

# Career Development Inventory

Volume 1: User's Manual

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# Acknowledgments

The development of a test was once an enterprise that could be undertaken by one person with the help of a few assistants. This has long since ceased to be the case, because the technical and ethical requirements of educational, vocational, and psychological measures have become clearer and more demanding. It now usually takes a testing agency to develop and standardize a test.

The *Career Development Inventory* (CDI) is an exception: it was developed by five university professors with the assistance of several graduate students; a number of colleagues in other universities; many former students now working in schools, colleges, and universities; and a large number of school and college personnel who have been interested in helping to devise a multidimensional measure of career maturity.

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## Note to Readers

The *User's Manual* is designed to facilitate research and field use of the *Career Development Inventory* (CDI). This manual emphasizes the CDI's rationale, content, administration, scoring, interpretation and use in field situations, basic psychometric characteristics, and norms.

Researchers and other serious users should also study the *Technical Manual*, which presents background information on the theory and research underlying the development of the instrument and provides detailed data on its psychometric characteristics.

# I. Introduction

## WHY MEASURE CAREER DEVELOPMENT?

Career development includes occupational awareness, planfulness, desire to explore the world of work, recognition of changes in the tasks of vocational development that one faces with increased age and social responsibility, and knowledge of the world of work and of appropriate occupations. Just as all boys and girls, and men and women, do not develop at the same rate, whether physically, intellectually, socially, or emotionally, similarly in career development, individual differences distinguish even people of the same age and socioeconomic and educational status.

As boys and girls progress through school, they make decisions, although not specifically occupational in the early years. For example, the decision in elementary school to be a good student creates career possibilities that are not available to the pupil who decides not to try for good grades; the decision to take 9th-grade algebra provides for occupational choices that are forfeited by the pupil who chooses general mathematics, unless remedial action is taken later. As the educational level increases, the occupational implications of career decisions become clearer. Therefore, educators ask questions such as the following:

1. When should instruction in the special disciplines and in the various vocational and professional fields begin?
2. When should students be expected to choose between courses leading to different types of education and thus to different fields of work and occupations?
3. Is this student or group of students ready to make the choices called for by the school or college system and by the organization of the curriculum?
4. Does taking a certain course, studying a certain unit, engaging in a certain extracurricular activity, being enrolled in a work experience program, or being counseled by a professional counselor in any way affect the readiness of students to make these decisions? (Super, 1974, p. 9).

In a monograph based on a thorough survey of the literature, Mitchell (1979) emphasized the need to be able to answer such questions. Other researchers in career education, career counseling, and career development (Adams & Walker, 1977; Enderlein, 1976; Hoyt, 1980; McCaslin, Gross, & Walker, 1977; and Young & Schuh, 1975) also report how widespread the need is.

The *Career Development Inventory* (CDI) has been made available for general use as a sound instrument for

assessing career development and vocational or career maturity. Its publication follows research beginning in 1951 (Super, et al., 1957) that documented the lack of readiness for career decisions in the 9th grade (Super & Overstreet, 1960), paved the way for the development of practical measures, and then led to test and inventory development work, underway since 1967 (Myers, et al., 1972).

## CDI FORMS

The CDI has a School Form, designed for use in junior and senior high schools, and a College and University Form, for use in higher education. The forms are similar in rationale and structure; they differ in item content, which is adapted to the appropriate occupational options and levels of education.

The School Form was designed for use in grades 8 through 12 and has national norms for grades 9 through 12. The vocabulary level of the first four CDI scales (CP, CE, DM, and WW) is suitable for grade 8 and above. One scale, Knowledge of Preferred Occupational Group (PO), is suitable for grades 11 and 12 and is difficult for many students in grade 10 and below because of the occupational terms, mature concepts (special aptitudes, interests, and values), and occupational information that typically come only with maturity, all of which are necessary components of PO.

The School Form can be used to help students make educational and career plans, whether administered in formal courses or in individual counseling. It may also help students who need to make decisions for which they may not be prepared, and it may contribute to program and service evaluation.

The College and University Form was designed to resemble the School Form, so longitudinal comparisons could be made. The content was modified to fit the college and university context and to focus largely on occupations typically entered by college graduates. The terminology and constructs are familiar to students at this level. The College and University Form is recommended for assessing the readiness of entering college students to make career decisions and thus for identifying those who need arousal, decision-making training, exploratory attitudes, occupational exploration in breadth, or in-depth exploration of a preferred field. This form can be used in counseling, planning career education, and evaluating programs and services. It can be particularly useful to liberal arts majors when choosing a major field and later when considering postgraduate education.

## CDI SCALES

The CDI consists of eight scales. Five assess specific dimensions of career development; two measure two group factors (conative and cognitive) that underly these dimensions; and one scale combines the two factors and thus provides a total score. The scales are as follows, and the relationship of the scales is shown in Figure 1:

- CP—Career Planning: 20 items
- CE—Career Exploration: 20 items
- DM—Decision-Making: 20 items
- WW—World-of-Work Information: 20 items
- PO—Knowledge of Preferred Occupational Group: 40 items
- CDA—Career Development—Attitudes: CP and CE combined
- CDK—Career Development—Knowledge and Skills: DM and WW combined
- COT—Career Orientation Total: CP, CE, DM, and WW combined

CP and CE have very low correlations with cognitive measures, such as tests of scholastic aptitude and achievement, and they load on a factor distinct from that on which DM and WW load. DM and WW correlate with aptitude and achievement tests (see the *Technical Manual* for data on these and other statistical analyses). PO, also a cognitive test, assesses knowledge of the occupational group that interests the student most; it is excluded from the combined scales because it is a more advanced scale and is most appropriate for mature students choosing curricula, major fields, or jobs. The CDI user may select specificity or generality when choosing from the available scales and may make a selection suited to the particular application.

**Career Planning (CP)** comprises 20 items in which the student reports the career planning in which he or she has engaged and the degree of engagement, for example: talking about career plans with an adult friend, getting a part-time or summer job that will help in deciding what kind of occupation to choose, and getting a job after finishing education or training. These items also have students rate their own knowledge of the kind of work that they would like to do, including what people really do on the job, the abilities and training needed, and so on. Although some items may appear cognitive, item and scale factor analyses of data obtained in the United States and elsewhere make it clear that the scale actually assesses attitudes and reported planfulness.

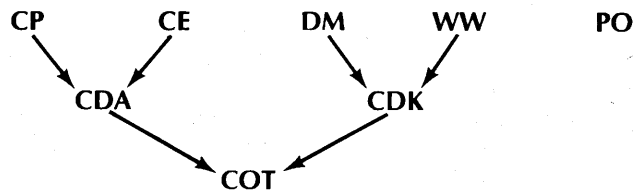


Figure 1. Relationship of the CDI Scales

**Career Exploration (CE)** is also a 20-item self-report scale. The first 10 questions ask the student to rate relatives, friends, people in the college or occupation being considered, other adults, printed materials, and the media as sources of career information. The remaining 10 ask for ratings of the usefulness of the information received from each of those sources. Thus, the student's use of good and poor sources can be compared with the use reported by others. As in CP, research has repeatedly shown that CE is an attitudinal rather than a cognitive scale and is a measure of the quality of exploratory attitudes.

**Decision-Making (DM)** is made up of 20 brief sketches of people making career decisions. Initials are used instead of names; this prevents identification of sex. The sketches cover a range of grade and occupational levels and both traditionally male and traditionally female occupations. The scale measures the ability to apply knowledge and insight to career planning and decision making. The rationale is that students who can solve the career problems in these sketches are more capable of making wise decisions about their own careers. Although DM might appear to be attitudinal at least in part, it loads heavily on the cognitive factor and assesses ability to apply principles of career decision making.

**World-of-Work Information (WW)** comprises 20 questions, 10 of which assess knowledge of the career-development tasks in the Exploratory and the early Establishment Stages, as described by Super (1957; also Super & Bohn, 1970). The other 10 questions test knowledge of the occupational structure, of sample occupations ranging from semiskilled to professional and executive, and of techniques for getting and holding a job. As a cognitive scale, WW tests the career awareness and occupational knowledge that contribute to successful career planning.

**Knowledge of the Preferred Occupational Group (PO)** is made up of 40 multiple-choice questions that pertain to all occupations, which are categorized into 20 groups. To help students identify the group that interests them most, the CDI includes a modified version of the Career Planning Questionnaire of the *Differential Aptitude Tests* (The Psychological Corporation, 1972). Before reading the PO questions, students are referred to the categories and instructions, which appear on the back of the CDI answer sheet. Having indicated on the answer sheet a preferred occupational group, students answer the PO questions with their group in mind. Scoring of PO answers, which differs for each occupational group, is based on objective data from sources, such as the Dictionary of Occupational Titles (U.S. Department of Labor, 1977); if objective data are unavailable, scoring is based on the judgment of 20 expert vocational psychologists (80% agreement was required for the retention of an item). PO measures the results of the in-depth exploration that should precede the choice of training or occupation. Because the scale applies to groups of occupations, it is not as probing as a test of specific occupations, and the items do not cover equally all aspects of occupations. Thorough coverage is given to job characteristics, psychological requirements, education, and training; duties are covered only in broad categories (data, people, and things); and the least coverage is given to techniques for getting jobs, employment prospects, and places and hours of work.

**Career Development—Attitudes (CDA)** combines CP and CE, scales that are highly intercorrelated and that share factor loadings. The combination has increased reliability as a measure of attitude, but is less specific because it combines planning and exploration.

**Career Development—Knowledge and Skills (CDK)** combines DM and WW. CDK assesses the highly intercorrelated knowledge of how to make career decisions with knowledge of the world of work, including its mores and its occupations. The combination makes a concise cognitive scale with increased reliability. Little meaning is lost by combining DM and WW; the combination is comparable to a combination of grammar and spelling tests or algebra and geometry tests.

**Career Orientation Total (COT)** combines CP, CD, DM, and WW. COT approaches a measure of career or vocational maturity, but it should not be titled as such, because it measures only four of the five basic dimensions in Super's (1974) model of adolescent vocational maturity. COT is best viewed as a composite measure of four important aspects of career maturity.

## POTENTIAL USES OF THE CDI

Field trials and research have shown the value of the CDI in individual counseling, group assessment, and program evaluation and planning. In individual counseling, examination of scale scores on the CDI profile yields a psychologically meaningful report of the individual's career-development needs. In group assessment, CDI can be used in studying cohort groups, such as year levels and program affiliations, to determine group differences and changes over time. In program evaluation, pre- and posttesting with the CDI can help to measure the impact of programs, such as career education, counseling, and program components. In program planning, analysis of the item responses in CP and CE are particularly valuable: CP item responses identify the planning activities students are engaged in, whereas CE items reveal what career-exploration resources the students are using and how much help the students think they are getting.

Detailed suggestions for interpreting and using CDI results are given in Chapter III: Uses of the CDI Results.

## II. Administration and Scoring

The CDI may be administered to individuals or groups and may be given in one or two sessions. It is untimed, and administration requires only clarification of instructions and ordinary proctoring.

Part I (Career Orientation) takes about 40 minutes and Part II (Knowledge of Preferred Occupations) takes about 25 minutes to complete. Both parts are printed on the same reusable test booklet. Responses are recorded on a separate answer sheet.

