The 1991 Revised DOT: What’s New and Different and its Impact on Traditional Evaluation Techniques

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Abstract

The 1991 Revision to the Dictionary of Occupational Titles (4th Edition) added some important new variables to the reported data. Since only about 20% of the content of the DOT was revised and the Department of Labor has not yet printed new characteristics of occupations information, it is difficult to understand what really is new. This paper compares many aspects of the old version to the revised edition. There is a discussion of the Revised Handbook for Analyzing Jobs (1991), and an analysis of the frequency with which the new worker characteristics data is reported. The impact of the subtleties of these many new changes on assessment instruments, techniques, and strategies is presented. Emphasis is placed on how to avoid dangerous judgments which may adversely affect the process of vocational analysis, particularly when using a computerized approach.

Spurred by the Great Depression, the United States Department of Labor (DOL) began a program of occupational research beginning in 1934, categorizing occupations primarily by job content using techniques for job analysis pioneered in this era. During and after World War II, research focus shifted towards methods and techniques for matching the individual worker’s characteristics to the requirements of a job (Miller, Treiman, Cain, and Roos, 1980). By the mid-sixties, The Dictionary of Occupational Titles, Third Edition (DOL, 1965) had evolved, with worker characteristics identified for occupations grouped by a new coding structure called Data-People-Things (DPT). The General Aptitude Test Battery and commercial development of assessment systems began to emerge using DPT technology.

DOL’s third release of the Handbook for Analyzing Jobs (DOL, 1972) laid the foundation for data collection and coding procedures used by job analysts to construct the Fourth edition of the DOT (DOL, 1977). The Fourth edition added three more digits to the DOT code to create a unique key for each DOT occupation, a step essential to computerized retrieval of DOT information. The Fourth edition also responded to the civil rights activism of the sixties and seventies, reflecting a careful review of words to eliminate sex bias in occupational titles and descriptions.

By 1977, a private sector method was introduced which built upon the Fourth edition DOT and the 1972 HAJ. The Vocational Diagnosis and Assessment of Residual Employability (VDARE) process (McCroskey, Wattenbarger, Field, and Sink, 1977).

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introduced the first scientific method for analyzing transferability of skills. To accommodate the disability adjudication needs of the Social Security Administration, the DOL began to publish some of the detailed characteristics of the typical requirements of each of the unique occupations in the Selected Characteristics of Occupations (DOL, 1981). The DOL also made the complete unabridged data set available to commercial developers on magnetic computer tape. From this data tape emerged the popular Classification of Jobs According to Worker Trait Factors (Field & Field, 1980). The release of the magnetic data tape stimulated pioneering work by a variety of innovative software companies to automate DOT information (Fry, 1982; Botterbusch, 1983).

Suggestions from the rehabilitation community and the embryonic vocational software industry led the DOL to begin to revise the HAJ to better classify physical demand characteristics and environmental working conditions. A Guide to Job Analysis (MDC, 1982) was a preliminary version of a revised HAJ, showing the general direction of future changes in DOT characteristics. Supplements to the Fourth Edition were released (DOL, 1982, 1986). The 1986 DOT Supplement introduced some preliminary expanded worker characteristics, though only for the 875 new titles, not the original 12,099 titles of the Fourth Edition. Additional changes to the job analysis taxonomy were made, culminating in the only official revision to the HAJ (DOL, 1991).

The Dictionary of Occupational Titles, Revised Fourth Edition (DOL, 1991) follows the new RHAJ criteria. The revision was done to consolidate the 1977 DOT and its 1986 Supplement, to add new titles, and to delete obsolete titles. A Revised SCO is in preparation by DOL, but has not yet been released in print (as of March, 1993). DOL has permitted electronic release of the data prior to the official print publication, an historic event signaling DOL movement towards more timely data release through technology. A Revised Classification of Jobs (Field & Field, 1992) has been privately printed to enable hard copy access to the data. Many manufacturers of vocational software have already modified their products to take advantage of the precision available in these new worker characteristics. Significant structural changes in the DOT may occur later in this decade, pending the outcome of recommendations of the Advisory Panel on the DOT (APDOT) and funding to implement the recommendations.

What's new about the 1991 DOT?

As released by the DOL, the 1991 DOT was printed in two soft cover volumes. The pages were edge-banded to make lookups easier. A number of private sector companies have reprinted the DOT, some binding the two volumes into a convenient and durable hard cover single volume.

