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Career Path Appreciation (CPA)
Data Reduction and Analysis

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13. ABSTRACT (Maximum 200 words)

The Career Path Appreciation (CPA) is an assessment interview that theoretically gives insight into conceptual capacity. CPA interviews were conducted with 148 active-duty Army officers in residence at the U.S. Army War College, Carlisle Barracks, Pennsylvania. Each volunteered to be interviewed. The interrater reliability, based on 57 cases scored by two raters, was .81. Considering the quasi-clinical nature of the assessment interview, this is highly acceptable. In addition, modest construct validity was demonstrated for the CPA Current Conceptual Capacity scores. War college instructors, who rated a substample on strategic thinking skill as demonstrated in War College seminar groups, tended to rate those who scored higher on the CPA as better thinkers than those who scored lower ($r = .57$ and $.51$ on two different thinking skill measures).

Examination of individual responses to the PHRASES task by subjects classified into four conceptual capacity levels on the basis of their investigator-rated CPA performances suggested ways to improve some of the PHRASES item sets.

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Career Path Appreciation (CPA)
Data Reduction and Analysis

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A growing body of research attests to the importance of complex cognitive/conceptual skills for successful strategic leadership performance. However, technologies for assessing and enhancing these skills are still in their infancy, as is a comprehensive theory of adult human development that would relate these skills to other essential leader attributes.

This report documents an investigation of one approach, an extended structured interview, for assessing these skills. Most of the academic year 1991-92 U.S. Army War College class participated in the effort. The research provides good evidence for the reliability of the interview, and suggests that trained interviewers make consistent judgments concerning the conceptual skills that are being assessed. These findings make reasonable further efforts that are now under way to establish the construct validity of the interview and to develop less costly approaches to measuring the same constructs.

This work was accomplished as a part of the program of the Strategic Leadership Technical Area (SLTA) or the Manpower and Personnel Research Division of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI).

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Director

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CAREER PATH APPRECIATION (CPA) DATA REDUCTION AND ANALYSIS

EXECUTIVE SUMMARY

Requirement:

This research was performed to determine the interrater reliability of the Career Path Appreciation (CPA) and to conduct a psychometric examination of its component parts. In particular, the psychometric examination was intended to focus on the contribution of the various parts to the total assessment, and on the internal consistency of the stimulus items in one specific part of the total assessment procedure.

Procedure:

CPA interviews were conducted with 148 active duty Army officers in residence at the U.S. Army War College, Carlisle Barracks, Pennsylvania. Each participant volunteered to be interviewed. The interviews were conducted by individuals familiar with the CPA assessment procedure. They were tape recorded and the tapes were subsequently transcribed. One hundred and thirty-seven (137) of these interviews were scored by the present investigator, of which 52 were also scored by an expert in Stratified Systems Theory. These replicated scorings provided the basis for estimation of interrater reliability. In addition, the stimulus items in the PHRASES part of the CPA were examined for internal consistency; several were replaced in response to this analysis.

Findings:

The interrater reliability of the CPA, based on the 57 cases scored by two raters, was .81. Considering the quasi-clinical nature of the assessment interview, this is highly acceptable. In addition, modest construct validity was demonstrated for the CPA Current Conceptual Capacity scores. War College instructors, who rated a subsample on strategic thinking skill as demonstrated in War College seminar groups, tended to rate those who scored higher on the CPA as better thinkers than those who scored lower ($R = .57$ and $.51$ on two different measures of thinking skill).

The search for possible objective approaches to scoring the CPA also yielded promising results. Analysis of the PHRASES portion of the CPA yielded respectable Cronbach Coefficient Alphas for the PHRASES "Most" scores and these scores were reasonably good predictors of rated Current Conceptual Capacity scores. Further, item

analyses of the PHRASES item sets suggested that all nine item sets should be retained. Similar analyses of the objective indexes generated by the computer-controlled SYMBOLS task of the CPA showed that the index of the total number of cards sorted is also a reasonably good predictor of rated Current Conceptual Capacity for some raters.

A combination of the principal objective scores from the PHRASES and SYMBOLS tasks (PHRASES "Most" average and SYMBOLS total cards sorted), produces a level of prediction of rated CPA scores that is very close to the reliability estimates of the measures. Finally, examination of individual responses to the PHRASES task by subjects classified into four conceptual capacity levels on the basis of their investigator-rated CPA performances suggested ways to improve some of the PHRASES item sets.

Utilization of Findings:

These findings have been used to revise portions of the CPA PHRASES task and will contribute to further efforts to develop cost-effective tools for assessing and facilitating the development of the complex conceptual skills required by strategic leaders.

CAREER PATH APPRECIATION (CPA) DATA REDUCTION AND ANALYSIS

CONTENTS

CAREER PATH APPRECIATION DATA REDUCTION AND ANALYSIS

INTRODUCTION

Career Path Appreciation (CPA) is a complex assessment interview designed to measure an individual's current capacity for meeting the conceptual demands of various work roles. Developed by Gillian Stamp (1984), the CPA is based on two key concepts contained in the Stratified Systems Theory of Elliott Jaques (1976, 1989). The first is the well-accepted notion that work is hierarchically stratified (Katz & Kahn, 1966, Simon, 1977) such that higher level managerial positions entail dealing with greater complexity than do lower level positions. Jaques (1976) extended this general idea of hierarchical role complexity by asserting that a finite and relatively small number of qualitative increases in work complexity define the identifiable levels of vertical work stratification.

The second key concept in Jaques' Stratified Systems Theory that informed the development of the CPA was the idea that the individual conceptual capacity necessary to master work complexity at the various organizational levels is also stratified. That is, Jaques asserted that there are qualitatively distinct levels of individual conceptual capability that correspond to levels of work complexity (Jaques, 1976, 1989; Jaques & Clement, 1991). It was these levels of individual capability that the CPA was designed to assess.

The potential value to the military of a valid measure of level of conceptual work capacity is considerable. Given the importance of maintaining highly competent armed forces, it is essential that the military have leaders at all organizational levels who have the capability to understand and master the level of complexity inherent in their work roles. For example, requisite conceptual capacity at upper organizational levels may be the sine qua non of what is commonly known as "strategic vision" (Jaques & Clement, 1991; Lewis & Jacobs, 1992). In addition, at all organizational levels within the military, having a level of conceptual work capability at least one level above one's own work role may facilitate a full understanding of commander's intent.

Because of its close conceptual tie to Stratified Systems Theory, the CPA is a promising candidate as a measure of individual work capability. Use of the CPA assessment methodology requires, however, the establishment of its interrater reliability and construct validity. As appealing as the CPA may be on conceptual grounds, it is of little value unless it can be shown to reliably assess individuals' current levels of conceptual capability. To that end, the present report provides the first published interrater reliability data for the CPA, extends its construct validity, and provides preliminary suggestions for its improvement.

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TECHNICAL DISCUSSION

The Career Path Appreciation (CPA) Methodology

An individually administered, multifaceted assessment device, the CPA yields an overall score of current work capacity and a related score of highest predicted future work capacity. The latter, termed "Mode" by Jaques (1989), is derived from the former using current age and empirically derived "progression curves." The CPA consists of three sections: Phrases, Symbols, and Work History. In the Phrases portion of the assessment, the interviewer gives the interviewee nine sets of six cards where each card contains a phrase (e.g., "Work within a given framework"). For each set of cards the interviewee is instructed to read the six phrases and then indicate which phrase is "most" like the way he or she prefers to approach a piece of work, and which phrase is "least" like the way he/she prefers to operate at work. The interviewee is then asked to elaborate upon his or her choices. And while the CPA includes a current level score for each of the six phrases in each set, the interviewee's elaboration of his or her choices is given considerable weight in estimating current conceptual level (CL).