Part I includes:

- CP—Career Planning: items 1-20
- CE—Career Exploration: items 21-40
- DM—Decision-Making: items 41-60
- WW—World-of-Work Information: items 61-80

Part II includes:

- PO—Knowledge of Preferred Occupations:  
items 1-40

### ADMINISTRATION

1. **DISTRIBUTION OF MATERIALS:** Distribute test booklets and answer sheets; read aloud the instructions on the front of the answer sheet. Students must use No. 2 pencils.
2. **NAME:** Students should write their names *vertically* from top to bottom and should leave a space between last and first names. If the entire first name will not fit in the boxes, initials should be used instead. Appropriate letters must be darkened in the horizontal lines in the name section.
3. **SEX AND GRADE OR YEAR:** No percentile scores can be reported unless the boxes for these items are filled in properly. On the School Form answer sheet, *JC* stands for *Junior College*. Year, instead of grade, is designated on the College and University Form answer sheet.
4. **SCHOOL PROGRAM OR MAJOR:** On the School Form answer sheet, students may indicate their program using any code prescribed. Be sure to keep a record of the code used. In trial testing, the following code proved useful for many schools:

- A for general
- B for college preparatory or academic
- C for vocational/technical
- D for commercial/business
- E for honors

On the College and University Form answer sheet, students may indicate their major according to any code the administrator establishes.

5. **IDENTIFICATION NUMBER:** This may be left blank, or you may instruct students to use it for any purpose you choose, for example, to identify a teacher, counselor, or school.
6. **OCCUPATIONAL GROUP PREFERENCE FORM:** Ask students to turn over their answer sheets and read the instructions for the Occupational Group Preference Form (OGPF).
7. **STEP ONE OF OGPF:** Students should check *all* occupations—regardless of group—that they are particularly interested in. They may check occupations in as many groups as they wish.  
If students ask which group is appropriate for an unlisted occupation, suggest that the group title and illustrative occupations should help them; you may assist them in deciding which group is most appropriate.
8. **STEP TWO OF OGPF:** Although students are not required to make a specific vocational choice, they do need to select one area of work that best represents their developing interests. **In addition to circling the Occupational Group letter at the bottom of the OGPF, students must blacken the letter on the front of the answer sheet in the shaded area above the Part II answers.** No scores can be computed for Part II if the Occupational Group letter has not been blackened on the front of the answer sheet.
9. **BEGINNING THE TEST:** Read aloud the last paragraph of the directions on the front of the test booklet. Emphasize the importance of answering all test questions; if unsure of an answer, students should guess.
10. **ONE-SESSION ADMINISTRATION:** If you are administering the CDI in one session, tell students that they may begin Part II as soon as they complete Part I. They should read the instructions carefully and raise their hands if they have questions. When working on Part II, students should consider the questions as they apply to their chosen Occupational Group or a typical occupation in that group.
11. **TWO-SESSION ADMINISTRATION:** If you administer the CDI in two sessions, tell students that in the first session they should stop at the end of Part I. At the beginning of the second session, have students check to be sure they have their own answer

sheets, confirm that they have darkened the Occupational Group letter on the front of their answer sheet, and ask them to read the instructions for Part II, which are printed on p. 11 of the test booklet. Remind students to answer Part II items in terms of their Occupational Group or typical occupations in that group.

12. **PACING THE STUDENTS:** Although the CDI is not a timed test, you may wish to help students pace themselves; at intervals, remind them that they should be beyond particular items: e.g., after 20 minutes, they should be beyond item 40. It is often helpful to tell students how much time they have left. Most students finish Part I in about 40 minutes and Part II in about 25 minutes. A few students may require extra time or a make-up session.
13. **STUDENTS' QUESTIONS:** Although the reading level of most of the School Form is appropriate for junior high school and up, some technical terms may be unfamiliar to some students. Since these terms are included as an integral part of the knowledge being tested, you should guard against explaining them on the three cognitive subtests (DM, WW, and PO). You may help in the interpretation of non-technical terms as well as test directions or procedures.
14. **AT THE END OF TESTING SESSIONS:** Have students check their answer sheets to be sure that all test questions have been answered. Remind students to blacken the letter of their preferred Occupational Group on the front of the answer sheet.
15. **UNSORTED ANSWER SHEETS:** If you submit answer sheets for scoring as an unsorted batch, the results will be reported on one alphabetical roster, which will give standard score means and standard deviations for the entire group.
16. **SORTED ANSWER SHEETS:** You may sort the answer sheets into subgroups, in which case the results will be reported on separate rosters for each subgroup, with means and standard deviations for the subgroup.

You may define the subgroups any way you wish, for example, by sex, grade, school program, clients of a particular counselor. However, each student may be counted only once and will appear on only one roster.

Submit subgrouped answer sheets in different envelopes or band them separately. Tests will be scored and reported exactly as submitted.

17. **MAILING ANSWER SHEETS:** Complete the Testing Report Form and mail it with the answer sheets to:

Scoring Service  
 Consulting Psychologists Press, Inc.  
 P.O. Box 11636  
 Palo Alto, CA 94306

## SCORING

The CDI answer sheets are designed for machine scoring. A scoring service is provided by the publisher.\* Each package of CDI test booklets includes instructions for use of this service.

Standard scale scores, not raw scores, are reported, because the scales differ in types of items and in scoring procedures. For preparation of the norms for the School Form, a norm group of 5,039 students in grades 9 through 12 was used. The standard score used has a mean of 100 and standard deviation of 20. A scale score of 120, for example, represents the raw score that is one standard deviation above the mean of the total group. For the College and University form, a similar procedure was used with an appropriate sample of college and university students. The standardization of scale scores facilitates the interpretation of scales on a profile and the comparison of groups.

The raw-score equivalents of scale scores, shown in Table 1, will help those School Form users who want to interpret scores in relation to the total range of possible scores.

The scoring service provides data in the form of a four-part computer printout, a sample of which is shown in Figure 2. The first part, the Individual Report, gives the student's standard scale scores and percentiles for each of the eight CDI scales.

The second part of the printout is the Group Roster, which alphabetically lists students' names; each student's scores, Occupational Group preference, grade, sex, and school program (if any); and the group's means and standard deviations. For answer sheets submitted in presorted subgroups, the printout will include a separate roster for each subgroup.

**Table 1**  
**Raw-Score Equivalents of Scale Score**  
**Means and Standard Deviations—the School Form**

Scale	Raw-Score		
	Range	Mean	S.D.
CP	20-100	63.8	14.7
CE	60-240	153.7	27.1
DM	0-20	11.0	3.95
WW	0-20	13.3	5.1
PO	0-40	18.0	6.1

Note: To derive raw scores for CP, responses A to E are scored 1 to 5, and the total score is the sum of the values for the 20 items. For CE, responses A to D are given values of 1 to 4; each item is assigned a weight according to the judged quality of the resource. The score is the response value times the item weight. For DM, WW, and PO, the score is simply the total number of items answered correctly.

Means and standard deviations are based on the total norming sample of 5,039 cases and, therefore, are the raw-score equivalents of the mean scale score of 100 and the standard deviation of 20.

\*Because of differential item weights, and the need for a different key for each of the 20 occupational groups in Part II, hand-scoring the CDI is not recommended.



INDIVIDUAL REPORT FOR DAVY, JUAN SCHOOL FORM

SHEET NUMBER: 2003003      SEX: M    PROGRAM: A      SCORED 5/19/81  
SPECIAL ID#                    OCCUPATIONAL GROUP PREFERENCE: H  
GRADE: 9    GROUP: 12            OMITTED ITEM COUNTS: PART I: 0    PART II: 0

STANDARD SCORE	PERCENTILE SCORE (*)	DESCRIPTION OF CDI SCALES
82	43	CP--CAREER PLANNING: HOW INVOLVED YOU ARE IN THINKING ABOUT YOUR FUTURE AND MAKING CAREER PLANS
110	55	CE--CAREER EXPLORATION: HOW ABLE YOU HAVE BEEN TO FIND AND UTILIZE GOOD SOURCES OF CAREER PLANNING INFORMATION

GROUP ROSTER      GROUP 12    05/19/81    SCHOOL FORM

SHEET NUMBER	STUDENT NAME	SEX	GRADE	PROG	OGP	CDI SCALES--STANDARD SCORES							
						CP	CE	DM	WW	PO	CDA	CDK	COT
2003056	ALVAREZ, LUIS	M	9	A	C	105	109	111	115	102	107	113	110
2003	RICHARD	M	9	A	K	77	70	68	66	73	73	67	70
2003				A	O	122	130	118	121	132	126	120	123
2003						82	110	90	101	112	96	95	96

RESPONSE ANALYSIS BY OCCUPATION SCHOOL FORM

OCCUPATIONAL GROUP PREFERENCE		%	N	GROUP 12 SCORED 5/19/81
15	GROUP A: PHYSICAL SCIENCE:RESEARCH			
ME	GROUP B: PHYSICAL SCIENCE:APPLIED	0.0	0	
ST	GROUP C: BIOLOGICAL AND MEDICAL SCIENCE	3.7	2	
	GROUP D: SOCIAL SCIENCE:RESEARCH	5.5	3	
	GROUP E: SOCIAL SCIENCE:TEACHING/SOCIAL SERVICE	0.0	0	
	GROUP F: WRITING AND LAW	18.5	9	

RESPONSE ANALYSIS FOR CP & CE ITEMS SCHOOL FORM

GROUP 12	15 STUDENTS										SCORED 5/19/81
ITEM NUMBER:	1	2	3	4	5	6	7	8	9	10	
% LEFT BLANK	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	1.9	0.0	
% MARKED "A"	5.6	7.5	7.5	15.1	22.6	39.6	11.3	15.1	37.7	5.6	
% MARKED "B"	28.2	22.6	22.6	22.6	30.2	30.2	26.4	28.2	28.2	24.5	
% MARKED "C"	39.6	39.6	22.6	20.7	16.9	9.4	24.5	20.7	16.9	22.6	
% MARKED "D"	9.4	9.4	9.4	9.4	11.3	5.6	18.8	5.6	9.4	20.7	
% MARKED "E"	16.9	20.7	35.8	32.1	18.8	15.1	18.8	30.2	5.6	26.4	
ITEM NUMBER:	11	12	13	14	15	16	17	18	19	20	

Figure 2. CDI Computer-Printout

The third part, Response Analysis by Occupation, gives the distribution by number and by per cent of the Occupational Groups chosen by the students.

The fourth part is the Response Analysis for CP and CE Items; it gives the distribution of responses to items

1-40 of Part I. In these scales, students give self-reports of their career-planning activities and their attitudes toward career-exploration resources. Item responses to these scales may have particular value for guidance counselors.

### III. Uses of the CDI Results

CDI results have three main applications:

1. In counseling individuals, CDI results provide diagnostic data and predictors.
2. In planning guidance programs, the CDI can be used as a survey instrument.
3. In evaluating programs and research, CDI results can measure criteria or outcomes.