The 1977 DOT plus the 1986 Supplement had a combined total of 12,855 occupations. The 1991 DOT has only 12,741 unique DOT descriptions. These base titles are cross-referenced by over 20,000 alternate titles. The DOL claims that 844 occupations are "new." The author, however, only finds that 90 occupations are truly "new," since the DOL count includes the 875 "new" titles which have been listed in the DOT supplement since 1986. These 90 completely new titles are listed in Table 1. The titles include a new Occupational Group Arrangement (OGA) for computer related occupations. There are 14 "new" titles added in this OGA, with 7 existing DOT codes having been reassigned to this new OGA for a total of 21 computer data processing occupations.
NEW 1991 Revised DOT Titles (by DOT Industry Designation)

Aircraft Manufacturing
007.362-010 NESTING OPERATOR, NUMERICAL CONTROL
553.362-014 AUTOCLAVE OPERATOR
604.382-026 ROBOTIC MACHINE OPERATOR
699.362-010 AUTOMATED CUTTING MACHINE OPERATOR
699.382-010 FLUID JET CUTTER OPERATOR

Any Industry
051.132-010 SUPERVISOR, NETWORK CONTROL OPERATORS
031.262-014 NETWORK CONTROL OPERATOR
823.261-050 DATA COMMUNICATIONS TECHNICIAN

Automobile Manufacturing
806.137-022 QUALITY ASSURANCE SUPERVISOR
806.367-014 QUALITY ASSURANCE GROUP LEADER
806.367-018 QUALITY ASSURANCE MONITOR

Clerical
221.362-030 COMPUTER PROCESSING SCHEDULER

Education
094.227-030 TEACHER, LEARNING DISABLED

Electrical Equipment
727.664-010 BATTERY ASSEMBLER, DRY CELL
820.664-010 TRANSFORMER ASSEMBLER II

Electronics Components
590.664-042 INTEGRATED CIRCUIT FABRICATOR
725.664-026 CATHODE RAY TUBE SALVAGE PROCESSOR

Financial
164.117-086 MANAGER, EXCHANGE FLOOR
164.167-070 ASSISTANT BRANCH MANAGER, FINANCIAL INSTITUTION
164.267-022 LOAN REVIEW ANALYST
164.267-026 UNDERWRITER, MORTGAGE LOAN
211.382-010 TELLER, VAULT
216.562-038 ELECTRONIC FUNDS TRANSFER COORDINATOR
216.562-046 TRANSFER CLERK
216.482-024 DIVIDEND CLERK
219.392-074 TRUST OPERATIONS ASSISTANT
349.337-054 SUPERVISOR, LENDING ACTIVITIES
349.562-018 MORTGAGE LOAN CLOSER

Government Services
195.267-022 CHILD SUPPORT OFFICER

Instruments & Apparatus
710.685-014 THERMOMETER PRODUCTION WORKER

Library
100.167-028 NEWS LIBRARIAN

Machine Shop
609.360-010 NUMERICAL CONTROL MACHINE SET-UP OPERATOR

Medical Services
075.127-034 NURSE, INFECTION CONTROL
075.167-014 QUALITY ASSURANCE COORDINATOR
076.121-018 EXERCISE PHYSIOLOGIST
076.261-026 CYTOGENETIC TECHNOLOGIST
076.261-034 MEDICAL RADIATION DENTIMETRIST
076.261-042 PHERESIS SPECIALIST
076.361-038 OPHTHALMIC TECHNICIAN
076.362-038 ELECTROMYOGRAPHIC TECHNICIAN
076.362-042 POLYSOMNOGRAPHIC TECHNICIAN
076.362-046 SPECIAL PROCEDURES TECHNOLOGIST, ANGIOGRAPH
076.362-050 SPECIAL PROCEDURES TECHNOLOGIST, CARDIAC
076.362-054 SPECIAL PROCEDURES TECHNOLOGIST, CT SCAN
076.362-058 SPECIAL PROCEDURES TECHNOLOGIST, MAGNETIC
076.362-062 STRESS TEST TECHNICIAN
076.364-014 ECHOCARDIOGRAPH TECHNICIAN
079.151-010 TRANSPLANT COORDINATOR
079.362-018 TUMOR REGISTRAR
079.364-026 PARAMEDIC
143.352-014 OPHTHALMIC PHOTOGRAPHER

