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Research Note 82-26

AD-A147 676

MEASURING INSTITUTIONAL DISCRIMINATION
IN AN INFANTRY DIVISION

Dwight J. Goehring

ARI FIELD UNIT AT PRESIDIO OF MONTEREY, CALIFORNIA



U. S. Army

Research Institute for the Behavioral and Social Sciences

August 1980

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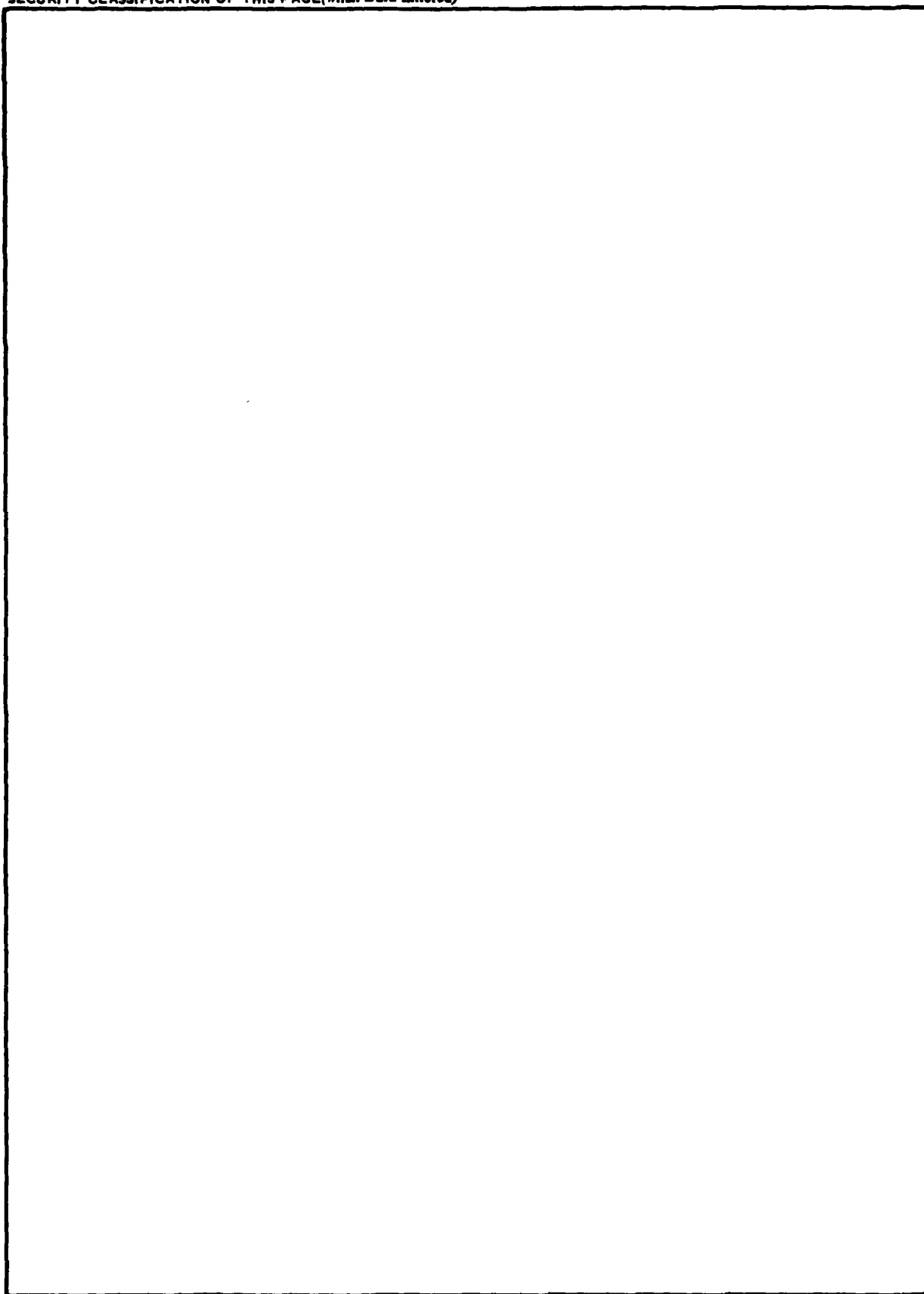
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER	
Research Note 82-26	AD-A147676		
4. TITLE (and Subtitle)		5. TYPE OF REPORT & PERIOD COVERED	
Measuring Institutional Discrimination in An Infantry Division		Final 1 Apr 78 - 31 Mar 79	
7. AUTHOR(s)		6. PERFORMING ORG. REPORT NUMBER	
Dwight J. Goehring			
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
U.S. Army Research Institute Field Unit PO Box 5787 Presidio of Monterey, CA 93940		2Q162717A767	
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE	
U.S. Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue, Alexandria, VA 22333		March 1980	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES	
		49 + v	
		15. SECURITY CLASS. (of this report)	
		Unclassified	
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report)			
Approved for public release; distribution unlimited			
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)			
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)			
Discrimination		Measurement	
Institutional Discrimination -		Difference Indicator	
Minorities			
Blacks			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)			
A method for measuring and assessing the construct of institutional discrimination in organizations was applied to an infantry division for a one-year time period. Data was obtained for 25 personnel decision areas. A descriptive statistic known as the Difference Indicator was calculated at division, brigade, and battalion levels. Comparisons are made between organizations and time periods. Difference indicators which are statistically different from zero were obtained for 14 of the areas at the division level. The strength of			

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Unclassified

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Unclassified

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

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IN AN INFANTRY DIVISION

Dwight J. Goehring



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5001 Eisenhower Avenue, Alexandria, Virginia 22333

Office, Deputy Chief of Staff for Personnel
Department of the Army

August 1980

Army Project Number
2Q162717A767

Equal Opportunity Management

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FOREWORD

From 1972 to 1980 ARI performed a multifaceted research program in support of the Army's equal opportunity program. This program produced numerous products which have been instrumental in assisting the Army in coping with significant problems related to race, ethnicity and gender.

Among the major concerns of Army leadership was the existence of institutional discrimination in the Army and its impact on the individual soldier, the unit, and the Army as a whole. Previous ARI research developed an operational definition of institutional discrimination and a prototype methodology for the quantification and measurement of institutional discrimination. The methodology was not only institutionalized in the Army but was used in other agencies, both military and civilian. This research, which also showed trends in the status of black soldiers from 1964 through 1973 in terms of appropriate representation on a number of personnel management dimensions, was published and broadly disseminated as DA PAM 600-43, "Measuring Institutional Discrimination in the Army." Another ARI research product developed similar procedures for measuring institutional discrimination in units. This document, "Commander's Handbook for Assessing Institutional Discrimination in the Units," Technical Report 78-B13, was developed in response to a DA DCSPER requirement to develop a similar approach for use by commanders at or below MACOM level.

The research reported here was a one-year (Apr 78 - Mar 79) tryout in an Infantry division of the procedures prescribed in the Technical Report. The results were communicated to the division and various appropriate ameliorative actions were taken by the command.

While ARI no longer conducts research in this area, this paper is important for two reasons. It demonstrates in detail how a division or smaller unit can proceed to implement the Handbook, and the specific results can offer a preliminary normative comparison in this important personnel management area.

MEASURING INSTITUTIONAL DISCRIMINATION IN AN INFANTRY DIVISION

BRIEF

Requirement:

The need for Army units at and below the major command level to monitor data relevant to the construct of institutional discrimination led to the development of the Commanders' Handbook for Assessing Institutional Discrimination in their Units. This paper reports the results of a tryout of the Handbook.

Procedure:

The system was applied down to the battalion level of an infantry division for one year. Data was obtained for 25 personnel decision areas, termed dimensions, from staff agencies and directly from computer records.

A descriptive statistic known as the difference indicator was calculated for all dimensions at the division level. For several dimensions difference indicators were calculated for battalions or by three-month intervals.

The statistic indicates the actual representation of minority personnel in specific categories in comparison to numbers of minority personnel eligible.

Findings:

Difference indicators which are statistically different from zero were obtained for 14 of the dimensions at the division level. The majority may be interpreted as reflecting institutional discrimination against minorities, while the meaning of several remains ambiguous.

Difference indicators from the division were compared to FORSCOM and DA data where available. Where comparisons are possible they show generally similar patterns of institutional discrimination.

The strength of the system lies in enabling leaders to meaningfully assess and monitor institutional discrimination in their organizations. Its shortcoming is that while the system provides voluminous data on the effects of institutional discrimination, information on causes can be obtained only indirectly.

Utilization:

This paper should provide users of the system described in the Handbook specific details of its application and a basis for the evaluation of findings.

MEASURING INSTITUTIONAL DISCRIMINATION IN AN INFANTRY DIVISION

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INTRODUCTION

During the 1960's, several writers developed the thesis that the continuing social class differences between white and black Americans are primarily maintained by a set of impersonal dynamics collectively termed institutional discrimination (Knowles and Prewitt, 1969). In addition, the construct has been extensively applied by others (cf Alvarez and Lutterman, 1979). The identifying characteristic of institutional discrimination against blacks, or more generally against racial/ethnic minorities and females is the existence of condition differences or status differences that are detrimental to the minority or female group. Such differences may develop and continue to exist both impersonally and unintentionally but the effects are its distinguishing hallmark.

In the early 1970s, a research investigation was carried out exploring the possible existence of institutional discrimination against blacks in the Army (Department of the Army, 1977). For the purposes of the study, institutional discrimination was operationally defined as a difference in what happens to people in an organization--a difference which:

1. is correlated with skin color;
2. results from the normal functioning of the organization;
3. operates to the consistent disadvantage of persons of a particular skin color.

The results of the research were unambiguous. After examining 58 different variables ranging from racial composition of the Army by paygrade between 1962 and 1973 to differentials in speed of promotions the research concluded:

There are general patterns in the data which are very consistent. With only a few exceptions, there is a tendency for blacks to be under-represented on those dimensions which are to their advantage and overrepresented on those dimensions which are not to their advantage.

The findings were intended not as a criticism of the Army, but as a diagnosis. The ensuing years have seen dramatic changes toward a more equitable representation of blacks in many of the areas examined in the original research. The data reflect large and important institutional changes toward the goal of equal opportunity and treatment for every member of the Army.

This paper reports an application of the Commanders' Handbook for Assessing Institutional Discrimination in Their Units (Nordle, Edmonds, and Goehring, 1978), the purpose of which is to enable a commander at or below the major command level to measure the construct in his or her organization. The Handbook recommends data collection in seven personnel decision areas: promotions, training and education, awards, command assignments, nonjudicial punishment, unprogrammed discharges, and reenlistments. These general areas are detailed later into specific dimensions which are substantially within the sphere of chain of command influence at or below the division level.

The system set forth in the Handbook was applied to an infantry division for one year. The procedures, the results, and an evaluation of the system are presented in the following pages.

Ideally, separate data analyses should be carried out for each individual racial/ethnic identification in addition to gender groups. This was beyond the scope of project for two reasons. First, the judgment was made that the Handbook could be satisfactorily evaluated and the overall magnitude of any institutional discrimination in the division assessed through the simplifying dichotomization of racial/ethnic identification into majority and minority. Second, as the number of individuals of a particular identification decreases or as the organizational unit of interest becomes smaller, the judgment concerning group representativeness in a particular personnel decision area becomes increasingly ambiguous. This problem is aggravated as dimensions are examined which have lower and lower base incidence rates. For example, while an evaluation can be offered concerning the representation of all minority personnel in First Term Reenlistments in the division, an evaluation of the representation of Korean Americans among those receiving Expeditious Discharges in a particular battalion would not be very meaningful. One solution to this problem is to maintain and aggregate data over extended periods of time.

Difference Indicator

Central to the system for assessing institutional discrimination described in the Commanders' Handbook is a simple statistic termed the Difference Indicator (D.I.). Generally, it is a positive percentage if the group of interest compared to the total group is overrepresented on a particular dimension and a negative percentage if the group is underrepresented. A thorough discussion of the indicator is presented in the Handbook.

The D.I. is calculated by dividing the actual number of minority personnel in a given category by the expected number. The resulting proportion is subjected to conversion to a percentage which is negative when the proportion is less than one. The formula for the Difference Indicator is:

$$D.I. = \left(\frac{\text{Actual Number}}{\text{Expected Number}} \times 100 \right) - 100$$

The expected number is calculated by multiplying the proportion of minority individuals in the eligible population times the total number of persons in the category of interest. The expected number is the number of minority individuals one would find in the given category if there were no random effects and if majority-minority identification were completely unrelated to inclusion in the category. Random effects can be shown to have a greater impact on D.I. values when the expected numbers are small. Following the recommendations of the Handbook, D.I. values are not reported when the expected number is less than six. In this report institutional discrimination is defined as D.I. values which are significantly different from zero.

A central concern in the use of the Difference Indicator system is the adequate definition of the eligible population. Often it is possible to establish more than one such population based upon different points of view. For example, in computing D.I. values for Article 15, should only enlisted personnel be considered the eligible population or should officers be included?

Rationales can be developed for either approach and D.I. values will vary somewhat depending which choice is made. It is likely that no definition of the eligible population for some dimensions will be completely satisfactory to all.

In actual application the choice may be additionally constrained by what data are available, or obtainable at some reasonable expense of time and effort. Two aspects of the selection of an eligible population seem essential: (1) that whatever eligible population is used be completely documented and that (2) changes in the definition be minimized, thus facilitating the comparison of D.I. values across both organizations and time periods.

METHOD

Project Background

The Commanding General of the division, along with the Chief of Staff, the G-1, and the Division Equal Opportunity Staff Officer (EOSO), were briefed on the project in December 1977 by representatives of the Army Research Institute Field Unit, Presidio of Monterey. Approval was granted to commence data collection in April 1978 for a one-year period. The Division EOSO was designated the primary point of contact for the project.

Various staff agencies were contacted concerning what data was available and could reasonably be provided to ARI. The research effort at this point focused upon obtaining the highest quality of information while minimizing the burden of the project upon the division. Consistent with these goals, the decision was made to refrain from the collection of data at the battalion level Personnel Administration Centers (PACs). In March the formal staffing of the project took place.

Data was sent to ARI thru the EOSO in most cases. Some data were obtained at regular intervals ranging from monthly to semiannually, while others were available sporadically. Most tabulations of eligible populations were extracted from the end-of-quarter standardized personnel file (SPF) computer tapes by an ARI developed computer program run on the research-oriented computer system of the Naval Postgraduate School. The dichotomization into majority or minority groups was based upon direct interrogation of the computer records, which are based upon self-report.

In Table 1 are shown the 25 dimensions selected for examination. The research design called for tracking each of these at division, brigade and battalion levels. Because of some nonavailability of data and particularly the small expected number problem noted above and in the Handbook, D.I. values are not available for all dimensions at every unit level.

The Handbook recommends 27 specific dimensions for monitoring. Six were combined into three in the project because requisite data were not available.

Table 1

DIMENSIONS FOR WHICH DATA WERE COLLECTED

1. Enlisted Minority Distribution

PROMOTIONS

- 2. Promotion to E4
- 3. Promotion to E5

TRAINING AND EDUCATION

- 4. Selection for Career Enhancing Training
- 5. Completion of Career Enhancing Training
- 6. Selection for PNCOC, BNCOC
- 7. Completion of PNCOC, BNCOC
- 8. H.S. Completion Program Enrollment
- 9. Completion of H.S. Program

AWARDS

- 10. Expert Field Medical Badge
- 11. Awards

COMMAND ASSIGNMENT

- 12. Assignment of Company Commanders
- 13. Assignment of First Sergeants

NON-JUDICIAL PUNISHMENT

- 14. Articles 15

UNPROGRAMMED DISCHARGES

- 15. All Unprogrammed Separations
- 16. Chapter 9 Separations
- 17. Chapter 10 Separations
- 18. Chapter 13 Separations
- 19. Expeditious Discharges
- 20. Courts-Martial
- 21. Punitive Discharge

REENLISTMENT

- 22. Bars to Reenlistment
- 23. Career Reenlistment
- 24. First Term Reenlistments

MISCELLANEOUS

- 25. Founded Offenses

The dimensions affected were Promotion to E4 and E5, each differentiated into with and without time-in-service or time-in-grade waivers, and Articles 15, differentiated into company- and field-grade types. The Handbook, in stressing that the recommended dimensions need not be considered immutable, also encourages the user to add additional dimensions as appropriate. The dimension of Founded Offenses was added when it was learned that the requisite data was readily available.

RESULTS

The D.I. values and expected numbers for the 25 dimensions for the period 1 April 1978 to 31 March 1979 are presented in Figure 1. The data in this form, known as a Type 1 display, present an overall summary for the division for the entire time period. Each dimension will be considered individually. Attention will focus on several questions: First, the basis for the computations will be briefly described. Second, an assessment of whether D.I. values differ from zero will be made. Finally, comparable Forces Command (FORSCOM) and Department of the Army (DA) data will be examined where available.

