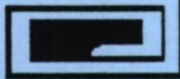


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**PERSONNEL SECURITY PRESCREENING:**

**An Application of the Educational and  
Biographical Information Survey (EBIS)**

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**Michael A. McDaniel**

**December 1988**

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PERSONNEL SECURITY PRESCREENING:  
An Application of the Educational and  
Biographical Information Survey (EBIS)

Prepared by  
Michael A. McDaniel, Ph.D.

Released by  
Carson Eoyang, Ph.D.  
Director

// Defense Personnel Security Research and Education Center  
Monterey, CA 93940-2481

## Preface

The Stilwell Report, presented to the Secretary of Defense in November 1985, identified the need for research into the existing personnel security system as essential for generating new security policy. Prescreening, background investigations, adjudicative policies, psychological and behavioral tests, and polygraph reliability were considered to be areas where serious gaps in our knowledge exist. The present report addresses some of these deficiencies.

This report evaluated the usefulness of background information for the prediction of issue case classifications. Background items were drawn from the military's Educational and Biographical Information Survey (EBIS) (Means & Perelman, 1984). This self-report inventory contains questions regarding educational experiences, drug and alcohol use, criminal activities, and family history. Issue case status is a classification assigned by the Defense Investigative Service (DIS) for investigations that are expanded due to the discovery of serious derogatory information.

Although the present research indicated that the EBIS was not a strong predictor of issue case status, the report raises questions about the reliability of issue case data, and provides prescriptive advice for the improvement of DIS investigations. Concerning issue cases, the report notes that little is known about the reliability of issue case status in the automated DIS records. The need for more detailed automated issue case information is emphasized. The report also indicates that high school behavior is a useful predictor of suitability, and recommends that DIS obtain this information through self-reports. DIS may wish to consider supplementing its background "sample" data with "sign" predictors of unsuitability and unreliability.

Carson K. Eoyang  
Director, PERSEREC

**PERSONNEL SECURITY PRESCREENING:  
An Application of the Educational and  
Biographical Information Survey (EBIS)**

prepared by  
Michael A. McDaniel

**Summary**

Problem and Background

The military services have many positions for enlisted accessions that should only be filled by highly trusted and reliable personnel. Those personnel who occupy these billets need a top secret or top secret/sensitive compartmented information clearance. Persons to be assigned to such positions are subject to screening procedures conducted by each service. Those who pass the service-specific prescreening are then subject to an extensive background investigation conducted by the Defense Investigative Service (DIS).

Given recent espionage incidents and other failures or criticisms of Department of Defense (DoD) security clearance procedures, there has been increasing interest in evaluating new approaches to screening personnel for sensitive positions.

Objective

The objective of this study was to examine the usefulness of the Educational and Biographical Information Survey (EBIS) as a personnel screening instrument for sensitive positions. The EBIS is a self-report instrument covering a person's background in the areas of education, drug use, and contacts with the law.

Approach

The sample consisted of 3,855 military accessions who completed the EBIS and who were subject to a DIS background investigation. The primary criterion was issue case status. An investigation of a person is classified as an issue case if the DIS investigation uncovers serious adverse information about the person being investigated. Approximately 10% of the background investigations were classified as issue cases.

The EBIS items were empirically scored to predict the issue case criterion. Approximately 80% of the sample was assigned to the scoring-key development group, while the remainder was used as a hold-out group to assess items' value in identifying issue cases.

## Results

The EBIS scoring key had low validity (.09) for the issue case criterion measure. The school experience scale, the miscellaneous scale, and the total scale showed substantially larger validities for unsuitability discharge and clearance revocation/denial than for the issue case criterion.

## Conclusion

The results indicate that the EBIS has limited usefulness as a predictor of issue case status. Part of the low validity can be attributed to the poor measurement properties of the EBIS items. Random and systematic errors in the issue case criterion may also be responsible for the low validity.

The pattern of validities for the school experience scale and the miscellaneous scale suggest that DIS can improve its security screening by placing greater emphasis on the background domains tapped by these scales.

## Recommendations

1. DIS should examine the extent and source of potential errors in the issue case classification process. A comparison of DIS investigation records with issue case status as recorded on the Defense Central Index of Investigations (DCII) would identify the extent of problems, if any, in the accurate automation of issue case status.
2. DIS should prepare a descriptive analysis of the major reasons for issue case classification. This information can be used to define the background areas to be addressed in future prescreening research and potentially explain why the present effort yielded such meager results.
3. DIS should place greater emphasis on school experiences and the background domains measured in the EBIS miscellaneous scale. Such information may be collected through self-reports.

4. DIS is encouraged to maintain a historical DCII file so that an automated history of an individual's past DIS investigations is available for research purposes. Automated information on the reasons for issue case classification would also be useful to personnel security researchers.

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## Introduction

In November 1985, the DoD Security Review Commission presented the Secretary of Defense with a report, commonly known as the Stilwell Report, which identified the weaknesses of the personnel security system and suggested recommendations for its improvement. The Stilwell Report identified the need for research into the existing personnel security system as essential for generating new security policy. Prescreening, background investigations, adjudicative policies, psychological and behavioral tests, and polygraph reliability were considered to be areas where serious gaps in our knowledge exist (DoD Security Exchange Commission, 1985). The present report is an attempt to help fill these gaps.

