

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

were quite modest. Validity estimates for the WPS scales and facets were much smaller than estimated validities for the most predictive of the RBI scales, and comparable to validities for the most predictive of the WSI full scores.

One reason for the small correlations between the WPS and attrition might be that the relationships between WPS scales and attrition are non-linear, rather than linear.[7] Based on the person-environment fit literature, one might expect the probability of attrition to be lowest when Soldiers' level of interest on a particular dimension matches the degree to which the dimension is supported by the Army work environment, and the probability of attrition to become progressively higher as Soldiers' level of interest deviates from the degree to which the dimension is supported by the Army work environment (i.e., the form of the relationship resembles an "inverted V"). Although other hypotheses may exist, nearly all "fit" hypotheses presume such a non-linear relationship between persons' interests and the criteria of interest (Van Iddekinge et al., 2005). In light of the potential for such non-linearity, we previously explored a series of non-linear models for linking the WPS to attrition (Putka & Le, 2005). These analyses revealed little evidence for systematic non-linearities in the relationship between WPS scales and attrition. On the basis of these earlier exploratory analyses results, as well as other concerns, we chose not to examine non-linear models for the WPS in this report.[8]

In addition to examining the validity of the WPS scales and facets for predicting attrition, we also examined evidence for validity of several WPS composites. Table 18 shows validity estimates for several types of WPS composites. The Pearson *r* fit index is a measure of similarity between a Soldier's profile of scores on the WPS and the mean profile of Army subject matter experts' (SMEs') scores on the Army Environment Survey (AES). The AES was designed to assess the degree to which the current work environment of first-term Soldiers is supportive of each of the RIASEC interest dimensions (Van Iddekinge et al., 2005). The D^2 fit index is a measure of dissimilarity between a Soldier's profile of scores on the WPS and the mean profile of Army SMEs' scores on the AES. It reflects the sum of squared differences between Soldiers' scores on the RIASEC interest dimensions and corresponding mean scores from SMEs on the AES. The "CV" composites shown in Table 18 were developed for predicting the attitudinal criteria gathered during the concurrent validation effort (Putka & Van Iddekinge, 2006). Lastly, Table 18 shows results for five unit weighted composites of WPS facet-level scores we constructed to predict each attrition criterion. Once again, the general steps followed in constructing these composites were outlined in the RBI section presented earlier.

The composition of the WPS composites optimized on each criterion is presented in Table 19. Specifically, Table 19 shows standardized odds ratios for WPS facets that entered into each composite based on the final logistic regression model for each attrition criterion. Table 19 reveals that interest in Artistic Activities and Leading Others were the WPS facets that tended to arise most often in the WPS composites. In general, Soldiers who expressed interests in Artistic Activities were more likely to attrit, whereas Soldiers who expressed interests in Leading Others were less likely to attrit (holding other WPS facets in the given composite constant).

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[7] The Pearson product-moment correlations presented in this table only index the degree of linear relationship between two variables.

[8] The other concerns alluded to here were (a) the small number of attritees in the analysis sample, and (b) findings from the Select21 concurrent validation report indicating little evidence of non-linearity in the relations between the WPS and attitudinal criteria (Putka & Van Iddekinge, 2006).

Table 18. Correlations between Attrition and WPS Composites

	Cohort			Raw Correlations					Adjusted Correlations				
Scale/Composite	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
D^2 WPS-AES Profiles	X	X	X	**.07**	-.02	.04	-.02	.02	.10	-.03	.05	-.04	.02
Pearson *r* WPS-AES Profiles	X	X	X	**-.10**	**-.06**	**-.11**	-.06	**-.12**	-.14	-.09	-.13	-.09	-.13
CV Achievement & Effort	X	X	X	**-.09**	**-.07**	**-.11**	.00	**-.09**	-.12	-.11	-.14	.00	-.10
CV Satisfaction with the Army	X	X	X	**-.13**	-.05	**-.13**	-.04	**-.12**	-.18	-.08	-.15	-.06	-.13
BCT Composite	X	X	X	**.14**	.04	**.13**	**.07**	**.14**	.20	.06	.15	.10	.15
AIT Composite	X	X	X	**.09**	**.06**	**.10**	.05	**.11**	.12	.09	.12	.07	.12
IET Composite	X	X	X	**.10**	**.08**	**.13**	.03	**.12**	.14	.12	.15	.04	.13
Unit Composite	X	X	X	**.09**	-.01	**.06**	**.06**	**.08**	.12	-.01	.07	.10	.09
15-Month Composite	X	X	X	**.13**	.04	**.12**	**.08**	**.14**	.18	.06	.15	.12	.16

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. "Boxed" correlations reflect correlations between a given WPS composite and the specific attrition criterion on which its development was based. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Table 19. Standardized Odds Ratios for Components of WPS Attrition Composites

	Cohort			Standardized Odds Ratio				
WPS Facet	A	B	C	BCT	AIT	IET	Unit	15-mo
Realistic Interests								
Mechanical Facet	X	X	X					
Physical Facet	X	X	X	0.83				
Investigative Interests								
Conduct Research Facet		X	X					
Critical Thinking Facet	X	X	X					
Artistic Interests								
Artistic Activities Facet	X	X	X	1.41	1.25	1.32		1.33
Creative Facet		X	X					
Social Interests								
Help Others Facet	X	X	X					
Work with Others Facet	X	X	X					
Enterprising Interests								
Lead Others Facet	X	X	X	0.76			0.79	0.80
Prestige Facet	X	X	X					
Sales Facet	X	X	X					
Conventional Interests								
Detail Orientation Facet	X	X	X			0.82		
Office Management Facet	X	X	X					

Note. If no odds ratio is listed for a WPS facet, it means that the facet was not part of the final composite targeting the given attrition criterion. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in when fitting the logistic regression model for the given criterion.

Returning to the validity estimates in Table 18, in general, the WPS showed less validity for predicting attrition than the RBI and WSI composites. This finding is somewhat disappointing given that that the WPS was found to be highly predictive of the attitudinal precursors of attrition in concurrent validation analyses (Putka & Van Iddekinge, 2006). It is also worth noting that the version of the WPS used for this report was quite similar to the final version of the WPS used in the concurrent validation report. Thus, the results here likely provide a good estimate of how valid the CV-version of the WPS would be for predicting attrition.[9]

Pre-Service Expectations Survey (PSES)

The Pre-Service Expectations Survey (PSES) is an assessment of respondents' expectations regarding the extent to which the Army work environment supports each of the work related interests in Holland's RIASEC taxonomy (Holland, 1985). Note that the PSES was not administered as part of the concurrent validation effort because it would not have been meaningful to administer to incumbent Soldiers who had gained enough experience to understand the extent to which the Army work environment supports the RIASEC dimensions. However, it was administered to new recruits participating in the reception battalion data collections given the inexperience of most recruits with the Army environment.