During the two decades of research on the assessment of career development, the CDI has undergone numerous revisions. In the 1960s, it began as a three-scale instrument (CDI Form I) and had a six-scale version (CDI Form III) in the mid-1970s (Super & Thompson, 1979). The current forms, comprising five basic scales and three combined scales, is a condensed version of Form III; much of the research findings and field uses of the earlier form are directly applicable. The following comparison of content shows how the current form is based on the Form III:

- CP—20 items from the 30 items in Part I of Form III
- CE—20 items from the 30 items in Part II of Form III
- DM—20 items from the 30 items in Part III of Form III
- WW—10 items from Part IV and 10 from Part V of Form III
- PO—40 items from the 41 items in Part VI of Form III

The current form consists of the Form III items with the strongest interitem and interscale correlations.

#### IN COUNSELING INDIVIDUALS

**Readiness for Choice.** Practitioners who use therapeutic insights in their work but distinguish between counseling and psychotherapy are likely to agree with Tyler (1969) that the purpose of counseling is not to change people's personalities but to help them make good decisions and choices. Such practitioners would also agree that the decisions and choices that people make can affect their lives and personalities (Super, 1957, 1980).

The CDI is designed to assess students' readiness to make sound educational and vocational choices. Research and theory suggest that high school students are still in the exploratory stage, in which they formulate vocational goals, first in general terms (e.g., "a job in

which you can help people with their problems") and then in more specific terms (e.g., "social worker," or "teaching emotionally disturbed children").

As shown by the Career Pattern Study (Super & Overstreet, 1960; Jordaan & Heyde, 1979), students differ greatly in their readiness to make sound educational and vocational choices. The counselor has three tasks: first, to determine where the student is in his or her vocational development; second, to identify how ready the student is to select among the available curricular and occupational choices; and third, to decide how the unprepared student can be helped.

Choice of curriculum (e.g., academic vs. nonacademic) and choice of electives (e.g., business math vs. algebra) are among the earliest, and perhaps among the most important, choices that high school students are expected to make. These choices are important because they can limit or expand later opportunities. Unfortunately, such choices usually must be made before the students have clarified their aspirations or reached an adequate level of vocational development.

Even a tentative vocational objective can be the basis for exploration and planning, and the formulation of a vocational objective usually cannot be postponed beyond the junior year of high school. As the Career Pattern Study shows, even in the senior year many high school students are poorly equipped to make the transition from school to work or from school to college. Those whose vocational development was lagging behind at age 18 were less likely than other students to see themselves and to be seen by others as successful and satisfied in young adulthood or at about age 25 (Super, Kowalski, & Gotkin, 1967; Jordaan & Super, 1974).

**Importance of Diagnosis.** Many practitioners agree that differential diagnosis makes differential treatment possible. In other words, an intervention or counseling strategy is most likely to succeed when based on careful assessment of the individual. Such an assessment helps the counselor to decide if the work with the client should be remedial, preventive, or developmental. If remedial, the counselor will devise strategies to rectify the diagnosed deficits in the client's vocational development. Preventive intervention is appropriate for a client who is diagnosed as likely to develop problems and deficits. Preventive steps are clearly indicated when a repeated administration of the CDI after a year or two shows that the student's scores have not increased with age and experience, as they should, but have stayed the same or begun to decline.

In addition to remedial and preventive work, developmental work concerns counselors. While helping individuals fulfill their potentials for growth, counselors recognize the individuality of capacity for growth. Their focus is on helping students to derive maximum benefit from experiences that are calculated to contribute to their growth: educational, avocational, instructional (e.g., a career-education course, values-clarification exercises, etc.), vocational (e.g., part-time or summer employment), and social. Counselors who adopt a developmental role see their task as helping the student to discover, develop, and use optimally the new as well as already existing resources and assets.

**Antecedents of Sound Choices and Decisions.**

Whereas the ultimate goal of educational and vocational counseling is to help individuals make good choices and decisions, counselors too often focus on the realism and appropriateness of students' choices, not on the attitudes, behaviors, and knowledge needed to make good choices. The process often focuses too narrowly on evaluating and questioning the suitability of students' choices, on persuading students to relinquish a seemingly inappropriate choice, and on steering them toward goals that are deemed more appropriate.

The counselor's first question should not be, "How suitable or realistic is this student's choice?" but "How ready is the student to make good choices, and if not ready, how can he or she be helped to become more ready?"

The CDI, which samples the attitudes, knowledge, and behaviors needed to make sound educational and vocational decisions, helps the counselor to direct attention away from the student's objectives and toward the conditions required for making sound choices.

**Interpretation of a Sample Profile.** In examining CDI scores and discussing them with students, the counselor may find it helpful to plot the reported percentile ranks on a profile. Figure 3 is an illustrative CDI profile of

MJ, a 10th-grade female student; the following are suggestions for interpretation of the profile and how to use it in counseling:

1. Scan the profile to identify peaks and valleys. High scores (75th percentile and above) and low scores (25th percentile and below) are usually not only more reliable, but also more significant diagnostically than other scores. Percentile ranks in the middle of the range tend to magnify differences: seemingly significant differences between two percentile ranks in this range may be based on small and insignificant differences in raw scores. Scores that place students in the top quarter of the distribution represent important strengths and assets; scores that place students in the lowest quarter indicate deficits that need to be remedied. In MJ's profile, the first two scores to study are CP (75th percentile) and DM (25th percentile).
2. Look at scores that are close to the two extreme quarters. Failure to meet the specified criterion (75th percentile and above, 25th percentile and below) may be the result of errors of measurement.
3. Examine other possibly significant differences among scores. Remember, however, that the seemingly important differences between scores may be caused by errors of measurement; for example, the apparent difference between MJ's scores on DM and WW may be a function of measurement error. As discussed in Chapter V: Reliability, which reports the standard error of measurement (SEM) associated with CDI scales, the difference between two scores should be approximately twice the error of measurement associated with the higher of the two scores for the difference to be considered significant. If it is not, a safe assumption is that the difference has little practical significance. This method is the most precise way to evaluate profile differences.

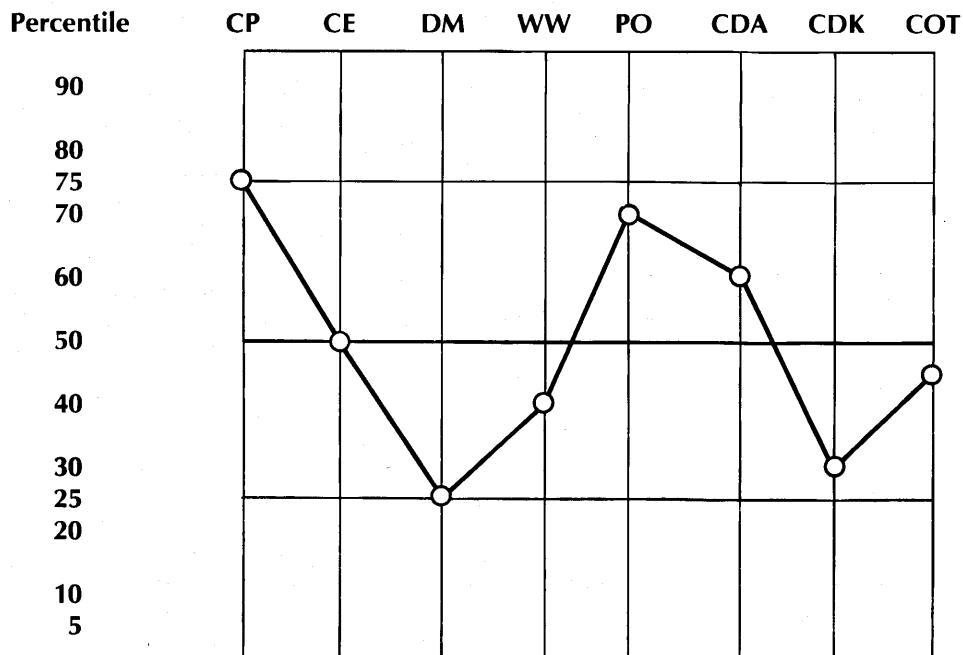


Figure 3. Sample Profile of MJ, a 10th-Grade Female

4. Scores between the 40th and 60th percentiles (roughly the middle range of the distribution) indicate that the student is performing about as well as the average subject in his or her grade. Such scores are nonetheless valuable as a platform on which to build. Averages show what is common, but not necessarily what is desirable; as documented in the Career Pattern Study (Jordaan & Heyde, 1979), the typical high school male senior knows little about his preferred occupation. An average score on PO may be more a cause for concern than a source of satisfaction.

Here the CDI raw-score equivalents (Table 1) are valuable. They show that a standard score of 100 (i.e., the mean score) on PO indicates that the individual responded correctly to only 18 of 40 items. Likewise, a standard score of 100 on CP represents the average rating on the 20 CP items, which was 63.8 divided by 20 or 3.19, i.e., just slightly above "I have plans, but am still not sure of them."

5. Having examined MJ's scale scores as suggested above, look at her scores on the three composite scales: COT, CDA, and CDK. Of these, COT is probably the most important; it summarizes and combines the student's standing on four important aspects of vocational maturity or readiness. The lower the score on COT, the more likely MJ is to need individual counseling, structured learning or exploratory experiences, or both. In selecting the focus of learning or exploratory experiences, examine the student's scores on the scales that contribute to the composite scales. MJ's profile suggests that planned intervention should focus on decision-making skills, information about the world of work, and perhaps career exploration.

Examination of MJ's CDK scores clarifies her need for help in the areas of decision-making, current and impending tasks of vocational development, and general rather than specific occupational information. Her scores on CDA and its two component scales show that her relatively satisfactory score on CDA is largely based on a high CP score; this finding suggests that attention needs to be paid to the less satisfactory score on CE.

6. Ask MJ if her scores on the CDI are in line with her expectations and whether she questions or agrees with the test findings.
7. Help MJ to identify high and low scores, to talk about their possible significance, and to say what might be done to remedy low scores and to build on high scores.
8. Consider that the three composite measures—CDA, CDK, and COT—can mask as well as reveal important strengths and deficits. An average score on a composite scale may result from combining high and low scores on component scales. Accordingly, examine the subject's scores on the scales that contribute to the composite scales.
9. Identify consistencies and inconsistencies in the subject's profile and reflect on their possible implications. MJ's score on CP is consistent with her score on PO, but inconsistent with her scores on CE, DM, and WW. MJ reports that she has engaged in appropriate career-planning activities and feels

knowledgeable about occupations. She has in fact acquired accurate information about her preferred occupational group. However, her scores show that she does not know as much about the world of work or occupations in general as she reports, that she has engaged in only an average amount of career exploration, and that she apparently knows very little about what to consider in making vocational choices. Although MJ's profile appears at first sight to be encouraging, careful examination raises important questions, the importance of which is confirmed by her slightly below-average COT score. Her high score on PO may indicate premature specification of an occupation rather than thoughtful selection based on a genuine readiness to choose. Evaluation of her vocational choice in the light of other information (e.g., school record and test scores) may show that her vocational preference is not only premature and poorly grounded but also unrealistic and inappropriate.