The purpose of this report is to evaluate the usefulness of background information for the prediction of issue case classifications. The background items were drawn from the military's Educational and Biographical Information Survey (EBIS) (Means & Perelman, 1984). This self-report inventory contains questions regarding educational experiences, drug and alcohol use, criminal activities, and family history. Issue case status is a classification assigned by the Defense Investigative Service (DIS) when investigating individuals for security clearances. An investigation is classified as an issue case when information is uncovered which raises serious concerns about the suitability of the individual for a position of trust (Department of Defense, 1985).

The EBIS was developed for two primary reasons. First, the survey was designed to assess the potential value of incorporating additional biographical information into the military selection process. Second, the survey was administered to collect data pertinent to the evaluation of current enlistment standards in the areas of education and moral character (Means and Perelman, 1984). During the spring of 1983, the EBIS was administered to approximately 34,000 military applicants and 40,000 new recruits from all four services.

Several studies have analyzed the EBIS data sets. Means, Laurence and Waters (1984) conducted a comparison of the applicant and recruit samples and a comparison of responses for samples receiving different administration instructions. Approximately half the applicant sample were told that their responses would not affect their enlistment application or military record (research instruction condition). The remaining applicant group and all of the recruit sample received the operational instructions which permitted applicants to presume that their responses might influence the military's selection decision. Means et al. (1984) concluded that recruits tended to be more willing than military applicants to disclose sensitive information. They also concluded that the type of instructions did not affect the applicants' responses.

Means et al. (1984) also were able to examine the test-retest reliability of the EBIS. A group of 855 respondents took the EBIS, first as applicants, at a MEPS or

MET site (i.e., military enlistment processing stations), and then one to twelve weeks later, after entering service, at their recruit training centers. The reliability analysis consisted of cross-tabulation tables of selected items. The authors concluded that "Taken as a whole, the data for the readministration sample suggest good consistency for most survey items" (p. 24). They reported that the majority of the individuals answer items the same way in both settings, but that applicants tended to provide more socially desirable answers.

To date, EBIS data have primarily been used to predict premature termination from the services. Laurence (1986) reported that military recruits who reported more frequent drug and alcohol use were more likely to leave service prematurely. Means and Heisey (1986) examined the relationship between the EBIS and six-month attrition status from the service. They argued that the background items that best predict military suitability differ for high school and non-high school graduates. Specifically, they argued that EBIS educational background items show the best validity for high school graduates, while alcohol/drug use, family relations, and work history are most effective for nongraduates.

Besides examining the relationship between the EBIS and attrition, the Laurence (1986) study examined the relationship between the instrument and clearance investigation data as automated in the Defense Central Index of Investigations (DCII), an automated data file maintained by DIS. Laurence categorized DCII investigations into those which indicated no derogatory information and those indicating some derogatory information. Laurence compared this indicator with other scales derived from the EBIS survey items. One EBIS scale measured past arrests and the other measured drug and alcohol use. It was concluded that the two EBIS scales were significantly related to the DCII-based derogatory information measure.

The present research seeks to expand and complement the earlier EBIS research. The present study differs from the earlier EBIS research (Laurence, 1986; Means & Heisey, 1986; Means & Laurence, 1986; Means et al., 1984; Means & Perelman, 1984) in two primary ways. First, the present study seeks to develop a scoring key for the EBIS items to predict criteria of interest. While the earlier research on the EBIS successfully identified background domains with predictive value for unsuitability discharge, it did not conduct the analyses necessary to combine optimally the background information into a personnel screening instrument. Second, the present research presents a more detailed analysis of the relations between the EBIS items and security criteria than was available in the Laurence (1986) report.

The use of background data in the prediction of human performance has a long history in psychology (Owens, 1986). Use of background data is based on the premise that the individual's past behavior and experiences are potent predictors of future behavior and experiences. The results of hundreds of studies generally have shown

background data to be an effective predictor for a variety of human performance domains (for reviews, see Asher, 1972; Ghiselli, 1973; Owens, 1976, Reilly & Chao, 1982).

This analysis is based on a sample of 3,855 military recruits. The sample contains all persons who completed the EBIS as military recruits and who received a DIS background investigation. Typically, therefore, the sample members were being investigated to receive a top secret or top secret/sensitive compartmented information (SCI) clearance. The EBIS was administered using an instruction set that emphasized that the data were being collected by a civilian contractor and the recruits' responses would not be used in making selection decisions.

While the results of the analysis may be generalized to the population of military recruits assigned to occupations requiring top secret or SCI clearances, they may be less applicable to the population of all military recruits or all military applicants. Military recruits assigned to occupations requiring higher clearances have already been screened for expected suitability. Thus, for the study sample there will likely be less variance in some predictors than for the population of all military recruits or all military applicants. The restricted predictor range will tend to lower the validity estimates for the present sample below that expected for the population of military recruits or the population of military applicants. Range restriction corrections may be applied to the results to estimate the predictive value of the measures for the population of all military recruits.

## Method

### Sample

DIS conducted background investigations for the 3,855 recruits in this sample. Two types of background investigation were requested: IBI (interview background investigation) and SBI (special background investigation). IBI investigations were conducted on 43% of the sample, while 57% underwent SBI investigation. The IBI is the principal type of investigation conducted when an individual requires top secret clearance. The investigation normally covers a five-year period and includes a subject interview, a national agency check, a local agency check, credit checks, developed character references, employment record checks, employment references, and select scoping (i.e., targeted investigation of any issue) as needed to resolve unfavorable or questionable information. The SBI is essentially an IBI that provides additional coverage both in periods of time (15 years) as well as sources, but without a personal interview (Department of Defense, 1987). While the IBI is primarily used for top secret applicants,

the SBI is used for persons seeking positions that require both a top secret clearance and access to compartmentalized information.