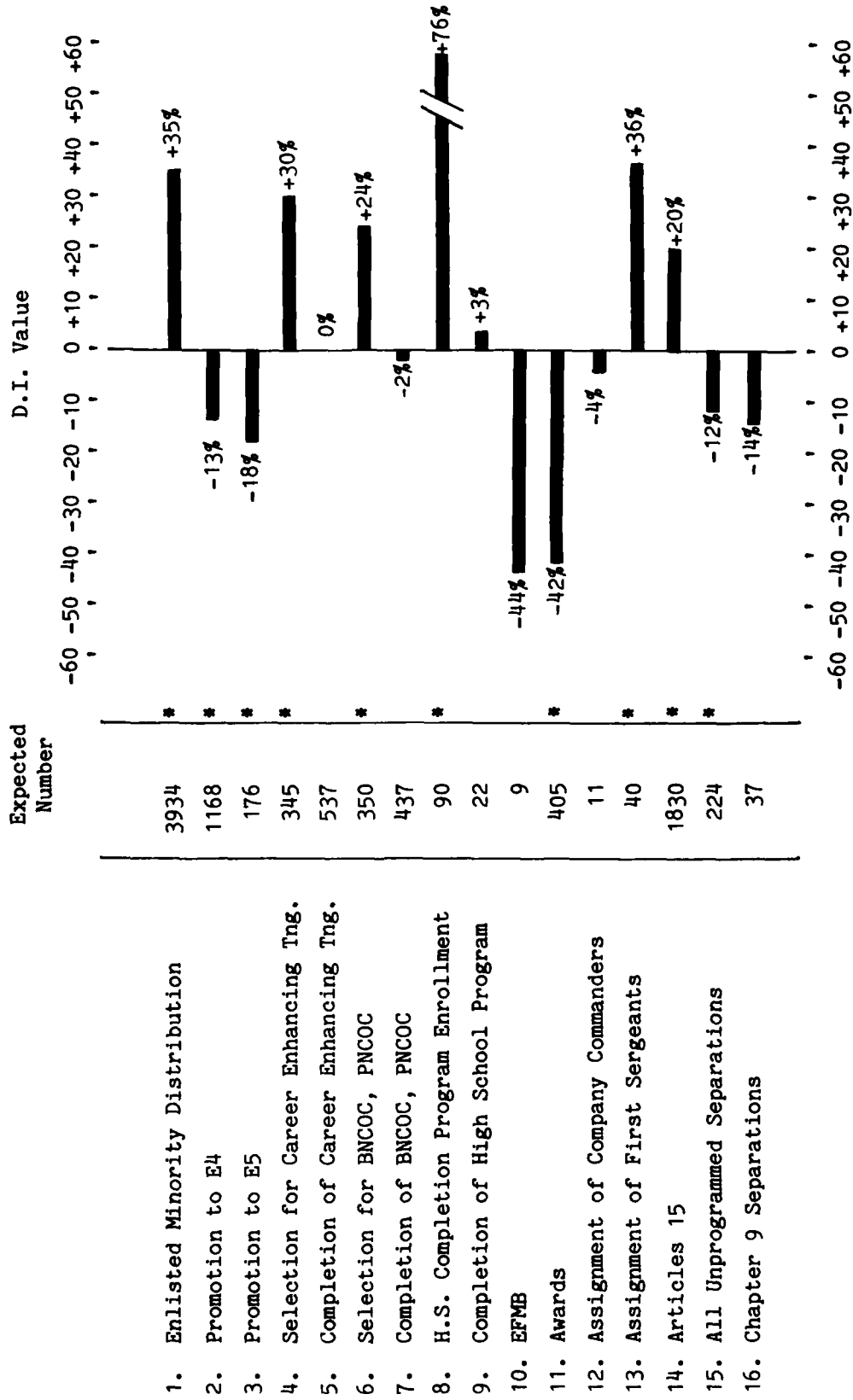
The dimension of Enlisted Minority Distribution is substantially different in nature from the other dimensions in that it is not the result of local personnel decisions. The D.I. value and the expected number are computed by taking means across the corresponding values for the four quarters. The D.I. value for each quarter is produced by comparing a count of SPF enlisted records at each quarter's end to the proportion of minority personnel in the Army in enlisted ranks as of 31 Aug 78 (.320, source DCSPER 338 Report). When the comparison is made to the estimated FORSCOM proportion of minority enlisted personnel for 1978 (.319), the D.I. value does not appreciably change.

The D.I. value of +35 percent indicates that minority enlisted personnel are substantially overrepresented at the division when compared to either the Army or FORSCOM overall. However, both the current level of minority membership among enlisted personnel in the division and the rate of increased representation since 1977 appear to be very similar to those of several other infantry divisions (FORSCOM, 1979). The raw proportions of minority enlisted personnel at the division at the end of each of the quarters was .418, .424, .438 and .446, an increase of 2.8 percent for the year.

The dimension of Promotion to E4 is examined by comparing the numbers of majority and minority personnel whose SPF records show a grade of E4 and date of rank falling within the quarter to the number of E3s who meet the time-in-grade and time-in-service requirements for promotion at the end of the quarter. The D.I. value for the year was calculated from the sums across the quarters. The dimension of Promotion to E5 was similarly computed. Both values are significantly different from zero (Goehring, in press). Also, both values indicate minorities are underrepresented. D.I. values in FORSCOM for promotion to E5 of blacks are reported as -31% for the period Apr 78 to Sep 78 and -12% for the period of Oct 78 to Mar 79.

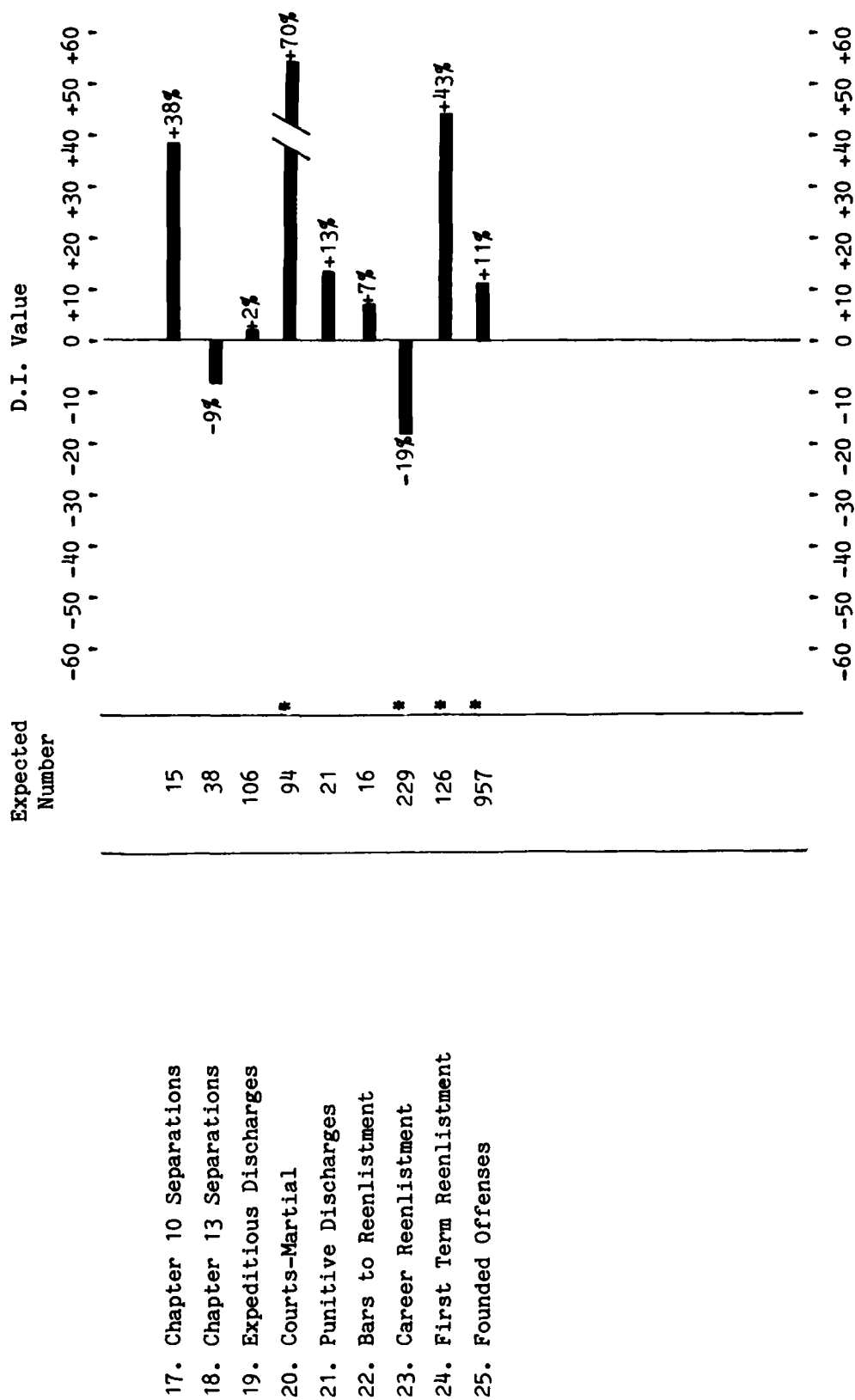
Figure 1

Difference indicators for dimensions at the division
from 1 Apr 78 to 31 Mar 79



* $p < .05$

Figure 1 (Continued)



The next four dimensions are based upon data collected directly from personnel enrolled in the various courses. The eligibles for each course were tabulated from SPF records based upon the MOS and paygrade prerequisites for each course. For the Primary Noncommissioned Officer Course (PNCOC) and the Basic Noncommissioned Officer Course (BNCOC) selection dimension, graduates of the respective course were excluded from the count of eligibles. Actual enrollees with other than the designated MOS and paygrade status were excluded from calculation of the selection dimensions, while the completion dimensions were based on all enrolled students.¹

The D.I. values in Figure 1 for these four dimensions should be evaluated with caution since data for a range of types and levels of course are combined into summarizing values. Tabulations of personnel were summed across both course-types and time-periods prior to calculation of the D.I. values. As a consequence, courses with the largest enrollment contribute a proportionally greater amount to the D.I. value.

Both of the summary D.I. values for selection are judged statistically different from zero. Their direction is indicative of minorities being over-represented. Neither completion dimension is judged statistically significant.

In Figure 2 are shown the D.I. values for courses included in the Selection for Career Enhancing Training dimension. D.I. values are omitted where expected numbers are less than six because of the extreme statistical instability of such indicators. Clearly the summary D.I. value for Selection for Career Enhancing Training is dominated by the Primary Leadership Course (PLC) data. In fact, the D.I. value for Basic Leadership Course (BLC) is statistically significant in the opposite direction, indicating that minorities are under-represented with respect to the number of minority personnel who meet the requirements. Different dynamics appear to be in operation concerning the selection processes for BLC compared to PLC.

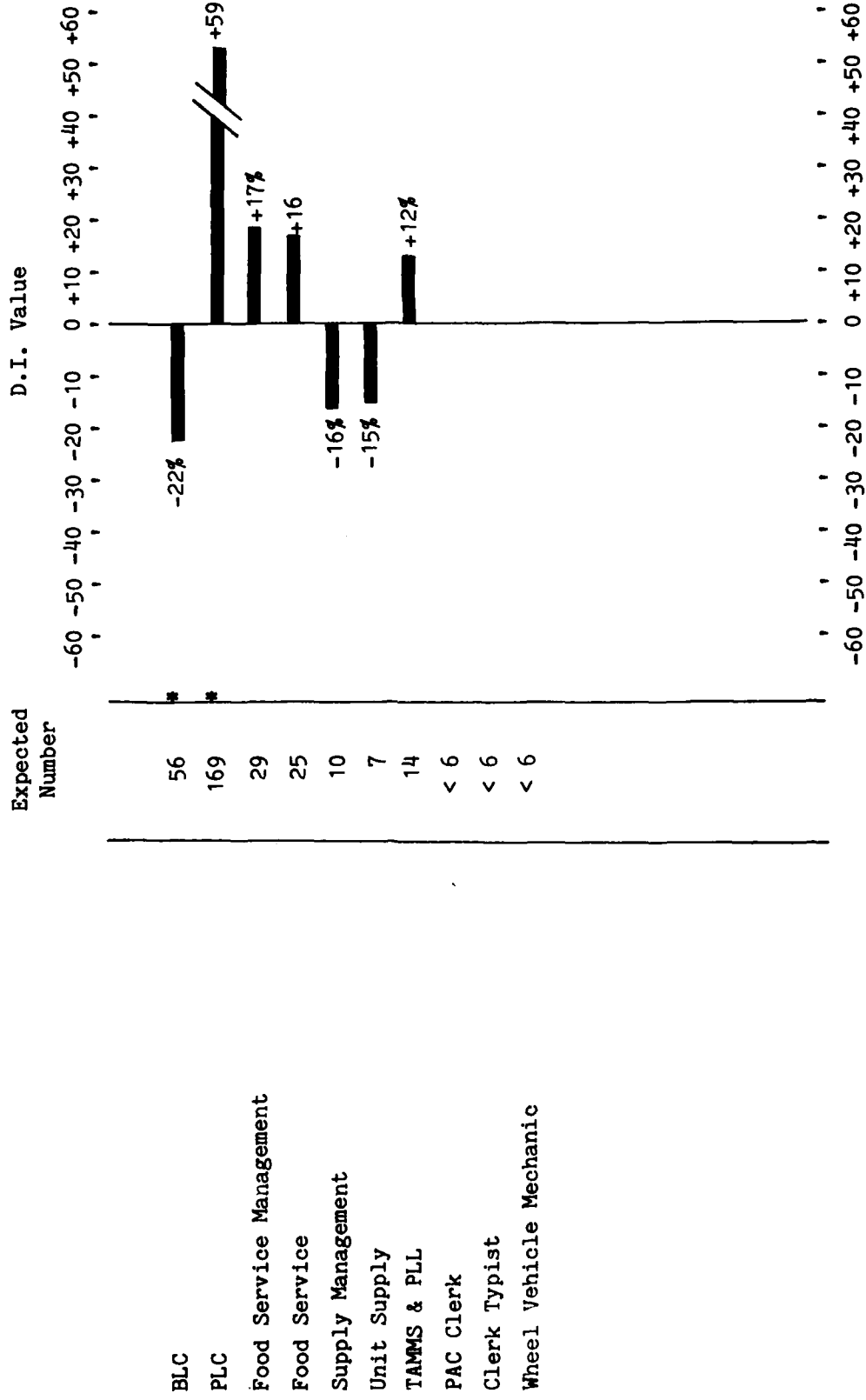
In Figure 3 are shown the D.I. values for the courses included in the Completion of Career Enhancing Training dimension. None of the values are statistically different from zero. When all enrollees successfully complete a course, the D.I. value is zero. That is precisely the case with three of the courses in Figure 3. In addition, when the overall success rate is high, as is in the case in all of the courses, the indicator seems restricted to small numerical values. For example, in one course in Figure 3 the success rate was 79 percent; no majority group member failed while one-third (3) of the minority group members did. The resulting D.I. value was only -15 percent.

The D.I. values in Figure 4 show the representation of minorities in selection for and completion of PNCOC and BNCOC. As measured, there appears to be an overrepresentation of minorities in selection for these courses. The D.I. values for completion suggest majority and minority group members are completing at the same rate.

¹Detailed MOS and paygrade requirements used in the computer program are presented in Appendix A.

Figure 2

Difference indicators for courses comprising the Selection for
Career Enhancing Training dimension



* $p < .05$

Figure 3

Courses comprising Completion of Career Enhancing Training

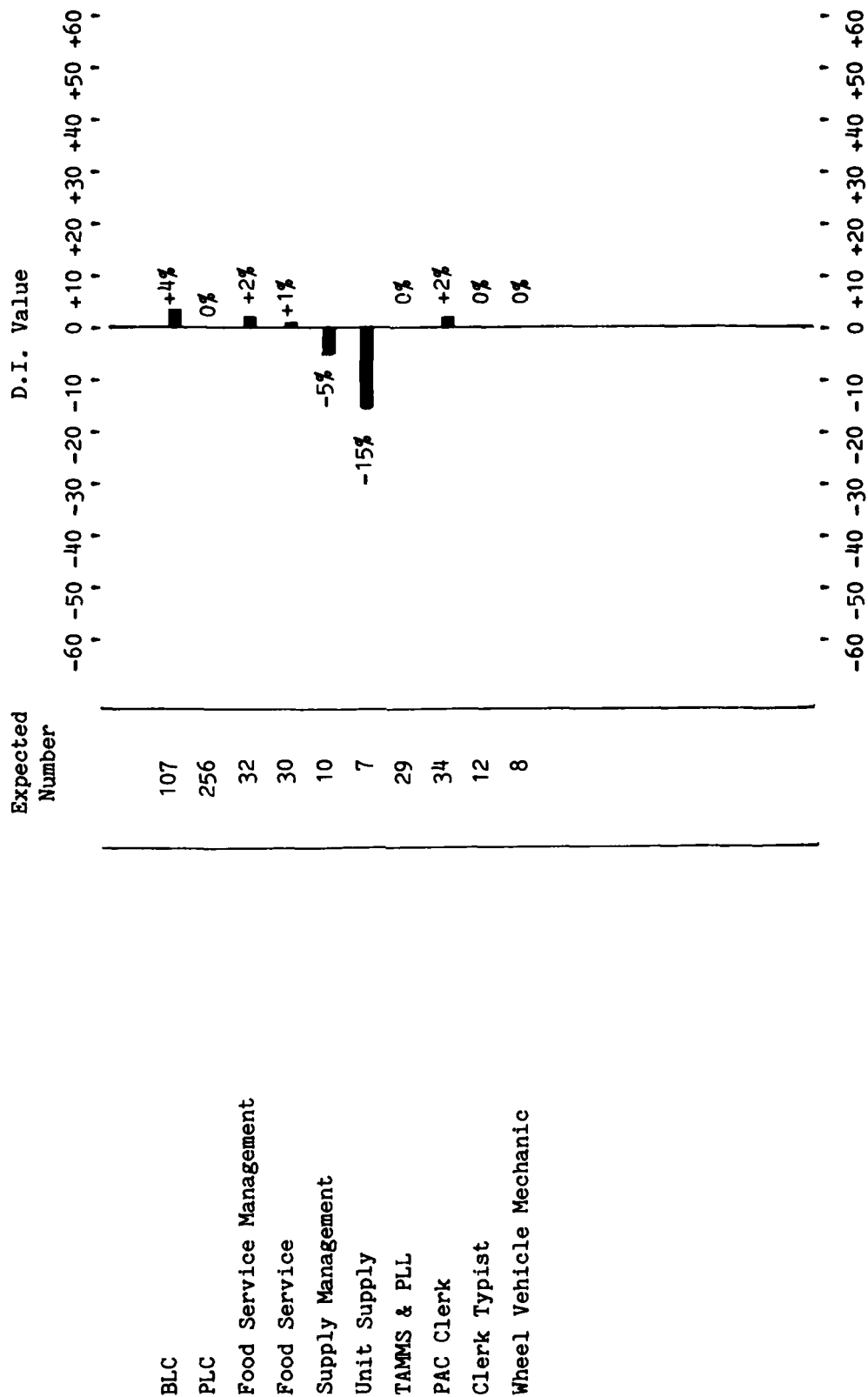
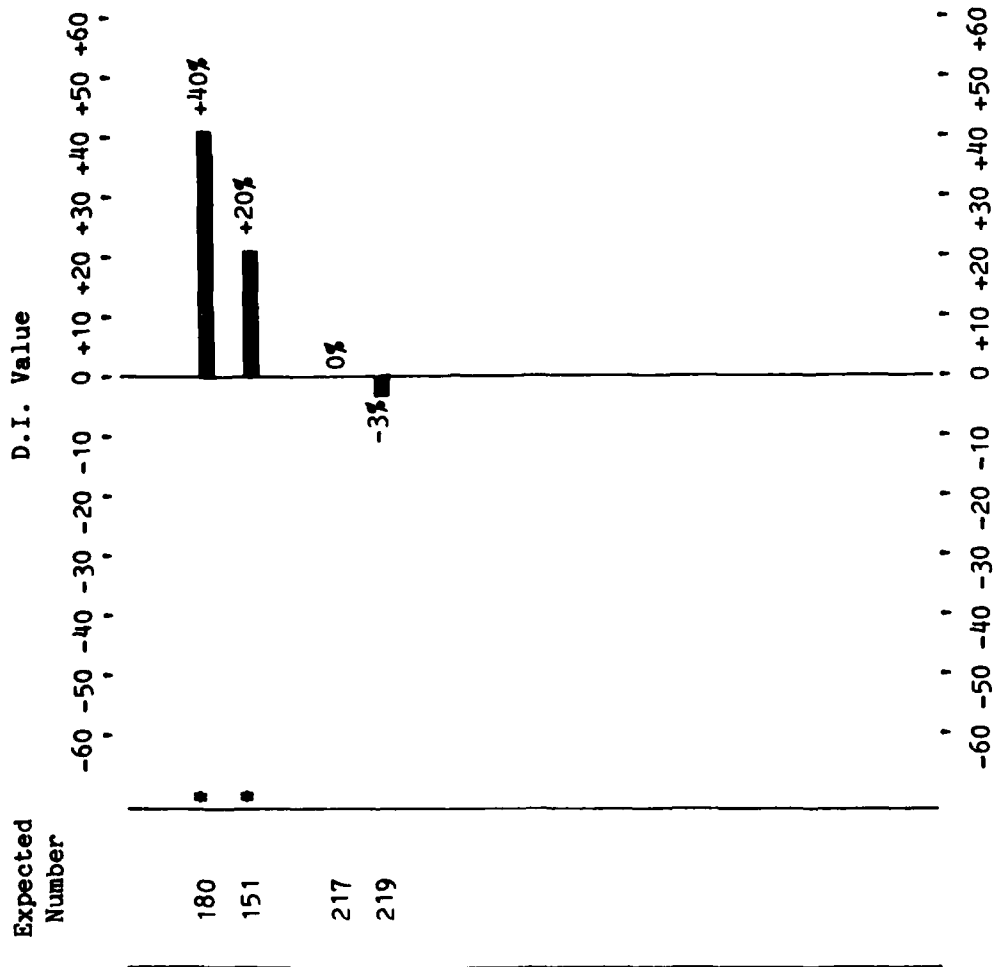