10. Data from the CDI should be supplemented by data from other sources (e.g., school records, interest and aptitude tests, inventories, and individual conferences) to determine whether MJ's current vocational preferences are in keeping with her financial circumstances and assessed interests, values, aptitudes, and intellectual ability. Patently inappropriate or unrealistic vocational aspirations, especially in the junior and senior years of high school, usually indicate that the student is deficient in the attitudes, behaviors, and knowledge assessed by the CDI. When this is the case, interest inventory scores and expressed preferences may provide a basis for choice of exploratory activities, but not for choice of an occupational objective.

**Next Steps.** Having assessed the student's strengths and deficits, the counselor needs to decide what action, if any, is called for. First, the counselor must decide whether remedial or developmental work is indicated. A counselor using either approach needs to identify what experiences are most likely to achieve the desired ends: individual conferences with the student, aptitude and interest testing, part-time or summer employment, a work-study program, participation in selected school and out-of-school activities, prescribed readings, "career days" in which speakers identify the range of occupations in their field, participation in a career-education program, or arranging for subject-matter teachers to discuss the occupations that are based on interest and ability in their subject.

In planning these experiences for an individual or a group, the counselor should tell the students that the purpose is not to get them to choose an occupation, but to increase their understanding of themselves and the world of work, so they can make better decisions and choices. In school or the first years of college, the primary goal of such experience is to plan, facilitate, and guide exploration.

Depending on the student's level of vocational development, as shown by the CDI, such exploration, which might be self-initiated (perhaps as a result of counseling) or prescribed (as in a career education course),

can be general or specific. General exploration is more appropriate in the 9th and 10th grades in which the focus should be on *fields of work* and *general* questions about personal interests, abilities, values and self-concepts. In the junior and senior year of high school and in the first year of college, more specific exploration is appropriate, particularly for those not going on for further education. The focus shifts from possible fields and levels of work to specific occupations, and from general to specific questions about self and occupational possibilities.

For students going on to liberal arts college, their CDI results in high school can stimulate them to have a more mature approach to planning their education. The College and University Form of the CDI can provide comparable data for diagnosing career development at the college level.

Planned learning and exploratory experiences are more likely to benefit a student when the student is helped to formulate relevant questions in advance, to select experiences that are likely to furnish the necessary information, and to evaluate and apply that information.

The most important question in vocational guidance and counseling may be, "How ready is the student to make good decisions and choices?" Equally important is the question, "What kind of exploration—general or specific—is more likely to help the student to become ready?"

The answer depends on an understanding of career maturity, decision making, and vocational counseling. The following list indicates the sequence in which events would ideally occur, suggests how the counselor can supplement the information provided by the CDI, and provides a basis for deciding what kind of exploration is needed and what its focus might be:

1. Awareness of the possibility of choice or the need for it.
2. Concern, that is, the motivation to respond to this recognized possibility of or need for choice.
3. Acceptance of responsibility for choice.
4. Clarification of the nature and requirements of available alternatives.
5. Acquisition of specific and accurate information about the nature and requirements of these alternatives.
6. Weighing of alternatives and possible outcomes.
7. Goal setting or choice among alternatives.
8. Formulation of plans for achieving objectives.
9. Implementation of plans.
10. Evaluation of outcomes and, if necessary, modification of objectives or strategies for achieving objectives.

The first two steps suggest that concern with choice, as demonstrated in personal interviews and the student's score on the three attitudinal scales of the CDI (CP, CE, and CDA, which combines CP and CE), is the basis for all further development. Without such awareness and concern, coupled with acceptance of the responsibility for choice, other steps in the sequence are likely to be premature, irrelevant, and unproductive.

The counselor's focus for most students in the early years of high school should be on steps 1 through 4 and on developing decision-making skills, encouraging wide-ranged exploration, and increasing the students' fund of

general information. Steps 6 through 10 are more appropriate for the later years of high school, when the need for specific information, objectives, and plans is more evident. Similarly, except for students who are likely to leave school at the end of the 10th grade, assessment of the student's knowledge of the preferred occupation may usually be postponed until the end of the 11th grade or the beginning of the 12th. This does not mean that students' vocational preferences should be ignored. Even if poorly conceived, premature, or unrealistic the preferences can provide a basis for exploration of self and the world of work and thus contribute to the development of desirable attitudes and behaviors.

## IN PLANNING GUIDANCE PROGRAMS

The CDI reports are designed to maximize the use of the CDI as a survey instrument to assess program needs of groups. Following are some suggestions:

First, look at the group profile based on the percentile equivalents of the mean scale scores of the group tested. For example, the profile of a 10th-grade group may reveal that they are high in CP and CE, low average in DM, and low in WW. The obvious implication is that the group needs more systematic attention to the basic principles of career development and the world of work as well as guidance and practice in applying these insights to career decisions appropriate to their age.

A 12th-grade group profile, which includes a mean score on PO considerably lower than that on WW, suggests that general familiarity with the world of work needs to be supplemented by more intensive study of an occupational group.

Second, look at reports on response frequency for the 20 items in CP and the 20 items in CE. Study of the response distribution of items 1-12 reveals the level of concern about career-planning activities—from A "I have not yet given any thought to this" to E "I have made definite plans, and know what to do to carry them out." The item-response data for items 13-20 similarly profile how much the students think they know about eight aspects of an occupation that interests them. Item response data are also provided for items 21-40.

The data in Table 2, from a school participating in the standardization study, provide useful clues concerning how the students are going about their career planning and career exploration. Of particular interest to guidance counselors are the students' attitudes toward sources of help.

The 10th-grade students are at least beginning to use their school experiences to help them think about career plans. Most do not report discussing their plans with adults nor do they see how their out-of-school activities can be used in career exploration. They report that they are more knowledgeable about job duties and educational requirements than about entry into the occupation.

From these group data, the guidance counselor gets a profile of the career-planning needs of the group and can then formulate appropriate objectives and components for the guidance program.

CE results help the counselor to know the current status of the group's attitude toward the available sources

of help and the group's evaluation of the help they have received.

The CE percentages in Table 2 have interesting implications. Although female students seem more willing than male students to go for help, they do not differ much in their reports on how much useful information they have gotten from the sources. Both males and females view school counselors as good sources, but the results suggest that teachers need to give more useful career-planning information to students who ask for it. Even with school counselors, only about one third of the students reported getting a "good deal" or "great deal" of useful information.

The CDI reports include the frequency distribution of Occupational Group Preferences. Table 3 is an example, again, from one of the participating schools. Interesting information may be obtained from these data: First, sex differences occur at both grade levels. Second, the 9th-grade males range over most of the 20 groups, but the 12th-grade males tend to concentrate on applied physical science, writing and law, public performance, and business management. Third, the female students exhibit considerable concentration at both 9th and 12th grades but with interesting shifts, namely, away from physical-science research, biology and medicine, and writing and

law and toward applied physical science, public performance, business management and office/clerical occupations, and technical health science.

Local results may not yield information from which generalizations can be made, but they should interest counselors, teachers, and curriculum consultants in that setting.

This diagnostic use of the CDI is crucial to individualizing career-education programs, which usually are planned on the assumption that all students at a given grade have similar career-development needs and are equally ready for what the course or activity has to offer. But even individuals in the same grade differ widely in career development (Super & Overstreet, 1960; Jordaan & Heyde, 1979) so that differences within a grade are nearly as great as differences between grades. Career-education or career-guidance programs therefore need to be planned in terms of the developmental status and needs of each student, or, when grouped by career-development readiness, in terms of the needs of the group. Following are some suggestions for such planning that are based on research and field use:

**CP—Career Planning** scores, when low, indicate that the students are not planful in their approach to careers and therefore need to be alerted to the importance of looking ahead and making tentative plans; their need is not so much for information, as provided by most career-education courses, but for arousal to the need to obtain and use information and for the development of curiosity about careers and the world of work. Students whose scores are average or better, compared to their peers, may be considered ready for other types of career-education activities.

**CE—Career Exploration** reveals students' attitudes toward sources of career and occupational information, willingness to use these sources, and evaluation of help

**Table 2**  
Item-Response Frequency from a 10th-Grade Sample

Selected Items	Males	Females
	Percent of Group Marking "D" or "E"	
<b>From CP</b>		
2. Discussing career-development plans with an adult who knows me	13.3	25.0
3. Taking classes to help me decide what kind of work to go into	33.3	50.0
10. Getting the needed training, education or experience for the work I'd like	31.7	50.0
13. What people really do on the job	46.6	50.0
16. Education or training needed to get the job	53.3	50.0
18. Ways of getting into that occupation	24.4	28.1
<b>From CE</b>		
23. Friends	46.6	68.7
25. Teachers	57.7	78.1
26. Counselors	75.5	87.5
30. TV shows, movies	27.8	40.7
33. Friends	22.1	21.8
35. Teachers	22.1	18.8
36. Counselors	35.5	37.5
40. TV shows, movies	11.1	18.8

Note: "D" and "E" in CP indicate definite plans for items 2, 3, and 10; considerable knowledge for items 13, 16, and 18. "C" and "D" in CE indicate would go to for help for items 23, 25, 26, and 30; good deal of useful information for items 33, 35, 36, and 40.

**Table 3**  
Per Cent of Ninth and Twelfth Graders Selecting Occupational Group in a Typical High School

Occupational Groups	9th-Grade		12th-Grade	
	M	F	M	F
A—Physical Sci: Research	—	16.0	4.0	—
B—Physical Sci: Applied	6.9	—	16.0	5.9
C—Biology and Med Science	10.3	12.0	4.0	2.9
D—Soc Science: Research	—	—	—	—
E—Soc Sci: Teach/Soc Serv	3.4	16.0	8.0	14.7
F—Writing and Law	3.4	20.0	20.0	—
G—Art and Music	3.4	8.0	4.0	2.9
H—Public Performance	20.7	8.0	12.0	17.6
I—Business: Financial	10.3	—	4.0	8.8
J—Business: Management	—	—	16.0	11.7
K—Business: Sales/Promotion	3.4	4.0	4.0	—
L—Business: Office/Clerical	3.4	4.0	—	11.7
M—Business: Merchandising	3.4	4.0	—	—
N—Technical: Physical Science	3.4	—	—	2.9
O—Technical: Health Service	—	4.0	—	14.7
P—Technical: Crafts	13.7	—	—	—
Q—Technical: Outdoor	3.4	—	8.0	2.9
R—Technical: Mechanical	3.4	—	—	—
S—Personal Service	3.4	4.0	—	2.9
T—Manual/Physical	3.4	—	—	—

received from them. Students who score low compared to their peers need to learn that competent sources can be helpful and to learn which sources are competent to help them. They need to develop exploratory attitudes so that when aroused to the need for and possibilities of planning, they may acquire the knowledge they need in planning. Students making average or better scores are ready for career-development activities that come later in the developmental sequence.

**DM—Decision-Making** assesses ability to apply the principles of career planning to a variety of situations that high school and college students encounter. Students making low scores compared to those of their peers are not yet ready to use information well, even if they are planful in their approach to careers and favor job exploration. They need help in learning rational decision making, including the identification of the problem, knowing what information is needed for its solution, and so on. They need to know more about career-development tasks and how other students effectively deal with them. Students who make average or better scores are presumably equipped to make their own career decisions, although the students may need world-of-work information.