### Criteria

Three criteria were used:

- 1) issue case status
- 2) unsuitability discharge
- 3) clearance revocation/denial

Issue case status served as the primary criterion of interest. Issue cases fall into one of three categories: loyalty, suitability, and hostage situations (Department of Defense, 1987). Loyalty refers to activities by individuals or groups that involve violations of the law for the purpose of overthrowing the government or substantially impairing government policy. Suitability issue cases concern serious derogatory information such as criminal or dishonest conduct, behavior or mental illness that may cause a defect in judgment, excessive indebtedness, use of intoxicants to excess, illegal possession/use of drugs, or misrepresentation of information on investigation forms. A hostage issue case exists when a member of an individual's family or another person to whom the individual is bound by obligation or affection resides in a country whose interests are inimical to those of the United States. Suitability issue cases are the most common.

Ten percent of the sample ( $n = 400$ ) were issue cases. Thus, the criterion is both dichotomous and severely skewed; this places limitations on the extent to which any predictor can correlate with the criterion.

The empirical selection of the EBIS items was restricted to the issue case criterion. However, the issue case scales were correlated with two additional criteria: unsuitability discharge and a security clearance denial/revocation measure.

Unsuitability discharge was defined as separation from the service on or before 30 September 1986 due to "failure to meet minimum behavioral performance criteria." Whereas the EBIS was administered in the Spring of 1983, these unsuitability discharges occurred in the first three and one-half years of the recruits' service. The most frequently occurring unsuitability discharge categories in this group were drugs, trainee discharge, discreditable incidents, and basic training attrition. Unsuitability discharge can be a security-related criterion in that those clearance holders who are discharged from the service for negative reasons may indicate a faulty security screening process. That is, persons who are unsuitable for the military should have been deemed unsuitable to hold sensitive positions essential for national security. As noted by Flyer

(1986), personnel discharged from sensitive positions for unsuitability pose a special security problem. Some of those discharged are likely to be bitter about their military experiences, and most are likely to face some degree of financial uncertainty on their return to civilian life. The combination of knowledge gained in sensitive positions, antagonism toward their former military employer, and financial insecurity makes these persons potential security problems.

Approximately nine percent of the sample were discharged for unsuitability, which is lower than the rate for the services as a whole (about 20%). The lower rate is probably due to service-specific security screening which removes many potentially unsuitable persons from the pool of individuals subject to DIS investigations. As with the issue case criterion, this is a very skewed distribution which minimizes the predictive value of any screening measure.

The final criterion is a composite of clearance revocation and clearance denial. Revocation and denial information is available only for Army and Air Force personnel in the DCII. For the Army clearance data on the DCII, those personnel with revoked clearances cannot be distinguished from those personnel who were denied clearances. While revocations and denials can be distinguished for Air Force personnel, the categories were combined to make the Air Force data consistent with the Army data. For the Air Force, the clearance status code "Z" was considered a clearance denial; that code is defined as "Terminated - No Clearance Issued - Unfavorable Investigation." The clearance data used was that recorded in the DCII as of 30 September 1986. Approximately 3.5 percent of the sample had revoked or denied clearances. The extreme skew of this variable severely limits its usefulness in security screening research. However, its clear relevance to the security criteria domain argues for its inclusion.

### Policy Capturing

Issue case status, as assigned by DIS, is based on a review of the recruit's life before entry into the service. Much of the information covered in the review process is the same as that self-reported by the recruit on the EBIS questionnaire (e.g., drug use, problems with the law). Analyses, such as the present research, which examine the validity of preservice biographical information may be viewed as policy capturing analyses. If a background domain such as self-reported drug use predicts issue case status, it indicates that the DIS investigation is tapping the same background information (e.g., drug use) or a correlated area of background information in making its issue case classification decision. The larger the correlation between an EBIS background item and issue case status, the greater the emphasis that DIS places on that background area in its issue case classification decision.

In contrast to the issue case classification which is based on the preservice life of the recruit, the unsuitability discharge criterion reflects a person's behavioral problems after entering the service. A comparison of the correlation between background domains with the issue case criterion and with the post-accession criterion of unsuitability discharge has policy implications for the conduct of DIS investigations. A background area that correlates with both issue case status and a post-accession criterion suggests that DIS uses the information on this background area in an efficient manner. Specifically, a judgment by DIS that an individual's experiences in the background area makes him a performance risk is supported by the finding that his post-accession behavior is also unacceptable.

However, a background area that correlates with issue case status but not with post-accession problems raises doubts about the appropriateness of DIS's use of such background information in the issue case classification decision. Specifically, if DIS classifies the person as an issue case on the basis of the person's life experiences in a given background area, yet this background area is actually unrelated to post-accession behavior, one could argue that DIS is erroneously labelling the person a bad risk.

There are clear limits to this argument. The hypothesis is reasonable only to the extent that the security risk criterion domain overlaps with the unsuitability discharge criterion domain. There can be several categories of security risk that are either uncorrelated with behaviors leading to unsuitability discharge, or which are negatively correlated with unsuitability behaviors. For example, a person can be classified as an issue case because of a hostage situation which has little logical relationship to post-accession unsuitability, but has substantial relation to potential security risk. Second, there can be types of security violators (e.g., professional spies) who might more closely resemble competent, highly valued employees than persons who are discharged for unsuitability.