[9] In other words, had the CV-version of the WPS been administered to Soldiers in the reception battalion samples used in this report, we would expect to observe similar levels of validities to those presented here.

Table 20 shows correlations between attrition and the PSES. Along with a scale score for each interest dimension, Table 20 also provides fit indexes based on PSES and AES scores obtained from SMEs (described earlier). Like the RBI, WSI, and WPS, we also attempted to create unit weighted composites of PSES scale scores to predict each attrition criterion. In attempting to create these composites, we followed the same general steps for constructing composites outlined earlier in the RBI section. However, this process resulted in composites for each criterion that comprised only one PSES scale each. Thus, we do not present results for these composites because they would be completely redundant with results for the PSES scales. The sole significant correlate of BCT and IET attrition was the Realistic expectations scale (both -.07); and the sole significant correlate of unit attrition was the Artistic expectations scale (-.10). No PSES scales were significantly related to AIT and 15-month attrition. With the exception of the very modest significant correlation between the D^2 fit index and BCT attrition, neither of the PSES fit indexes were predictive of attrition.

As was the case with the WPS, one reason for the small correlations between the PSES and attrition might be that the relationships between PSES scales and attrition are non-linear. Based on the P-E fit literature, one might expect the probability of attrition to be lowest when Soldiers' level of expectation regarding support of a particular interest matches the degree to which the interest is supported by the Army work environment, and the probability of attrition to become progressively higher as Soldiers' level of expectation regarding support of the interest deviates from the degree to which the interest is supported by the Army work environment (again, an "inverted-V" shape). Given the potential for such non-linearity, we previously explored a series of non-linear models for linking the PSES to attrition (Putka & Le, 2005). Relative to comparable analyses performed on the WPS, these analyses revealed more evidence for non-linearities in the relationship between the PSES and attrition, particularly for Conventional and Artistic interests. Upon further review of these results, we decided not to pursue similar analyses here out of concern over instability of results due to the small number of attritees in the analysis sample.

To be more specific, our concern was that the results of such a modeling effort may be driven by a few influential outlying cases on the PSES score distributions. When samples are small, values on the extremes of score distribution are relatively rare occurrences (assuming fairly normal distributions). Coupling this fact with the low base rates of attrition creates a situation where the base rates of attrition for individuals at the extreme ends of the predictor distribution are extremely unstable. This instability in attrition rates for individuals in the extremes of the predictor distribution can have a profound influence on the results of non-linear models, which essentially examine differences in the relation between the predictor and attrition across different segments of the predictor score distribution.

Table 20. Correlations between Attrition and PSES Scale Scores and Fit Indexes

	Cohort			Raw Correlations					Adjusted Correlations				
Scale/Composite	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
Scale													
Realistic	X	X	X	**-.07**	-.04	**-.07**	-.01	-.07	-.10	-.05	-.09	-.02	-.07
Investigative	X	X	X	-.06	.05	-.01	-.04	-.03	-.08	.07	-.01	-.06	-.03
Artistic	X	X	X	-.03	.01	-.02	**-.10**	-.06	-.04	.01	-.02	-.15	-.07
Social	X	X	X	-.04	.03	-.01	-.02	-.02	-.05	.04	-.01	-.03	-.02
Enterprising	X	X	X	-.06	.01	-.04	-.03	-.05	-.08	.02	-.04	-.05	-.05
Conventional	X	X	X	-.04	.00	-.03	.01	-.02	-.05	-.01	-.04	.01	-.02
Composite													
D^2 PSES-AES Profiles	X	X	X	**.08**	-.03	.04	.06	.06	.12	-.04	.05	.09	.07
Pearson *r* PSES-AES Profiles	X	X	X	-.02	-.04	-.04	.06	.00	-.03	-.05	-.05	.10	.00

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Work Values Inventory (WVI)

The Work Values Inventory (WVI) is an assessment of Soldiers' work values based partially on Dawis and Lofquist's (1984) Theory of Work Adjustment. Table 21 shows correlations between attrition and scale-level scores from the WVI.[10] The WVI scales vary in terms of their validity for predicting attrition. The validity of the most predictive WVI scales exceeded those found for the interest-based measures (i.e., WPS and PSES) and WSI full scores, but did not match the validity of the most predictive of the RBI scales. The WVI scales most strongly predicting tended to vary by attrition criteria. For BCT attrition, the strongest correlates were WVI Home (.13) and Leisure Time (.11). For AIT attrition, the strongest correlates were WVI Esteem (-.12), Social Status (-.12), and Team Orientation (-.12). For IET attrition, the strongest correlates were WVI Esteem (-.12) and Team Orientation (-.12). For Unit attrition, the strongest correlates were Leisure Time (-.12), Esteem (.10), and Fixed Role (.10). Lastly, only one WVI scale was significantly predictive of 15-month attrition, namely Influence (-.10).

As with the other person-environment fit predictor measures discussed thus far (i.e., the WPS and PSES), one explanation for the relatively small correlations between the WVI scales and attrition might be that their relationships are non-linear. Given the potential for non-linearity, we previously explored a series of non-linear models for linking the WVI to attrition (Putka & Le, 2005). Relative to comparable analyses performed on the WPS, these analyses revealed more evidence in non-linearities in the relationship between the WVI scales and attrition. This finding was consistent with the results from the concurrent validation effort, where we found more evidence for non-linearities in relations between WVI and attitudinal criteria than in relations between the WPS and attitudinal criteria (Putka, 2006; Putka & Van Iddekinge, 2006). As with the PSES however, upon further review of these results, we decided not to pursue similar analyses here, primarily out of concern over instability of results due to the small number of attritees in the analysis sample. Indeed, the potential instability in results that we described at the end of the PSES section presented earlier is likely even more problematic for the WVI. Unlike the WPS and PSES, only the field test version of the WVI enabled us to create scale scores that were comparable to the concurrent validation version of the WVI. Thus, any non-linear modeling we would have done on the WVI would have been based on the field test sample only.