In the Symbols portion of the assessment, the interviewee is asked to attempt to solve a symbol sorting task. Computerized by the US Army Research Institute in 1990, the Symbols task uses geometric symbols derived from the Bruner concept formation task. The computer program presents four "target cards," one of which is blank. The interviewee is then told that his or her task is to discover a sorting rule by which a set of "cards" (computer images) can be correctly sorted into piles below each of the four target cards. Solution of the sorting task is considered to require the capacity to induce the nature of the required task, to abstract the essential attributes of the symbols, and to test complex hypotheses systematically.

In the Work History portion of the interview, the interviewee is asked to provide a chronological description of major work assignments and to describe the level of challenge (overstretched, comfortable, underutilized) and time span of discretion in each of those assignments. Finally, in an attempt to elicit an indicator of the interviewee's time horizon, the interviewee is asked to describe what he or she envisions as lying in their future in the "near term," "mid term'" and "long term."

Scoring the CPA. The CPA, as used in the present investigation, yields a single score estimating each individual's current conceptual work capacity. These scores can, potentially, range from current level I to current level VII. Within each level, there are three distinctions made: high, medium, or low. Converted to Arabic numbers, scores can thus range from 1 (low current level I) to 21 (high current level VII).

The present investigator scored CPAs from three sources of information: 1) a paper record which included the interviewer's notes of the three-part interview and a

notation of the interviewee's age, 2) a typescript of the Phrases narrative, and 3) a computer generated record of the Symbols performance showing each sorting response made. In addition to assigning an overall score of current conceptual work capacity, use of the current level score, current age, and Jaques' 1990 progression curves permitted the present investigator to assign a score of highest future potential ("Mode"). In accordance with CPA scoring guidelines (Stamp, 1984), separate scores were not assigned for each of the three portions of the interview. Rather, a single overall score was assigned. In assigning an overall score of current conceptual work capacity, the present investigator first examined the Symbols computer record and the interviewer's notes about the symbols performance (if there were any) and developed a working hypothesis of current level. In general, a successful Symbols performance was considered strong evidence that current capacity was mid level IV or higher. Weaker successful performances were presumed to reflect a current capacity of high level III or, possibly, low level IV. Unsuccessful performances were interpreted more equivocally, as there are undoubtedly multiple reasons for failure to solve the Symbols task, only some of which may reflect current conceptual capacity. Nonetheless, particularly poor performances, in terms of the types of strategies employed, were usually interpreted as reflecting a current capability at mid III or below.

After considering the Symbols performance, the present investigator evaluated the Phrases performance as captured in the typescript and the interviewer's notes. Because of the nature of the subjects interviewed for the present investigation, War College students who had been successful in leadership roles at an organizational level considered to be high level III (Jacobs & Jaques, 1991), the present investigator generally started by attempting to make a three category discrimination: current level IV, below IV, or above IV. And although Stamp's level I through level VI rating of each phrase chosen as "most" was considered, scoring was based primarily on each interviewee's verbal explanation of both their "most" and "least" choices. Only if there was a marked discrepancy between the estimates obtained from analysis of the Symbols and Phrases performances were notes concerning the Work History consulted in determining the overall current work capacity score.

Subjects and Procedure

Subjects were 148 active duty Army Officers in residence at the US Army War College, Carlisle Barracks, Pennsylvania. Each volunteered to be interviewed in connection with an Army "brown envelope" study of officer development. The CPA interviews took approximately 90 minutes and were conducted by individuals familiar with the CPA assessment procedure. Interviews were tape recorded and the tapes subsequently transcribed. One hundred and thirty-seven (137) of these interviews were scored by the present investigator in the manner described above. In addition, 52 of the 137 were scored by an expert in Stratified Systems Theory. The present investigator was kept ignorant of those scores until after reliability scoring was completed.

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Task One: CPA Reliability Assessment

Task One of the Statement of Work called for the determination of the rater-rater reliability of the CPA scores. In accomplishing this task, the present investigator supervised the typing of 78 Phrases narratives and typed several others himself. The remaining Phrases typescripts were provided to the present investigator by the Contracting Officer's Technical Representative. In all, 137 complete scoring protocols were obtained and scored by the present investigator. As shown in Table 1, current conceptual work capacity scores (CLPL) ranged from a low of 7 (low current level III) to a high of 15 (high current level V). The majority of the subjects (58%) obtained scores in the level IV range (scores ranging from 10 to 12)[1]. Twenty-six percent (26%) were estimated to be at Jaques' level III, and four percent (4%) at level V. The remainder were scored at the border between level III and level IV (6%) or between level IV and level V (6%).

Table 1

War College Students' Current Conceptual Work Capacity Scores

CLPL	Frequency	Percent	Cumulative Frequency	Cumulative Percent
7.0	6	4.4	6	4.4
7.5	2	1.5	8	5.8
8.0	7	5.1	15	10.9
8.5	5	3.6	20	14.6
9	15	10.9	35	25.5
9.5	8	5.8	43	31.4
10	30	21.9	73	53.3
10.5	13	9.5	86	62.8
11	22	16.1	108	78.8
11.5	5	3.6	113	82.5
12	10	7.3	123	89.8
12.5	8	5.8	131	95.6
13	1	0.7	132	96.4
13.5	4	2.9	136	99.3
15	1	0.7	137	100.0

CLPL = Current Work Capacity Scores by PL. N = 137

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[1] Note that half scores were assigned in those instances where it was not possible to decide between two adjacent scores.

In order to assess rater-rater reliability of the CPA current capacity scores, Pearson product-moment correlations were computed between CPA scores of the fifty-two subjects who were scored by both the current investigator (PL) and Jacobs (TOJ). The correlation between the two sets of current work capacity scores was .81 ($p<.0001$, $\underline{df}=50$). For several reasons, this is considered to be an excellent level of rater-rater agreement. First, CPA scores result from a very complex scoring process where the scorer makes judgements about level of capability based on both the form and substance of the subject's performance on a number of tasks. Second, in the present study many of Jacobs' scores were assigned immediately after he conducted the CPA interview and thus were undoubtedly influenced by both the Work History and by interpersonal and nonverbal cues not available to the present investigator. Finally, the range of scores was restricted (from low III to high V) which undoubtedly attenuated the rater-rater agreement correlation.

Although not a formal part of Task One of the Statement of Work for the present project, additional scores became available on a subset of the subjects, scores which have a bearing upon the reliability of the CPA scores. For thirty-two of the 137 subjects assessed with the CPA by the present investigator, several ratings of these subjects were obtained from two sets of War College seminar group instructors. Each instructor provided two ratings of strategic thinking potential and a rating of general officer potential for the students in his seminar group. Because current conceptual capacity (as assessed using the CPA) is expected to influence students' performance in the War College's intensive, issue focused seminar groups, instructor rated strategic thinking capacity and general officer potential can be considered relevant to the construct validity of conceptual work capacity.