Finally, should a background area not predict issue case status, but instead predict unsuitability discharge, the background area should be considered in the revision of DIS investigative methods. Thus, for example, if a measure of high school adjustment predicts unsuitability discharge but not issue case status, one can conclude that the DIS places little weight on this information even though it predicts behaviors that would be unwelcome in an occupation requiring a security clearance.

The clearance denial/revocation index reflects preservice behavior for the clearance denial component of the index, and mirrors post-accession behavior for the clearance revocation component. In either event, the classification of "denied" or "revoked" is based on a finding of very derogatory information. Thus, predictors of the denial/revocation index should also show a relationship with issue case status.

## Data Analysis

A review of EBIS item frequencies revealed that many items had severe variance problems, with the vast majority of the respondents choosing the same item response for a given item. (See Means & Perelman, 1984, Part III for frequency tables by item for the full recruit and applicant samples. While the present research used only a small portion of the total recruit sample reported by Means et al., the skewed pattern in the data is very similar.) Although the author does not question the value of the EBIS items for their original purpose, their use as predictors is limited by their sharply restricted variance.

Another problem apparent in the data is the substantial amount of missing data. For example, about half the respondents refused to answer the question about their father's arrest record. Missing data create problems for extrapolating results to operational settings because it is not known how these nonresponders would answer under conditions requiring a response.

Table 1 presents the percentage of issue cases by service and selected demographic variables for this study's sample. The Army and the Navy had the highest percentages of issue cases while the Air Force and Marines had lower issue case rates. One can place less confidence in the accuracy of the Marine data due to the small sample size. The lower issue case rate for the Air Force is consistent with earlier findings by Flyer (1986) who attributed the lower rate to better accession prescreening in the Air Force. It may also be that the Air Force attracts persons who are more suitable. No large differences in issue case rate are apparent by sex, race, or Armed Forces mental category (AFQT).

Table 1  
 Percentage of Issue Cases  
 by Service and Selected Demographic Variables

Analysis Group	Number of Investigations	Percentage of Issue Cases
<u>Service</u>		
Army	1,069	13.28
Navy	1,090	12.66
Air Force	1,511	7.08
Marines	185	7.03
<u>Gender</u>		
Female	758	11.21
Male	3,097	10.17
<u>Race</u>		
Black	555	10.99
White	3,181	10.34
Other	118	8.47
<u>AFQT</u>		
I (93-99)	488	9.84
II (65-92)	1,768	10.12
IIIb (50-64)	775	11.23
IIIa (31-49)	692	10.26
IV (21-30)	125	12.00

Two lines of evidence indicate that issue case status is primarily a measure of unsuitability. First, the primary reason for classification as an issue case is unsuitability. Of the 400 issue cases in this sample, none was classified as subversive, only one was classified as a hostage case, and the remaining 399 were classified as suitability issue cases. Second, issue case status is correlated with unsuitability discharge, clearance denial or revocation, and character of service (e.g., honorable discharge, less than honorable, etc.).

Table 2 summarizes these relationships for all services combined and for the Army, Navy and Air Force separately. Given the small number of Marines in the sample,

their data were not reported separately. An examination of the data for all services combined shows a strong relationship between issue case status and discharge from the service for unsuitable performance. Those who are classified as issue cases are two and one-half times more likely than non-issue case individuals to be discharged from the military for unsuitable performance (7.6% vs. 19.0%).

Issue case status may also be compared with the "character of service" separation category (i.e., honorable, under honorable conditions, and under other than honorable conditions). However, this analysis can be misleading for three reasons: 1) the services often provide honorable discharges for those who are separated from the service for unsuitable behavior; 2) most of the sample was still in the service at the time the separation data were collected; and, 3) a portion of the sample has missing data for character of service. These data contaminants probably account for the anomalous finding that issue cases for the entire sample have a slightly higher rate of honorable discharges. The artifactual nature of this finding is supported by the result in Table 2 indicating that this effect is largely due to the Air Force data, and the finding in Table 3 showing that the Air Force has the highest percentage of unsuitable discharges assigned to the fully honorable character of service code.

Table 2 shows that for the sample containing data from all services, individuals classified as issue cases have a greater likelihood of being discharged under the less honorable categories of "under honorable conditions" (3.2% vs. 9.5%) and "under other than honorable conditions" (1.1% vs. 3.8%). Although the low frequency of clearance revocations and denials may cause some distortion in the results, the data for the Army indicate that issue cases are about ten times more likely to have their clearance revoked or denied (1.4% vs. 13.4%). For the Air Force, issue cases are about five times more likely to have their clearance investigation terminated due to unfavorable findings (2.9% vs. 14%). These analyses provide support for concluding that issue case status is best viewed as a measure of suitability.