In addition to examining the validity of the WVI scales for predicting attrition, we also examined evidence for the validity of several WVI composites (see Table 22). The first composite score shown in Table 22, "High over Low Composite," reflects the proportion of times Soldiers' ranked values that were highly supported by the Army environment (High) over values that tended not to be supported by the Army environment (Low). The values that were labeled as highly supported and not supported were identified based on the responses of NCOs to the Army Description Inventory (ADI) (Van Iddekinge et al., 2005). The ADI was designed to assess the degree to which the current work environment of first-term Soldiers reinforces each of the work values assessed on the WVI. The rationale behind the High over Low composite is that Soldiers who prefer values that are supported by the Army over those values that are not will be less

[10] Note, only the field test version of the WVI enabled us to create scale scores that were comparable to the concurrent validation version of the WVI. Thus, all correlations in Table 21 are based on Cohort C (the field test sample) only.

Table 21. Correlations between Attrition and WVI Scales

	Raw Correlations					Adjusted Correlations				
Scale	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
Ability Utilization	-.03	-.04	-.04	-.01	-.04	-.04	-.06	-.06	-.02	-.05
Achievement	.02	**-.10**	-.04	-.01	-.04	.03	-.16	-.05	-.02	-.05
Activity	.06	-.04	.02	.05	.04	.08	-.06	.03	.07	.05
Advancement	.02	-.06	-.02	-.08	-.06	.03	-.09	-.03	-.13	-.07
Autonomy	**.09**	.02	.08	-.07	.03	.13	.04	.10	-.10	.04
Comfort	.07	-.04	.03	.03	.04	.11	-.06	.04	.04	.05
Co-Workers	**-.10**	-.02	**-.09**	.00	-.07	-.15	-.03	-.11	-.01	-.09
Creativity	.04	.04	.05	-.07	.00	.06	.06	.07	-.11	.00
Emotional Development	.00	-.02	-.01	.05	.02	-.01	-.03	-.02	.08	.02
Esteem	-.06	**-.12**	**-.12**	**.10**	-.04	-.08	-.18	-.14	.15	-.05
Feedback	.08	.00	.06	-.07	.01	.12	.00	.08	-.11	.02
Fixed Role	.03	**-.09**	-.03	**.10**	.03	.04	-.15	-.04	.16	.03
Flexible Schedule	.03	.02	.03	-.01	.02	.04	.02	.04	-.01	.02
Home	**.13**	-.06	.06	-.02	.04	.19	-.09	.08	-.04	.05
Independence	.07	.07	**.09**	-.04	.06	.10	.11	.12	-.06	.07
Influence	-.07	-.08	**-.10**	-.03	**-.10**	-.10	-.13	-.13	-.04	-.12
Leadership Opportunities	-.02	-.04	-.04	-.02	-.04	-.03	-.06	-.05	-.03	-.05
Leisure Time	**.11**	.01	**.09**	**-.12**	.01	.16	.02	.11	-.19	.01
Physical Development	-.03	-.04	-.05	-.01	-.05	-.05	-.06	-.06	-.02	-.05
Recognition	.03	-.02	.01	-.03	-.01	.04	-.02	.02	-.05	-.01
Skill Development	-.05	-.07	-.08	.04	-.05	-.07	-.11	-.10	.06	-.05
Social Service	-.02	.04	.01	-.04	-.02	-.03	.06	.01	-.07	-.02
Social Status	.04	**-.12**	-.04	.03	-.02	.06	-.19	-.05	.04	-.02
Societal Contribution	.01	-.07	-.04	-.01	-.04	.01	-.11	-.05	-.02	-.04
Supportive Supervision	.04	**-.10**	-.03	.04	.00	.06	-.16	-.03	.05	.00
Team Orientation	-.07	**-.12**	**-.12**	.06	-.07	-.10	-.18	-.16	.09	-.08
Travel	-.05	.02	-.03	.04	.00	-.07	.03	-.03	.07	.00
Variety	-.02	.00	-.02	.03	.00	-.03	.00	-.02	.04	.00

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. All correlations are based on Cohort C (field test) only. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Table 22. Correlations between Attrition and WVI Composites

	Cohort			Raw Correlations					Adjusted Correlations				
Composite	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
High over Low Composite	X	X	X	**-.09**	**-.08**	**-.12**	.02	**-.09**	-.13	-.13	-.15	.04	-.10
D^2 WVI-ADI Profiles			X	**.09**	.04	**.09**	-.04	.06	.13	.07	.12	-.06	.07
Pearson *r* WVI-ADI Profiles			X	**-.13**	-.04	**-.12**	.01	**-.09**	-.18	-.06	-.15	.02	-.11
CV Achievement & Effort			X	-.07	-.08	**-.10**	.07	-.05	-.10	-.12	-.13	.11	-.06
CV Satisfaction with the Army			X	**-.09**	-.09	**-.12**	.06	-.07	-.13	-.14	-.15	.10	-.08
BCT Composite			X	**.24**	.02	**.19**	**-.10**	**.11**	.35	.03	.24	-.15	.12
AIT Composite			X	.05	**.18**	**.14**	-.09	.07	.07	.29	.18	-.14	.08
IET Composite			X	**.12**	**.16**	**.19**	-.07	**.12**	.18	.26	.24	-.11	.14
9-Mo Unit Composite			X	**-.12**	**-.12**	**-.17**	**.22**	-.02	-.18	-.19	-.21	.35	-.02
15-Mo Overall Composite			X	.07	.08	**.10**	.03	**.10**	.10	.13	.13	.04	.12

Note. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. "Boxed" correlations reflect correlations between a given WVI composite and the specific attrition criterion on which its development was based. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

likely to attrit (or conversely, Soldiers who prefer reinforcers that are not supported by the Army over those values supported by the Army will be more likely to attrit). Based on results shown in Table 22, this hypothesis was only partially supported. The High over Low composite was significantly related to four of the five attrition criteria, but the magnitude of its validity was modest (~.10).

Also shown in Table 22 are composites based on the Pearson *r* and D^2 fit indexes. These fit indexes reflect measures of similarity between a Soldier's profile of scale scores on the WVI and the mean profile of Army SMEs' scores on ADI. Like the High over Low composite, these fit indexes showed modest levels of validity for predicting attrition. The "CV" composites shown in Table 22 were developed for predicting the attitudinal criteria gathered during the concurrent validation effort (Putka, 2006). Like the WVI composites mentioned above, these composites also showed only modest levels of validity for predicting attrition. Table 22 shows results for five unit weighted composites of WVI scales we constructed to predict each attrition criterion. The method for forming these composites mimicked the methods used to form the other empirical composites discussed thus far in this report. The general steps followed in constructing these composites were outlined in the RBI section.