Each of the 32 subjects (in one of five participating seminar groups) was rated independently by two seminar group instructors. Each set of two instructors interacted with the students in the same seminar group but at different points in the academic year; and the topical focus of the groups was different under the different sets of instructors. Thus, the two sets of instructor ratings were based on different samples of the students' behavior. Because of this fact, the two sets of instructor ratings were expected to be only moderately correlated. This was indeed the case. The two sets of instructors' paired comparison ratings (McAnulty, 1990) of strategic thinking potential correlated .57 ($p<.001$, $\underline{df}=30$) and their quartile rankings of strategic thinking potential correlated .51 ($p<.01$, $\underline{df}=30$). The correlation between the two sets of instructors' paired comparison ratings of general officer potential were lower (.34) and statistically not significantly different from zero for this small sample (N=32).

To examine the construct validity associated with the CPA ratings of current conceptual capacity, the correlations among current level scores (CLPL) and a sum of the two instructors' ratings were computed. These correlations were all positive and statistically significant beyond the .02 probability level. The Pearson correlations between the current investigator's CPA scores and the combined strategic thinking scores

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were .42 (paired comparison score), .41 (quartile score), and for general officer potential was .46. These correlations not only provide needed construct validity support for the CPA scores, by inference they also support the reliability of the CPA scores assigned by the current investigator.

Task Two: Improvement of CPA Scoring Procedures

Analysis of PHRASES Item Sets. Part 1 of Task Two in the Statement of Work entails conducting an analysis of the PHRASES item sets from the CPA to determine whether their scoring and overall internal consistency can be improved. At issue is the extent to which each of the six item phrase sets (there are nine sets in all) can be objectively scored and combined to produce an overall score which is associated with conceptual work capacity. In each item set (A through I) there are six phrases, each of which is thought to reflect a discrete level of work capacity. Subjects are instructed to select the one phrase which is "most" like the way they prefer to approach a piece of work and one which is "least" like the way they prefer to operate at work. The most parsimonious way to arrive at an objective score from this method is to compute an average of each subject's "most" choices[2].

Examination of the relationship between each subject's "most" average and his or her rated current conceptual capacity (a rater judgement based on a subject's entire CPA performance) indicates that the objective index ("most" average) is indeed correlated with rated current capacity. For the 131 subjects with both a "most" average and current capacity score, as rated by PL, the Pearson correlation was .59 ($p < .0001$, $df = 129$).

For 49 subjects similarly rated by TOJ, the Pearson correlation was .60 ($p < .0001$, $df = 47$. By way of comparison, the correlation between subjects' "least" average and rated current capacity was slightly lower (-.52 and -.56 for PL and TOJ respectively). These findings suggest that attempts to improve the psychometric properties of the PHRASES item sets as part of a search for an objective scoring method for the CPA may prove fruitful.

Table 2 shows the Cronbach Coefficient Alphas computed on subjects' "most" choices. As shown, these are .776 for the raw scores and .783 for the standardized "most" scores. The alpha statistic is an estimate of the internal consistency of the PHRASES "most" responses and suggests that, as currently keyed, PHRASES has an acceptable level of internal coherence. A more fine grained analysis of the contribution of each item set to the total "most" score is gained by examining the item-total correlations of each item set and the effect on the overall Cronbach Coefficient Alpha if the contribution of each item set is deleted (see the second portion of Table 2).

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[2] An average score is used rather than a total, because subjects occasionally fail to indicate an item preference.

Table 2

Item Analyses for Phrases "Most" Responses

Cronbach Coefficient Alpha

for RAW variables   : 0.775590
for STANDARDIZED variables: 0.782659

| | Raw Variables | | Std. Variables | |
| Deleted | Correlation | | Correlation | |
Variable	with Total	Alpha	with Total	Alpha
SET A	0.498980	0.748145	0.500374	0.757140
SET B	0.586142	0.736643	0.597894	0.742883
SET C	0.437684	0.758172	0.440561	0.765643
SET D	0.679003	0.726257	0.683128	0.730016
SET E	0.470593	0.752569	0.467297	0.761864
SET F	0.400464	0.763884	0.394625	0.772051
SET G	0.359901	0.767216	0.363789	0.776294
SET H	0.325447	0.771561	0.334752	0.780246
SET I	0.440638	0.761551	0.436561	0.766205

Examination of these statistics indicates that item sets D, B, A, and E correlate most closely with the total score, while item sets H, G, and F are more tenuously associated with the "most" total score. Nonetheless, the item-total correlations are all positive (ranging from .33 to .68), and internal consistency of the entire set would not be improved by the elimination of any one item set. These analyses, therefore, do not support the elimination of any of the nine PHRASES item sets.

It may, nonetheless, be possible to improve the PHRASES item sets by a) rewriting items that appear to contribute little to discriminating among work capacity levels and/or b) re-keying items that appear to be endorsed by subjects at different capacity levels than those indicated by the item's predetermined level score. Such an analysis requires identification of distinct groups of subjects who have been determined to be functioning at different levels of conceptual work capacity. Because of the characteristics of the present sample of War College students (see Table 1), it was decided to divide subjects into four groups based on PL's current level scores: Current Level III (scores up to and including 9.0), low Current Level IV (scores from 9.5 to 10.5), high Current Level IV (scores from 11.0 to 12.0), and Current Level V (scores 12.5 and above). Included were 96 subjects who met the following criteria: 1) they received a

current level score from PL, 2) their PHRASES "most" responses were available for at least 8 of the 9 item sets, 3) there was no group membership discrepancy between current level scores assigned by PL and TOJ, and 4) there was no group membership discrepancy of more than 1/2 point between rated overall current conceptual level and current level based only on the scoring of the subject's PHRASES responses.

Table 3 (Appendix A) shows the distribution of "most" responses to the items in Set A for subjects classified into the four current level groups described above. This item set, which had an item-total correlation of .50, seemed reasonably well constructed with all items receiving some endorsements and higher level subjects generally endorsing the higher keyed items.

Table 4 (Appendix A) shows a similar analysis of item set B. This set had one of the highest item-total correlations (.59) and also appeared to be well constructed and keyed. Table 5 (Appendix A) shows the distribution of "most" responses to Set C. This set had a more modest correlation with the "most" total (.44, with its own contribution removed). Examination of the frequency distributions reveals that this item set's ability to discriminate among the four current level groups is hampered by a high level of endorsement (>66%) of item 5, "See the rules as guides to action", by subjects in all but the highest group. In an attempt to make other phrases in this item set more attractive, the phrases rated III and IV by Stamp (1984) were rewritten. The revised item set can be found in Appendix B.

Table 6 (Appendix A) shows the distribution of "most" responses among the items of Set D. This set had the highest item-total correlation (.68) of all the PHRASES sets. Interestingly, not a single subject endorsed item 5, "Restructure the task." Although there is a risk that replacing this low endorsement item might reduce the item set's correlation with the total score, a more specific item might attract more subjects. In consultation with the P.O.C., it was decided to replace item 5 with the following item: "Look for relationships between the current task and other tasks." The revised item set can be found in Appendix B.

Responses to the items in Set E are presented in Table 7 (Appendix A). This set had a reasonably good item-total correlation (.47), but item 3, "Look for sequences or common relationships," had a very low frequency of endorsement. A possible rewrite of this item is "Figure out the right sequence of tasks." The revised item set can be found in Appendix B.