Table 2

Relationships Between Issue Case Status  
and Other Measures of Unsuitability

	Not Issue Case		Issue Case	
<u>All Services</u>				
<u>Discharge Measures</u>				
Unsuitability Discharge	7.6%	(263)	19.0%	(76)
Not Unsuitability Discharge	92.4%	(3,192)	81.0%	(324)
Honorable Discharge	19.7%	(679)	22.8%	(91)
Under Honorable Conditions	3.2%	(112)	9.5%	(38)
Under Other Than Honorable Conditions	1.1%	(37)	3.8%	(15)
Not Discharged or Unknown	76.0%	(2,627)	64.0%	(256)
<u>Army</u>				
<u>Discharge Measures</u>				
Unsuitability Discharge	8.2%	(76)	15.5%	(22)
Not Unsuitability Discharge	91.8%	(851)	84.5%	(120)
Honorable Discharge	41.42%	(384)	39.4%	(56)
Under Honorable Conditions	1.94%	(18)	7.0%	(10)
Under Other Than Honorable Conditions	0.32%	(3)	0.0%	(0)
Not Discharged or Unknown	56.3%	(522)	54.0%	(76)
<u>Clearance Measures</u>				
Clearance Revoked or Denied	1.4%	(1)	13.4%	(19)
Not Revoked or Denied	98.6%	(914)	86.6%	(123)
<u>Navy</u>				
<u>Discharge Measures</u>				
Unsuitability Discharge	7.8%	(74)	18.2%	(25)
Not Unsuitability Discharge	92.2%	(878)	81.9%	(113)
Honorable Discharge	14.4%	(137)	12.3%	(17)
Under Honorable Conditions	1.6%	(15)	7.3%	(10)
Under Other Than Honorable Conditions	3.4%	(32)	8.7%	(12)
Not Discharged or Unknown	80.1%	(768)	71.7%	(99)
<u>Air Force</u>				
<u>Discharge Measures</u>				
Unsuitability Discharge	7.89%	(109)	25.2%	(27)
Not Unsuitability Discharge	92.2%	(1,295)	74.8%	(80)
Honorable Discharge	7.3%	(103)	12.2%	(13)
Under Honorable Conditions	5.6%	(79)	16.8%	(18)
Under Other Than Honorable Conditions	0.0%	(0)	0.9%	(1)
Not Discharge or Unknown	94.2%	(1,222)	70.1%	(75)
<u>Clearance Measures</u>				
Investigation Terminated due to Unfavorable Findings	2.9%	(41)	14.0%	(15)
Not Terminated	97.1%	(1,363)	86.0%	(92)

Note: Sample size in parentheses.

Table 3

## Character of Service Separation Code by Unsuitability Discharge Status

Character of Service	Unsuitability Discharge		Not Unsuitability Discharge	
<u>All Services</u>				
Honorable Discharge	10.4%	(80)	89.6%	(690)
Under Honorable Conditions	98.7%	(148)	1.3%	(2)
Under Other Than Honorable Conditions	98.1%	(51)	1.9%	(1)
Not Discharged or Unknown	2.1%	(60)	98.1%	(2823)
<u>Army</u>				
Honorable Discharge	8.9%	(39)	91.1%	(401)
Under Honorable Conditions	100.1%	(28)	0.0%	(0)
Under Other Than Honorable Conditions	100.0%	(3)	0.0%	(0)
Not Discharged or Unknown	4.7%	(28)	95.3%	(570)
<u>Navy</u>				
Honorable Discharge	13.0%	(20)	87.0%	(134)
Under Honorable Conditions	96.0%	(24)	4.0%	(1)
Under Other Than Honorable Conditions	97.7%	(43)	2.3%	(1)
Not Discharged or Unknown	1.4%	(12)	98.6%	(848)
<u>Air Force</u>				
Honorable Discharge	16.4%	(19)	83.6%	(97)
Under Honorable Conditions	99.0%	(96)	1.0%	(1)
Under Other Than Honorable Conditions	100.0%	(1)	0.0%	(0)
Not Discharged or Unknown	1.5%	(20)	98.5%	(1277)

Note: Sample size in parentheses.

Item Scoring

Each EBIS item was empirically keyed to predict the issue case criterion (England, 1971). The purpose of the empirical keying process is to derive scoring weights for the items that maximize the items' value in predicting the issue case criterion. To develop empirical keys for the items, the sample was randomly divided into two groups: a keying sample (N = 3,075) and a cross-validation sample (N = 780). Empirical keying procedures are influenced by fluctuations in the data due to random error. Thus, for the keying sample, the relationship between any item and the issue case criterion will be spuriously high. To estimate accurately the relationship between the background item and issue case status, one applies the scoring key developed using the keying sample to the cross-validation sample. The best estimate

of the validity of the item or item scale is the validity of the measure in the cross-validation sample. The item response values that were keyed were those described by Means and Perelman (1984). For the empirical keying procedure, missing data responses were considered valid responses. Depending on the item, these missing responses were assigned to one of four groups: 1) missing or uncodable, 2) multiple punch (i.e., two or more responses for a given question requiring one response), 3) not applicable (i.e., respondent correctly followed instructions to skip the item due to an answer to a previous item), 4) extra data (i.e., respondent did not follow instructions; respondent answered a question that should have been skipped).

No surprises were found in the scored items. The more self-reported problems one experienced in school and employment settings, the greater the probability of being classified as an issue case. Also, the greater the reported drug usage, and the greater frequency and severity of contacts with the law, the more likely one was to be classified as an issue case.

An inspection of the keying weights also provides information about the pattern of missing data in the survey. For most every missing item value that met the keying criteria, a missing response was related to a higher probability of being classified as an issue case. Thus, the missing data response was not random and probably reflected the applicants' motivations to withhold negative information about their background.

Based on the results of the empirical scoring procedure, 44 items were retained, and assigned to one of 6 categories derived from a rational analysis of item content. These content categories are:

School Experiences	School suspensions, trouble in school.
Traffic/Parking	Traffic and parking offenses.
Criminal History	Juvenile and adult arrest and conviction history.
Substance Use	Alcohol and drug use.
Job Experience	Length of employment and termination reasons.
Miscellaneous	Items that did not fit elsewhere. These items include the age at which one first went on a date, ran away, and smoked cigarettes. Also included are frequency of physical fights and father's discipline.

A list of EBIS items for each background scale is provided in the Appendix. Each of the six scales were transformed into t-scores based on their mean and standard deviations in the keying sample. The six transformed scales were summed to obtain a total score.