The unit weighed WVI showed more validity than the WPS composites for predicting attrition (with the exception of 15-month attrition), and it showed comparable levels of validity to the RBI and WSI composites. Interestingly, out of any of the predictors examined, these WVI composites appeared to show the relatively greatest validity for predicting unit attrition. As alluded to above, caution should be taken in interpreting results, because the results for these WVI unit weighted composites are based on the field test sample only; thus, these results may not be stable due to the small number of attritees.

Finally, the composition of the WVI composites optimized on each criterion is presented in Table 23. Specifically, Table 23 shows standardized odds ratios for WPS facets that entered into each composite based on the final logistic regression model for each attrition criterion. Table 23 reveals that that Esteem, Influence, Independence, and Leisure Time were the only WVI scales that entered composites for more than one attrition criterion.

Army Beliefs Survey (ABS)

The Army Beliefs Survey (ABS) is an assessment of respondents' expectations regarding the extent to which work in the Army supports a broad range of work-related values. With few exceptions, the values assessed by the ABS are the same as those assessed by the concurrent validation version of the WVI.[11] The ABS was not administered as part of the concurrent validation effort because it would not have been meaningful to administer to incumbent Soldiers who had gained enough experience to understand the extent to which the Army work environment reinforces the work values comprising the ABS. However, it was administered to new recruits participating in the reception battalion data collections. Table 24 shows correlations between attrition and scores from the ABS.

[11] In Table 24, only those ABS work values that are assessed on the concurrent validation version of the WVI are presented.

Table 23. Standardized Odds Ratios for Components of WVI Attrition Composites

	Standardized Odds Ratio				
Scale	BCT	AIT	IET	Unit	15-mo
Ability Utilization					
Achievement					
Activity					
Advancement					
Autonomy					
Comfort					
Co-Workers	0.51				
Creativity					
Emotional Development					
Esteem		0.63	0.72	1.83	
Feedback	1.55			0.52	
Fixed Role				1.82	
Flexible Schedule					
Home	1.55				
Independence		1.50	1.42		
Influence	0.67		0.74		0.76
Leadership Opportunities					
Leisure Time	1.45			0.65	
Physical Development					
Recognition					
Skill Development					
Social Service					
Social Status		0.65			
Societal Contribution					
Supportive Supervision					
Team Orientation					
Travel					
Variety					

Note. If no odds ratio is listed for a WVI scale, it means that the scale was not part of the final composite targeting the given attrition criterion. All correlations are based on Cohort C (field test) only.

As Table 24 reveals, the ABS scales varied in terms of their validity for predicting attrition. The strongest correlates of attrition among the ABS scales also tended to vary by attrition criteria. For BCT attrition, the strongest correlate was Feedback (-.14). For AIT and IET attrition, the strongest correlates were Emotional Development (-.11 and -.14, respectively) and Team Orientation (-.11). For 15-month attrition, the strongest correlate was Emotional Development (-.11). Lastly, only one ABS scale was significantly predictive of unit attrition, namely Physical Development (-.16). The magnitudes of these validities were comparable to the estimated validities for the most predictive WVI scales. These findings, along with the low correlations between the WVI scales and corresponding ABS scales (see Van Iddekinge et al., 2005), suggest that work-related needs and work-related expectations may account for unique variance in first-term attrition.

In addition to examining the validity of the ABS scales for predicting attrition, we also examined evidence for the validity of several ABS composites (see Table 25). The first two composites shown in Table 25 are the Pearson *r* and D^2 fit indexes. These fit indexes reflect measures of similarity between a Soldier's profile of scale scores on the ABS and the mean profile of Army SMEs' scores on ADI (described earlier). Also shown in Table 25 are estimated validities for five unit weighted composites of ABS scales we constructed to predict each attrition criterion. The method for forming these composites mimicked the method used to form

Table 24. Correlations between Attrition and ABS Scales

	Cohort			Raw Correlations					Adjusted Correlations				
Scale	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
Ability Utilization	X	X	X	.04	.04	.06	.00	.05	.06	.06	.07	.00	.05
Achievement	X	X	X	.03	-.05	-.02	-.06	-.05	.04	-.08	-.02	-.09	-.05
Activity			X	.03	-.03	.00	-.06	-.03	.05	-.05	.01	-.10	-.04
Advancement	X	X	X	.00	.01	.01	-.05	-.02	.01	.02	.01	-.07	-.02
Autonomy	X	X	X	-.04	.05	.01	.07	.04	-.06	.08	.01	.10	.05
Comfort	X	X	X	-.01	.03	.01	.04	.03	-.02	.04	.01	.06	.04
Co-Workers	X	X	X	-.02	.00	-.01	-.04	-.03	-.03	.00	-.02	-.06	-.04
Creativity	X	X	X	.00	-.02	-.01	.03	.01	.01	-.03	-.01	.05	.01
Emotional Development	X	X	X	**-.09**	**-.11**	**-.14**	.00	**-.11**	-.13	-.18	-.18	.00	-.13
Esteem	X	X	X	-.03	-.02	-.04	-.07	**-.07**	-.05	-.03	-.05	-.11	-.08
Feedback	X	X	X	**-.14**	.01	**-.09**	-.03	**-.09**	-.22	.02	-.12	-.04	-.10
Fixed Role	X	X	X	.05	-.03	.01	-.05	-.02	.08	-.05	.02	-.08	-.02
Flexible Schedule	X	X	X	.04	-.01	.02	.07	.05	.06	-.02	.02	.11	.06
Home	X	X	X	.03	**.08**	**.08**	-.02	.05	.05	.13	.10	-.03	.06
Independence	X	X	X	**.09**	.02	**.08**	.05	**.09**	.14	.04	.10	.08	.11
Influence	X	X	X	-.03	.01	-.01	.07	.03	-.04	.02	-.01	.11	.04
Leadership Opportunities	X	X	X	.04	.07	**.08**	.00	.06	.07	.10	.10	-.01	.07
Leisure Time	X	X	X	.05	**-.07**	-.01	-.03	-.03	.08	-.11	-.02	-.05	-.04
Physical Development			X	.06	-.07	.00	**-.16**	-.09	.10	-.11	.00	-.25	-.11
Recognition	X	X	X	-.02	-.02	-.03	-.01	-.03	-.04	-.04	-.04	-.02	-.04
Skill Development	X	X	X	-.01	-.06	-.05	-.07	**-.08**	-.01	-.10	-.06	-.11	-.10
Social Service	X	X	X	-.02	-.07	-.06	-.01	-.05	-.02	-.11	-.08	-.01	-.06
Social Status	X	X	X	-.04	**-.08**	**-.08**	-.02	**-.08**	-.06	-.13	-.11	-.03	-.09
Societal Contribution	X	X	X	-.05	-.02	-.05	.00	-.04	-.08	-.04	-.07	.00	-.05
Supportive Supervision			X	-.07	.10	.01	.03	.03	-.10	.16	.01	.05	.03
Team Orientation	X	X	X	-.05	**-.11**	**-.11**	-.05	**-.11**	-.08	-.18	-.14	-.07	-.13
Travel			X	-.02	-.08	-.06	-.08	-.09	-.02	-.12	-.07	-.12	-.10
Variety	X	X	X	.05	-.03	.02	.00	.01	.08	-.05	.02	.01	.02

Note. *Scale was dropped after the faking research data collection. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. Raw correlations that are bolded are statistically significant ($p < .05$, one-tailed).