Set F had one of the lowest item-total correlations (.40) of the PHRASES item sets. Inspection of Table 8 (Appendix A) indicates the main reason for this was a very high endorsement frequency of item 1, "Use your common sense," by all but the subjects in the current level V group. It would seem advisable to eliminate this item from the item set, at least for an Army officer population, where common sense appears to be a highly valued commodity. A revision of this item set which replaces the above item and

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revises two other items can be found in Appendix B.

Set G is another item set with a relatively poor item-total correlation (r = .36). Inspection of Table 9 (Appendix A) suggests that the major problem with this item set is that a relatively high proportion of current level III and Lo IV subjects endorsed item 6, "See gaps as pauses in the process." This item was rewritten as "Know that new information creates new gaps." and the original item substituted for "See gaps as missing links in a chain," which had very low endorsement frequencies (6 of 95 endorsements). The revised item set can be found in Appendix B.

Set H had the lowest item-total correlation (.33). Inspection of Table 10 (Appendix A) reveals no obvious reason why this should be the case. One minor problem appears to be that the keying of items 3 and 4 may be reversed. Another possibility is that item 5, "Seek original solutions," may have a high level of social desirability. In consultation with the P.O.C., several items in this set were revised or rewritten to try to boost its validity. The revised item set can be found in Appendix B.

Finally, Table 11 (Appendix A) shows the "most" endorsements for item set I. The only obvious problem with this item set is that there is a high level of endorsement of item 1, "Answers should be straightforward." This investigator's impression from reading a large number of subjects' justifications of this item endorsement is that many current level IV subjects were careful to point out that even when it is desirable to give straightforward answers, the problems may be quite complicated. It might be possible to rewrite this item as follows to reduce the number of current level IVs who endorse it: "Most problem solutions are straightforward." The resulting new item set can be found in Appendix B.

To summarize, the PHRASES item sets had reasonable internal consistency, as reflected by Cronbach's Coefficient Alpha. And while an examination of item responses broken down by subject level suggested a number of ways in which some of the item sets might be improved, there was little evidence that eliminating one or more item sets would appreciably improve internal consistency of the entire PHRASES task.

Analysis of SYMBOLS Statistics. The second part of Task Two of the Statement of Work was an exploration of the best way to use the SYMBOLS data to arrive at an estimate of subjects' Current Conceptual Work Capacity. More specifically, were statistics other than total number of cards to criterion, either separately or in combination with the total, better indicators of a subject's current level than total cards to criterion?

To address this research question a new data set was created which included only those subjects who had a computer generated Symbols performance, whose performance was not "aborted," and who received a current conceptual level score from the present investigator (PL). One hundred and fifteen (115) of the entire sample of 148 met these

criteria and were subjected to the regression analyses described below.

Table 12

Multiple Regression of SYMBOLS Data on Current Conceptual Level (CLPL)

Maximum R-square Improvement for Dependent Variable CLPL

Step 1   Variable MOVES Entered R-square = 0.3350 C(p) = 2.1036

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	1	1.93534	81.93534	56.92	0.0001
Error	113	162.66032	1.43947		
Total	114	244.59565			

Step 2 Variable PROPCRCT Entered R-square = 0.3468 C(p) = 2.0879

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	2	84.83419	42.41710	29.74	0.0001
Error	112	159.76146	1.42644		
Total	114	244.59565			

Step 3 Variable TIME Entered R-square = 0.3474 C(p) = 4.0000

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	3	84.96059	28.32020	19.69	0.0001
Error	111	159.63507	1.43815		
Total	114	244.59565			

No further improvement in R-square is possible.

A Maximum R-square stepwise multiple regression procedure (SAS release 6.04) was used to determine which of the SYMBOLS statistics were independently and in combination the most highly correlated with investigator rated Current Conceptual Level. The Maximum R-square procedure is used to find the "best" n-variable regression models starting with the best single variable model. Next, the best two variable model is

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identified, the one which yields the greatest increase in variance over the single variable model. This procedure continues until no appreciable increase in variance is obtained when additional variables are included or there are no more predictor variables to be added. The three predictor variables were Phrases Most Average (MOST), Phrases Least Average (LEAST), Symbols Moves Total (MOVES), Proportion of Correct Symbols Moves (PROPCRCT), and Average Time of Symbols Moves (TIME).

In the first regression analysis three statistics derived from the computer generated SYMBOLS task were treated as potential predictors of Current Conceptual Capacity, as rated by the present investigator (PL). These statistics were total number of cards to criterion (or to the end of the task, 162 cards), average time taken for each card sort, and the proportion of total cards sorted which were correctly sorted. The results of this analysis can be found in Table 12. Step 1 selected total number of moves as the best single variable predictor of investigator rated Current Conceptual Level. This variable produced an R^2 of .335 ($p < .0001$, $\underline{df} = 1$). In step 2, the total number of cards and proportion of total cards which were correctly sorted were selected for the best two variable model. Inclusion of these two variable in the predictor equation resulted in a small and statistically nonsignificant increase in R^2 from .335 to .347. The effect of the addition of the third predictor to the equation, average time per move, also produced a negligible increase in R^2. To summarize this analysis, it appears that only total number of moves in the SYMBOLS task is a significant predictor of rated conceptual level.

The same Maximum R-square analysis described immediately above was also conducted for the 36 subjects in the data set who received a Current Conceptual Level score from T. O. Jacobs. With such a small sample size, these results should be treated with great caution. The results of the analysis of SYMBOLS predictors of Jacobs' Current Conceptual Level scores are shown in Table 13. As can be seen, none of the predictors accounted for an R^2 significantly different from zero for this small sample. Total number of moves was the best predictor of Jacobs' scores, but the R^2 was only .052. It seems likely that Jacobs relied less on SYMBOLS performance than did the present investigator in assigning an overall Current Conceptual Level score.

A final question which can be addressed using the present data set concerns the extent to which PHRASES statistics ("Most" and "Least" averages) can be combined with SYMBOLS statistics to improve prediction of rated Conceptual Level over and above the use of either set of statistics alone. To examine this question, an additional Maximum R-square regression analysis was conducted where both PHRASES and SYMBOLS statistics were included as possible predictors of Current Conceptual Level, as rated by the current investigator (PL). The results of this analysis are presented in Table 14. The results were dramatic and rather straightforward. As expected from an examination of the first order correlations, the single best predictor of Current Conceptual Level was "Most" average from the PHRASES task. This variable produced an R^2 of .374 ($p < .0001$, $\underline{df} = 1$). The procedure next selected Symbols total cards as contributing the most to a two variable prediction equation, and the increase in R^2 was dramatic. The R^2

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Table 13

Multiple Regression of SYMBOLS Data on Current Conceptual Level (CLTOJ)

Maximum R-square Improvement for Dependent Variable CLTOJ

Step 1 Variable MOVES Entered R-square = 0.0516 C(p) = 0.1775

	DF	Sum of Squares	Mean Square	F	Prob > F
Regression	1	5.85627	5.85627	1.85	0.1826
Error	34	107.55345	3.16334		
Total	35	113.40972			

Step 2 Variable TIME Entered R-square = 0.0569 C(p) = 2.0004

	DF	Sum of Squares	Mean Square	F	Prob > F
Regression	2	6.44830	3.22415	0.99	0.3806
Error	33	106.96142	3.24126		
Total	35	113.40972			

Step 3 Variable PROPCRCT Entered R-square = 0.0569 C(p) = 4.0000

	DF	Sum of Squares	Mean Square	F	Prob > F
Regression	3	6.44957	2.14986	0.64	0.5929
Error	32	106.96016	3.34250		
Total	35	113.40972			

The above model is the best 3-variable model found. No further improvement in R-square is possible.