**WW—World-of-Work Information** scores may be low even for students who make high scores on the first three scales; such students are not ready for decision making but need experiences to give them the knowledge of the range of occupations open to them and available for exploration in greater depth. They also need knowledge of the mores of the world of work and how people get jobs and adjust to workday schedules and to being one of a youthful minority among older workers. Although the CDI scales, which are limited to twenty or forty items each, do not reveal highly specific needs, they do identify strength or weakness in planfulness, exploratory attitudes, decision making, and information.

**PO—Knowledge of the Preferred Occupational Group** is designed to assess familiarity with the type of work that students say interests them most. PO is most useful with students who score average or better on the first four scales. Therefore, counselors may choose not to use PO with students in 8th, 9th, and perhaps even 10th grades, but should use it with some 10th graders and with all students in more advanced classes. Students with low scores need help in learning more about the fields in which they have expressed interest and may

want to be tested on others; they are especially likely to profit from aptitude test batteries, such as the GATB of the U.S. Employment Service and the DAT and Career Planning Program of the Psychological Corporation, together with the results of vocational interest inventories, such as the Strong-Campbell, the Kuder, and the OVIS. Students with average or better scores may also benefit from the examination of their abilities and interests; if these and their achievement records support their preferences, they may be ready to make decisions about educational training or occupational entry.

## IN EVALUATING PROGRAMS AND RESEARCH

Because the CDI is designed to measure meaningful components of vocational development, the scales can measure outcome or change in research and program evaluation.

For example, Form I of the CDI was designed for use in evaluating the effectiveness of the Educational and Career Exploration System, a computer-based guidance program. Comparison of pre- and posttest measures on the three scales (Planning Orientation, Use of Resources for Exploration, and Information and Decision-Making) revealed differences between experimental and control groups in the expected direction (Myers, et al., 1972).

The CDI components can measure the outcomes of *career education* programs (Hilton, 1974). Career awareness, decision making, knowledge of the world of work, and career exploration are included in the goals or performance objectives of most career education curricula. Hilton's content analysis of three vocational maturity inventories, including Form I of the CDI, shows their relationship to six career-education categories as defined in an Ohio State project.

In research or program evaluation, the broader scales are often sufficient to test the hypotheses or measure the general outcome. COT, which is based on 80 items from the four component scales, is a composite measure with maximum reliability. CDA and CDK also have superior reliability and measure the two broad aspects: attitudinal and cognitive. Often they are sufficient to test the research or evaluation hypotheses.

PO is most useful with students in the last years of school who are approaching entry into the labor force or with college or university students who are planning to choose a major field or professional training.

## IV. Norms

The CDI scale scores are reported in standard score form, with a mean of 100 and standard deviation of 20, based on the total standardization group that included students from grades 9 through grade 12. Therefore, each scale has a common base, i.e., the average score of the more than 5,000 students in the norming sample.

To facilitate interpretation of CDI results, percentile tables for each scale were constructed for each grade (9 through 12) and for male and female subgroups within each grade. These results are reported in Tables A through H.\* A profile description of an individual's performance on the eight scales can be made from the percentile equivalents derived from the appropriate comparison group.

A group profile (e.g., class or curriculum) can also be constructed from group mean scale scores by plotting the percentile equivalents compared with the appropriate normative group.

In addition, subgroups can be directly compared on a given scale by using their scale scores. For example, Table A shows an increase on CP from a mean of 96.0 for 9th Grade Total to a mean of 107.4 for 12th Grade Total, a difference of approximately one-half a standard deviation on the standard score scale. Similar analyses can be made with local group means.

Although the sample of secondary school students was useful in developing the scale scores and percentile equivalents, the sample is not a representative national sample of 9th through 12th grade students. The sample does, however, comprise groups that differ in relevant characteristics, e.g., urban-suburban-rural, inner city, and regions as well as grade and sex.

The N's at the bottom of the Tables A through H show that there were roughly similar numbers for each grade level and for sex subgroups within grade. However, the breakdown by program, which yielded considerable differences in subgroup size, reflects differing concentrations of students in secondary school programs and differing methods of classifying students according to program.

Following is a list of the schools where data were collected:

	Grades				Total N
	9	10	11	12	
1. Palmyra, New York	—	10	11	12	270
2. Middletown, New Jersey	9	10	11	12	3284
3. Baltimore, Maryland	9	10	11	12	300
4. Delaware City, Ohio	9	10	11	12	201
5. Westlake, Ohio	9	—	—	—	251
6. DeKalb County, Alabama	9	10	11	12	290
7. Delta Junction, Alaska	9	10	11	—	121
8. Beaverton, Oregon	9	10	11	12	432
9. Turner, Oregon	—	10	11	12	292
10. Fairbanks, Alaska	9	10	11	12	265
	Total:				5706

The percentile norms were based on the 5,039 cases who completed all five sections of the CDI and filled out the Occupational Group Preference Form. Eastern schools were heavily represented in the standardization group. As CDI use increases, the norms tables will be reviewed and further breakdown will be available. In the meantime, users are encouraged to develop local norms for their own use.

\*Tables A through N appear in the Appendix.



## V. Reliability

Before evaluating validity, one must evaluate how consistently or reliably an instrument performs as a measuring device. To be a valid measure of career maturity, the CDI must be a reliable measure of the general construct and of its several components or dimensions.

### INTERNAL CONSISTENCY

Table 4 gives evidence of reliability in terms of the internal consistencies (Cronbach alpha coefficients) of the five scales and the reliability estimates (alpha coefficients) of the combined scales: CDA, CDK, and COT. In all cases, the estimates are given by sex within grade.

Table 4 shows that the measure of internal consistency for the combined scales ranges from .79 to .88 with a median of .86. These scales clearly have adequate reliabilities for use in individual counseling and in analyses of group differences. A similar conclusion can be drawn for CP, CE, and WW, which have median scale reliabilities of .89, .78, and .84, respectively. However, DM and PO

have median reliability estimates of .67 and .60. These values suggest that caution should be exercised in making judgments about individual students based on DM and PO scores, although the values are satisfactory for analyzing group differences.

Note that for some of these scales, the median reliabilities are lowered by the relatively low values for some subgroups. In the case of DM, for example, the median values are considerably lower for females than for males (.59 vs. .70). A similar result is apparent for PO. The PO values are noticeably lower for grades 9 and 10 than for grades 11 and 12 (.55 vs. .66). This result is not surprising; 11th and 12th graders should have made firmer decisions about preferred occupational groups than 9th or 10th graders.

### STANDARD ERROR OF MEASUREMENT

An alternative expression of an instrument's reliability is in terms of its standard error of measurement (SEM).

Table 4  
Scale Reliabilities ( $\alpha$  Coefficients) by Grade and Sex

Scale	9			10			11			12		
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
CP	89	88	89	89	85	87	87	89	88	90	87	89
N	190	165	355	144	180	324	163	210	373	158	170	328
CE	78	78	77	78	75	76	80	81	80	75	80	77
N	171	157	328	144	158	302	163	209	372	138	156	294
DM	58	68	64	60	69	68	65	70	69	58	71	64
N	181	156	337	143	180	323	160	206	366	158	168	326
WW	83	85	84	77	84	83	81	87	85	79	87	85
N	177	158	335	141	179	320	155	205	360	153	167	320
PO	53	61	57	53	55	55	67	64	65	57	71	66
N	167	145	312	128	158	286	135	177	312	151	150	301
CDA	85	87	86	86	82	84	85	86	86	84	85	84
N	255	225	480	144	157	301	163	209	372	129	141	270
CDK	86	86	86	80	86	86	85	88	87	79	88	86
N	339	318	657	140	179	319	154	202	356	153	165	318
COT	86	86	86	87	83	85	85	87	87	82	87	85
N	249	223	472	140	155	295	149	200	349	126	139	265

Note: Decimals omitted.

This statistic is related by the following formula to the reliability:

$$SEM = S_x \sqrt{1 - r_{xx}}$$

in which  $S_x$  is the standard deviation of scores on the instrument for a group, and  $r_{xx}$  is an estimate of the reliability of the instrument based on that group. A SEM value may be roughly but usefully interpreted as *approximately* the average error made when an instrument is used to measure an individual characteristic. For some individuals, the error of measurement will be less than the SEM and for others, more; but the average error will be approximately equal to SEM.

Table 5 gives SEM values for the CDI scales for grades 9 through 12. Note that the SEM is smaller in value for those scales with larger reliability estimates (Table 4) and larger values of the SEM are associated with smaller values of the reliability. Values of SEM for males and females may be calculated by using the above formula for SEM and the results in these tables.

**Table 5**  
**Standard Errors of Measurement (SEM) of the CDI Scales**

Scale	Grade			
	9	10	11	12
CP	6.5	6.8	6.8	6.7
CE	9.4	9.0	9.3	9.8
DM	11.4	10.6	11.1	13.0
WW	8.0	7.5	7.5	8.4
PO	13.0	13.3	11.9	11.8
CDA	7.4	7.3	7.5	8.1
CDK	7.3	6.8	7.0	8.1
COT	7.1	6.9	7.2	8.2
N	1,249	1,402	1,269	1,047

The SEM is particularly useful in profile analysis, i.e., in judging whether an individual's scores on different scales of the CDI differ from one another to a meaningful extent. Suppose, for example, that a 9th-grade male scores 120 on CDA and 114 on CDK. Does this suggest that he is really much better on CDA than on CDK? Table 5 shows that the SEM of CDA is 7.4 and of CDK is 7.3; the difference between his scores on these scales is less than one SEM on either scale. To be considered meaningful, the difference between scores should be at least twice as large as the SEM of the scale having the larger SEM. Further discussion of the interpretation of differences between CDI scale scores is given in Chapter III: Uses of the CDI Results.

### STABILITY

A final aspect of reliability is the *stability* of measurement, i.e., the extent to which a measurement instrument yields the same or nearly the same score for an individual tested on occasions separated by an appropriate interval of time. If the measured characteristic typically changes markedly from day to day, then stability is irrelevant. Such fluctuation would not be expected in the CDI. Career-development characteristics are expected to be stable over several weeks or months; noticeable developmental changes occur only over periods of one or more years. High correlations would be expected between scores obtained on administrations separated by one to six months.

The available evidence of such stability is based on data from previous forms of the CDI and strongly suggests that CDI scores are highly stable over periods of up to six months. Further evidence of such stability is presented in the *Technical Manual*.

## VI. Validity

An essential characteristic of a measurement device is how well it measures what it is intended to measure. Here *content* validity and *construct* validity will be discussed. *Criterion-related* validity is the subject of future research with the CDI.

### CONTENT VALIDITY

To have content validity, a test or inventory should comprise items that qualified judges view as dealing with those variables that are to be measured. The items in the CDI are based on prior work on the nature and assessment of career maturity and have been drawn from the basic work on this topic by two of its authors (Super & Overstreet, 1960; Jordaan & Heyde, 1979). In the Career Pattern Study, these authors and their associates defined career or vocational maturity as readiness to cope with the career-development tasks that are appropriate to one's stage in life: to make the required career decisions as one progresses through school, into the world of work, and through early and mature adulthood into later maturity and retirement. At each stage, individuals face distinct cultural expectations as well as recurring needs (Havighurst, 1953; Super, 1957): adolescents are expected to find an appropriate field of endeavor, young adults are expected to establish themselves in appropriate occupations or sequences of occupations (if in the labor force), and older persons are expected to phase out or to stop work with approaching old age.