Table 25. Correlations between Attrition and ABS Composites

	Cohort			Raw Correlations					Adjusted Correlations				
Composite	A	B	C	BCT	AIT	IET	Unit	15-Mo	BCT	AIT	IET	Unit	15-Mo
D^2 ABS-ADI Profiles	X	X	X	.04	.05	.06	**.13**	**.13**	.06	.09	.08	.21	.15
Pearson *r* ABS-ADI Profiles	X	X	X	-.06	**-.08**	**-.10**	**-.12**	**-.15**	-.10	-.13	-.13	-.19	-.18
BCT Composite	X	X	X	**.16**	.01	**.12**	.06	**.12**	.25	.01	.15	.09	.14
AIT Composite	X	X	X	**.08**	**.16**	**.17**	.01	**.14**	.13	.26	.22	.02	.17
IET Composite	X	X	X	**.09**	**.17**	**.18**	.01	**.14**	.14	.26	.23	.01	.17
9-Mo Unit Composite	X	X	X	.00	.03	.02	**.11**	**.08**	.00	.04	.02	.17	.09
15-Mo Overall Composite	X	X	X	**.12**	**.12**	**.17**	.06	**.16**	.19	.19	.21	.09	.19

Note. *Scale was dropped after the faking research data collection. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in estimating the correlation between the predictor and attrition. Sample sizes for the correlations presented, as well as the attrition rates within those samples are presented in Appendix A. "Boxed" correlations reflect correlations between a given ABS composite and the specific attrition criterion on which its development was based. Raw correlations that are bolded are statistically significant ($p <$ .05, one-tailed).

the empirical composites discussed thus far in this report. The general steps followed in constructing these composites were outlined earlier in the section on the RBI.

The ABS unit weighted composites showed more validity than composites for the interest-based fit measures (i.e., the WPS and PSES), but they did not show quite as much validity as composites for the WVI, WSI, and RBI. Interestingly, the Pearson r and D^2 fit indexes for the ABS showed validities for predicting unit and 15-month attrition that were comparable in magnitude to the unit weighted ABS composites targeted at predicting those criteria.

The composition of the ABS composites optimized on each attrition criterion is presented in Table 26. Specifically, Table 26 shows standardized odds ratios for the ABS scales that entered into each composite based on the final logistic regression model for each attrition criterion. Table 26 reveals that Emotional Development, Team Orientation, Independence, and Home were the only ABS scales that entered composites for more than one attrition criterion.

Table 26. Standardized Odds Ratios for Components of ABS Attrition Composites

	Cohort			Standardized Odds Ratio				
Scale	A	B	C	BCT	AIT	IET	Unit	15-mo
Ability Utilization	X	X	X					
Achievement	X	X	X					
Activity			X					
Advancement	X	X	X					
Autonomy	X	X	X					
Comfort	X	X	X					
Co-Workers	X	X	X					
Creativity	X	X	X					
Emotional Development	X	X	X		0.74	0.75		0.82
Esteem	X	X	X				0.72	
Feedback	X	X	X	0.63				
Fixed Role	X	X	X					
Flexible Schedule	X	X	X					
Home	X	X	X		1.46	1.26		
Independence	X	X	X	1.31				1.22
Influence	X	X	X				1.45	
Leadership Opportunities	X	X	X			1.26		
Leisure Time	X	X	X					
Physical Development			X					
Recognition	X	X	X					
Skill Development	X	X	X					
Social Service	X	X	X					
Social Status	X	X	X					
Societal Contribution	X	X	X					
Supportive Supervision			X					
Team Orientation	X	X	X		0.72	0.76		0.80
Travel			X					
Variety	X	X	X					

Note. If no odds ratio is listed for a ABS scale, it means that the scale was not part of the final composite targeting the given attrition criterion. Attrition was coded as 1 = Attritee and 0 = Non-attritee. Cohort: A= Pilot test cohort; B = Faking cohort; C = Field test cohort. X's indicate that the cohort was included in when fitting the logistic regression model for the given criterion.

Summary

The demographic composition of Soldiers in the Select21 Attrition Database was very similar to the composition of the FY1999 and FY2003 enlisted accession cohorts (Putka & Strickland, 2004). Likewise, the base rates of BCT attrition (7.0%), AIT attrition (7.2%), total IET attrition (13.6%), and 15-month attrition (20.0%) were quite similar to base rates of attrition observed among these previous accession cohorts. Furthermore, like the FY1999 and FY2003 cohorts, the vast majority of IET attrition that occurred among Soldiers in the Select21 Attrition Database comprised two ISCs: entry-level discharge program (ISC 87), and unqualified for active duty/other (ISC 16). Additionally, like the FY1999 cohort, moral-character related ISCs appeared to account for the largest portion of unit attrition.

With regard to the correlates of attrition, the results presented in this report reinforce several findings from Project First Term (Putka & Strickland, 2004; Strickland, 2004) and extend them in meaningful ways. For example, several of the top predictors of training attrition in Project First Term (e.g., pre-service fitness, generalized self-efficacy, pre-service positive affect towards the Army, pre-service perceived stress) clearly relate to constructs assessed by the RBI scales that were most predictive of attrition, namely Fitness Motivation, Self-Esteem, Army Identification, and Stress Tolerance (see Table 12). For the most part, these scales correlated higher than their counterparts in the First Term project. Further reinforcing the importance of notions of stress tolerance for predicting early attrition, Stress Tolerance was among the WSI traits most predictive of attrition (see Table 14). The emergence of Fitness Motivation and Stress Tolerance is also consistent with research on the Army's AIM which has suggested that the Physical Conditioning and Adjustment components of the AIM are most predictive of training attrition (Heggestad et al., 1999).