Table 14

Multiple Regression of PHRASES and SYMBOLS Data on Current Conceptual Level (CLPL)

Maximum R-square Improvement for Dependent Variable CLPL

Step 1 Variable MOST Entered R-square = 0.3739 C(p) = 58.0320

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	1	89.44958	89.44958	65.69	0.0001
Error	110	149.78033	1.36164		
Total	111	239.22991			

Step 2 Variable MOVES Entered R-square = 0.5754 C(p) = 6.5947

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	2	137.65630	68.82815	73.86	0.0001
Error	109	101.57362	0.93187		
Total	111	239.22991			

Step 3 Variable PROPCRCT Entered R-square = 0.5935 C(p) = 3.7925

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	3	141.98839	47.32946	52.57	0.0001
Error	108	97.24152	0.90038		
Total	111	239.22991			

Step 4 Variable LEAST Entered R-square = 0.5973 C(p) = 4.8006

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	4	142.88322	35.72080	39.67	0.0001
Error	107	96.34669	0.90044		
Total	111	239.22991			

Step 5 Variable TIME Entered R-square = 0.6003 C(p) = 6.0000

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	5	143.60546	28.72109	31.84	0.0001
Error	106	95.62445	0.90212		
Total	111	239.22991			

13

increased from .374 to .575, and this increase was statistically highly significant ($p<.0001$, $df=2$). Together, these two predictors produce a multiple r of .76, which approaches the rated reliability of both the CPA score (.81) and the PHRASES "Most" score (Coefficient Alpha = .78). The third variable selected by the Maximum R-square procedure, the Symbols proportion correct statistic, also produced a small but statistically significant increase in the multiple R^2 from .575 to .594 ($p<.05$, $df=3$).

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In general, the present investigation of the Career Path Appreciation (CPA) assessment method yielded results which support the value of conducting further investigations of this approach. First, the CPA Current Conceptual Level scores appear to have adequate rater-rater reliability. Despite the fact that scoring the CPA entails making complex judgements about subjects' multiple responses, and that the two scorers often consulted different parts of the CPA data in making scoring judgements, the Pearson correlation between the two raters' scores was a respectable .81. This rater-rater reliability index is the first known reliability estimate for the CPA. In addition, modest construct validity was demonstrated for the CPA Current Conceptual Capacity scores provided by the present investigator. War college instructors, who rated a subsample of our subjects' strategic thinking skill as demonstrated in War College seminar groups, tended to rate those who scored higher on the CPA as being better thinkers than those who scored lower on the CPA ($r = .57$ and $.51$ on two different thinking skill measures). Given the dependence of validity estimates on reliability, this validity finding lends further support to the reliability of the CPA scores.

Search for possible objective approaches to scoring the CPA also yielded promising results. Analysis of the Phrases portion of the CPA yielded respectable Cronbach Coefficient Alphas for the Phrases "Most" scores and these scores were reasonably good predictors of rated Current Conceptual Capacity scores. Furthermore, item analyses of the Phrases item sets suggested that all nine item sets should be retained. Similar analyses of the objective indices generated by the computer controlled Symbols task of the CPA showed that the index of the total number of cards sorted is also a reasonably good predictor of rated Current Conceptual Capacity, at least for some raters. Most encouraging of all, in terms of the likelihood of being able to develop an objective scoring procedure for the CPA, is the finding that a combination of the principal objective scores from the Phrases and Symbols tasks (Phrases "Most" average and Symbols total cards sorted), when combined, produce a level of prediction of rated CPA scores which is very close to the reliability estimates of the measures. Finally, examination of individual responses to the Phrases task by subjects classified into four conceptual capacity levels on the basis of their investigator rated CPA performances suggested ways in which some of the Phrases item sets might be improved.

Overall, the present investigation suggests that the CPA assessment methodology

may be a good candidate for the assessment of individual conceptual characteristics which are believed to be essential to the effective accomplishment of complex organizational work. It should be kept in mind, however, that the present sample of U.S. Army War College students is a highly homogeneous group with respect to age, gender, organizational level, and work socialization background. Therefore, generalization of the present findings to other populations would appear to be unwarranted. Nonetheless, the strength of the present results are testimony to the power of Stratified Systems Theory, from which the CPA was derived, and to the work of Gillian Stamp in developing the CPA assessment approach.

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APPENDIX A

Bar Graphs Showing Frequency of Selection of CPA PHRASES Items
For the Nine Item Sets Broken Down by Subject Group
For 96 War College Students

Table 3

"Most" Responses to Set A of CPA PHRASES by Subjects Classified at Four Different Current Capacity Levels (III, LoIV, HiIV, and V)

LEVEL=III

FREQUENCY OF SET A

		FREQ	CUM FREQ	PERCENT
1	*******	4	4	12.90
2	************************************	18	22	58.06
3	**	1	23	3.23
4	**	1	24	3.23
5	*******	4	28	12.90
6	******	3	31	9.68

```
----+---+---+---+---+---+---+---+---+
    2   4   6   8  10  12  14  16  18
              FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET A

		FREQ	CUM FREQ	PERCENT
1	**	1	1	3.57
2	***********************	12	13	42.86
3	******	3	16	10.71
4	**	1	17	3.57
5	**********	5	22	17.86
6	**********	5	27	17.86
7	**	1	28	3.57

```
----+---+---+---+---+---+
    2   4   6   8  10  12
          FREQUENCY
```

Phrases -
1 - Work to a complete set of instructions
2 - Work within a given framework
3 - Work with connections even if particular links are unclear
4 - Work in abstracts and concepts
5 - Work with a minimum of preconceptions
6 - Define the horizons of the work
7 - (Two or more phrases identified as "Most")

Table 3 Continued

LEVEL=HiIV

FREQUENCY OF SET A

		FREQ	CUM FREQ	PERCENT
1	**********	2	2	8.33
2	***************	3	5	12.50
3	**********	2	7	8.33
4	***************	3	10	12.50
5	******************************	6	16	25.00
6	**************************************	7	23	29.17
7	*****	1	24	4.17

```
    ----+----+----+----+----+----+----+
        1    2    3    4    5    6    7
                FREQUENCY
```

LEVEL=V

FREQUENCY OF SET A

SET A		FREQ	CUM FREQ	PERCENT
3	**********	2	2	15.38
4	**********	2	4	15.38
5	*****	1	5	7.69
6	******************************	6	11	46.15
7	**********	2	13	15.38

```
    ----+----+----+----+----+----+
        1    2    3    4    5    6
            FREQUENCY
```

Table 4

"Most" Responses to Set B of CPA PHRASES by Subjects Classified at Four Different Current Capacity Levels (III, LoIV, HiIV, and V)

LEVEL=III

FREQUENCY OF SET B

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	*************	7	7	22.58	22.58
2	*******	4	11	12.90	35.48
3	*********************	11	22	35.48	70.97
4	***********	6	28	19.35	90.32
5	****	2	30	6.45	96.77
6	**	1	31	3.23	100.00