Motion Pictures
203.362-026 CAPTION WRITER

Printing and Publishing
221.167-026 CUSTOMER SERVICES COORDINATOR
651.683-026 ASSISTANT PRESS OPERATOR, OFFSET
651.684-014 FEEDER
651.686-022 ROLL TENDER
972.281-022 STRIPPER, LITHOGRAPHIC I
972.283-018 ELECTRONIC MASKING SYSTEM OPERATOR
972.284-010 FILM FLOAT INSPECTOR
972.381-034 PROOFER, PREPRESS
972.607-010 PLATE INSPECTOR
976.664-038 CONTACT WORKER, LITHOGRAPHY
977.664-026 BENCH WORKER, BINDING
979.202-010 ELECTRONIC PREPRESS SYSTEM OPERATOR

Professional & Kindred
030.062-010 SOFTWARE ENGINEER
030.162-014 PROGRAMMER-ANALYST
030.162-022 SYSTEMS PROGRAMMER
031.362-010 DATA COMMUNICATIONS ANALYST
032.132-010 USER SUPPORT ANALYST SUPERVISOR
033.162-010 COMPUTER SECURITY COORDINATOR
033.162-014 DATA RECOVERY PLANNER
033.162-018 TECHNICAL SUPPORT SPECIALIST
033.362-010 QUALITY ASSURANCE ANALYST
033.362-010 COMPUTER SECURITY SPECIALIST
039.162-010 DATA BASE ADMINISTRATOR
039.162-014 DATA BASE DESIGN ANALYST
043.107-020 CLINICAL THERAPIST
043.107-054 COUNSELOR, MARRIAGE AND FAMILY
160.162-020 AUDITOR, DATA PROCESSING
169.167-022 MANAGER, COMPUTER OPERATIONS

Protective Devices
719.381-018 BLOCK MAKER

Radio-TV Broadcasting
159.147-018 SHOW HOST/HOSTESS
194.122-010 ACCESS COORDINATOR, CABLE TELEVISION
194.162-010 PROGRAM DIRECTOR, CABLE TELEVISION
194.262-022 MASTER CONTROL OPERATOR
194.362-022 TECHNICAL NEWS GATHERER
The DOL added "trailer" information to each DOT description. This enables quick retrieval of basic worker characteristics without having to consult another resource document. Trailer data includes the Strength classification, General Educational Development (GED) - Reasoning, Math, and Language, Specific Vocational Preparation (SVP), Guide for Occupational Exploration Code (GOE), and the Date the description was Last Updated (DLU).

DOL claims to have reviewed all of the occupational definitions and made significant changes to 1,609 occupations based on additional information gathered from on-site observations of 10,000 jobs in more than 1,500 establishments in some 45 industries. The number of industries (Industry Designations) was reduced from 220 categories to only 140. The surviving industries are much more useful ... who will ever miss the 'Excelsior' industry?

The DOL appears to have "taken the bull by the horns", focusing its on-site analyses within industries which have been most impacted by automation. These industries include:
- Aircraft manufacturing
- Automobile manufacturing
- Clerical
- Electronics
- Finance
- Instruments and apparatus
- Machine shop
- Medical services
- Printing and publishing

The author was able to identify significant changes in 1,544 occupations, many of which had multiple factors changed (such as strength, physical demands and working conditions, GED, SVP, aptitudes, and cross-references to other codes). The author's sampling of these significantly changed definitions revealed excellent work by DOL analysts. Many of the changed descriptions incorporated references to the use of computers as an essential component of the job tasks. Changes in worker characteristics ratings appear to have been in directions expected, with slightly higher GED levels and Clerical aptitude assigned if computer use was involved in a description.

A total of 310 existing occupations were identified which were assigned new DOT code numbers. DOL claims to have deleted 208 obsolete titles, but the author found that only 75 occupations were completely deleted in the revision. Rather, the author discovered 133 old occupations were combined into other, already existing DOT codes. This reflected DOL's desire to show how some narrow, highly focused jobs no longer exist. Many "real world" positions require performance of a multitude of duties.

Major Changes in Worker Characteristics

The Revised Handbook for Analyzing Jobs (RHAJ) is the primary reference document used by DOL job analysts to collect job data. Ambiguities in interpretation of worker characteristics vs. typical job requirements were resolved by study of the relevant descriptive material contained in the RHAJ. Being the foundation for the 1991 DOT, the RHAJ is a critical document for understanding the DOT. When purchasing the RHAJ, be sure that Chapter 9 contains 36 pages. The Government Printing Office misprinted this chapter, omitting 32 pages! Private sector reprints are available which include these missing pages.