The CDI is based on the theoretical model that was developed and tested by the Career Pattern Study; tested independently by Gribbons and Lohnes (1968, 1969), Asis (1971), Vriend (1968), and Willstach (1966); slightly modified and then and then tested by Crites (1973); and further refined by Super (1974) in the light of accumulated evidence. This work, reviewed in detail in the *Technical Manual*, can be considered evidence of the validity of the career-maturity model on which the CDI is based. If examination of the CDI items confirms that they are the types specified by the model, then content validity of the CDI will have been established.

To have content validity, then, the CDI items should appear to experts to be such as are prescribed by the model. The model postulates five basic dimensions. The measures of those dimensions show varying degrees of intercorrelation, sufficient to justify using the general construct of career maturity, but low enough to make clear its multidimensionality. These dimensions are: planfulness, exploration, decision making, information (now

broken down into two types, general world-of-work information and knowledge of the preferred occupation), and reality orientation (itself multidimensional and requiring a number of independent measures).

CP seeks to measure planfulness by asking students to estimate how much time, compared to their peers, they have given to thinking about and planning various career-related activities, such as courses, postschool education, and occupations. Students rate how much they think they know about occupations. On the face value and in the judgment of the authors, the items assess a planning orientation to careers.

CE is designed to assess the use of resources in exploration. Like planfulness, this variable, the willingness to use various resources for exploration and to be aware of the quality of the resources used, is an attitudinal or conative variable. Students are asked about consulting parents, teachers, counselors, friends, and others about career matters, as well as using printed and audiovisual resources. Four of the CDI authors, specialists in career-development research, unanimously consider these items relevant to career exploration and they agree that the resources vary in quality for learning about careers.

DM seeks to measure knowledge and application of decision-making principles to career decisions. DM uses brief case studies; for each case, the respondent must choose the best career decision from a list. Case studies cover a range of levels and types of occupations.

WW tests world-of-work information and knowledge of career development. As a result of work with experimental forms of the CDI, described in the *Technical Manual*, the model's dimension of information was broken down into three parts. One part, knowledge of preferred occupation, is tested in PO. The other two are tested in WW: the need for and processes of exploration and establishment in adolescence and young adulthood, drawn from the literature on life stages and developmental tasks; and information concerning the classification of occupations, types and amounts of training needed, for a wide range of occupations, the tools and equipment used in various fields and levels of occupations, employment practices, and so on.

PO measures knowledge of the occupational group or cluster selected by the student as being of greatest interest. The device for helping the student to choose the preferred group, the Occupational Group Preference Form, was developed by three of the CDI authors as part of the Career Planning Questionnaire of the *Differential Aptitude Tests* (The Psychological Corporation, 1972) and was

modified for the present use after its successful widespread use with the DAT. The PO items cover aspects of occupations generally considered important in vocational counseling and occupational descriptions (e.g., the *Dictionary of Occupational Titles* and the *Occupational Outlook Handbook*). Judges agree that the items assess knowledge of educational and training requirements, entry, duties and so on. Items were written so that each is pertinent to any occupational group, but the appropriate response differs according to the group. The keys are based on the sources named above, or if those sources did not cover the item in question, on the agreement of 8 out of 10 (in rare cases, for needed coverage, 7 out of 10) experts cooperating with the test authors. Thus, the content validity of the PO items is well established on the basis of expert judgment.

Reality orientation, the fifth dimension in the model on which the CDI is based, is not assessed by this instrument. As pointed out in the pioneer study by Super & Overstreet (1960), realism consists of relationships between internal to external data, such as self-reports to test scores, plans to probability of success, behavior to expectations. Realism might include comparing self-estimated intelligence or vocational interests with tests or other measures of those variables, or comparing levels of aptitudes with desired levels for probable success. A free-standing measure of career maturity can not do this by itself. CDI results, however, can be used to make some of these comparisons.

## CONSTRUCT VALIDITY

Construct validity is the extent to which an instrument measures a well-defined educational or psychological construct. If a measurement device truly measures the intended construct, then the device should exhibit predictable characteristics. For example, if it is a measure of a trait that would be expected to increase with age, then mean scores should show positive increments from lower to higher age levels. If the instrument should have positive (or negative) relationships with valid measures of other constructs, then appropriate statistical analyses should reveal such relationships. If the internal structure of the instrument should have other predictable characteristics, then these should be demonstrated through appropriate statistical treatment.

Evidence of the CDI's construct validity is based on subgroup differences (sex, grade, and program) and on the factor structure of the instrument. Table I gives means and standard deviations of the CDI scales by grade and by sex within grade. These figures are based on standard scores with a mean of 100 and a standard deviation of 20 from the total group of 5,039 students. The sum of the reported subgroup N's does not equal the total N because of missing information about grade, sex, program, and so on.

Because of the large N's, tests of statistical significance of differences between means of males and females or between grade means provide little meaningful information regarding construct validity. In fact, a difference of only 3/4 of one unit between means of males and females within a given grade would be statistically

significant well beyond the .05 level. Therefore, nearly all subgroup differences in Table I are highly significant in a statistical sense and do not need separate statistical reports. For evaluating construct validity, a meaningful difference must be at least as large as one-half of a standard deviation. Here differences must be at least 10 units (or 9 units, in cases where groups have smaller than average standard deviations).

**Grade of Year Differences.** The construct underlying the CDI is vocational or career maturity, which is measured by separate and combined scales. Career maturity is a developmental characteristic: it should increase as students progress from the 9th to the 12th grade. Therefore, means on the CDI scales would be expected to increase from grade 9 to grade 12. As Table I shows, such an increase occurs for all separate and combined scales, although the amount of increase varies from scale to scale. CP shows the greatest increase in mean, from 96.0 in grade 9 to 107.4 in grade 12, while PO shows the smallest, from 98.3 in grade 9 to 100.8 in grade 12. For DM, WW, PO, and CDK, the 11th grade mean is slightly larger than the 12th, so that increases from 9th to 11th are larger than those from 9th to 12th. Although not all of the differences between 9th and 12th (or 11th) grade means are meaningful, in terms of the construct-validity criterion, the pattern of the differences and their consistency from scale to scale are strong evidence of the construct validity of the separate and combined CDI scales.

**Sex Differences.** Although the CDI items were deliberately written in unisex terms, they were *not* selected to mask differences between males and females. However, the basic theory of career development would predict minimal sex differences. Table I shows relatively few instances in which sex differences within a grade are meaningful, according to the construct-validity criterion. Notable differences occur in grades 11 and 12 on DM and WW, the cognitive scales, and on their combination, CDK: here females tend to make higher scores. At these grade levels, such differences are consistent with sex differences often found in academic achievement. The cognitive CDI scales are more highly correlated with academic achievement measures than are CP, CE, and CDA, the conative scales. The infrequent and moderate sex differences are further evidence of the construct validity of the CDI.

**Curricular Differences.** In examining construct validity, differences in means among students in different programs were investigated. In the norming groups, students indicated that they were enrolled in one of five programs: General, College Preparatory, Vocational/Technical, Business, or Honors. Tables J through M give means and standard deviations by program for 9th through 12th graders.

Although career-development theory would not accurately predict specific differences among programs as reported on the CDI scales, clearly such differences should occur. For example, students in honors programs would be expected to have larger means, particularly on the cognitive scales. Tables K through M show this to be the case. In grades 10, 11, and 12, students in college preparatory and business programs tended to have higher scores than those in general and vocational programs, again particularly on the cognitive scales. On the conative or attitudinal scales, the vocational/technical students

scored higher, perhaps because they would be entering the work force sooner and thus have planned and explored more than other students. In general, the differences in Tables J through M provide further evidence of the construct validity of the CDI scales.

**Factor Structure.** Table N presents the results of factor analyses of the five separate CDI scales by sex and grade. Because the first two were designed to be conative or attitudinal and the last three were intended to be cognitive, the factor analysis should result in two factors;

CD and CE should have high loadings on one factor and DM, WW, and PO should have high loadings on the other. This happens consistently for each sex within each grade. Moreover, the loadings are large, ranging from .62 to .89. The expected two-factor structure clearly exists and the evidence further supports the construct validity of the CDI.

Other evidence of the validity of the CDI can be obtained by investigating the relationship to other variables, including aptitude and achievement. This evidence is reported in detail in the *Technical Manual*.

## VII. Current Status and Future Research

The CDI School Form and College and University Form provide practical, reliable, and content-valid measures on CDA, CDK, and COT scales. CP is also reliable enough for use with individuals, and CE and WW may be used cautiously with individuals. DM and PO may be used very cautiously in interpreting individual profiles, but more confidently in group comparisons; PO is useful primarily at grade 11 and above.

The validity of the CDI has been demonstrated on the basis of its content and its differentiation of grade levels, sexes on cognitive scales (females tend to score higher, which is generally true in verbal achievement tests), and students by curricula. Furthermore, the CDI yields the two hypothesized career-maturity factors, one conative and one cognitive.

Authors of newly published tests are rarely able to report predictive or criterion-validity data, especially for measures of career maturity, which require several years for truly adequate (valid) career-development criteria to become available. Most young men and women are still exploring and only begin to stabilize in their careers at age 25 (Super, Kowalski, & Gotkin, 1967).

The *Technical Manual* reports in detail on the concurrent validity of the CDI, as well as on the predictive validity of its precursors. Studies of the validity of the School and College and University Forms are now being conducted by the authors and graduate students. More are needed. The authors will be glad to comment on pro-

posed research topics, designs, and results, and they welcome reports of research with the CDI.

Research is also needed on the assessment of adult career development. The Adult Form of the CDI, yet unpublished, differs from the School Form and College and University Form in rationale and content. The Adult Form is based on a series of statements describing career concerns or activities in different stages of vocational life, such as "finding what line of work I am best suited for," "deciding whether or not I should change my type of work," "settling down in a regular job," "improving my chances of advancement," "getting ahead in the organization," "planning for retirement," "having friends I can enjoy in retirement," and so on. The items sample the concerns typical of the following stages: Exploration, Establishment, Maintenance, and Disengagement. The examinees rate their current involvement in each activity and use ratings from "I have not thought much about it" to "I have already done this."

The Adult Form is still in the process of field trial and validation (Zelkowitz, 1974; Super, 1977). As a unidimensional measure, its uses are more limited than are those of the multidimensional School and College and University Forms (Super & Kidd, 1979). Specifications and prototype items for a multidimensional test for young blue-collar adults have been developed (Super & Knasel, 1979), but the test has not yet been constructed.