Figure 4

Difference indicators for selection and completion of NCO courses
from 1 Apr 78 to 31 Mar 79



* $p < .05$

The dimension of Enrollment in the High School Completion Program was calculated by comparing counts of enrollees to tabulations of nongraduates extracted from SIDPERS records. The D.I. value in Figure 1 is statistically significant and indicates an overrepresentation of minorities in enrollment, as measured. The D.I. values of black participation in high school education in FORSCOM were -1 percent and +5 percent for the time periods Apr 78 to Sep 78 and Oct 78 to Mar 79, respectively.

The associated dimension of Completion of High School Program compares actual graduates to enrollees. The resulting D.I. value does not differ significantly from zero. D.I. values for graduation of blacks in FORSCOM were -13 percent and -11 percent for the two corresponding six-month time periods.

The Handbook recommends monitoring of both the Expert Field Medical Badge (EFMB) and Expert Infantry Badge (EIB) testing procedures. There were no plans for administration of the EIB during the course of the research. Data were obtained from one administration of the EFMB examination. The D.I. value is based upon persons who passed compared to those who took the examination. Although the D.I. value is large because of the small numbers involved, it cannot be considered reliable.

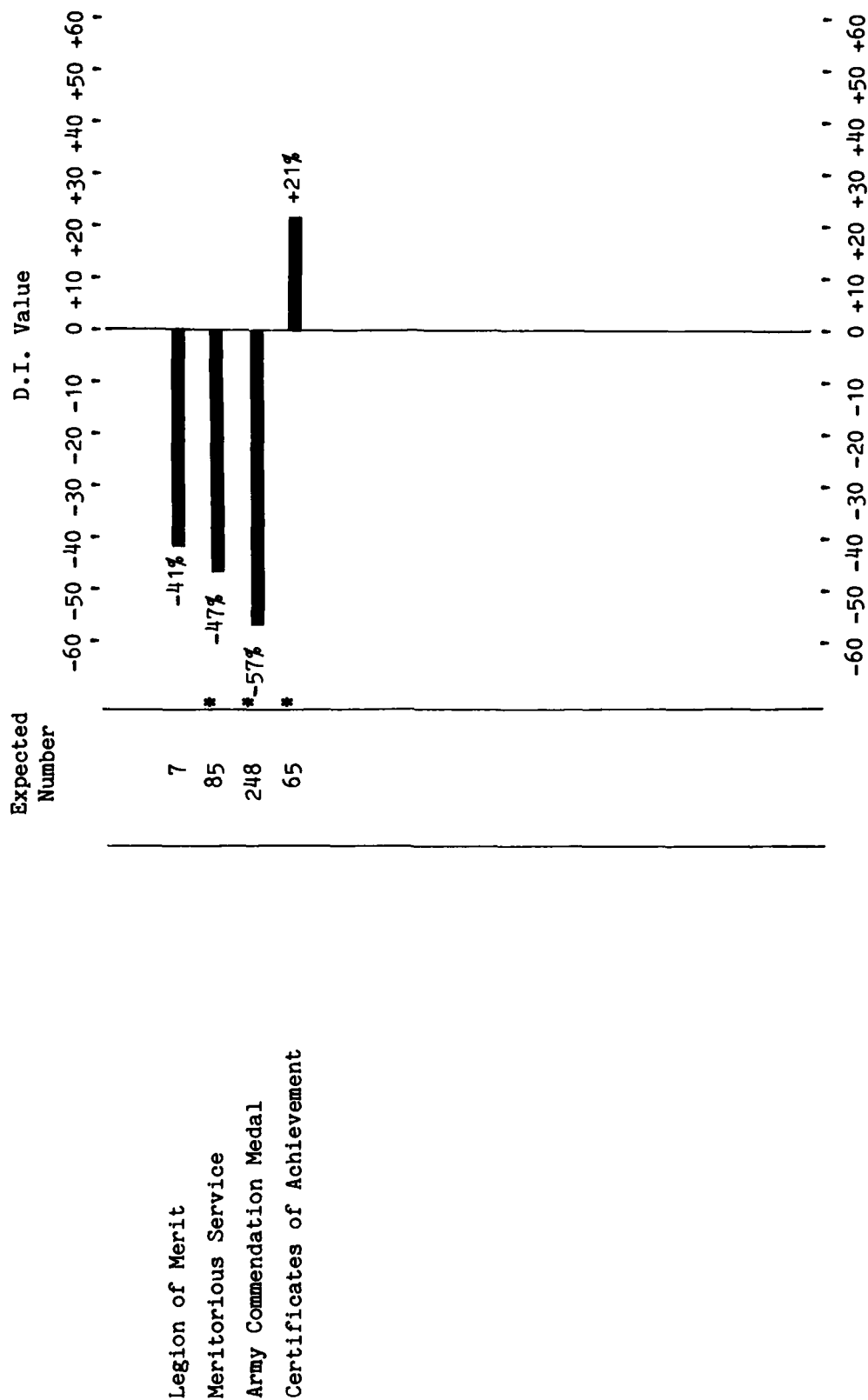
The Awards dimension in Figure 1 is based upon all awards given compared to the entire population. The D.I. value is statistically significant and indicates that minorities are underrepresented in awards overall. Figure 5 presents D.I. values for specific types of awards. Few individuals received the Legion of Merit, thus, the obtained value of -41 percent does not achieve statistical significance. The D.I. values for both the Meritorious Service and the Army Commendation Medal are statistically significant and indicate underrepresentation of minorities. However, for Certificates of Achievement the D.I. value of +21 percent, which is also statistically significant, suggests that minorities are overrepresented. Comparable FORSCOM data is available for these four awards for blacks for the period Oct 78 to Mar 79. The D.I. values are -69 percent for the Legion of Merit, -51 percent for Meritorious Service, -29 percent (estimated) for ARCOMS, and +7 percent for Certificates of Achievement.

The next two dimensions in Figure 1 show the D.I. values for command assignments. The actual number of minority personnel holding company commander and first sergeant positions was compared to the number of possible positions times the proportion of minorities eligible.² The D.I. values in Figure 1 are an average of the values calculated for the two semiannual periods. The D.I. value for company commanders does not achieve statistical significance while that for first sergeants does. Minorities are overrepresented in Assignment to First Sergeant, as measured.

²See Appendix A for detailed definition.

Figure 5

Difference indicators for awards from
1 Apr 78 to 31 Mar 79



* $p < .05$

The D.I. value for Articles 15 was calculated based upon an eligible population of all enlisted personnel. The value is statistically significant and shows overrepresentation of minorities. The D.I. value tends to be somewhat inflated because a given individual may receive more than one nonjudicial punishment. It may be reasonable, though probably conservative, to discount the D.I. value by 20 percent to, in this case, +16 percent prior to testing for significance. The overall interpretation here is not affected. More importantly, the D.I. value should be computed in the same way, whether discounted or not, for different time periods and for different units. The FORSCOM D.I. value, not discounted, for Articles 15 for blacks were +28 percent and +41 percent for Apr 78 to Sep 78 and Oct 78 to Mar 79, respectively.

The D.I. value for All Unprogrammed Separations is based upon a summation of all Chapter 9 (alcohol and drug), Chapter 20 (in lieu of court-martial), Chapter 13 (unsuitability), and Chapter 5 (expeditious) separations in comparison to total military population. The value of -12 percent is statistically significant and indicates minorities are underrepresented. Comparable FORSCOM data are not available.

The next four D.I. values for the specific types of separations are based upon an eligible population of total personnel receiving unprogrammed separations. Thus, the calculated D.I. values are not independent of one another. None of the four achieves statistical significance.

The D.I. value for Courts-Martial is based upon the entire post population, is statistically significant, and shows minorities to be overrepresented by +70 percent. FORSCOM D.I. values for blacks are +42 percent and +65 percent for Apr to Sep 78 and Oct 78 to Mar 79, respectively.

Using the number of personnel tried under BCD, SPCM and GCM proceedings as the eligible population, the D.I. value for Punitive Discharges is not statistically significant.

The dimension of Bars to Reenlistment is based upon actual bars compared to numbers of enlisted personnel. The D.I. value is not statistically significant. The FORSCOM D.I. values for blacks are +12 percent for Apr 78 to Sep 78 and -2 percent for Oct 78 to Mar 79.

The D.I. value for Career Reenlistment is statistically significant and shows minorities are underrepresented by -24 percent. FORSCOM values for blacks are +25 percent Apr 78 to Sep 78 and +2 percent for Oct 78 to Mar 79.

The dimension of First Term Reenlistment has a statistically significant D.I. Minorities are overrepresented by +43 percent. In FORSCOM D.I. values were +10 percent for each of the corresponding semiannual periods.

Finally, for the dimension of Founded Offenses, which is based on total military personnel, a statistically significant D.I. value is observed in which minorities are overrepresented. Data are from monthly military police reports in which founded offenses are defined as criminal offenses the commission of which have been adequately substantiated by investigation.

However, a founded offense is not dependent on judicial decision. The D.I. value in Figure 1 represents a summation across four categories of offenses. The D.I. value for each of the four is presented in Figure 6. Crimes of Violence are offenses of murder, rape, aggravated assault, and robbery. Crimes Against Property include burglary, housebreaking, larceny and auto theft. Drug offenses include use, possession, sale and trafficking. Military Offenses are reported AWOLs and reported deserters. All four D.I. values are statistically significant. Minorities are overrepresented on the first three dimensions and underrepresented on the last. When data for the first three dimensions are converted to a rate-per-thousand basis, they do not differ substantially from those reported by the Department of the Army for FY 78 (Department of the Army, 1979).

Difference Indicator Values for Units

Figures 7 through 11 present Type 1 graphs for the brigades and brigade-equivalent units at the division. With the exception of the Enlisted Minority Distribution dimension, the D.I. values are calculated the same as in Figure 1 based upon the eligible populations within the respective brigades.

The D.I. value for Enlisted Minority Distribution is based upon the numbers of minority and majority group personnel in the division at the end of each quarter, rather than the Department of the Army numbers. Therefore, a positive D.I. value suggests that the unit has an overrepresentation of minority enlisted personnel with respect to the overall division military population and a negative D.I. value indicates a relative underrepresentation. Because of this method of computation some units will necessarily manifest an overrepresentation and others an underrepresentation.

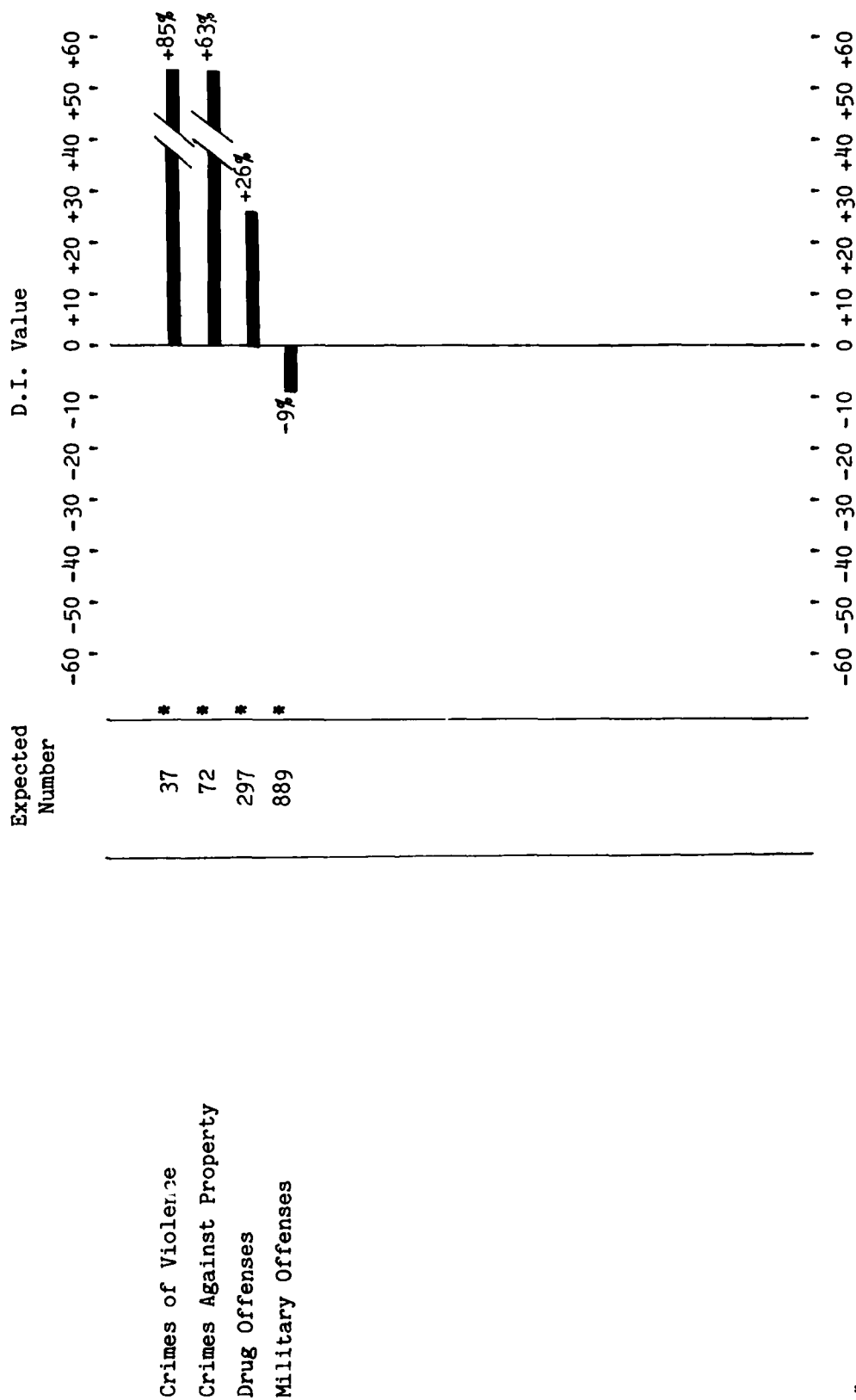
The D.I. values in Figure 7 through Figure 11 are for the time period from 1 Apr 78 to 31 Mar 79 with two exceptions. The dimensions of First Term Reenlistment and Career Reenlistment cover only the six-month period from 1 Apr 78 to 30 Sep 79. Requisite data for individual units for the second semi-annual period was not received.

A consistent pattern is observed across the brigades. In each, minorities are underrepresented on both promotion dimensions and overrepresented in non-judicial punishments and in first term reenlistments. Not all of these D.I. values achieve statistical significance, however. The pattern of D.I. values for career reenlistments is mixed, with none of the brigade values attaining statistical significance.

As described in detail in the Handbook, a Type 2 graph presents D.I. values on a dimension for various units. Figure 12 presents the D.I. values for the Enlisted Minority Distribution dimension for the battalions included in the research project. The basis used for the calculations was the post population at the end of each quarter. Thus, some units will necessarily show an overrepresentation and others an underrepresentation relative to the overall past enlisted minority distribution. Each of the D.I. values in Figure 12 is an average for that unit across the four quarters.