Table 4 presents the mean and standard deviation for EBIS scales and the criteria for both the keying sample and the cross-validation sample. For the two samples, one can compare the mean and standard deviations for the EBIS scales. A comparison of any given EBIS scale's mean indicates that the mean scores are roughly equivalent for both the keying sample and the cross-validation sample. This comparison supports the random equivalency of the two samples. A similar comparison of the standard deviation suggests a slight reduction of predictor variance in the cross-validation sample.

As noted in the discussion of the Means et al. (1984) study, a group of persons completed the EBIS questionnaire twice, once as applicants and once as military recruits. (Means et al. reported that the size of this sample was 855. The present author found only 754 cases that were common to both files. This difference in the number of observations is not judged important for the present analysis.) The correlation between the scale scores computed when this sample consisted of military applicants and the scores derived from the data when the sample consisted of military recruits can serve as an estimate of the test-retest reliability of the scale scores. This estimate is not ideal because, as discussed by Means et al. (1984), the response patterns of the applicant sample and the recruit sample showed some systematic differences. However, it is the best available estimate of the test-retest reliability of scale scores. These reliabilities are presented in Table 4.

Table 4

Mean and Standard Deviation for the EBIS Scales  
and Criterion Variables  
for the Keying and Cross-Validation Sample.  
Reliabilities for the EBIS Scales.

	Keying Sample N = 3,075		Cross- Validation Sample N = 780		Test Retest Reliabilities
	Mean	Standard Deviation	Mean	Standard Deviation	
<u>EBIS Scales</u>					
School Experience	50.00	10.00	49.41	9.59	.77
Traffic/Parking	50.00	10.00	50.61	9.79	.77
Criminal History	50.00	10.00	49.47	9.10	.44
Drug Use	50.00	10.00	49.82	10.09	.61
Job Experience	50.00	10.00	50.07	9.73	.71
Miscellaneous	50.00	10.00	49.98	9.77	.68
Total	300.00	32.52	299.37	30.06	.73
<u>Criteria Variables</u>					
Issue	.11	.31	.09	.28	NA
Unsuitability Discharge	.09	.28	.09	.28	NA
Clearance Revoked	.01	.10	.01	.10	NA

A comparison of the criteria statistics across the two samples shows a slightly higher variance for the issue case criterion in the keying sample. The reduction in issue case variance in the cross-validation sample is due to random factors in the sample selection process. Thus, shrinkage in scale validity from the keying sample to the cross-validation sample is due to both sampling error from capitalization or chance in the keying process, and to a less variable criterion. The predictor intercorrelation matrices for both samples are presented in Table 5.

Table 5

## Intercorrelation Matrix of EBIS Scale Scores

	Keying Sample (N = 3075)						
	1	2	3	4	5	6	7
1. School Experience	---						
2. Traffic Parking	.06	---					
3. Criminal History	.18	.14	---				
4. Drug Use	.27	.12	.15	---			
5. Job Experience	.05	.25	.07	.15	---		
6. Miscellaneous	.32	.02	.10	.33	.08	---	
7. Total	.58	.49	.50	.62	.49	.57	---

	Cross-Validation Sample (N = 780)						
	1	2	3	4	5	6	7
1. School Experience	---						
2. Traffic/Parking	-.01	---					
3. Criminal History	.14	.11	---				
4. Drug Use	.23	.11	.13	---			
5. Job Experience	-.05	.23	.00	.13	---		
6. Miscellaneous	.26	.04	.11	.32	.05	---	
7. Total	.51	.48	.46	.63	.44	.58	---

Table 6 presents the observed validity results for the EBIS scales against the three security/suitability criteria. These results are presented for both the keying sample and the cross-validation sample. As noted above, the keying sample estimates are overestimates of the true value of the EBIS scales because the empirical keying procedure captures both the true common variance shared between each scale and the issue criterion as well as the random sampling error variance. The validity estimates from the cross-validation sample are the appropriate statistics to interpret.

Table 6

## Observed Validity of EBIS Scales for Three Security Suitability Criteria

EBIS Scale	Keying Sample (N = 3,075)			Cross-Validation Sample (N = 780)		
	Issue	Unsuitability Discharge	Clearance <sup>1</sup> Revoked/Denied (N = 2,051)	Issue	Unsuitability Discharge	Clearance <sup>1</sup> Revoked/Denied (N = 529)
School Experience	.12	.11	.06	.03	.19	.20
Traffic/Parking	.07	.00	.01	.08	-.01	.01
Criminal History	.11	.05	.08	.04	.03	-.04
Drug Use	.17	.06	.03	.05	.05	.09
Job Experience	.13	.01	.04	.06	.02	.04
Miscellaneous	.14	.11	.08	.03	.16	.13
Total	.22	.10	.10	.09	.14	.14

<sup>1</sup>The clearance revoked/denied criterion is available for only the Army and Air Force personnel. This reduces the sample size to 2,051 in the keying sample and 529 in the cross-validation sample.

An inspection of the cross-validation sample validities shows small correlations with issue case status. The validities of the EBIS scales were meager, ranging from .03 to .09 for the total scale. The validity of EBIS total scale with unsuitability discharge was somewhat higher with the total score correlated at .14. Note the school experience scale above yielded a validity of .19 with unsuitability discharge. The miscellaneous scale yielded a correlation of .16 with unsuitability discharge. As discussed earlier, the EBIS scale scores were based on keying for the issue case criterion. A separate keying for unsuitability discharge is likely to yield higher validities. Thus, these validities are best viewed as the lower limit of the validity of the EBIS items for unsuitability attrition.