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# Appendix

**Table A**  
**Percentile Norms for Scale CP (Career Planning)**  
**By Grade and Sex**

Scale Score	9			10			11			12			
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT	
146+								99	99	99	99	99	99
140-145		99	99	99	99	99	99	98	98	98	96	96	96
135-139	99	97	98	97	98	98	97	95	96	96	93	93	93
129-134	98	94	96	95	95	95	93	91	92	92	86	88	87
124-128	95	92	93	93	92	92	87	87	87	87	78	81	79
118-123	91	87	89	88	88	88	83	80	81	81	71	74	72
113-117	85	81	82	81	82	81	76	72	74	74	62	65	64
108-112	77	73	75	72	73	73	67	64	66	66	54	55	55
102-107	68	64	65	63	64	63	56	56	56	56	43	46	44
97-101	58	54	56	53	54	54	44	46	46	46	33	36	34
91-96	48	44	45	42	41	42	33	35	34	34	26	26	26
86-90	35	35	35	34	29	32	24	24	24	24	19	19	19
80-85	25	25	25	24	21	23	15	17	16	16	12	13	12
75-79	17	18	17	15	12	14	9	11	10	10	7	8	7
69-74	11	12	11	8	6	7	5	6	6	6	3	5	4
64-68	6	7	7	3	3	3	2	3	1	1	2	2	2
58-63	3	3	3	2	1	2	1	2			1	1	1
53-57	1	2	1	1		1		1					
-52		1											
Mean	95.2	96.7	96.0	97.7	98.3	98.0	102.2	102.2	102.2	108.0	106.7	107.4	
SD	18.5	20.6	19.6	19.2	18.3	18.8	18.9	20.3	19.7	20.0	20.4	20.2	
N	613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047	

**Table B**  
**Percentile Norms for Scale CE (Career Exploration)**  
**By Grade and Sex**

Scale Score	9			10			11			12		
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
143+				99			99	99	99	99	99	99
138-142		99	99	98	99	99	96	96	96	95	97	96
134-137	99	98	98	97	98	98	94	94	94	92	96	94
130-133	97	96	96	96	97	96	91	92	91	88	94	91
125-129	94	93	93	93	95	94	86	88	87	84	90	87
121-124	92	90	91	88	92	90	81	84	83	77	85	81
116-120	86	86	86	83	88	85	74	80	77	71	78	74
112-115	80	82	81	76	82	79	68	74	71	63	71	67
107-111	72	76	74	69	74	72	60	66	63	55	64	59
103-106	63	70	66	61	65	63	50	58	54	46	57	51
99-102	55	62	58	51	56	54	40	48	45	38	48	43
94-98	46	51	49	41	45	43	32	40	36	31	38	35
90-93	37	42	39	32	36	34	26	33	30	23	30	26
85-89	31	34	32	25	27	26	20	28	24	16	23	19
81-84	24	26	25	19	19	19	15	22	18	11	17	14
76-80	17	20	18	12	13	13	9	15	12	8	12	10
72-75	11	14	12	8	9	8	5	10	8	5	8	6
67-71	7	10	8	5	5	5	3	7	5	4	6	5
63-66	4	6	5	3	3	3	2	5	3	2	4	3
-62	2	2	2	1	1	1	1	1	1	1	1	1
Mean	97.4	95.4	96.4	100.2	98.1	99.2	105.0	100.8	102.9	106.9	101.9	104.4
SD	18.7	20.6	19.7	18.8	17.9	18.4	19.7	21.3	20.7	20.0	20.5	20.4
N	613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047



**Table C**  
**Percentile Norms for Score DM (Decision-Making)**  
**By Grade and Sex**

Scale Score	9			10			11			12		
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
139+				99			99		99	99	99	99
134-138				98	99	99	97	99	98	96	98	97
129-133	99	99	99	95	97	96	91	97	94	91	95	93
124-128	96	97	97	88	93	91	82	93	88	84	91	87
119-123	90	94	92	79	88	83	70	87	79	75	85	80
114-118	82	89	85	68	81	74	59	77	68	64	78	71
108-113	71	82	77	56	72	64	47	67	57	50	71	60
103-107	60	74	67	45	62	53	36	57	47	38	63	50
98-102	49	65	57	35	51	43	26	49	38	28	55	41
93-97	39	56	48	24	42	33	19	42	31	21	49	35
88-92	31	46	39	16	35	25	14	36	25	17	44	30
83-87	25	38	32	11	28	19	10	30	20	13	38	25
78-82	19	31	25	7	21	14	6	24	15	8	31	19
73-77	14	23	19	5	16	10	4	17	11	6	23	14
68-72	9	15	12	3	11	7	3	11	7	4	16	10
63-67	5	8	6	2	6	4	2	7	5	3	10	7
58-62	2	4	3	1	2	2		4	2	2	5	3
53-57	1	2	1		1	1		1	1	1	2	1
-52											1	
Mean	98.2	91.5	94.8	106.1	97.4	102.0	109.7	98.0	103.6	107.8	95.1	101.7
SD	18.4	18.9	19.0	17.0	19.6	18.8	17.3	20.6	20.0	18.5	22.7	21.6
N	613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047

**Table D**  
**Percentile Norms for Scale WW (World-of-Work Information)**  
**By Grade and Sex**

Scale Score	9			10			11			12		
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
126+	99	99	99	99	99	99	97	98	98	96	98	97
122-125	95	98	96	94	96	95	86	93	90	85	92	88
118-121	87	94	90	82	90	86	71	84	78	70	83	76
114-117	77	86	81	67	81	73	57	75	66	55	75	65
110-113	66	77	71	52	70	60	44	65	55	44	68	56
106-109	55	69	62	40	59	49	32	56	45	36	61	48
102-105	45	62	54	31	50	40	25	48	37	29	55	41
98-101	38	56	47	24	43	33	21	42	32	23	50	37
94-97	32	51	42	19	38	28	17	38	28	20	46	33
90-93	28	47	37	15	34	24	14	34	25	18	43	30
86-89	24	41	33	12	30	21	12	31	22	16	40	28
83-85	20	36	28	10	26	17	10	28	19	14	35	24
79-82	17	31	24	8	21	14	9	23	16	13	30	21
75-78	15	25	20	7	17	12	7	18	13	11	26	19
71-74	12	20	16	5	13	9	6	14	10	10	21	15
67-70	9	14	12	4	10	7	4	10	7	8	15	11
63-66	7	10	8	3	7	5	3	7	5	6	10	8
59-62	5	6	5	2	4	3	2	4	3	5	6	5
55-58	3	4	3	2	3	2	2	2	2	4	3	3
51-54	2	2	2	1	2	1	2	1	2	3	1	2
-50	1	1	1		1		1		1	1		1
Mean	99.7	92.3	95.9	106.1	97.6	102.0	108.2	98.3	103.1	106.5	95.0	100.9
SD	19.3	20.1	20.0	16.0	19.4	18.2	16.8	20.3	19.3	19.9	22.0	21.7
N	613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047

**Table E**  
**Percentile Norms for Scale PO (Knowledge of Preferred Occupational Group)**  
**By Grade and Sex**

Scale Score	9			10			11			12		
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
138+				99	99	99	99	99	99	99	99	99
132-137	99	99	99	98	98	98	97	98	98	98	98	98
125-131	97	98	97	96	94	95	92	93	93	95	95	95
119-124	90	92	91	89	89	89	82	86	84	87	89	88
112-118	79	84	82	77	81	79	70	78	74	73	78	76
106-111	67	72	69	62	69	65	54	65	60	57	67	62
99-105	53	57	55	43	53	48	40	50	45	43	55	48
93-98	39	40	39	29	35	32	28	37	32	30	40	35
86-92	27	24	25	18	22	20	19	25	22	19	27	23
80-85	17	14	15	11	14	12	12	15	14	14	15	14
73-79	11	9	10	8	9	9	8	9	9	8	9	9
67-72	9	6	8	7	7	7	6	7	6	6	8	7
60-66	8	5	6	6	6	6	4	5	5	5	6	6
54-59	7	5	6	6	5	5	4	5	4	5	5	5
47-53	6	4	5	5	4	5	3	4	4	5	4	4
-46	4	3	3	4	3	3	2	3	3	3	2	3
Mean	98.2	98.4	98.3	101.6	99.7	100.7	104.2	100.3	102.2	102.4	99.2	100.8
SD	21.1	18.4	19.8	20.0	19.6	19.8	19.8	20.3	20.1	20.2	20.2	20.2
N	613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047

**Table F**  
**Percentile Norms for Scale CDA (Career Development—Attitudes)**  
**By Grade and Sex**

Scale Score	9			10			11			12		
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
152+							99		99	99		99
146-151							98	99	99	98	99	98
140-145		99	99	99	99	99	97	98	98	96	97	97
135-139	99	98	98	98	98	98	95	96	95	92	94	93
129-134	97	96	96	96	97	96	91	91	91	87	90	88
123-128	95	92	93	91	94	93	86	86	86	80	84	82
117-122	89	87	88	85	91	88	79	79	79	71	75	73
111-116	82	81	81	77	84	80	69	72	71	60	66	62
105-110	75	72	74	67	73	70	59	63	61	48	56	52
100-104	64	64	64	58	59	58	47	52	50	37	46	41
94-99	51	53	52	47	45	46	35	41	38	27	33	30
88-93	38	41	40	34	33	34	25	29	28	20	23	21
82-87	28	30	29	25	22	23	17	21	19	12	16	15
76-81	19	20	19	15	14	15	11	13	12	7	12	9
70-75	12	13	12	9	7	8	5	8	7	4	6	5
65-69	6	8	7	5	4	4	2	4	3	2	3	3
59-64	3	5	4	2	1	2	1	2	2	1	2	2
53-58	1	3	2	1		1		1	1		1	1
-52		2	1									
Mean	95.6	95.3	95.4	98.6	97.8	98.2	104.3	101.7	102.8	108.6	104.9	106.8
SD	18.5	20.8	19.7	19.4	17.0	18.2	19.6	20.5	20.1	19.8	20.6	20.2
N	613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047

**Table G**  
**Percentile Norms for Scale CDK (Career Development—Knowledge and Skills)**  
**By Grade and Sex**

Scale Score	9			10			11			12		
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
131+				99	99	99	98	99	98	98	99	98
127-130	99	99	99	97	98	98	92	98	95	92	96	94
123-126	96	98	97	90	95	93	82	94	87	82	92	87
118-122	90	94	92	79	89	84	69	85	78	71	85	78
114-117	80	89	85	67	81	73	57	77	67	60	77	68
109-113	70	81	76	54	71	62	45	66	56	47	70	58
105-108	59	72	66	44	62	52	34	58	46	36	63	49
101-104	49	66	57	34	52	43	27	51	39	30	57	43
96-100	41	59	51	25	45	34	21	45	33	24	53	38
92-95	35	52	44	18	40	28	17	40	28	20	49	34
88-91	29	47	38	14	35	24	13	34	24	17	45	31
83-87	24	41	33	11	29	20	10	29	20	14	39	26
79-82	21	34	27	8	25	16	8	25	17	11	32	22
75-78	16	27	22	6	20	12	5	20	13	9	27	18
70-74	12	21	16	4	14	9	3	15	9	7	21	14
66-69	8	14	11	3	9	5	2	10	7	5	15	10
62-65	5	8	7	2	5	3	1	7	4	3	10	6
57-61	2	5	3	1	2	2		3	2	2	5	3
-56	1	2	1		1	1		1	1	1	1	1
Mean	98.8	91.2	94.9	106.6	97.3	102.2	109.7	98.0	103.6	107.8	94.6	101.4
SD	18.6	19.5	19.4	15.9	19.4	18.3	16.6	20.4	19.5	18.9	22.5	21.7
N	613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047