Figure 6

Difference indicators for offense categories comprising the
Founded Offenses dimension



* $p < .05$

Figure 7

Difference indicators for the M BDE

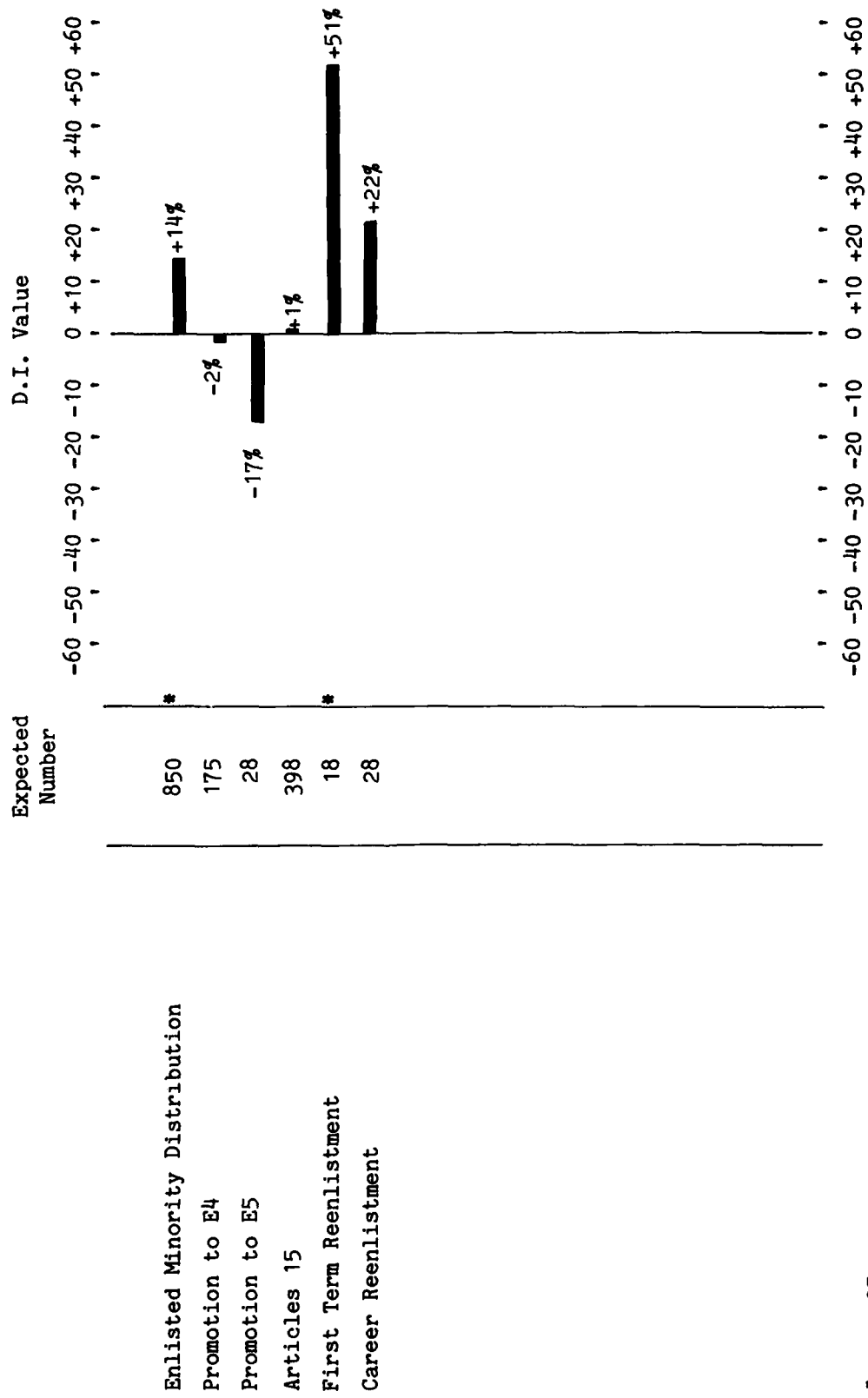


Figure 8

Difference indicators for the N BDE

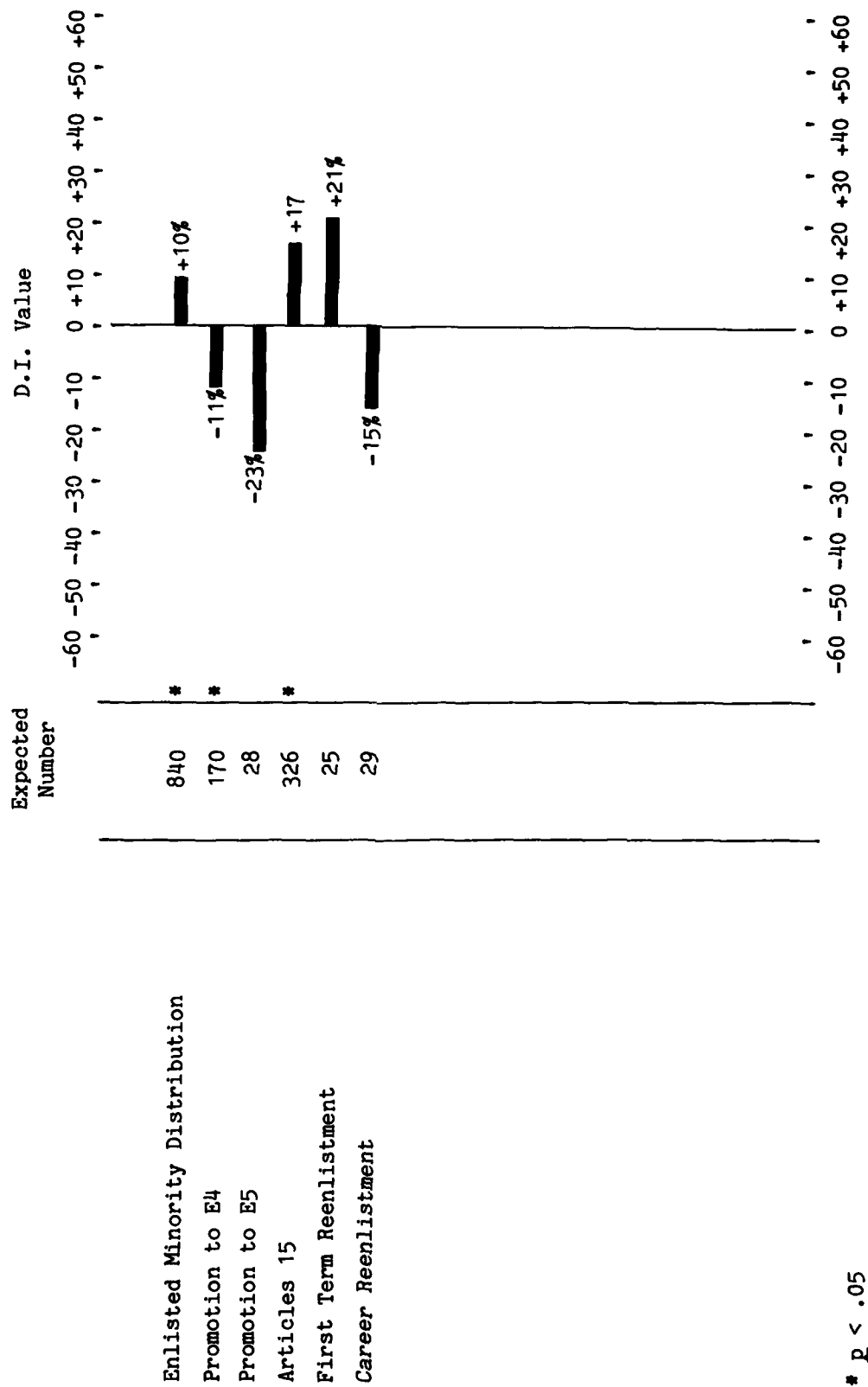
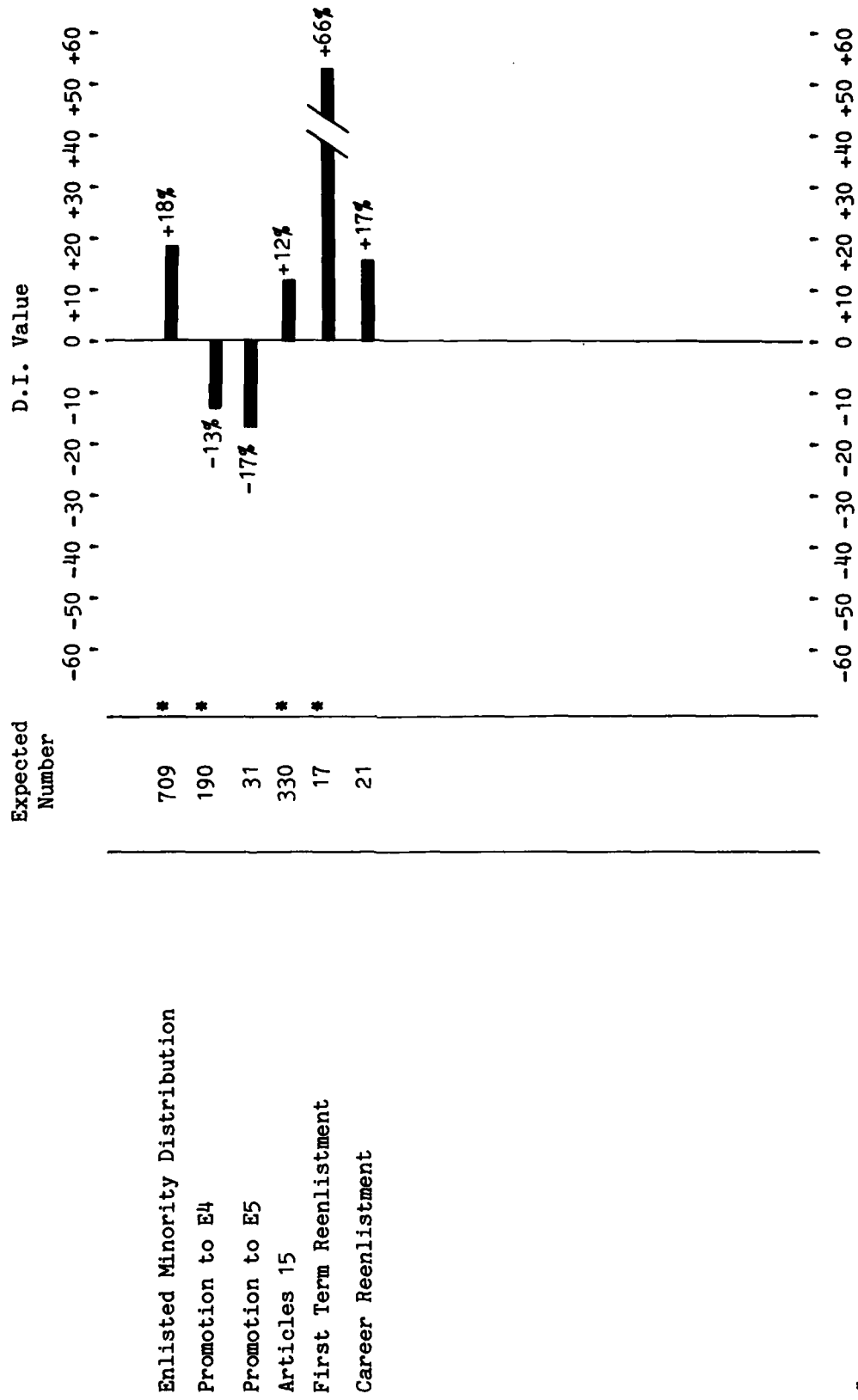