As detailed in the RHAJ, there are significant changes in Strength, Physical Demands, Environmental Working Conditions, and Temperaments. GED and SVP definitions are unchanged. Bipolar interest ratings (i.e. 1A vs. 2B) were discontinued. Details on each of these areas are presented below.
Strength

The RHAI presents a much clearer definition of Strength requirements than was given in the original HAIJ. The new definition is quite specific on issues relating to the frequency, the forces, and the positions of the worker. The RHAIJ (Chapter 12) presents a table which can also be inverted as presented below (Table 2).

**STRENGTH - Per RHAIJ (Chapter 12)**

<table>
<thead>
<tr>
<th>WEIGHT / FORCE Exerted to lift/carry/push/pull/move objects</th>
<th>WORKDAY</th>
<th>Occasional (up to 1/3)</th>
<th>Frequent (1/3 to 2/3)</th>
<th>Constant (2/3 or more)</th>
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</thead>
<tbody>
<tr>
<td>10 lbs. max.</td>
<td>S</td>
<td>S</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>20 lbs. max.</td>
<td>S</td>
<td>L</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>30 lbs. max.</td>
<td>M</td>
<td>M</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>50 lbs. max.</td>
<td>M</td>
<td>M</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>100 lbs. max.</td>
<td>W</td>
<td>W</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

Figure 1 - 1991 vs. 1977/86 DOT Strength

towards fewer Sedentary and Light occupational titles, and more Medium occupations. Figure 2 shows this trend...
characteristics into discrete factors, added a new category for tasting/smelling, and expanded the seeing characteristic to six new

When using these new factors in computerized systems, it is essential that the user be fully aware of the frequency
Environmental Conditions

Once again in response to input from the rehabilitation community, the DOL greatly expanded its treatment of working conditions. The same frequency rating intervals are followed for these factors, except that the Noise factor is rated on a scale of 1-5 (Very Quiet to Very Loud). Table 4 lists each of the factors, again with the author’s suggested "user-friendly acronyms".

1 - WE - Exposure to Weather  
2 - CO - Extreme non-weather Cold  
3 - HO - Extreme non-weather Heat  
4 - WT - Wetness/Humidity  
5 - NO - Noise intensity level  
6 - VI - Vibration  
7 - AT - Atmospheric conditions  
8 - MV - Moving mechanical parts hazard  
9 - EL - Electric shock hazard  
10 - HI - High, exposed places  
11 - RA - Radiation exposure hazard  
12 - EX - Explosion hazard  
13 - TX - Toxic/Caustic hazards  
14 - OT - Other hazards

FREQUENCY DISTRIBUTION

<table>
<thead>
<tr>
<th>Factor</th>
<th>Not Present</th>
<th>Occasional</th>
<th>Frequent</th>
<th>Constant</th>
</tr>
</thead>
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<tr>
<td>1 - WE</td>
<td>10875</td>
<td>504</td>
<td>750</td>
<td>312</td>
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<td>2 - CO</td>
<td>12631</td>
<td>70</td>
<td>33</td>
<td>5</td>
</tr>
<tr>
<td>3 - HO</td>
<td>11915</td>
<td>364</td>
<td>406</td>
<td>56</td>
</tr>
<tr>
<td>4 - WT</td>
<td>11594</td>
<td>543</td>
<td>599</td>
<td>95</td>
</tr>
<tr>
<td>5 - NO</td>
<td>Rating from 1=Very Quiet to 5=Very Loud</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6 - VI</td>
<td>12675</td>
<td>36</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>7 - AT</td>
<td>10993</td>
<td>820</td>
<td>765</td>
<td>163</td>
</tr>
<tr>
<td>8 - MV</td>
<td>12016</td>
<td>564</td>
<td>140</td>
<td>21</td>
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<td>9 - EL</td>
<td>12590</td>
<td>101</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>10 - HI</td>
<td>12377</td>
<td>119</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>11 - RA</td>
<td>12670</td>
<td>51</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>12 - EX</td>
<td>12645</td>
<td>60</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>13 - TX</td>
<td>12371</td>
<td>312</td>
<td>45</td>
<td>13</td>
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<tr>
<td>14 - OT</td>
<td>11030</td>
<td>787</td>
<td>843</td>
<td>81</td>
</tr>
</tbody>
</table>

Table 4 - New Environmental Conditions

The frequency distributions for all of these factors are heavily skewed towards "Not Present," so the impact on database searches is relatively minimal.