```
----+---+---+---+---+--
    2   4   6   8   10
        FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET B

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
2	****	2	2	7.14	7.14
3	*****************	9	11	32.14	39.29
4	**********************	12	23	42.86	82.14
6	****	2	25	7.14	89.29
7	******	3	28	10.71	100.00

```
----+---+---+---+---+---+
    2   4   6   8   10  12
        FREQUENCY
```

Phrases -
1 - Do one thing at a time
2 - Focus on one part of the task at a time
3 - Co-ordinate by drawing together a number of separate strands
4 - Compare the merits of alternative options
5 - Establish new relationships between previously unrelated materials
6 - Use words, ideas, and theories as tools
7 - (Two or more phrases identified as "Most")

Table 4 Continued

LEVEL=HiIV

FREQUENCY OF SET B

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
2	|**********	2	2	8.33	8.33
3	|********************	4	6	16.67	25.00
4	|***********************************	7	13	29.17	54.17
5	|***************	3	16	12.50	66.67
6	|********************	4	20	16.67	83.33
7	|********************	4	24	16.67	100.00

```
    ----+----+----+----+----+----+----+
        1    2    3    4    5    6    7
             FREQUENCY
```

LEVEL=V

FREQUENCY OF SET B

		FREQ	CUM FREQ	PERCNT	CUM PERCNT
3	|****	1	1	7.69	7.69
4	|****	1	2	7.69	15.38
5	|************************************	9	11	69.23	84.62
6	|****	1	12	7.69	92.31
7	|****	1	13	7.69	100.00

```
    ---+---+---+---+---+---+---+---+---+
       1   2   3   4   5   6   7   8   9
            FREQUENCY
```

Table 5

"Most" Responses to Set C of CPA PHRASES by Subjects Classified at F ` Different Current Capacity Levels (III, LoIV, HiIV, and V)

LEVEL=III

FREQUENCY OF SET C

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	***	3	3	9.68	9.68
2	*****	5	8	16.13	25.81
4	*	1	9	3.23	29.03
5	******************	19	28	61.29	90.32
6	**	2	30	6.45	96.77
7	*	1	31	3.23	100.00

```
--+-+-+-+-+-+-+-+-
  2   6  10  14  18
        FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET C

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	*	1	1	3.57	3.57
3	*	1	2	3.57	7.14
5	********************	21	23	75.00	82.14
6	*	1	24	3.57	85.71
7	****	4	28	14.29	100.00

```
--+-+-+-+-+-+-+-+-
  2   6  10  14  18
        FREQUENCY
```

Phrases -
1 - Follow the rules
2 - Work within the rules
3 - Extrapolate from the given rules
4 - Look for the pattern of the rules
5 - See the rules as guides to action
6 - Redefine the rules
7 - (Two or more phrases identified as "Most")

A-6

Table 5 Continued

LEVEL=HiIV

FREQUENCY OF SET C

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
3	****	2	2	8.33	8.33
4	****	2	4	8.33	16.67
5	********************************	16	20	66.67	83.33
7	********	4	24	16.67	100.00

```
----+---+---+---+---+---+---+---+
    2   4   6   8   10  12  14  16
                FREQUENCY
```

LEVEL=V

FREQUENCY OF SET C

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
3	*****	1	1	7.69	7.69
4	**********	2	3	15.38	23.08
5	********************	4	7	30.77	53.85
6	********************	4	11	30.77	84.62
7	**********	2	13	15.38	100.00

```
----+----+----+----+
    1    2    3    4
         FREQUENCY
```

Table 6

"Most" Responses to Set D of CPA PHRASES by Subjects Classified at Four Different Current Capacity Levels (III, LoIV, HiIV, and V)

LEVEL=III

FREQUENCY OF SET D

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	********	4	4	12.90	12.90
2	*******	4	8	12.90	25.81
3	*******************************	16	24	51.61	77.42
4	************	6	30	19.35	96.77
6	**	1	31	3.23	100.00

```
----+---+---+---+---+---+---+---+
    2   4   6   8  10  12  14  16
            FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET D

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	**	1	1	3.57	3.
2	****	2	3	7.14	10.71
3	***********************	12	15	42.86	53.57
4	*******************	10	25	35.71	89.29
7	******	3	28	10.71	100.00

```
----+---+---+---+---+---+
    2   4   6   8  10  12
            FREQUENCY
```

Phrases -
1 - Follow instructions carefully
2 - Approach each task in own right
3 - Take a systematic approach
4 - Span a broad spectrum and also focus in detail
    on certain aspects
5 - Restructure the task
6 - Transcend the task
7 - (Two or more phrases identified as "Most")

Table 6 continued

LEVEL=HiIV

FREQUENCY OF SET D

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	**	1	1	4.17	4.17
2	**	1	2	4.17	8.33
3	********************	10	12	41.67	50.00
4	********************	10	22	41.67	91.67
7	****	2	24	8.33	100.00

```
----+---+---+---+---+
    2   4   6   8   10
        FREQUENCY
```

LEVEL=V

FREQUENCY OF SET D

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
3	****	2	2	15.38	15.38
4	******	3	5	23.08	38.46
6	************	6	11	46.15	84.62
7	****	2	13	15.38	100.00

```
----+---+---+
    2   4   6
    FREQUENCY
```

Table 7

"Most" Responses to Set E of CPA PHRASES by Subjects Classified at Four Different Current Capacity Levels (III, LoIV, HiIV, V)

LEVEL=III

FREQUENCY OF SET E

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	*********************	11	11	35.48	35.48
2	************	6	17	19.35	54.84
3	**	1	18	3.23	58.06
4	************	6	24	19.35	77.42
5	**********	5	29	16.13	93.55
6	**	1	30	3.23	96.77
7	**	1	31	3.23	100.00

```
----+---+---+---+---+--
    2   4   6   8   10
         FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET E

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	*******	4	4	14.29	14.29
2	*******	4	8	14.29	28.57
3	**	1	9	3.57	32.14
4	*******	4	13	14.29	46.43
5	**********************	12	25	42.86	89.29
6	****	2	27	7.14	96.43
7	**	1	28	3.57	100.00

```
----+---+---+---+---+---+
    2   4   6   8   10  12
         FREQUENCY
```

Phrases -
1 - Do first things first
2 - Break up aproblem into separate parts
3 - Look for sequences or common relationships
4 - Analyse problems by searching for their underlying structure
5 - Create an overall picture of the problem
6 - Consider the context of the problem
7 - (Two or more phrases identified as "Most")

A-10

Table 7 Continued

LEVEL=HiIV

FREQUENCY OF SET E

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
2	****	2	2	8.33	8.33
3	****	2	4	8.33	16.67
4	*******	4	8	16.67	33.33
5	******************	9	17	37.50	70.83
6	********	4	21	16.67	87.50
7	******	3	24	12.50	100.00

```
----+---+---+---+--
    2   4   6   8
      FREQUENCY
```

LEVEL=V

FREQUENCY OF SET E

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
3	*****	1	1	7.69	7.69
4	********************	4	5	30.77	38.46
5	************************	5	10	38.46	76.92
6	**********	2	12	15.38	92.31
7	*****	1	13	7.69	100.00