Figure 9

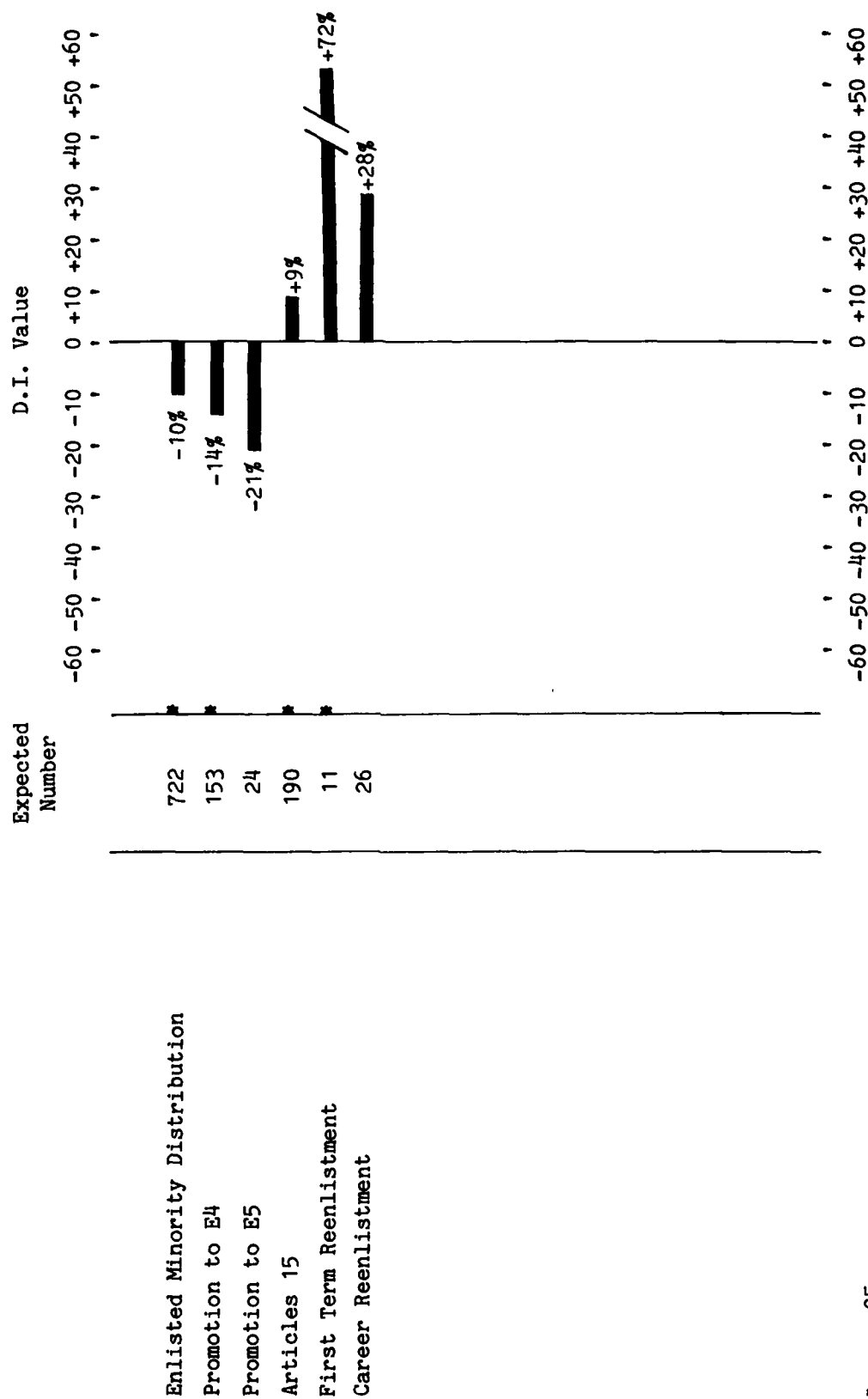
Difference indicators for the O BDE



* $p < .05$

Figure 10

Difference indicators for the P BDE



* $p < .05$

Figure 11

Difference indicators for the Q BDE

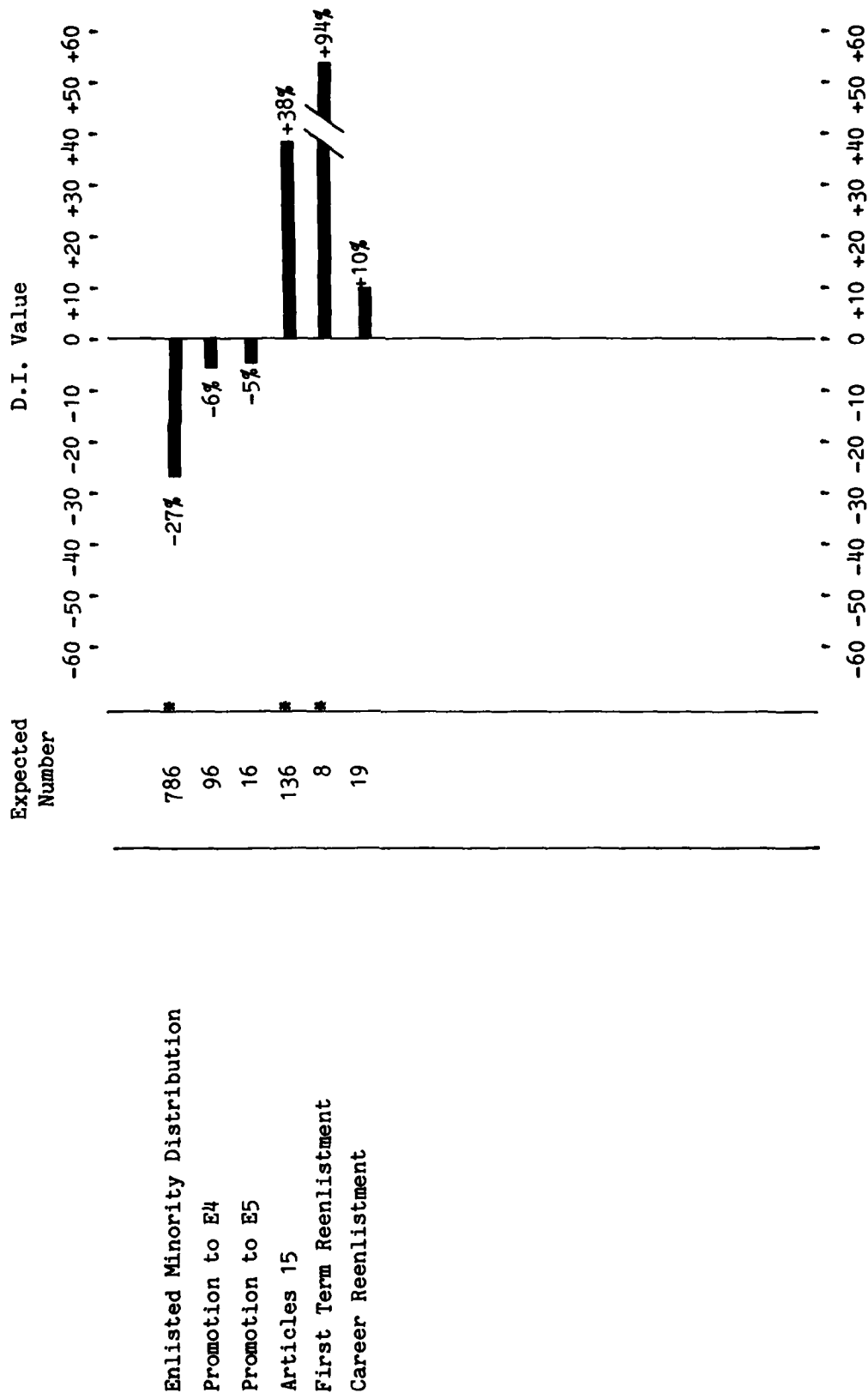
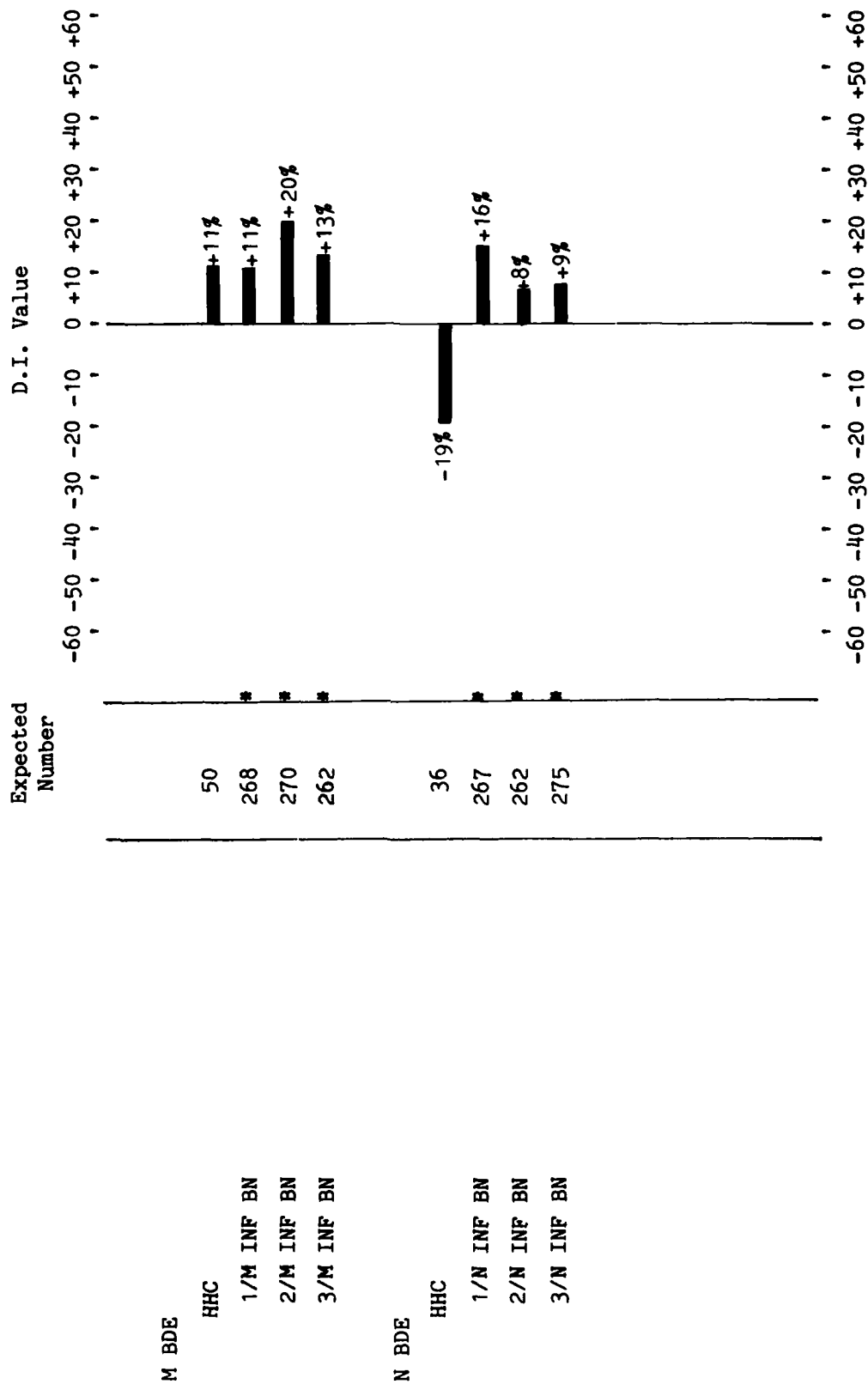


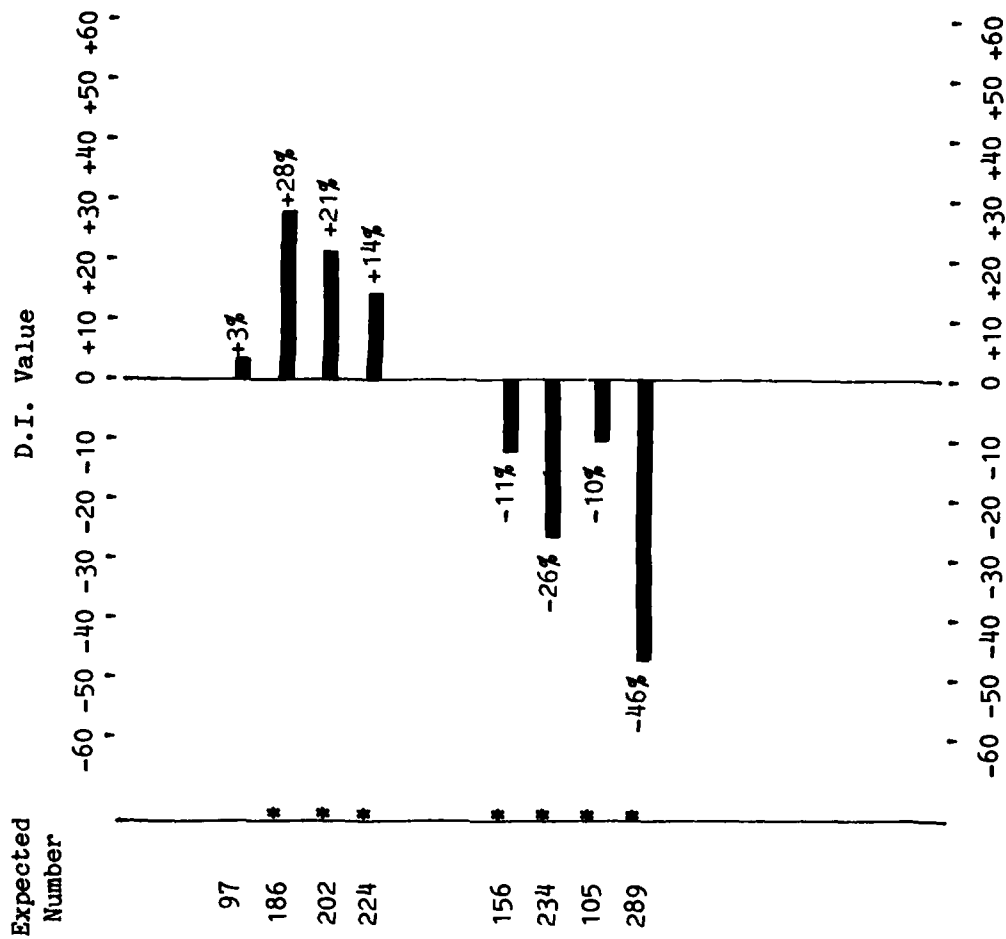
Figure 12

Difference indicator values for Enlisted Minority Distribution dimension by units



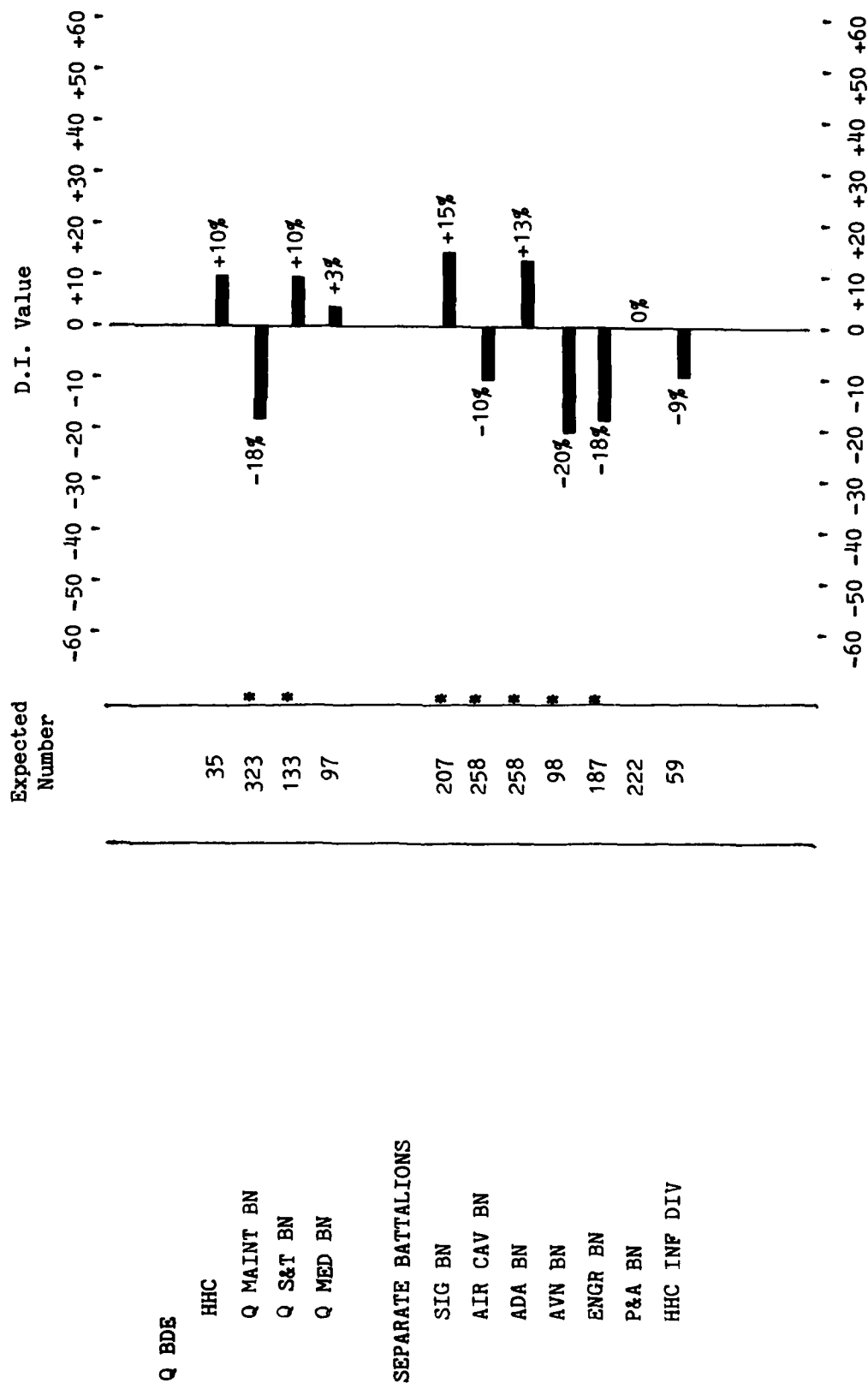
* $p < .05$

Figure 12 (Continued)



* $p < .05$

Figure 12 (Continued)



* $p < .05$

Figure 13 shows the difference indicator values for the dimension of Promotion to E4 by units. While the D.I. values for few units attain statistical significance the overall pattern is clear: minorities are underrepresented on the Promotion to E4 dimension, as measured.

Figure 14 presents nondiscounted difference indicator values for Articles 15 by units. Again, the overall pattern seems clear, in a large majority of units minority group members are overrepresented in receipt of Article 15 actions.

Difference Indicator Values for Time Intervals

Figure 15 through Figure 21 show trends for the post for several dimensions. Data presented in this form is termed a Type 3 graphical display, as described in the Handbook. Dimensions have been selected for display where at least half of the included D.I. values are statistically significant. The time intervals are either quarters or semiannual periods depending upon how the data were received. Applying a test of differences between D.I. values there are no clear statistically significant trends for these dimensions.³

DISCUSSION

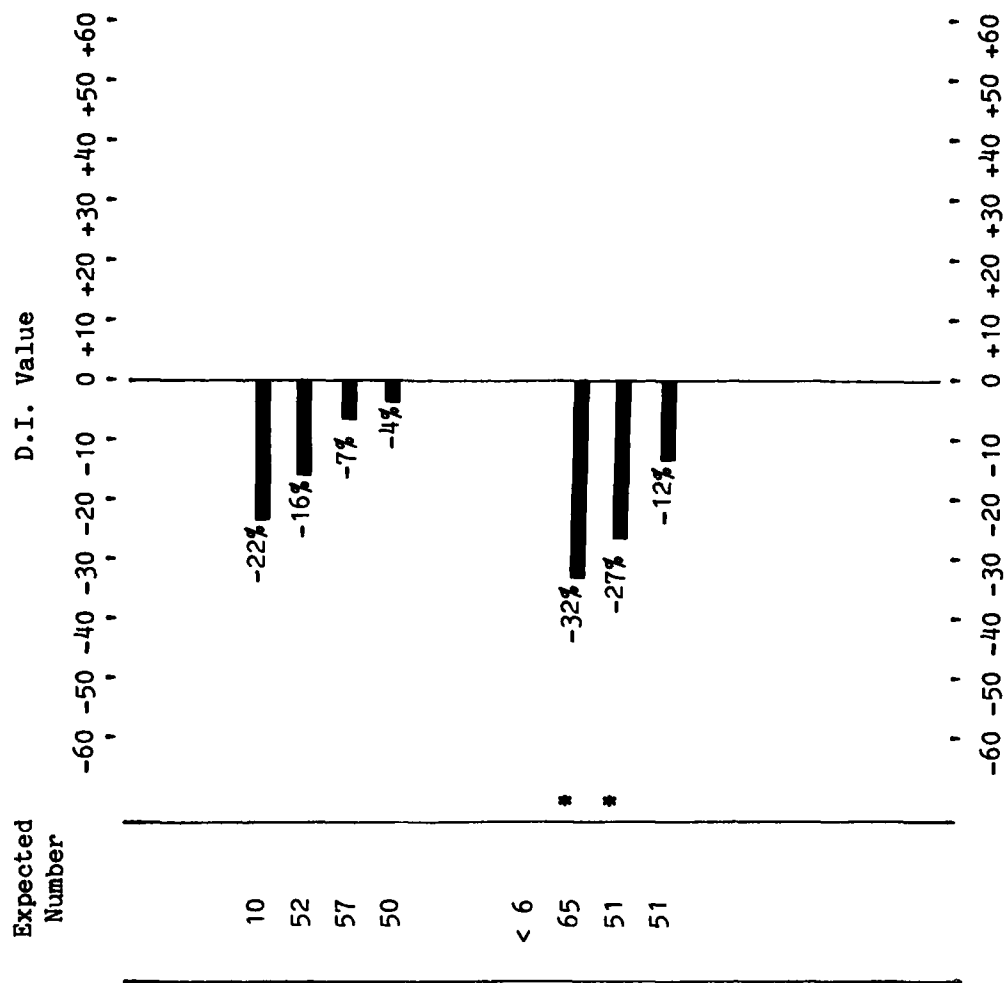
The overall conclusion seems warranted that institutional discrimination against minorities, as defined, does exist in several of the personnel decision areas measured at the division. Of the 14 statistically significant D.I. values presented in Figure 1, three values show minorities to be underrepresented to their disadvantage (Promotion to E4, Promotion to E5 and Awards) and three other values show minorities to be overrepresented to their disadvantage (Articles 15, Courts-Martial, and Founded Offenses). The interpretations of D.I. values for Enlisted Minority Distribution, Assignment of First Sergeants, All Unprogrammed Separations, Career Reenlistments and First Term Reenlistments contain ambiguities with respect to whether these dimensions reflect situations advantageous or disadvantageous to minority group personnel. Three values reflect circumstances seemingly advantageous to minorities (Selection for Career Enhancing Training, Selection for BNCOC and PNCOC, and High School Completion Program Enrollment).

A caveat would seem in order at this point. While the above conclusions are data-based, the reader must be vigilant against the assumption that they necessarily reflect the final or unequivocal status of institutional discrimination at the division in these areas. Each dimension has been defined and measured through highly specific procedures; other ways are possible and justifiable, but the data, as it exists, is the basis for conclusions presented in this paper. It has been said that one of the uses of research is to generate new questions. Thus, perhaps it will not be a shortcoming of this research project if more questions are raised than answered.

³Goehring, D. J. op. cit.