**Table H**  
**Percentile Norms for Scale COT (Career Orientation Total)**  
**By Grade and Sex**

Scale Score	9			10			11			12		
	F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
142+							99		99	99	99	99
138-141				99			97	99	98	96	98	97
134-137	99	99	99	98	99	99	94	97	95	91	95	93
129-133	98	98	98	96	98	97	91	95	93	86	93	89
125-128	97	97	97	91	96	94	85	91	88	79	89	84
121-124	93	95	94	86	93	89	77	87	82	71	84	78
116-120	88	92	91	78	89	83	66	80	73	63	78	70
112-115	82	88	85	71	81	76	56	72	64	52	72	62
108-111	74	82	78	61	74	67	48	64	57	42	63	52
104-107	65	75	70	50	65	58	39	55	48	35	58	46
99-103	55	67	62	40	56	48	30	48	39	29	51	40
95-98	46	60	53	31	48	39	24	42	33	23	45	34
91-94	37	51	45	25	40	32	16	35	26	17	38	28
86-90	31	43	37	19	31	25	12	30	21	13	31	22
82-85	24	34	30	14	24	19	9	25	17	10	25	17
78-81	18	27	23	10	18	14	7	20	14	8	20	14
74-77	13	19	16	7	13	10	5	14	10	6	15	10
69-73	10	14	12	4	7	6	3	11	7	4	11	7
65-68	8	10	9	2	4	3	2	6	4	2	6	4
61-64	6	7	6	1	3	2	1	4	3	1	4	3
57-60	3	4	4		2	1		1	2		3	2
-56	1	2	1		1				1		1	1
Mean	96.4	91.2	93.8	103.4	96.7	100.2	108.8	99.6	104.0	110.2	99.3	104.9
SD	18.6	19.3	19.1	17.3	17.8	17.8	18.0	20.7	20.0	19.3	22.0	21.3
N	613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047

**Table I**  
**Scale Statistics, by Grade and Sex (Scale Scores)**

Scale	Stat	9			10			11			12		
		F	M	TOT	F	M	TOT	F	M	TOT	F	M	TOT
CP	M	95.2	96.7	96.0	97.7	98.3	98.0	102.2	102.2	102.2	108.0	106.7	107.4
	SD	18.5	20.6	19.6	19.2	18.3	18.8	18.9	20.3	19.7	20.0	20.4	20.2
CE	M	97.4	95.4	96.4	100.2	98.1	99.2	105.0	100.8	102.9	106.9	101.9	104.4
	SD	18.7	20.6	19.7	18.8	17.9	18.4	19.7	21.3	20.7	20.0	20.5	20.4
DM	M	98.2	91.5	94.8	106.1	97.4	102.0	109.7	98.0	103.6	107.8	95.1	101.7
	SD	18.4	18.9	19.0	17.0	19.6	18.8	17.3	20.6	20.0	18.5	22.7	21.6
WW	M	99.7	92.3	95.9	106.1	97.6	102.0	108.2	98.3	103.1	106.5	95.0	100.9
	SD	19.3	20.1	20.0	16.0	19.4	18.2	16.8	20.3	19.3	19.9	22.0	21.7
PO	M	98.2	98.4	98.3	101.6	99.7	100.7	104.2	100.3	102.2	102.4	99.2	100.8
	SD	21.1	18.4	19.8	20.0	19.6	19.8	19.8	20.3	20.1	20.2	20.2	20.2
CDA	M	95.6	95.3	95.4	98.6	97.8	98.2	104.3	101.7	102.8	108.6	104.9	106.8
	SD	18.5	20.8	19.7	19.4	17.0	18.2	19.6	20.5	20.1	19.8	20.6	20.2
CDK	M	98.8	91.2	94.9	106.6	97.3	102.2	109.7	98.0	103.6	107.8	94.6	101.4
	SD	18.6	19.5	19.4	15.9	19.4	18.3	16.6	20.4	19.5	18.9	22.5	21.7
COT	M	96.4	91.2	93.8	103.4	96.7	100.2	108.8	99.6	104.0	110.2	99.3	104.9
	SD	18.6	19.3	19.1	17.3	17.8	17.8	18.0	20.7	20.0	19.3	22.0	21.3
N		613	635	1,249	732	668	1,402	611	656	1,269	540	502	1,047

Note: Based on a total N of 5,039. The scale scores are standard scores with a mean of 100 and a standard deviation of 20.

**Table J**  
**Grade 9**  
**Scale Statistics by Program (Scale Scores)**

Scale		Program			
		General	Academic/ Coll. Prep.	Voc./ Tech.	Total Grade
CP:	M	96.2	94.2	110.8	96.0
	SD	18.4	22.4	18.0	19.6
CE:	M	96.5	94.6	111.6	96.4
	SD	19.0	21.1	22.2	19.7
DM:	M	95.1	93.2	91.9	94.8
	SD	18.8	19.9	16.2	19.0
WW:	M	96.9	91.7	94.0	95.9
	SD	19.5	21.9	14.8	20.0
PO:	M	98.5	98.8	104.3	98.3
	SD	19.1	20.3	11.9	19.8
CDA:	M	95.6	93.4	113.0	95.4
	SD	18.5	22.6	19.0	19.7
CDK:	M	95.6	91.8	92.4	94.9
	SD	19.0	21.0	13.8	19.4
COT:	M	94.4	90.4	102.8	93.8
	SD	18.2	22.0	14.3	19.1
N		853	289	28	1,249

**Table K**  
**Grade 10**  
**Scale Statistics by Program (Scale Scores)**

Scale		Program					
		Gen.	Acad./ C. Prep.	Voc./ Tech.	Comm./ Bus.	Honors	Total
CP:	M	95.3	98.0	103.6	97.3	101.1	98.0
	SD	17.9	20.0	19.4	16.5	18.2	18.8
CE:	M	96.4	101.2	99.2	93.9	104.0	99.2
	SD	18.8	17.8	21.1	15.0	16.9	18.4
DM:	M	96.9	107.2	92.3	95.7	116.9	102.0
	SD	18.7	16.9	15.7	19.7	13.9	18.8
WW:	M	97.1	106.5	94.1	103.1	113.6	102.0
	SD	18.9	16.0	18.4	17.2	11.2	18.2
PO:	M	97.7	105.2	95.9	94.5	115.1	100.7
	SD	20.1	17.2	15.7	16.3	16.6	19.8
CDA:	M	95.1	99.4	101.5	94.8	102.9	98.2
	SD	17.8	18.9	20.1	15.0	17.2	18.2
CDK:	M	96.8	107.5	92.6	99.4	116.6	102.2
	SD	18.5	15.9	16.7	18.5	11.3	18.3
COT:	M	94.7	104.5	96.0	96.2	112.5	100.2
	SD	17.4	16.6	17.4	16.6	14.3	17.8
N		552	417	87	44	111	1,402

**Table L**  
**Grade 11**  
Scale Statistics by Program (Scale Scores)

Scale	Program					
	Gen.	Acad./ C. Prep.	Voc./ Tech.	Comm./ Bus.	Honors	Total
CP: M	99.7	98.9	107.0	101.8	111.9	102.2
SD	20.0	18.9	19.4	21.4	18.9	19.7
CE: M	98.6	103.4	99.9	101.0	112.9	102.9
SD	21.8	19.2	21.0	21.6	19.0	20.7
DM: M	98.9	107.2	90.3	106.5	117.1	103.6
SD	19.8	18.4	20.3	19.3	15.4	20.0
WW: M	100.4	105.0	91.3	105.0	114.7	103.1
SD	19.4	18.1	19.2	18.0	14.3	19.3
PO: M	101.9	104.5	95.1	98.8	117.0	102.2
SD	17.0	19.0	18.4	14.0	16.3	20.1
CDA: M	98.9	101.2	103.9	101.4	114.4	102.8
SD	21.3	18.6	19.9	21.6	18.8	20.1
CDK: M	99.6	106.7	89.9	106.3	117.3	103.6
SD	19.7	17.5	19.7	18.9	14.3	19.5
COT: M	98.9	105.0	95.7	105.0	120.0	104.0
SD	20.9	18.3	20.6	17.2	15.3	20.0
N	334	400	111	60	139	1,269

**Table M**  
**Grade 12**  
Scale Statistics by Program (Scale Scores)

Scale	Program					
	Gen.	Acad./ C. Prep.	Voc./ Tech.	Comm./ Bus.	Honors	Total
CP: M	103.4	108.9	111.8	109.7	109.7	107.4
SD	19.9	20.5	21.1	18.0	19.4	20.2
CE: M	100.9	106.3	104.3	103.3	105.4	104.4
SD	21.0	19.3	22.9	19.8	21.6	20.4
DM: M	97.8	105.5	91.6	105.3	100.2	101.7
SD	21.1	22.0	21.8	19.1	15.6	21.6
WW: M	98.3	103.2	91.7	103.6	101.2	100.9
SD	22.3	21.7	19.5	18.0	21.3	21.7
PO: M	100.1	102.6	96.8	97.1	96.5	100.8
SD	18.9	22.3	15.9	19.8	22.8	20.2
CDA: M	102.4	108.7	109.2	107.4	108.7	106.8
SD	20.8	19.7	21.9	17.6	19.0	20.2
CDK: M	97.8	104.7	91.0	104.8	100.7	101.4
SD	21.9	21.8	20.2	18.5	15.5	21.7
COT: M	99.9	108.3	99.5	107.7	105.7	104.9
SD	22.2	20.7	21.8	19.1	17.6	21.3
N	330	440	89	60	13	1,047

**Table N**  
Factor Analyses of 5 CDI Scales  
by Grade and Sex

Scale		Grade							
		9		10		11		12	
		Factor I	Factor II	Factor I	Factor II	Factor I	Factor II	Factor I	Factor II
Male and Female	CD	—	87	—	85	—	87	—	85
	CE	—	85	—	82	—	82	—	84
	DM	84	—	83	—	83	—	84	—
	WW	89	—	86	—	86	—	86	—
	PO	70	—	68	—	66	—	71	—
	% Var	43.1	26.6	41.4	25.8	43.9	23.9	45.0	24.6
Female	CD	—	85	—	88	—	87	—	84
	CE	—	83	—	86	—	85	—	84
	DM	80	—	80	—	80	—	80	—
	WW	88	—	84	—	85	—	85	—
	PO	74	—	68	—	70	—	74	—
	% Var	44.4	24.6	41.2	26.4	42.9	25.1	42.5	25.7
Male	CD	—	87	—	81	—	86	—	86
	CE	—	86	—	78	—	80	—	85
	DM	85	—	83	—	83	—	85	—
	WW	89	—	87	—	87	—	87	—
	PO	70	—	70	—	62	—	69	—
	% Var	42.5	28.0	41.1	24.4	43.2	23.0	45.7	24.2

Note: Varimax rotated principal components solutions. Only loadings of at least .30 are given. Decimals are omitted.