Temperaments

Temperaments are the adaptability requirements made on the worker by specific types of job situations. The HAJ identified 10 temperamental factors. The RHAJ dropped old Temperament M - Generalizing and deciding based on measurable or verifiable criteria, combining it with Temperament J - Making Judgements and decisions. The RHAJ also introduced two new temperament factors, A - Working Alone or apart in physical isolation from others and U - Working Under specific instructions. Table 5 lists the temperament factors and gives frequency information.

N Temperament
2229 D - DIRECTING, controlling, planning
5858 R - REPETITIVE, short cycle work
490 I - INFLUENCING people
2243 V - VARIETY of duties
171 E - EXPRESSING personal feelings
3 A - Working ALONE, apart from others
274 S - Performing under STRESS
6983 T - Attaining precise TOLERANCES
193 U - Work UNDER specific instructions
2897 P - Dealing with PEOPLE
6024 J - Make JUDGMENTS and decisions

Table 5 - Revised Temperament Factors

Specific Vocational Preparation

No changes were made to the SVP category. Table 6 shows that the cumulative frequency count distribution is remarkably stable. In the absence of a skills definition by the DOL since 1965, the author suggests four clusters of SVP: Unskilled (SVP = 1 or 2); Semi-Skilled (SVP = 3 or 4); Skilled (SVP = 5, 6, or 7); and Highly Skilled (SVP = 8 or 9). These clusters correspond to popular usage of these terms by the general public and by educational organizations.
General Educational Development

No changes were made to the GED taxonomy. The author noted that there were a considerable number of changes in the assigned GED levels for R, M, and L. A minor trend is seen in Table 7 showing a shift away from lower levels of GED-R,M,L towards average and high average areas. No clear pattern can emerge since less than 20% of the 1991 DOT was significantly changed or new.

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<tr>
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<tr>
<td></td>
<td>Low</td>
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<td>996</td>
<td>416</td>
<td>758</td>
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<td>245</td>
<td>109</td>
<td>167</td>
<td>6</td>
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</table>

Table 7 - General Educational Development

Aptitudes

No changes were made to the Aptitude classification. The author observed in his sample review of significantly changed DOT descriptions that the Aptitude value for Q - Clerical Perception often was raised one level when computer use was added to the description of job duties. Table 8 presents the...
G - General Learning Ability  
V - Verbal  
N - Numerical  
S - Spatial Perception  
P - Form Perception  
Q - Clerical Perception  
K - Motor Coordination  
F - Finger Dexterity  
M - Manual Dexterity  
E - Eye-Hand-Foot Coordination  
C - Color Discrimination

APTITUDE FREQUENCY DISTRIBUTION

<table>
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<tr>
<th></th>
<th>1</th>
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<td>185</td>
<td>1053</td>
<td>3818</td>
<td>7664</td>
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</table>

Table 8 - Frequency Distribution of Aptitude Levels

Although DOL was able to significantly change only about 20% of the DOT, the author is impressed by the work done in the 1991 DOT. While not "perfect", the precision with which worker characteristics are catalogued is much more useful to the rehabilitation industry.

Users of computerized job matching systems have a tremendous responsibility to study the full meaning of these new characteristics. There must be a continuous focus on the frequency distributions to understand how the database will behave. The additional complexity of these new factors requires a computerized search to assure complete and accurate analysis.

Manufacturers of vocational software are notified of the periodic changes in DOT data made by DOL. Many data changes occurred during 1992 which were released only to the software manufacturers. The only regular method being used by the DOL for public dissemination of these data changes is through vocational software manufacturers. DOT users who want to conveniently access the most up-to-date DOL information will likely only be able to do so through reliance on reputable vocational software manufacturers.

Users of assessment instruments and career reference materials should carefully examine all instrumentation being purchased or used to be sure that DOT code references remain accurate. Commercial instrumentation should be reviewed by the manufacturer to insure that references to DOT codes, Strength, Physical Demands, Environmental Conditions, WORK fields, and MPSMS codes in manuals, interpretation guides, and scoring profiles, use the revised DOT and RHAJ codes and code structures.

fields were eliminated; others were absorbed into existing codes. A new WORK field was created for Data Processing. The realignment of these codes is of great significance to proper analysis of transferable skills.

SUMMARY

The author believes that the changes made to these taxonomies are excellent and will lead to even better analysis of transferable skills. WORK and MPSMS codes are the only proper method for determining transferability (Botterbusch, 1986).
References


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