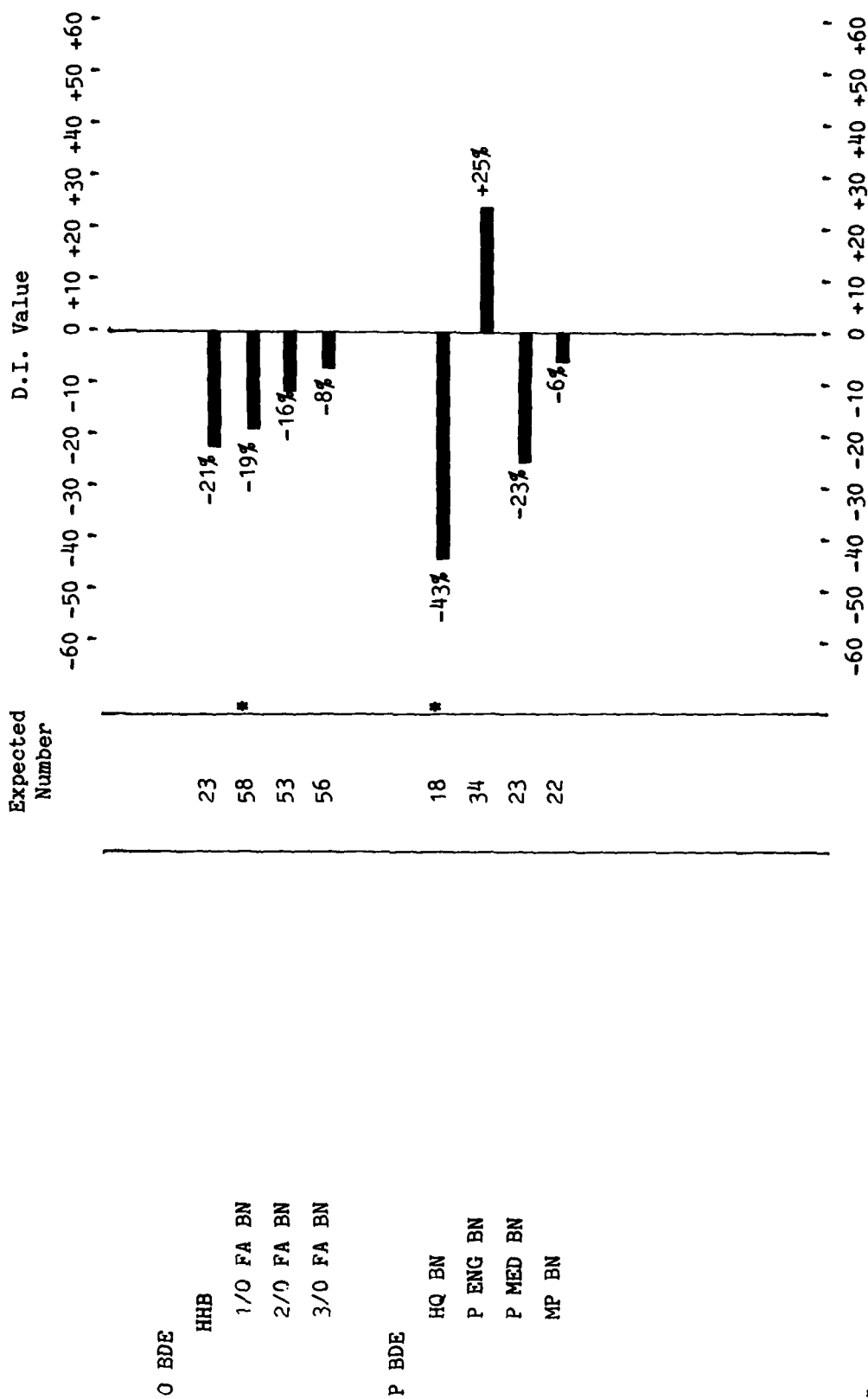
Figure 13

Difference indicator values for the Promotion to E4 dimension by units



* $p < .05$

Figure 13 (Continued)



* $p < .05$

Figure 13 (Continued)

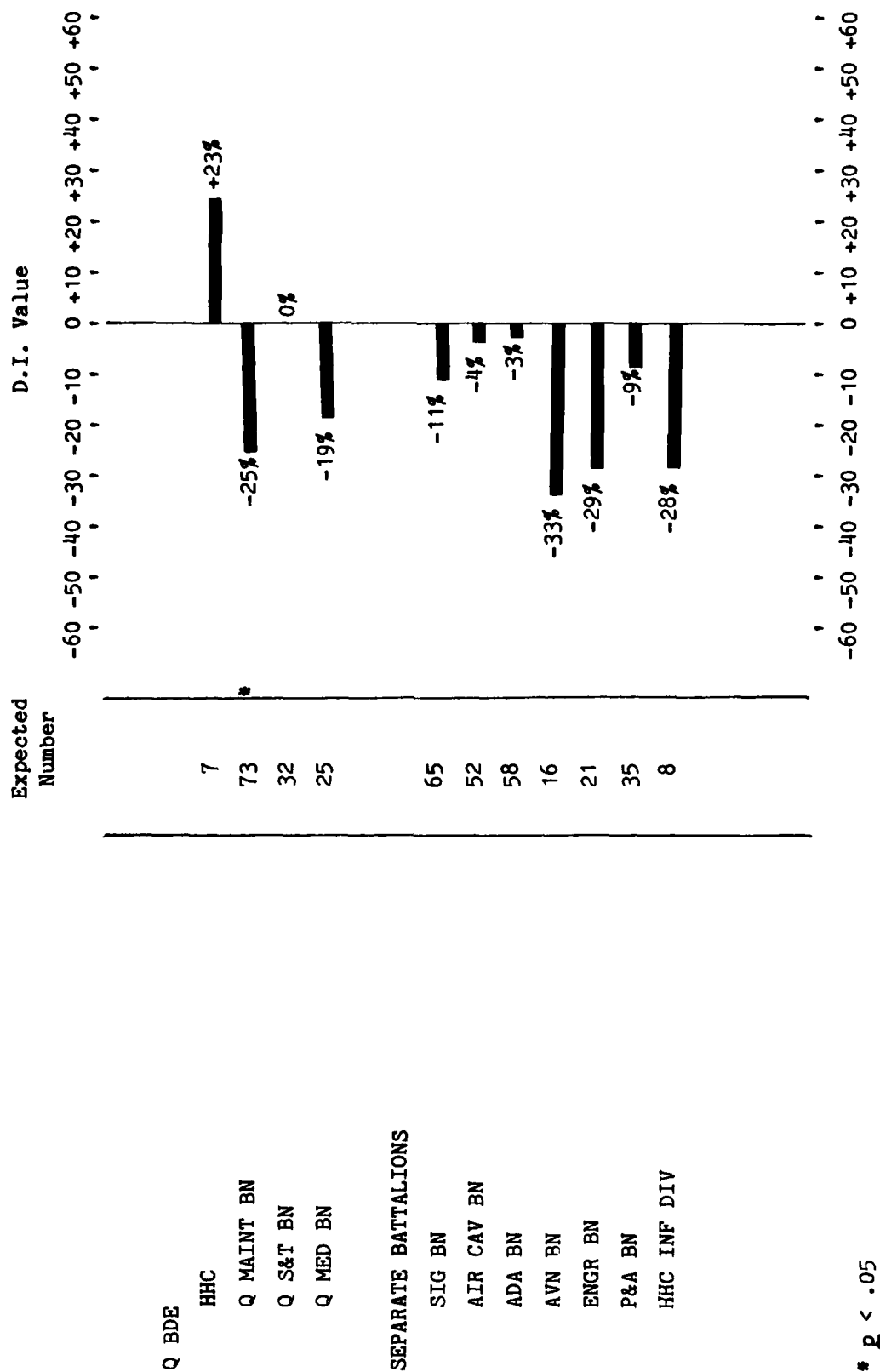


Figure 14

Difference indicator values for the Articles 15 dimension by units

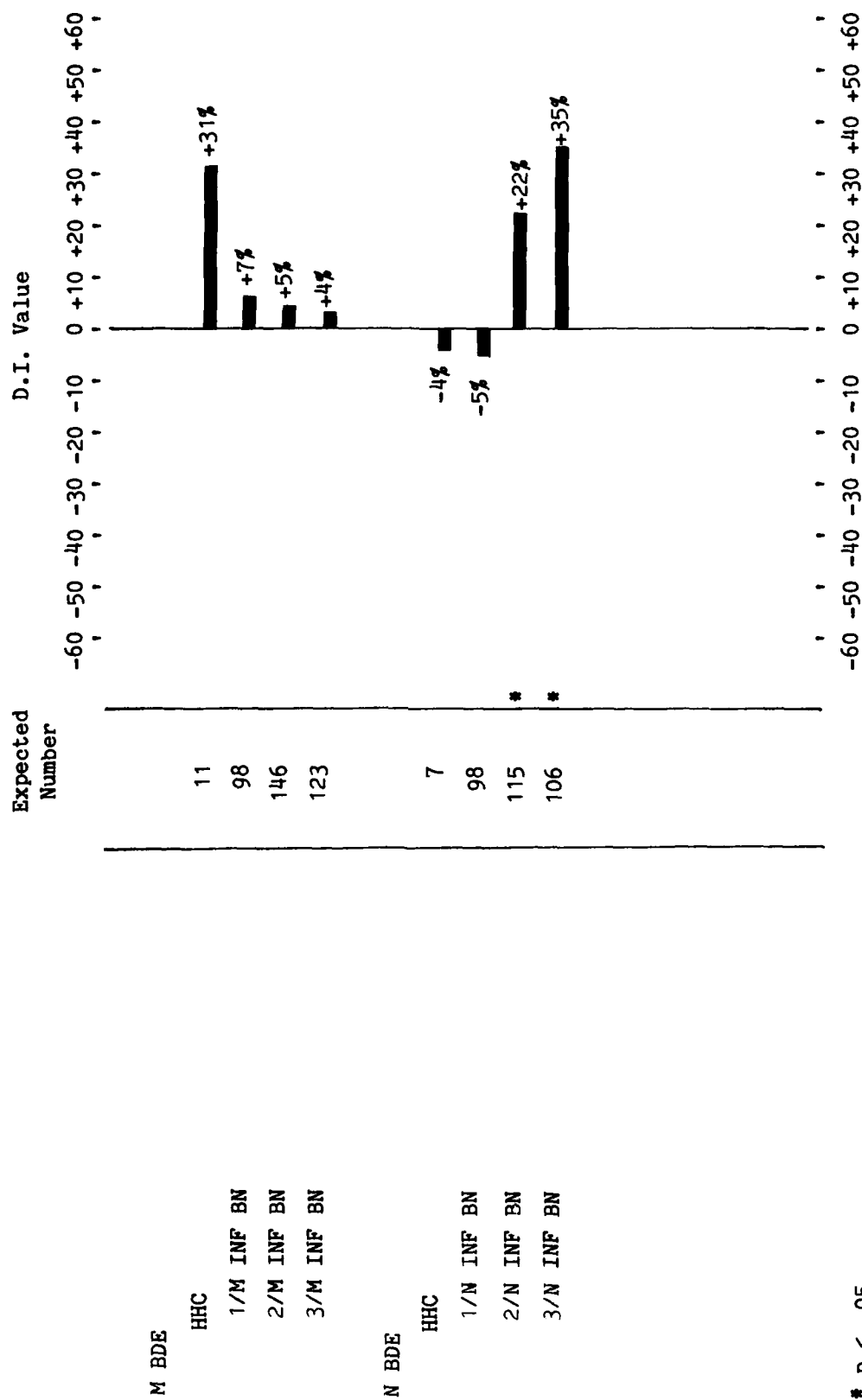
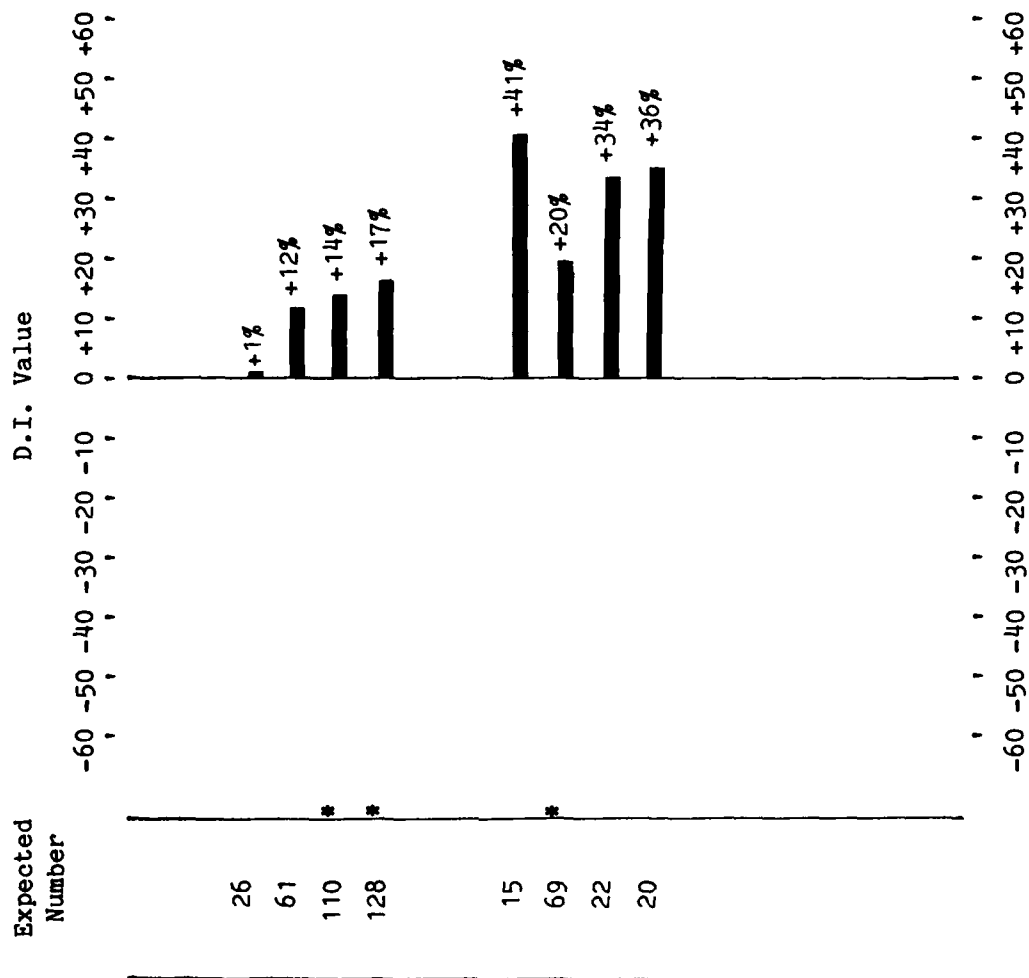
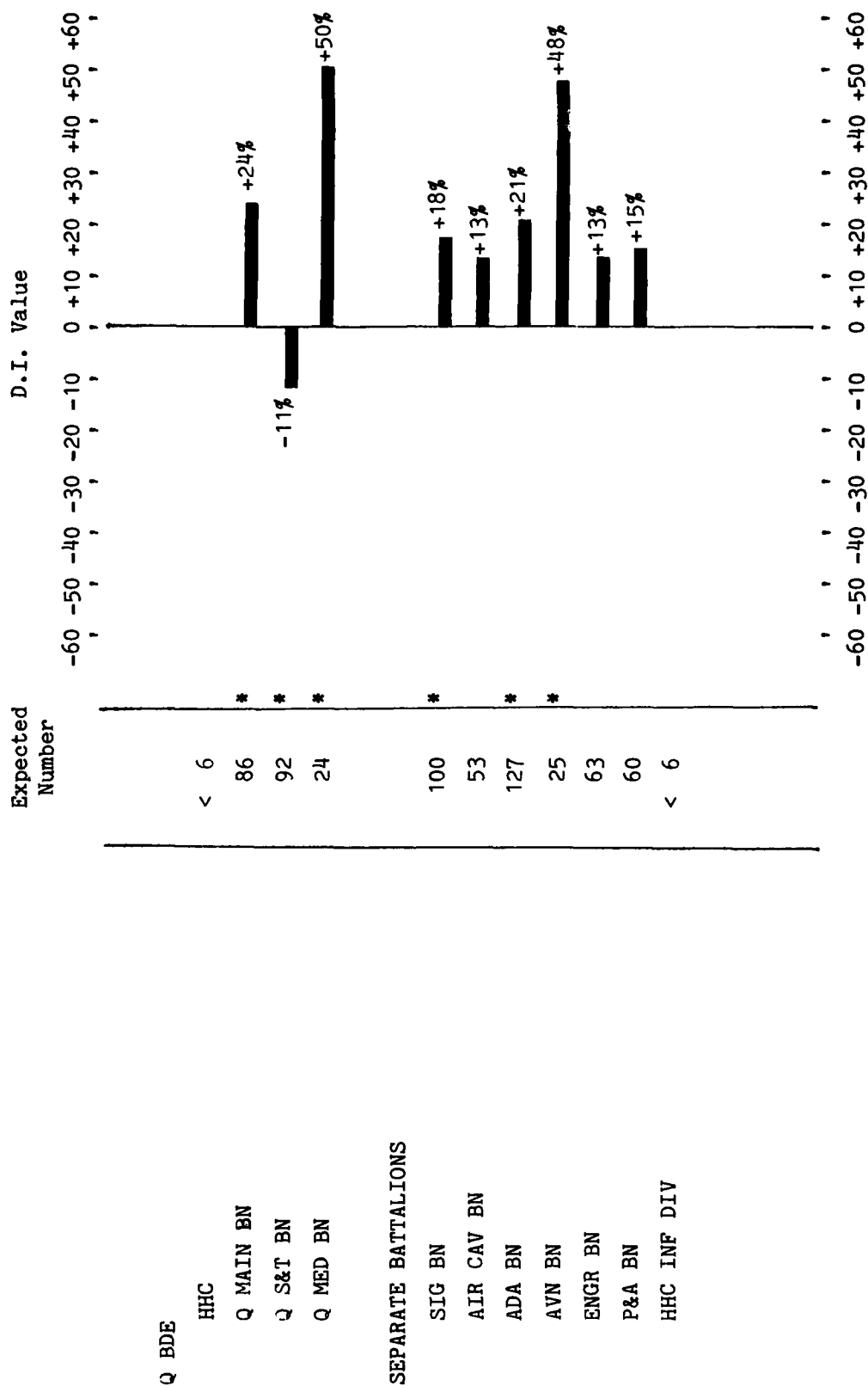


Figure 14 (Continued)