Findings with regard to the PSJT were inconsistent (Table 8). Specifically, the PSJT Judgment score based on Form A was significantly negatively correlated with attrition, whereas the Judgment score based on Form B was significantly positively correlated with attrition. Follow-up of PSJT item-level estimated validities revealed that PSJT items varied widely in their validity for predicting attrition and that the discrepancies between Form A and Form B can be linked to a few items on each form.

Several person-environment fit (P-E fit) predictor measures were administered as part of the Select21 data collections. With regard to the interest measures (i.e., WPS and PSES), several significant correlations were found, but these tended to be quite small in magnitude ($< .10$). In general, findings with regard to the work value measures (i.e., WVI and ABS) were more positive than those found for the interest measures. Interestingly, the strongest correlate of attrition on the ABS was Emotional Development (see Table 24). Specifically, Soldiers who expected that Army work would involve gaining personal discipline and maturity were less likely to attrit than those that did not. This finding seems consistent with results regarding the predictiveness of Stress Tolerance from the RBI and WSI presented earlier.

Caveats and Future Work

The purpose of this report was to provide insight into the potential of experimental Select21 selection and classification measures for predicting first-term attrition. Several predictors showed promise and exhibited levels of validity for predicting attrition that were greater than or equal in magnitude to predictors examined in recent attrition research (e.g., Heggestad et al., 1999; Putka & Strickland, 2004; Strickland, 2004). Despite the fact that several predictors showed promise for predicting attrition, several caveats are important to mention. First, the results presented here are based on pre-concurrent validation versions of the Select21 predictor measures. With the exception of the WSI, ABS, and PSES, all measures summarized here underwent some degree of change between these data collections and the concurrent validation (Knapp et al., 2005). Second, the sample sizes reported here are far smaller than those in recent past research that also examined the efficacy of measures for predicting attrition (e.g., Project First Term, AIM). Thus, the results presented here are expected to be less stable than findings of studies based on larger samples. Despite this caveat, it is worth reinforcing that the levels of validity found here and the types of predictor constructs that significantly predicted attrition were very comparable to past studies. Thus, despite the small samples on which the analyses in this report are based, the results appear quite lawful. Third, as part of this report, we formed many empirically-based composites designed to explore the potential of each experimental measure for predicting attrition. Given their empirical nature, the validity of these composites for predicting attrition would be expected to shrink upon cross-validation.

Although the caveats above caution the reader on overinterpreting the positive aspects of these findings, a few other observations can be made that suggest the results here understate the validity of some of the measures for predicting attrition. For example, we did not attempt to model persons' fit to the Army environment using the methods described in Knapp et al. (2005) and employed in the concurrent validation study to model performance and attitudinal criteria (Putka & Van Iddekinge, 2006). Although the aforementioned methods may have produced higher levels of validity than the methods used here to link P-E fit predictor measures to attrition, their use here was precluded by the small number of attritees in the Select21 attrition database and by the sample-size demands for simultaneously modeling multiple predictor scales for each P-E fit instrument (e.g., 27 scales on the WVI).

On a related topic, it is important to note that due to such sample size limitations, we did not test one of the fundamental hypotheses underlying the creation of the P-E fit measures for Select21, namely that there would be an interaction between needs and expectations when predicting attrition (Van Iddekinge et al., 2005, p. 196). Such an interaction may mitigate the "main effects" of both the needs measures (i.e., WVI, WPS) and expectations measures (i.e., ABS, PSES) considered in isolation (reflected by the observed validities presented in this report). For example, consider two recruits, one who values autonomy and expects the Army to supply it, and a second who values autonomy, but does not expect the Army to supply it. If the Army does not supply autonomy, it is likely that the second recruit will be less likely to attrit than the first. Although both recruits value autonomy (indicating a lack of needs-supplies fit), the fact that the first recruit expects autonomy and does not receive it may result in greater dissatisfaction for the first recruit. Given that the estimated validities between the P-E fit measures and attrition summarized in this report were fairly modest (particularly for the

interest-based measures), future work should consider whether modeling interactions between these two types of measures leads to significantly higher levels of validity for predicting attrition than found here.

Although several of the instruments changed between these data collections and the concurrent validation, the data in the Select21 attrition database has several potential uses that, in the long run, may be leveraged to identify recruits at risk for attrition. For example, the data in the Select21 attrition database may be viewed as an additional resource that ARI may consider for augmenting the Tier II Attrition Screen (White, Young, Heggestad, Stark, Drasgow, & Piskator, 2004). We found much content at the item-level, particularly on the RBI, that was more predictive than the RBI scales presented above. Unfortunately, many of the most predictive RBI items were excluded from the concurrent validation version, due to the particular item-selection strategies used in refining the RBI (Kilcullen et al., 2005).[12] Item-level data from the RBI could be mined to identify content that (a) exhibited small honest-fake differences in the faking research components of the Select21 project, (b) exhibited small correlations with the RBI Lie scale, and (c) exhibited good levels of validity for predicting attrition. Taken together, such items could serve as a pool of alternative content that might be considered for subsequent analysis or cycled-in for experimental use as part of the Tier II Attrition Screen under operational conditions. Alternatively, content analysis of such items might provide the basis for developing blueprints for faking-resistant biodata items that are predictive of attrition. Similar benefits might also be achieved by performing item-level analyses on the WSI, WPS, PSES, and Interest Finder Questionnaire (IFQ).

While leveraging the Select21 attrition database to identify content for augmenting the Tier II Attrition Screen, a similar approach might be used to identify preliminary content for a general measure of attrition risk. As discussed by Strickland and McCloy (2004), such a measure would not necessarily be used as a selection or classification measure (though it could be), but rather used as a pre- or post-enlistment diagnostic to identify individuals who would be at high-risk for attrition and funnel them into interventions specific to their areas of deficiency or misunderstanding. For example, such a risk measure might identify prospective applicants at heightened risk of attrition because their expectations regarding the physical demands of Army life are entirely inaccurate. Such individuals could be identified by a broad attrition risk measure (perhaps administered on-line at goarmy.com) and could subsequently receive realistic previews of Army life that are customized to their area of misunderstanding (e.g., a realistic preview that emphasizes the physical demands of Army life). The combination of an on-line assessment, dynamically generated interventions specific to the prospective applicant's needs, and follow-up discussion with a recruiter is one example of how a general measure of attrition risk could be integrated into a broader system for reducing attrition that could include but goes beyond selection and classification.