Despite the severe skew in the clearance revocation/denial criterion, several non-zero correlations with EBIS scales were obtained. School experiences correlated .20 with the index, while the miscellaneous scale yielded a validity of .13.

The observed validities in Table 6 are those expected for samples of persons receiving DIS investigations. Whereas the services conduct security pre-screening evaluations of persons seeking assignment to sensitive billets, the variance of the EBIS scales is probably restricted below that expected for the population of military recruits. Due to this range restriction, the observed validities in Table 6 underestimate the value of the EBIS scales as security prescreening instruments for the military recruit population. To estimate the validity of the EBIS scales for the military recruit population, the variance of the EBIS scales for that population are needed. This variance was estimated by determining the variance of the EBIS scales for the full military recruit population ( $n = 40,275$ ). The observed correlations in the cross-validation sample were then corrected for restriction in range. These results are shown in Table 7. Note that the full military recruit population is not a perfect definition of the population from which recruits are drawn for sensitive positions. Some in the recruit population would not be considered for sensitive positions because they do not meet mental or other qualification standards.

Table 7

Validity of EBIS Scales for Three Security Suitability Criteria.  
Validities Corrected for Range Restriction.  
Cross Validation Sample.

	Population SD	Corrected Validities		
		Issue	Unsuitability Discharge	Clearance Revoked/Denied
<u>EBIS Scales</u>				
School Experience	11.17	.04	.22	.23
Traffic/Parking	9.93	.08	-.01	.01
Criminal History	11.98	.05	.04	-.06
Drug Use	10.14	.06	.05	.09
Job Experience	9.86	.06	.02	.04
Miscellaneous	10.19	.03	.16	.14
Total	35.16	.11	.17	.17

A comparison of the range-restriction-corrected validities in Table 7 with the observed cross-validation validities in Table 6 shows that the range restriction corrections had a slight effect on the validities by raising them a point or two. However, the validities remain low.

## Discussion

As discussed in the introduction, a comparison of the EBIS scale validities for the issue case criterion with the validities for the unsuitability discharge criterion can provide information on the adequacy of coverage in DIS investigations. Present DIS investigation practices may be questioned when the validities for issue case criterion and unsuitability discharge criterion differ. The EBIS scale measuring school experiences and the scale composed of the miscellaneous items show meaningfully higher correlations for unsuitability discharge than for issue case classification. This pattern of results suggests that these background areas are related to behavioral problems in the military, but are not given much weight in the issue case decision-making process. Given that high schools are reluctant to release records involving minors, it is often difficult to obtain information from official sources about a military recruit's high school related activities and adjustment. However, it would not be difficult to obtain this information directly from the applicant. Relative to other EBIS items or the questions on the DoD Personnel Security Questionnaire (DD Form 398), the types of items comprising the school experiences scale are relatively unthreatening, thus raising confidence in the accuracy of self-reported information.

The miscellaneous item group also does much better in predicting unsuitability discharge than issue case classification. These items cover the age at which one first went on a date, ran away, and smoked cigarettes. The scale also includes the items covering frequency of physical fights and the level of father's discipline. This information does not appear to weigh heavily in issue case decisions, yet is associated with unsuitable behavior in the military. As with the school experience variables, it would not be difficult to obtain this information from the applicant.

The school experience and miscellaneous scales also show higher correlations with clearance revocation/denial than with issue case status. Thus, there is considerable support for the proposal that DIS place greater weight on this type of information.

Predictors of suitability may vary along a continuum from "samples" to "signs" (Barge, Hough, & Dunnette, 1984). Sample predictors of suitability are measures of actual suitability behavior. Most information collected in background investigations (e.g., drug use, criminal activity) are sample predictors. Sign predictors are indicators of predispositions to behave in certain ways. Personality measures designed to predict subsequent suitability behavior are best classified as sign predictors. Background items in the EBIS miscellaneous scale, such as the age at which one first went on a date, would be classified as sign predictors. Sign predictors have been shown to have substantial value in the prediction of a broad range of behavior. The observation that a sign predictor has no immediate obvious relationship to unsuitability does not diminish the value of the sign predictor for suitability prescreening. Greater emphasis on sign predictors in security screening is warranted.

Background domains that show correlations with issue case status but not unsuitability discharge may be information that is weighed too heavily by DIS investigators. Although a predictor of issue case status, traffic and parking offenses were unrelated to unsuitability discharge. This finding is difficult to interpret. While the author does not have access to DIS decision rules for the evaluation of parking/traffic offenses in relation to issue case decisions, it is unlikely that traffic and parking offenses alone would cause an investigation to be classified as an issue case. While future research should address this issue, its import for DIS investigation policy is not clear. No changes in DIS procedures based on the present analyses are recommended relative to screening for parking/traffic offenses.

The value of EBIS background scales in predicting issue case status is not high. Used alone as an issue case predictor, the EBIS instrument would have some utility in screening out those who would be considered issue cases, but at the cost of falsely identifying much of the available manpower pool as potential issue cases.