* $p < .05$

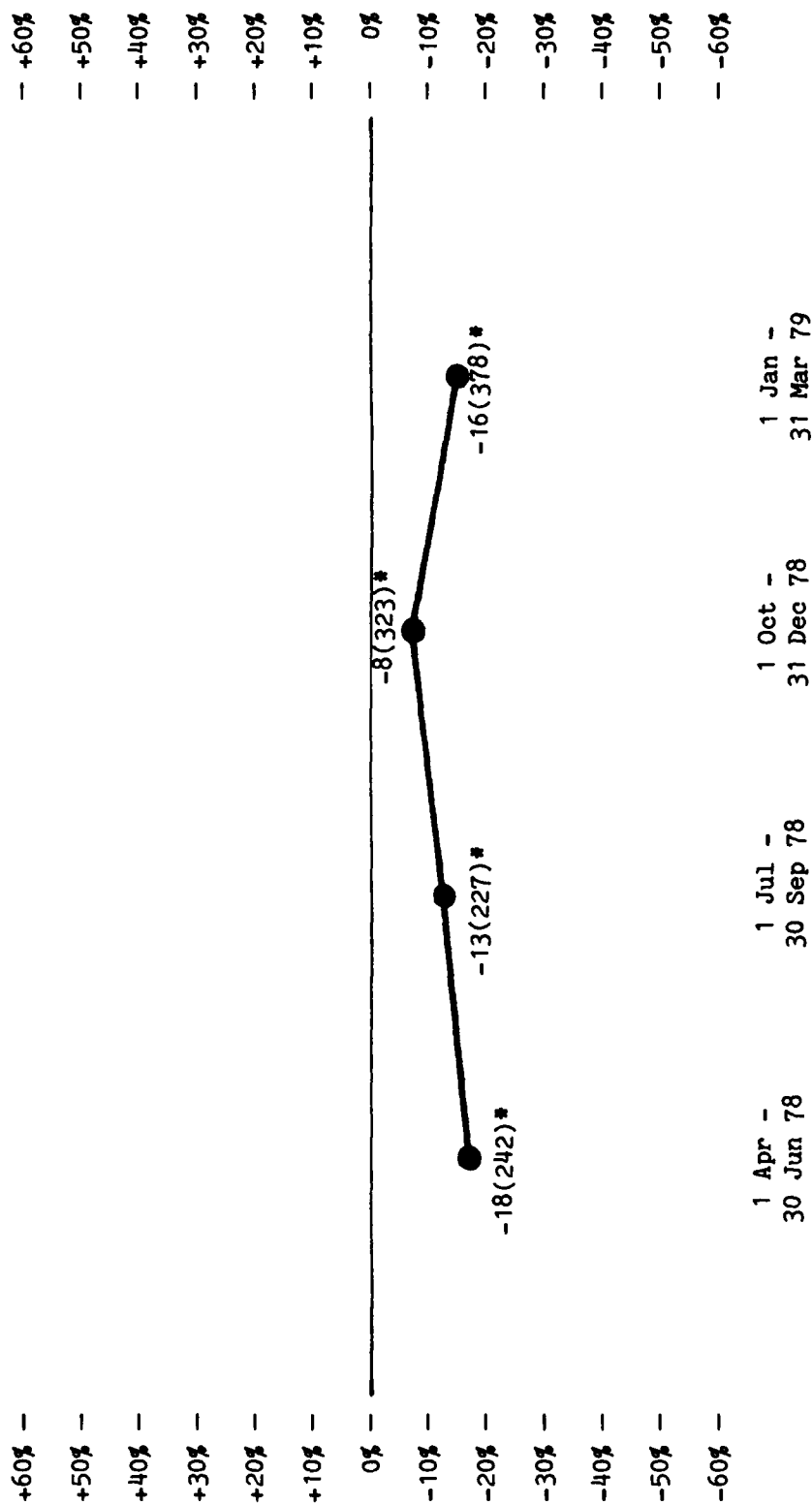
Figure 14 (Continued)



* $p < .05$

Figure 15

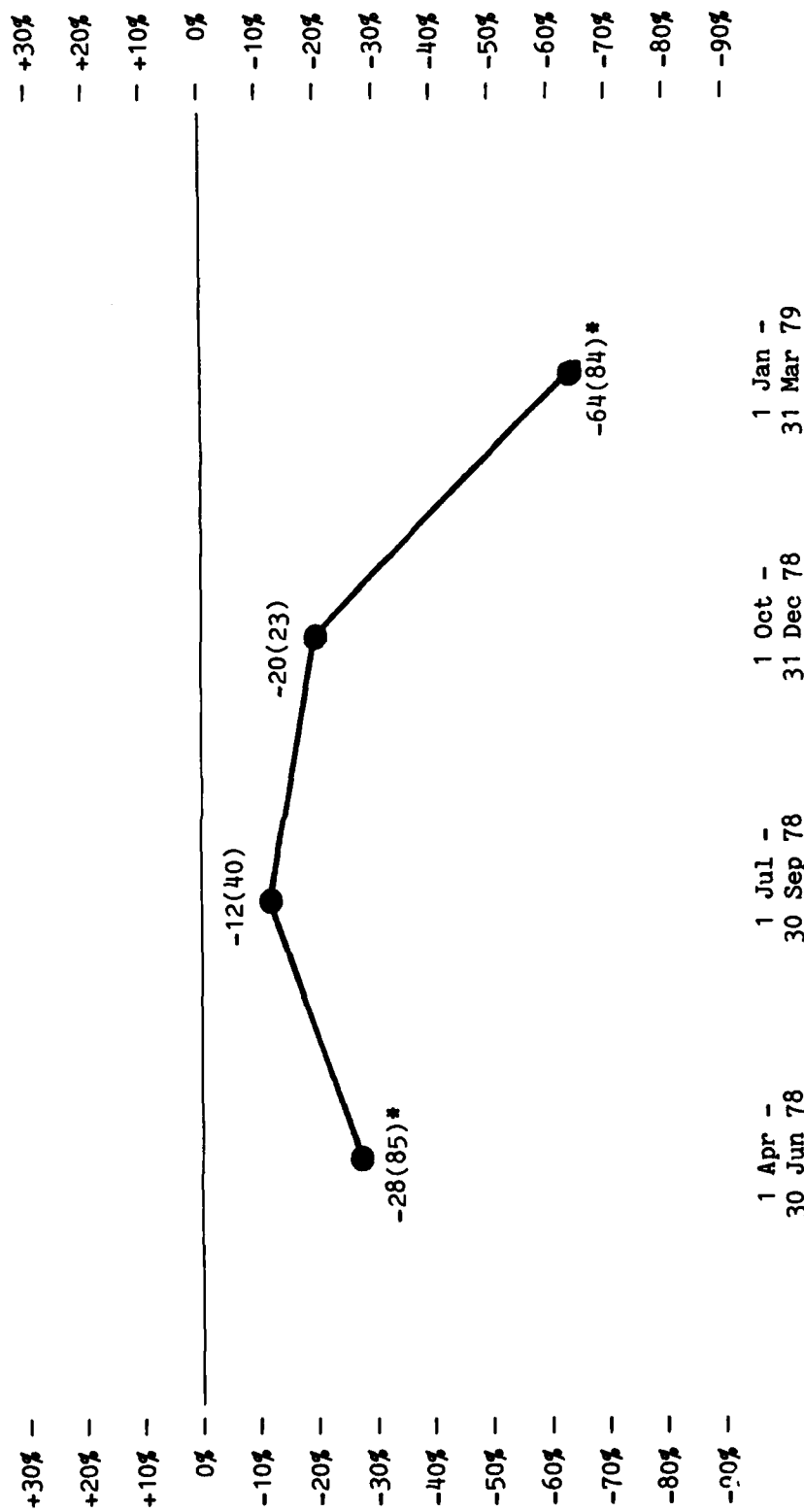
Difference indicators for Promotion to E4 by quarters¹



¹Expected numbers are shown in parentheses. Asterisk indicates difference indicator value is statistically significant at the .05 level.

Figure 16

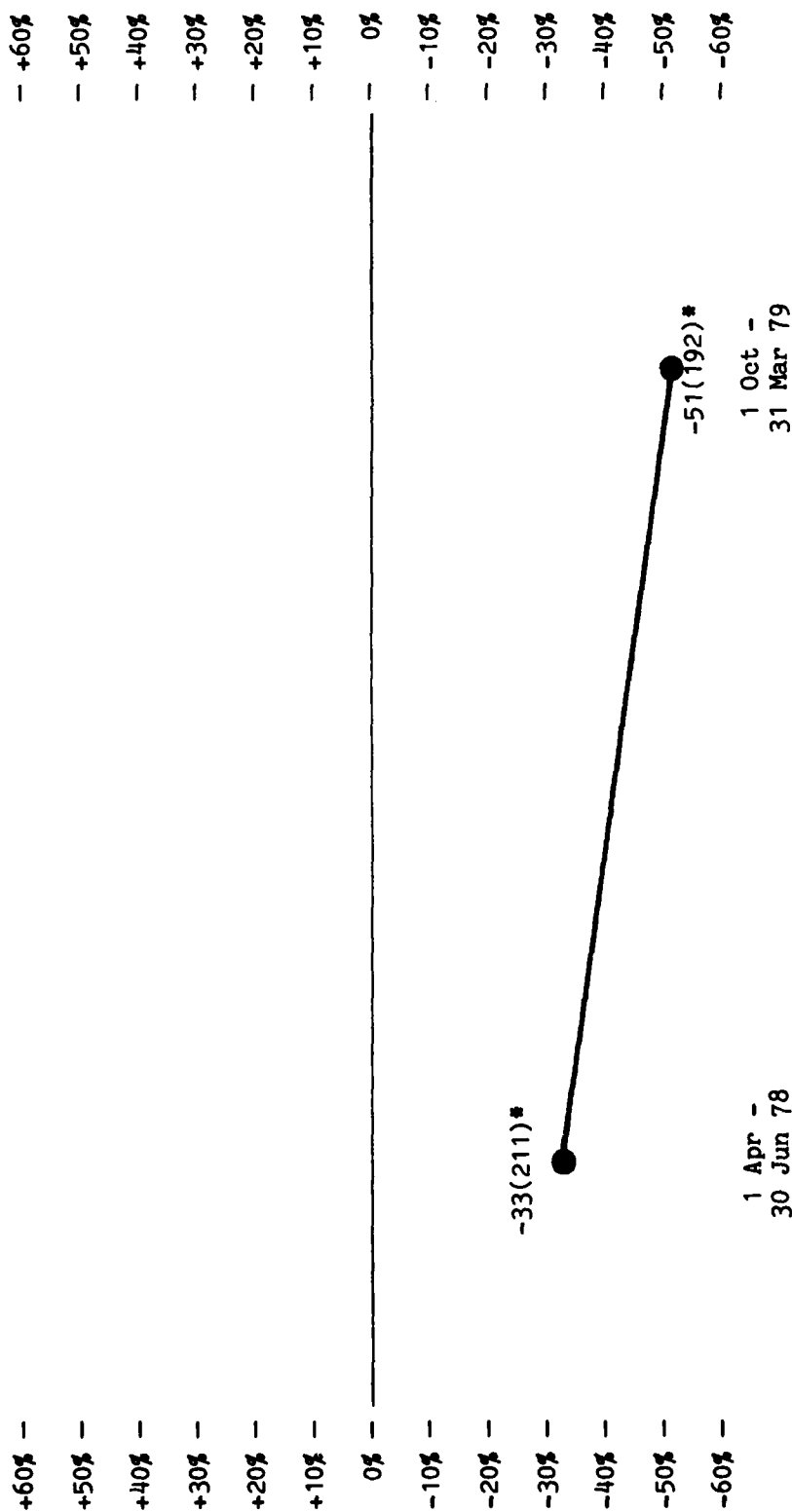
Difference indicators for Promotion to E5 by quarters¹



¹Expected numbers are shown in parentheses. Asterisk indicates difference indicator value is statistically significant at the .05 level.

Figure 17

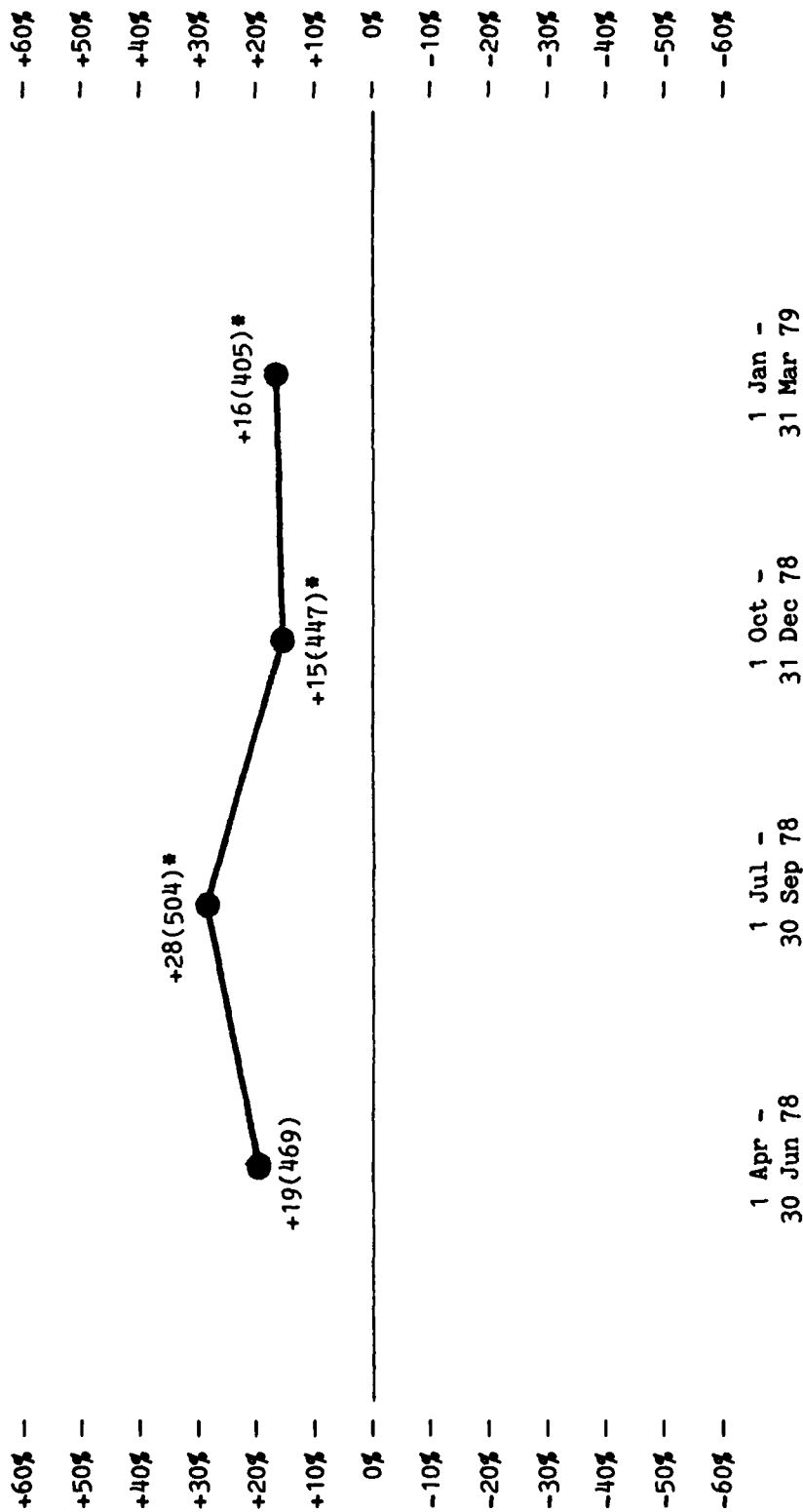
Difference indicators for Awards by six-month periods¹



¹ Expected numbers are shown in parentheses. Asterisk indicates difference indicator value is statistically significant at the .05 level.

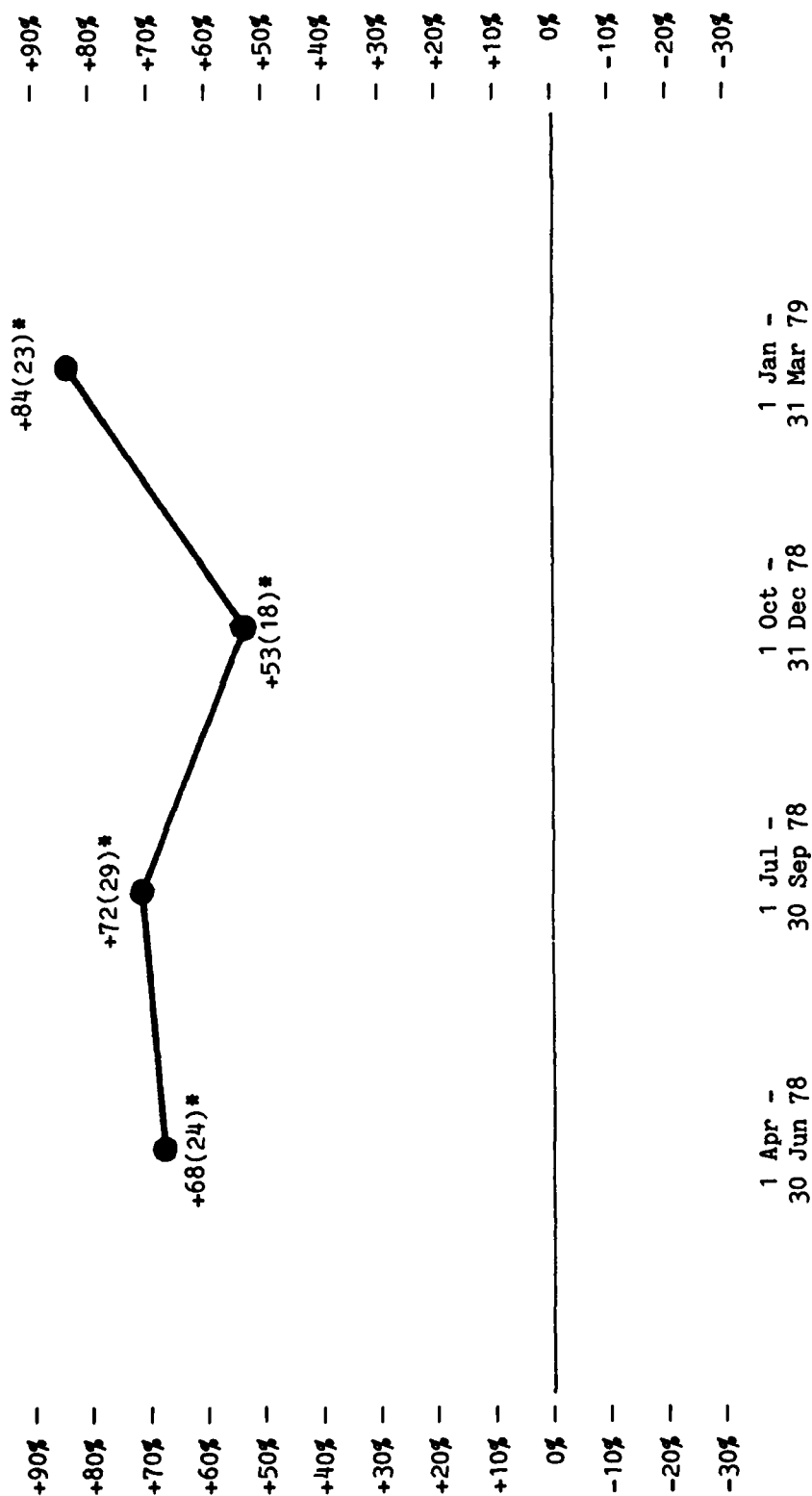
Figure 18

Difference Indicators for Articles 15 by quarters¹



¹ Expected numbers are shown in parentheses. Asterisk indicates difference indicator value is statistically significant at the .05 level.