[12] In the process of selecting items for concurrent validation version of the RBI, emphasis was put on retaining items hypothesized to be most strongly related to job performance. This emphasis reflected the fact that job performance was a primary criterion of interest in the concurrent validation effort, whereas attrition data were not gathered for concurrent validation participants because they were incumbents rather than new recruits.

References

Dawis, R. V., & Lofquist, L. H. (1984). *A psychological theory of work adjustment.* Minneapolis: University of Minnesota Press.

Heggestad, E. D., Young, M. C., Strickland, W. J, & Rumsey, M. G. (1999). *The Assessment of Individual Motivation: Evaluation of validity and development of alternative forms* (FR-WATSD-99-66). Alexandria, VA: Human Resources Research Organization.

Holland, J. L. (1985). *Making vocational choices: A theory of vocational personalities and work environments (2nd ed.).* Upper Saddle River, NJ: Prentice Hall.

Kemery, E. R., Dunlap, W. P., & Griffeth, R.W. (1998). Correction for variance restriction in point-biserial correlations. *Journal of Applied Psychology, 73*, 688-691.

Kilcullen, R. N., Putka, D. J., McCloy, R. A., & Van Iddekinge, C. H. (2005). Development of the Rational Biodata Inventory (RBI). In D. J. Knapp, C. E. Sager, & T. R. Tremble (Eds.), *Development of experimental Army enlisted personnel selection and classification tests and job performance criteria* (Technical Report 1168). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Knapp, D. J., Sager, C. E., & Tremble, T. R. (Eds.) (2005). *Development of experimental Army enlisted personnel selection and classification tests and job performance criteria* (Technical Report 1168). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Knapp, D.J. & Tremble, T.R. (Eds.) (2006). *Concurrent validation of experimental Army enlisted personnel selection and classification measures* (FR-06-35). Alexandria, VA: Human Resources Research Organization.

Laurence, J. H., Naughton, J. A., & Harris, D. A. (1996). *Attrition revisited: Identifying the problem and its solutions* (Research Note 96-20). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

McCloy, R. A., & Putka, D. J. (2005). The Work Suitability Inventory. In D. J. Knapp, C. E. Sager, & T. R. Tremble (Eds.), *Development of experimental Army enlisted personnel selection and classification tests and job performance criteria* (Technical Report 1168). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

McCloy, R. A., & Putka, D. J. (2006). Work Suitability Inventory. In D. J. Knapp & T. R. Tremble (Eds.), *Concurrent validation of experimental Army enlisted personnel selection and classification measures* (FR-06-35). Alexandria, VA: Human Resources Research Organization.

Putka, D. J. (2006). Work Values Inventory. In D. J. Knapp, & T. R. Tremble (Eds.), *Concurrent validation of experimental Army enlisted personnel selection and classification measures* (FR-06-35). Alexandria, VA: Human Resources Research Organization.

Putka, D. J., & Le, H. (2005). *Select21 attrition update: Initial entry training attrition* (IR-05-58). Alexandria, VA: Human Resources Research Organization.

Putka, D. J., & McCloy, R. A. (2003, May). Evaluation of the MFS AIM an ARI's attrition screen (Memorandum for Record). Alexandria, VA: Human Resources Research Organization.

Putka, D. J., & Strickland, W. J. (2004). *A comparison of the FY03 and FY99 First Term Attrition Study cohorts* (FR-04-35). Alexandria, VA: Human Resources Research Organization.

Putka, D. J., & Van Iddekinge, C. H. (2006). Work Preferences Survey. In D. J. Knapp & T. R. Tremble (Eds.), *Concurrent validation of experimental Army enlisted personnel selection and classification measures* (FR-06-35). Alexandria, VA: Human Resources Research Organization.

Strickland, W. J. (Ed.) (2004). *A longitudinal examination of first term attrition and reenlistment among FY1999 enlisted accessions* (FR-04-14). Alexandria, VA: Human Resources Research Organization.

Van Iddekinge, C. H., Putka, D. J., & Sager, C. E. (2005). Person-environment fit measures. In. D. J. Knapp, C. E. Sager, & T. R. Tremble (Eds.), *Development of experimental Army enlisted personnel selection and classification tests and job performance criteria* (Technical Report 1168). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Waugh, G. W., & Russell, T. L. (2005). Predictor Situational Judgment Test (PSJT). In D. J. Knapp, C. E. Sager, & T. R. Tremble, (Eds.), *Development of experimental Army enlisted personnel selection and classification tests and job performance criteria* (Technical Report 1168). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

White, L. A., Young, M. C., Heggestad, E. D., Stark, S., Drasgow, F., Piskator, G. (2004). *Development of a non-high school diploma graduate pre-enlistment screening model to enhance the future force*. Paper presented at the Army Science Conference, Orlando, FL.

Appendix A: Base Rates of Attrition and Sample Sizes by Instrument Analysis Sample

Table A1. BCT Attrition Rates

	Cohort A: Pilot Test			Cohort B: Faking			Cohort C: Field Test			Total		
Instrument	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit
Army Beliefs Survey (ABS)	300	15	5.0	130	11	8.5	132	10	7.6	562	36	6.4
Army Work Knowledge Survey (AWKS)	189	5	2.6	120	5	4.2	167	14	8.4	476	24	5.0
Interest Finder Questionnaire (IFQ)	225	23	10.0	146	11	7.5	458	46	10.0	829	80	9.7
Predictor Situational Judgment Test (PSJT)	.	.	.	.	.	.	352	34	9.7	352	34	9.7
Pre-Service Expectations Survey (PSES)	213	23	11.0	141	10	7.1	230	22	9.6	584	55	9.4
Psychomotor Test	.	.	.	76	6	7.9	444	44	9.9	520	50	9.6
Rational Biodata Inventory (RBI)	187	5	2.7	135	8	5.9	414	42	10.0	736	55	7.5
Work Preferences Survey (WPS)	309	32	10.0	147	11	7.5	441	43	9.8	897	86	9.6
Work Suitability Inventory (WSI)	181	5	2.8	111	4	3.6	434	44	10.0	726	53	7.3
Work Values Inventory (WVI)	278	14	5.0	126	10	7.9	364	36	9.9	768	60	7.8

Note. *n* = number of Soldiers in the cohort with EMF data and useable instrument data. *n* Attrit = number of Active Army Soldiers who attrited in the first two months of service. % Attrit = Percent of Soldiers who attrited in each cohort.