```
----+----+----+----+----+
    1    2    3    4    5
        FREQUENCY
```

Table 8

"Most" Responses to Set F of CPA PHRASES by Subjects Classified at Four Different Current Capacity Levels (III, LoIV, HiIV, and V)

LEVEL=III

FREQUENCY OF SET F

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	|****************************	29	29	93.55	93.55
3	|*	1	30	3.23	96.77
4	|*	1	31	3.23	100.00

```
    ----+----+----+----+----+----
        5   10   15   20   25
                 FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET F

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	|********************	21	21	75.00	75.00
3	|**	2	23	7.14	82.14
4	|*	1	24	3.57	85.71
5	|***	3	27	10.71	96.43
7	|*	1	28	3.57	100.00

```
    ----+---+---+---+---+-
        4   8  12  16  20
                FREQUENCY
```

Phrases -
    1 - Use your common sense
    2 - Allot a specific amount of time to each task
    3 - Tolerate Uncertainty
    4 - Handle ambiguity by developing opposing points of view
    5 - Expect that a task will be transformed while it is
        in progress
    6 - Transform the task to create uncertainty
    7 - (Two or more phrases identified as "Most")

Table 8 Continued

LEVEL=HiIV

FREQUENCY OF SET F

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	|******************	17	17	70.83	70.83
2	|*	1	18	4.17	75.00
3	|**	2	20	8.33	83.33
4	|*	1	21	4.17	87.50
5	|*	1	22	4.17	91.67
7	|**	2	24	8.33	100.00

```
     ----+---+---+---+-
         4   8  12  16
              FREQUENCY
```

LEVEL=V

FREQUENCY OF SET F

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	|**********	2	2	15.38	15.38
3	|**********	2	4	15.38	30.77
5	|************************	5	9	38.46	69.23
6	|**********	2	11	15.38	84.62
7	|**********	2	13	15.38	100.00

```
     ----+----+----+----+----+
         1    2    3    4    5
              FREQUENCY
```

Table 9

"Most" Responses to Set G of CPA PHRASES by Subjects Classified at Four Different Current Capacity Levels (III, LoIV, HiIV, and V)

LEVEL=III

FREQUENCY OF SET G

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	********	3	3	10.00	10.00
2	********	3	6	10.00	20.00
3	********	3	9	10.00	30.00
4	**************************	9	18	30.00	60.00
5	***************	5	23	16.67	76.67
6	********************	7	30	23.33	100.00

```
---+--+--+--+--+--+--+--+--+
   1  2  3  4  5  6  7  8  9
          FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET G

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	**	1	1	3.57	3.57
3	****	2	3	7.14	10.71
4	******************************	15	18	53.57	64.29
5	**	1	19	3.57	67.86
6	**************	7	26	25.00	92.86
7	****	2	28	7.14	100.00

```
---+---+---+---+---+---+---+--
   2   4   6   8   10  12  14
          FREQUENCY
```

Phrases -
- 1 - Stop if there is a problem
- 2 - See gaps in knowledge as interruptions to work
- 3 - See gaps in knowledge as missing links in a chain
- 4 - See gaps in knowledge as missing pieces of a jigsaw
- 5 - See gaps as the most interesting part
- 6 - See gaps as pauses in the process
- 7 - (Two or more phrases identified as "Most")

Table 9 Continued

LEVEL=HiIV

FREQUENCY OF SET G

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	**	1	1	4.17	4.17
2	**	1	2	4.17	8.33
4	******************	9	11	37.50	45.83
5	**************	7	18	29.17	75.00
6	********	4	22	16.67	91.67
7	****	2	24	8.33	100.00

```
--+---+---+---+---+
  1   3   5   7   9
      FREQUENCY
```

LEVEL=V

FREQUENCY OF SET G

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
3	**	1	1	7.69	7.69
4	**	1	2	7.69	15.38
5	******************	9	11	69.23	84.62
7	****	2	13	15.38	100.00

```
--+---+---+---+---+
  1   3   5   7   9
      FREQUENCY
```

A-15

Table 10

"Most" Responses to Set H of CPA PHRASES by Subjects Classified at Four Different Current Capacity Levels (III, LoIV, HiIV, and V)

LEVEL=III

FREQUENCY OF SET H

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	**	1	1	3.23	3.23
2	************************************	13	14	41.94	45.16
3	**************	7	21	22.58	67.74
4	**********	5	26	16.13	83.87
5	**********	5	31	16.13	100.00

```
----+---+---+---+---+---+--
    2   4   6   8  10  12
         FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET H

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
2	****************	8	8	28.57	28.57
3	**************	7	15	25.00	53.57
4	********************	10	25	35.71	89.29
5	****	2	27	7.14	96.43
7	**	1	28	3.57	100.00

```
+---+---+---+---+---+
    2   4   6   8  10
         FREQUENCY
```

Phrases -
1 - Expect to be told what to do
2 - Work out the answer from previous experience
3 - Expect that a solution will emerge
4 - Resolve tasks by choosing between alternatives
5 - Seek original solutions
6 - See the solution as the beginning of a new problem
7 - (Two or more phrases identified as "Most")

A-16

Table 10 Continued

LEVEL=HiIV

FREQUENCY OF SET H

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
2	************************	5	5	20.83	20.83
3	*****************************	6	11	25.00	45.83
4	************************	5	16	20.83	66.67
5	*******************	4	20	16.67	83.33
6	*****	1	21	4.17	87.50
7	***************	3	24	12.50	100.00

```
-----+----+----+----+----+----+
     1    2    3    4    5    6
          FREQUENCY
```

LEVEL=V

FREQUENCY OF SET H

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
2	**********	1	1	8.33	8.33
3	********************	2	3	16.67	25.00
4	********************	2	5	16.67	41.67
5	******************************	3	8	25.00	66.67
6	********************	2	10	16.67	83.33
7	********************	2	12	16.67	100.00

```
----------+---------+---------+
     1         2         3
          FREQUENCY
```

A-17

Table 11

"Most" Responses to Set I of CPA PHRASES by Subjects Classified at Four Different Current Capacity Levels (III, LoIV, HiIV, and V)

LEVEL=III

FREQUENCY OF SET I

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	*****************	17	17	54.84	54.84
2	*****	5	22	16.13	70.97
3	*****	5	27	16.13	87.10
4	*	1	28	3.23	90.32
6	**	2	30	6.45	96.77
7	*	1	31	3.23	100.00

```
+---+---+---+---+--
    4   8  12  16
       FREQUENCY
```

LEVEL=LoIV

FREQUENCY OF SET I

		FREQ	CUM FREQ	PERCENT	CUM PERCENT
1	*****************************	7	7	25.00	25.00
2	********************	5	12	17.86	42.86
3	*******	2	14	7.14	50.00
4	****************************	7	21	25.00	75.00
5	*******	2	23	7.14	82.14
6	****************	4	27	14.29	96.43
7	****	1	28	3.57	100.00

```
----+---+---+---+---+---+---+
    1   2   3   4   5   6   7
           FREQUENCY
```

Phrases -
1. - Answers should be straightforward
2. - Options should not be discarded
3. - Go back to the beginning if the thread is lost
4. - Hold a solution while developing an alternative approach
5. - Discard solutions when you deem it necessary
6. - There are no permanent solutions
7. - (Two or more phrases identified as "Most")