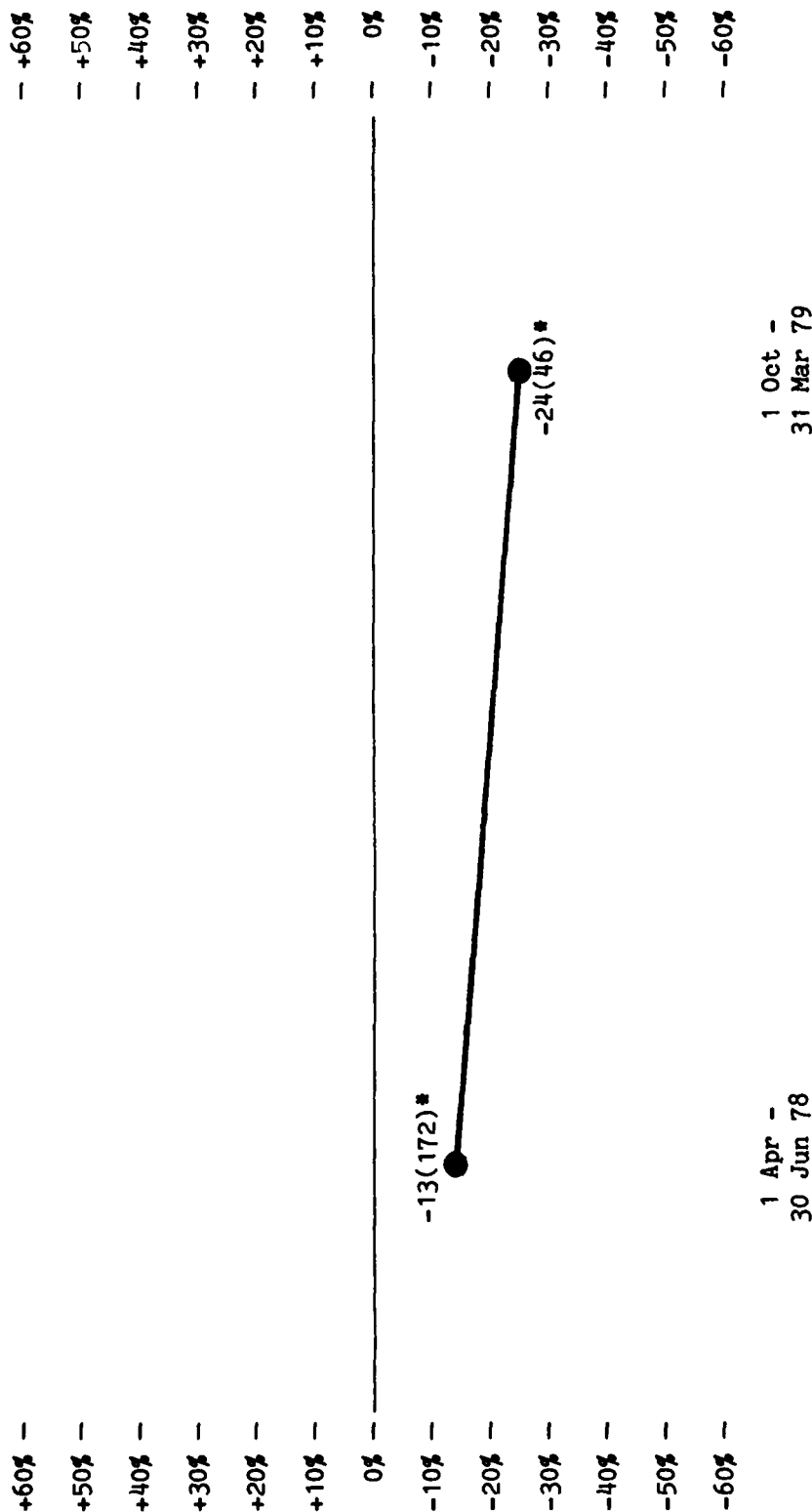
Figure 19
Difference indicators for Courts-Martial by quarters¹



¹Expected numbers are shown in parentheses. Asterisk indicates difference indicator value is statistically significant at the .05 level.

Figure 20

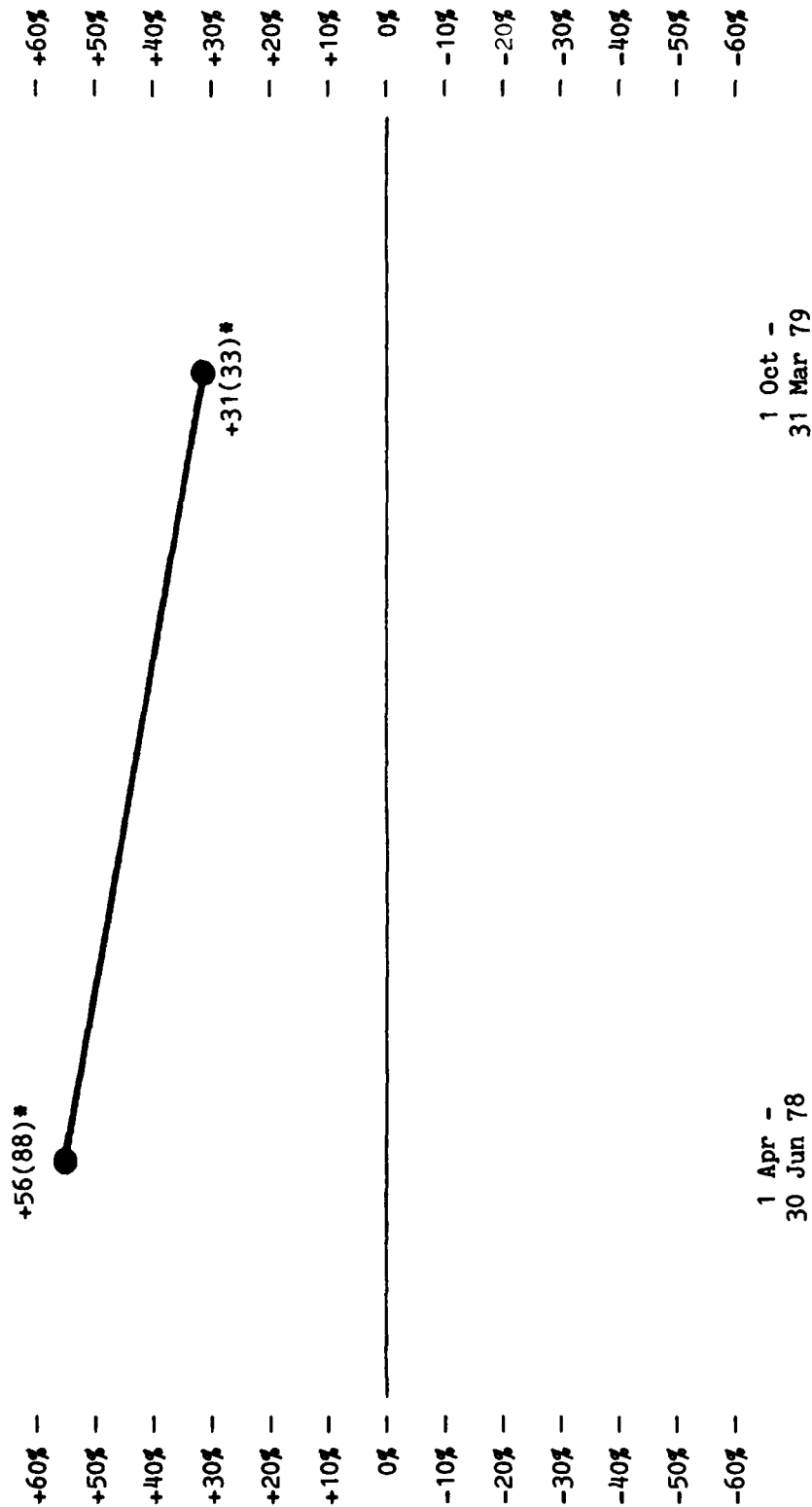
Difference indicators for Career Reenlistment by six-month periods¹



¹ Expected numbers are shown in parentheses. Asterisk indicates difference indicator value is statistically significant at the .05 level.

Figure 21

Difference indicators for First Term Reenlistment by six-month periods¹



¹ Expected numbers are shown in parentheses. Asterisk indicates difference indicator value is statistically significant at the .05 level.

Examining the statistically significant D.I. values in Figure 1, interpreted as disadvantageous to minority personnel, each should be viewed as the effects of a large number of complex events. These data tell quite a lot about the effects of institutional discrimination against minorities but little about its causes. For example, in considering the two promotion dimensions, the data at hand cannot test between even such sharply contrasting hypotheses as that the differences are accounted for by eligible minority personnel having a lower average level of developed abilities than their majority group counterparts, versus that the differences are due to the existence of intentional discrimination against blacks and other minorities on the part of individuals with influence over the promotion process.

Figure 2 through Figure 6 detail several of the dimensions. Several D.I. values suffer from the shortcoming of representing a combination of rather dissimilar phenomena. This is best exemplified by the D.I. value for the Selection for Career Enhancing Training dimension. When the included courses and associated D.I. values are examined in Figure 2, it can be seen that the range of courses is very broad and that values do not reveal a consistent pattern across different courses. It is probably unnecessary to repeat the truism that global statistics may be misleading.

Figure 7 through Figure 11 show six dimensions at brigade level. The dimension of Minority Enlisted Distribution is the only consistently statistically significant one which varies sharply between brigades. These differences are probably accounted for by a relative concentration of minority personnel in some career fields. Figure 12 further reveals that minorities are not uniformly distributed across battalions. This is an Army-wide phenomenon (Department of the Army, 1979). It was first extensively documented in the research reported in DA PAM 600-43 (Department of the Army, 1977). In civilian society generally there are fewer minority individuals (or women) in the more highly skilled, powerful, or prestigious occupational categories. This current reality of U.S. society exemplifies institutional discrimination in a broader sense than it has been defined in this paper. The data at hand, however, may be in part mirroring this characteristic of the society at large.

Figure 15 through Figure 21 show selected dimensions in a form that should reveal any trends over time. It appears doubtful that there are any reliable trends in evidence among the D.I. values for these dimensions. The importance of this finding is to warrant the conclusion that institutional discrimination in this division, as measured by these seven dimensions, has not diminished during the time period covered by this research investigation.

EVALUATION

First in this section will be considered several specifics concerning the dimensions, the D.I. statistic, and its use. Following will be a more general overview of the system and its application.

Several of the dimensions recommended for data collection in the Handbook seem more important a priori than some others. For example, the dimensions of Promotion to E4 and EFMB (or EIB) offer a contrast. The former personnel action affects a large number of soldiers and is integrally related to career progression. The attainment of these badges impacts few and cannot be considered career essential, which is not to denigrate the skill and effort needed to win one. However, if large disparities were evident between the representation of minority and majority groups on both dimensions, the promotion area must be considered the more crucial.

A few of the dimensions, perhaps most clearly the Selection for Career Enhancing Training, suffer from what might be termed an "apples and oranges" problem, by which is meant that a highly diverse collection of elements are combined to yield a single D.I. value. One may posit that not only is the eligible population completely different between, for example for clerk-typist training and selection for training in food service management, but that the dynamics of the selection process probably are quite different as well. Such dimensions can suffer from averaging away potentially important constituent differences.

Several of the dimensions are mutually dependent. Since each of the four administrative discharge dimensions is based upon the eligible population of All Unprogrammed Separations, the results the D.I. values are not independent of one another. While theoretically each could equal zero, if one is nonzero and of positive sign at least one must be of negative sign. Technically, this would somewhat complicate the use of the procedure to test each of the four D.I. values, but the more serious practical problem is the low frequency of occurrence in these dimensions.

The test for significance of a D.I. value is based upon the statistical independence of constituent events. As noted, the dimension of Articles 15 probably violates the assumption. D.I. values which have been discounted by the estimated percentage of nonindependent events is one heuristic for dealing with such situations.

The test based upon the nomograph is itself conservative for most actual data situations. That means it will frequently err in the direction of indicating a D.I. value as not different from zero when, if the truth were known, its population parameter really is. The numerals comprising any D.I. value can be tested with the conventional χ^2 statistic but to do so requires some statistical training.

The D.I. statistic itself has a rather unpleasant mathematical characteristic of which users should be aware. Suppose there exist two populations with proportions of minorities of .05 and .50 (the numbers themselves in the eligible population do not change the D.I. value). For both populations let the probability of a minority individual being included in the category of interest be twice that of a majority group individual. Suppose there are one hundred actuals chosen from each population, thus, the actuals would be 91 majorities, 9 minorities and 33 majorities and 67 minorities for the two groups respectively. The resulting D.I. values would be +80 and +34 with expected numbers of 5 and 50, respectively. The example shows the sensitivity of the

index value to the proportion of minorities in the eligible population; the higher the proportion the lower the D.I. value with base incidence rates constant. When each D.I. value with its associated expected number is tested for significance the two values compare more favorably, which underscores the importance of considering D.I. values only in conjunction with their expected number values.

The most challenging aspect of the application of the system as set forth in the Handbook is the implementation. Considerable time and effort is involved in determining what data will be collected, how, and who will be responsible. It is essential that the project officer or NCO assigned to implement the system have sufficient motivation, sufficient time, and be capable of accomplishing the task. Implementation of the system is probably not possible without strong command support.

One particular problem which should be anticipated is the high rate of point-of-contact (POC) turnover, frequently with a failure on the part of the departing individual to properly brief the incoming individual on the system requirements. In the division, the POC turnover was in excess of 80 percent for the first quarter. Another problem which is not to be underestimated is the work of actually calculating all of the D.I. values. Use of a relatively inexpensive (about \$50) programmable calculator is highly recommended both in terms of time savings and accuracy. (See Appendix B for sample programs).

Overall, the system appears well suited for obtaining a general view of the status of minorities at an installation level, with some dimensions producing large enough frequencies to provide reliable D.I. values down to the battalion level. Particularly valuable would be the collection of data over extended time periods to reveal trends.

The system, as it was applied here, only measures the effects of institutional discrimination, leaving to speculation possible causal factors. Another component of the system enables the user to test possible explainer variables. The test involves the collection of additional data and would be most appropriately used where a commander had one or more specific hypotheses to be tested and could simultaneously authorize the resources for supplemental data collection.

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APPENDIX A

Definitions of Eligible Population for Selected Dimensions

1. For 1 Apr 78 to 30 Jun 78 personnel of any duty status were erroneously included in tabulations of eligibles derived from SIDPERS records. Resulting distortions are judged to be very slight.
2. Promotion to E4: In relevant unit with present-for-duty status and pay-grade equal to E4 and Time-in-Grade equal to or greater than eight months and Time-in-Service equal to or greater than thirty-six months.
4. Selection for Career Enhancing Training: In relevant unit and present-for-duty status and Primary MOS and paygrade requirements for specific courses as follows:
 - RLC - E2 or E3,
 - PLC - all except 11 or 12 or 13 or 16 and E5 or E6,
 - Supply Management School - 76Y and E5 to E7,
 - Unit Supply - 76Y and E1 to E4,
 - PLL & TAMMS Clerk - 76D and E1 to E5,
 - Wheel Vehicle Mechanics - 63A, 63B, 63C or 63H and E1 to E4,
 - Dining Facility Management - 94B and E5 to E7,
 - Food Service - 94B and E1 to E5,
 - Clerk Typist - 71L and E1 to E4,
 - PAC Clerk - 75B and E1 to E5.
6. Selection for PNCOC and BNCOC:
 - PNCOC - In relevant unit with present-for-duty status and MOS of 11,12,13, or 16 and E4 and not a graduate of PNCOC,
 - BNCOC and 11B, 11C, 12F, 13B or 16 series MOS and either E4 and Graduate of PNCOC or E5 or E6.
8. High School Completion Program Enrollment: In relevant unit with present-for-duty status and not a high school graduate.
11. Awards: All personnel in relevant unit with present-for-duty status.
12. Assignment as Company Commander: In relevant unit with present-for-duty status with paygrade of CPT or 1LT and CMF not equal to 55 or 56 or 60 or 61.
13. Assignment as First Sergeant: In relevant unit with present-for-duty status with paygrade of E7 or E8.
23. Career Reenlistment: Basic active service date more than four years previously and ETS (expected termination of service) within two months.
24. First Term Reenlistment: Basic active service date less than four years previously and ETS within six months.

APPENDIX B

Sample Programs for Programmable Calculators

Input:

Method 1

STO 0 = Number of Majority Personnel Eligible
STO 1 = Number of Majority Personnel Actual
STO 2 = Number of Minority Personnel Eligible
STO 3 = Number of Minority Personnel Actual
STO 4 = 100

Method 2

STO 1 = Number of Majority Personnel Actual
STO 3 = Number of Minority Personnel Actual
STO 4 = 100
STO 5 = Proportion of Minority Personnel In
Eligible Population

Output:

After numbers are stored, start calculator.
First stop is Difference Indicator Value.
Restart.
Second stop is Expected Number.

NOTES: After putting program into machine always test for accuracy with a known problem.

Program to Calculate Difference Indicator Values
with Texas Instruments 57

0. RCL 5	21. RCL 1
1. 2nd X = t	22. +
2. GTO 1	23. RCL 3
3. STO 5	24. =
4. 2nd LBL 2	25. x
5. RCL 1	26. RCL 5
6. +	27. =
7. RCL 1	28. R/S
8. =	29. RST
9. 1/X	30. 2nd LBL 1
10. x	31. RCL 2
11. RCL 3	32. +
12. ÷	33. RCL 0
13. RCL 5	34. =
14. x	35. 1/X
15. RCL 4	36. x
16. =	37. RCL 2
17. -	38. =
18. RCL 4	39. STO 5
19. =	40. GTO 2
20. R/S	

Program to Calculate Difference Indicator Values
with Hewlett Packard 25

1. RCL 5	23. GTO 00
2. g X=0	24. RCL 3
3. GTO 24	25. ENTER
4. ENTER	26. RCL 2
5. RCL 3	27. ENTER
6. ENTER	28. ENTER
7. ENTER	29. RCL 0
8. RCL 1	30. +
9. +	31. ÷
10. ÷	32. RCL 1
11. X $\leftrightarrow$ Y	33. ENTER
12. ÷	34. RCL 3
13. RCL 4	35. +
14. X	36. X
15. RCL 4	37. STO 6
16. -	38. ÷
17. R/S	39. RCL 4
18. RCL 1	40. X
19. RCL 3	41. RCL 4
20. +	42. -
21. RCL 5	43. R/S
22. X	44. RCL 6