Table A2. AIT Attrition Rates

	Cohort A: Pilot Test			Cohort B: Faking			Cohort C: Field Test			Total		
Instrument	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit
Army Beliefs Survey (ABS)	284	16	5.6	119	10	8.4	122	6	4.9	525	32	6.1
Army Work Knowledge Survey (AWKS)	184	7	3.8	115	5	4.3	153	9	5.9	452	21	4.6
Interest Finder Questionnaire (IFQ)	202	20	9.9	135	7	5.2	412	27	6.6	749	54	7.2
Predictor Situational Judgment Test (PSJT)	.	.	.	.	.	.	318	25	7.9	318	25	7.9
Pre-Service Expectations Survey (PSES)	190	19	10.0	131	6	4.6	208	15	7.2	529	40	7.6
Psychomotor Test	.	.	.	70	5	7.1	400	25	6.3	470	30	6.4
Rational Biodata Inventory (RBI)	182	8	4.4	127	8	6.3	372	26	7.0	681	42	6.2
Work Preferences Survey (WPS)	277	28	10.0	136	7	5.1	398	27	6.8	811	62	7.6
Work Suitability Inventory (WSI)	176	8	4.5	107	5	4.7	390	25	6.4	673	38	5.6
Work Values Inventory (WVI)	264	14	5.3	116	9	7.8	328	21	6.4	708	44	6.2

Note. *n* = number of Soldiers in the cohort with EMF data and useable instrument data. *n* Attrit = number of Active Army Soldiers who attrited between the third month and sixth month of service. % Attrit = Percent of Soldiers who attrited in each cohort.

Table A3. Total IET Attrition Rates

	Cohort A: Pilot Test			Cohort B: Faking			Cohort C: Field Test			Total		
Instrument	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit	*n*	*n* Attrit	% Attrit
Army Beliefs Survey (ABS)	299	31	10.4	130	21	16.2	132	16	12.1	561	68	12.1
Army Work Knowledge Survey (AWKS)	189	12	6.3	120	10	8.3	167	23	13.8	476	45	9.5
Interest Finder Questionnaire (IFQ)	225	43	19.1	146	18	12.3	458	73	15.9	829	134	16.2
Predictor Situational Judgment Test (PSJT)	.	.	.	.	.	.	352	59	16.8	352	59	16.8
Pre-Service Expectations Survey (PSES)	213	42	19.7	141	16	11.3	230	37	16.1	584	95	16.3
Psychomotor Test	.	.	.	76	11	14.5	444	69	15.5	520	80	15.4
Rational Biodata Inventory (RBI)	187	13	7.0	135	16	11.9	414	68	16.4	736	97	13.2
Work Preferences Survey (WPS)	309	60	19.4	147	18	12.2	441	70	15.9	897	148	16.5
Work Suitability Inventory (WSI)	181	13	7.2	111	9	8.1	434	69	15.9	726	91	12.5
Work Values Inventory (WVI)	278	28	10.1	126	19	15.1	364	57	15.7	768	104	13.5

Note. *n* = number of Soldiers in the cohort with EMF data and useable instrument data. *n* Attrit = number of Active Army Soldiers who attrited in the first six months of service. % Attrit = Percent of Soldiers who attrited in each cohort.

Table A4. Unit Attrition Rates (through 9 months in unit)

	Cohort A: Pilot Test			Cohort B: Faking			Cohort C: Field Test			Total		
Instrument	*n*	*n Attrit*	% Attrit	*n*	*n Attrit*	% Attrit	*n*	*n Attrit*	% Attrit	*n*	*n Attrit*	% Attrit
Army Beliefs Survey (ABS)	267	19	7.1	112	5	4.5	121	8	6.6	500	32	6.4
Army Work Knowledge Survey (AWKS)	178	18	10.1	109	11	10.1	149	13	8.7	436	42	9.6
Interest Finder Questionnaire (IFQ)	184	11	6.0	128	7	5.5	394	30	7.6	706	48	6.8
Predictor Situational Judgment Test (PSJT)	.	.	.	.	.	.	302	24	7.9	302	24	7.9
Pre-Service Expectations Survey (PSES)	172	9	5.2	125	7	5.6	199	18	9.0	496	34	6.9
Psychomotor Test	.	.	.	62	6	9.7	383	31	8.1	445	37	8.3
Rational Biodata Inventory (RBI)	175	18	10.3	117	10	8.5	355	30	8.5	647	58	9.0
Work Preferences Survey (WPS)	251	20	8.0	129	7	5.4	379	31	8.2	759	58	7.6
Work Suitability Inventory (WSI)	168	17	10.1	102	10	9.8	373	29	7.8	643	56	8.7
Work Values Inventory (WVI)	248	15	6.0	110	5	4.5	313	22	7.0	671	42	6.3

Note. *n* = number of Soldiers in the cohort with EMF data and useable instrument data. *n* Attrit = number of Active Army Soldiers who attrited within the first 9 months of joining their unit. % Attrit = Percent of Soldiers who attrited in each cohort.

Table A5. Overall 15-Month Attrition Rates

	Cohort A: Pilot Test			Cohort B: Faking			Cohort C: Field Test			Total		
Instrument	*n*	*n Attrit*	% Attrit	*n*	*n Attrit*	% Attrit	*n*	*n Attrit*	% Attrit	*n*	*n Attrit*	% Attrit
Army Beliefs Survey (ABS)	299	50	16.7	133	26	19.5	137	24	17.5	569	100	17.6
Army Work Knowledge Survey (AWKS)	190	30	15.8	119	21	17.6	172	36	20.9	481	87	18.1
Interest Finder Questionnaire (IFQ)	226	53	23.5	146	25	17.1	467	103	22.1	839	181	21.6
Predictor Situational Judgment Test (PSJT)	.	.	.	.	.	.	361	83	23.0	361	83	23.0
Pre-Service Expectations Survey (PSES)	213	50	23.5	141	23	16.3	236	55	23.3	590	128	21.7
Psychomotor Test	.	.	.	73	17	23.3	452	100	22.1	525	117	22.3
Rational Biodata Inventory (RBI)	188	31	16.5	133	26	19.5	423	98	23.2	744	155	20.8
Work Preferences Survey (WPS)	310	79	25.5	147	25	17.0	449	101	22.5	906	205	22.6
Work Suitability Inventory (WSI)	181	30	16.6	111	19	17.1	442	98	22.2	734	147	20.0
Work Values Inventory (WVI)	277	43	15.5	129	24	18.6	370	79	21.4	776	146	18.8

Note. *n* = number of Soldiers in the cohort with EMF data and useable instrument data. *n* Attrit = number of Active Army Soldiers who attrited within the first 15 months of service. % Attrit = Percent of Soldiers who attrited in each cohort.