Table 11 Continued

LEVEL=HiIV

FREQUENCY OF SET I

```
                                      CUM                   CUM
                              FREQ    FREQ   PERCENT    PERCENT

1   |********************************    9       9    37.50      37.50
2   |********                            3      12    12.50      50.00
4   |************                        4      16    16.67      66.67
6   |******************                  6      22    25.00      91.67
7   |******                              2      24     8.33     100.00
    ---+--+--+--+--+--+--+--+--+--+
       1  2  3  4  5  6  7  8  9
              FREQUENCY
```

LEVEL=V

FREQUENCY OF SET I

```
                                      CUM                   CUM
                              FREQ    FREQ   PERCENT    PERCENT

1   |****                                2       2    15.38      15.38
6   |********************               10      12    76.92      92.31
7   |**                                  1      13     7.69     100.00
    ---+---+---+---+---+
        2   4   6   8   10
             FREQUENCY
```

APPENDIX B

Revised PHRASES Item Set and

Scoring Key

WORK STYLE INVENTORY

On each of the following pages you will find a list of six
phrases. Each phrase describes one way of approaching work.
Your first task is to read each of the six phrases and then
choose the one which is **MOST LIKE THE WAY YOU PREFER TO APPROACH
A PIECE OF WORK**. When you have decided, place an "X" to the left
of that phrase.

There are no right or wrong answers. We are only interested in
how you prefer to operate when working.

After you have indicated which phrase is most like you prefer to
approach a piece of work, next decide which of the remaining
phrases is **LEAST LIKE THE WAY YOU PREFER TO APPROACH YOUR WORK**.
When you have decided, place a "L" to the left of that phrase.

Finally, at the bottom of each page write two or three sentences
indicating why you picked the phrase you did as your most
preferred phrase.

**IF YOU ARE AT ALL UNCLEAR ABOUT HOW TO PROCEED, PLEASE ASK US TO
CLARIFY THESE INSTRUCTIONS**

Place an **"M"** to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an **"L"** to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

Set A:

_____ Work within a given framework

_____ Work with a minimum of preconceptions

_____ Define the horizons of the work

_____ Work to a complete set of instructions

_____ Work with connections even if particular links are unclear

_____ Work in abstracts and concepts

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your **"MOST"** choice.

Place an "M" to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an "L" to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

Set B:

_____ Use words, ideas, and theories as tools

_____ Establish new relationships between previously
        unrelated materials

_____ Do one thing at a time

_____ Co-ordinate by drawing together a number of separate
        strands

_____ Focus on one part of the task at a time

_____ Compare the merits of alternative options

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your "MOST" choice.

Place an "M" to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an "L" to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

SET C:

_____ Follow the rules

_____ Make sure the rules fit

_____ Redefine the rules

_____ Look for the intent of the rules

_____ Work within the rules

_____ Use the rules as guides to action

_____

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your "MOST" choice.

Place an "M" to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an "L" to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

SET D:

    _____   Take a systematic approach

    _____   Look for relationships between the current task and other tasks

    _____   Approach each task in its own right

    _____   Transcend the task

    _____   Follow instructions carefully

    _____   Span a broad spectrum and also focus in detail on certain aspects

---

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your "MOST" choice.

Place an "M" to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an "L" to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

SET E:

_____ Look for underlying issues

_____ Break up the problem into separate parts

_____ Consider the context of the problem

_____ Do first things first

_____ Look for underlying issues

_____ Figure out the right sequence of tasks

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your "MOST" choice.

Place an "M" to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an "L" to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

SET F:

_____ Handle ambiguity by developing opposing points of view

_____ Follow a set procedure

_____ Allot a specific amount of time to each task

_____ Transform the task

_____ Expect that a task will be transformed while it is in progress

_____ Impose a procedure to reduce uncertainty

_____

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your "MOST" choice.

Place an "M" to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an "L" to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

SET G:

_____ See gaps in knowledge as missing pieces of a jigsaw

_____ See gaps as pauses in the process

_____ See gaps in knowledge as interruptions to work

_____ Know that new information creates new gaps

_____ Stop if there is a problem

_____ See gaps as the most interesting part

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your "MOST" choice.

Place an "M" to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an "L" to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

SET H:

_____ Expect to be told what to do

_____ Resolve tasks by formulating alternatives

_____ See the solution as the beginning of a new problem

_____ Rely mainly on previous experience

_____ Expect that the situation will resolve itself in time

_____ Seek to develop an original solution

_____

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your "MOST" choice.

Place an "M" to the left of the phrase which is <u>most</u> like the way you prefer to approach a piece of work

Next place an "L" to the left of the phrase which is <u>least</u> like the way you prefer to approach your work

SET I:

_____ There are no permanent solutions

_____ Most problem solutions are straightforward

_____ Options should not be discarded

_____ Go back to the beginning if the thread is lost

_____ Conflicting solutions must sometimes be accepted

_____ Hold a solution while developing an alternative approach

---

Below write a few sentences which explain <u>why</u> you picked the particular phrase you did as your "MOST" choice.

REVISED PHRASES (PHRASES II)
SCORING KEY (2/93)

SET A:

- II Work within a given framework
- V Work with a minimum of preconceptions
- VI Define the horizons of the work
- I Work to a complete set of instructions
- III Work with connections even if particular links are
       unclear
- IV Work in abstracts and concepts

SET B:

- VI Use words, ideas, and theories as tools
- V Establish new relationships between previously
       unrelated materials
- I Do one thing at a time
- III Co-ordinate by drawing together a number of separate
       strands
- II Focus on one part of the task at a time
- IV Compare the merits of alternative options

SET C:

- I Follow the rules
- III Make sure the rules fit
- VI Redefine the rules
- IV Look for the intent of the rules
- II Work within the rules
- V Use the rules as guides to action

SET D:

- III Take a systematic approach
- V Look for relationships between the current task and
       other tasks
- II Approach each task in its own right
- VI Transcend the task
- I Follow instructions carefully
- IV Span a broad spectrum and also focus in detail on
       certain aspects

SET E:

- V Look for underlying issues
- II Break up the problem into separate parts
- VI Consider the context of the problem
- I Do first things first
- IV Create an overall picture of the problem
- III Figure out the right sequence of tasks

SET F:

- IV   Handle ambiguity by developing opposing points of view
- I   Follow a set procedure
- II   Allot a specific amount of time to each task
- VI   Transform the task
- V   Expect that a task will be transformed while it is in progress
- III   Impose a procedure to reduce uncertainty

SET G:

- IV   See gaps in knowledge as missing pieces of a jigsaw
- III   See gaps as pauses in the process
- II   See gaps in knowledge as interruptions to work
- VI   Know that new information creates new gaps
- I   Stop if there is a problem
- V   See gaps as the most interesting part

SET H:

- I   Expect to be told what to do
- IV   Resolve tasks by formulating alternatives
- VI   See the solution as the beginning of a new problem
- II   Rely mainly on previous experience
- III   Expect that the situation will resolve itself in time
- V   Seek to develop an original solution

SET I:

- V   There are no permanent solutions
- I   Most problem solutions are straightforward
- II   Options should not be discarded
- III   Go back to the beginning if the thread is lost
- VI   Conflicting solutions must sometimes be accepted
- IV   Hold a solution while developing an alternative approach

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