What accounts for the low relationship between the background domains and issue case status? At least four answers are possible. First, the background domains measured by the EBIS may have little true relation to issue case status. This seems unlikely given that it is similar information obtained on the DD398 and uncovered during background checks that causes an individual to be classified as an issue case. Second, the survey respondents may not be accurately responding to the survey questions, particularly those questions on sensitive topics (e.g., drug use, mother's criminal history). Unlike the personnel security screening instruments presently used in the military (e.g., DD398), the EBIS survey instructions included no threats of harsh sanctions for incomplete or false responses. This hypothesis of inaccurate reporting is supported by the finding that many items, particularly the most sensitive items, had very large nonresponse rates. Third, issue cases may be too rare an occurrence to permit accurate prediction. Fourth, the reliability of the issue case criterion may be low. That is, the number of errors in the recording of issue case status in the DCII may be large enough to reduce significantly the power of any variable to predict issue case status. Several sources of unreliability are possible. The background investigation is fallible and probably underestimates the proportion of issue cases. A known but probably minor source of contamination in the issue case criterion is the practice of replacing past DIS investigation data in the DCII with information from the most recent DIS investigation. Thus, in the present analysis, the issue case status is that recorded in the DCII as of September 1986. This probably is the DIS data for the investigation begun when the recruit was first considered for a security-related position. However, for some the data may reflect a more recent investigation.

Finally, the relation between the background data and issue case status is attenuated by the poor measurement properties of many of the EBIS items. Many items are highly skewed, thus limiting the item and scale variance. Items or scales with little

variance generally have little predictive value. A related issue concerns the breadth of coverage of a given background domain. Consider the items designed to measure the life adjustment of the respondent's father. Four items tapping alcohol use, drug use, mental illness and arrest history are used to measure this area. These items are highly skewed and tap only the most severe end of an adjustment continuum. These items also have a high nonresponse rate. Future attempts to measure this domain could minimize these problems by focusing on less severe indicators of life adjustment and by employing response options that permit more gradations in response than a yes/no response. Such items are likely to yield better variances, generate fewer missing data, and provide a more robust measure of the content domain.

### Conclusion

The predictive value of the EBIS instrument is insufficient to recommend its use as a predictor of issue case status. Analyses suggested that issue case status is best viewed as a suitability criterion, and conceptually is not unlike other suitability criteria such as discharge from the services for unsatisfactory behavior. A policy-capturing analysis of issue case classification was used as a means of evaluating and understanding the role of various types of background information in DIS decisions.

Future research directed at the measurement of background domains similar to those measured by the EBIS should give explicit consideration to the measurement properties of the items. More breadth in the measurement of the background domains coupled with increased attention to the variability of the item responses is expected to yield a more useful measurement instrument.

DIS and other policy makers in personnel security screening should consider the possibility that background information that does not necessarily have a compelling logical relationship to security risk (e.g., the items classified in the miscellaneous item group) may be useful in the security screening process. Since the vast majority of investigations that receive issue case status are so classified because of suitability problems (and not hostage or subversive behavior), any variables having predictive value for one or more forms of unsuitable behavior should prove useful in the DIS security screening process.

Results of analyses suggest that greater attention to school experiences, and a group of background variables classified here as miscellaneous, would improve the accuracy of security/unsuitability screening. Finally, an assessment of the reliability of DIS issue case determination is warranted.

## Recommendations

1. DIS should examine the extent and source of potential errors in the issue case classification process. A comparison of DIS investigation records with issue case status as recorded on the Defense Central Index of Investigations (DCII) would identify the extent of problems, if any, in the accurate automation of issue case status.
2. DIS should prepare a descriptive analysis of the major reasons for issue case classification. This information can be used to define the background areas to be addressed in future prescreening research and potentially explain why the present effort yielded such meager results.
3. DIS should place greater emphasis on school experiences and the background domains measured in the EBIS miscellaneous scale. Such information may be collected through self-reports.
4. DIS is encouraged to maintain a historical DCII file so that an automated history of an individual's past DIS investigations is available for research purposes. Automated information on the reasons for issue case classification would also be useful to personnel security researchers.



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## Appendix

<u>Content Area</u>	<u>ITEM</u>	<u>Description</u>
School Experiences	Q12A	Suspended from school
	Q12B	Suspensions grades 1-6
	Q12C	Suspensions grades 7-8
	Q12D	Suspensions grades 9-12
	Q14	School absences excluding illness
	Q15A	No trouble in school
	Q15C	Skipping school
	Q15G	Smoking
	Q11C	Other school clubs
	Q16A	Never thought of quitting school
	Q16L	Wanted to work full time
	Q2	High school diploma
	Job Experience	Q19A
Q20C		Left job because of low pay
Q20E		Fired
Q20F		Left job because of a better job
Q20K		Left job because of no opportunity
Traffic/Parking	Q29A	Traffic violations
	Q29B	Parking violations
	Q29C	Other traffic violations
Criminal History	Q30B	Disorderly conduct
	Q30C	Drunk driving
	Q30D	Drug-related offense
	Q30E	Theft
	Q31A	Convicted of a misdemeanor
	Q31B	Fines without sentence
	Q31C	Sentences under 4 months
	Q31D	Sentences over 4 months
	Q32A	Arrested or convicted of felony

Drug Use	Q34A	Times used alcohol
	Q34B	Times used marijuana
	Q34E	Times used uppers
	Q34F	Times used downers
	Q34G	Times used other narcotics
	Q34H	Times used other drugs
	Q26	Job loss, arrest, treatment for
Alcohol	Q27E	Age when first drunk
	Q27F	Age when first used marijuana
	Q27G	Age when first used hard drugs
Miscellaneous	Q27B	Age when went on first date
	Q27C	Age when first ran away
	Q27D	Age when first smoked cigarettes
	Q28	Frequency of physical fights in last 3 yrs
	Q23A	Father's discipline