

HEALTH AND RETIREMENT STUDY

Health and Retirement Study Linkage to Occupational Information Network Data

Data Description and Usage

Version 1, June 2022

Data and report prepared by

Rebekah Carpenter, Florida State University

Dawn Carr, Florida State University

Brooke Helppie-McFall, University of Michigan

Amanda Sonnega, University of Michigan

To the Restricted Data Investigator: This restricted data set is intended for exclusive use by you and the persons specified in the *Agreement for Use of Restricted Data from the Health and Retirement Study* and/or the *Supplemental Agreement with Research Staff for Use of Restricted Data from the Health and Retirement Study*.

If there are any questions about this data set and its use, refer to the HRS Restricted Data page (<https://hrs.isr.umich.edu/data-products/restricted-data>) or contact the HRS Help Desk (hrsquestions@umich.edu).

This document may not be reproduced without the written consent of the staff of the Health and Retirement Study, The Institute for Social Research, The University of Michigan.

Accessing the Data

- The 2022 Health and Retirement Study (HRS) Linkage to Occupational Information Network (O*NET) Data are available to registered HRS data users as a restricted data product housed in a secure data enclave at the University of Michigan Institute for Social Research.
- The enclave can be accessed through a virtual desktop infrastructure (VDI).
- All analyses with the data that are requested for export from the enclave undergo a strict [disclosure limitation review](#).
- Visit the HRS website to [apply for access](#).

Citing the Data

- The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement and Disability Research Consortium through the Michigan Retirement and Disability Research Center Award RDR18000002.
- Please include the following citation in any research reports, papers, or publications based on the 2022 HRS Linkage to O*NET Data:

"Carpenter, R., Carr, D. Helppie-McFall, B., & Sonnega, A. Health and Retirement Study Linkage to Occupational Information Network Data: Data Description and Usage, Version 1. Produced and distributed by the University of Michigan with funding from the National Institute on Aging (grant number NIA U01AG009740); Social Security Administration (grant number RDR18000002). Ann Arbor, MI, (2022)."

Acknowledgments

We gratefully acknowledge the contribution of Roma Patel, Julia Beckel, and Gwen Fisher. We also deeply appreciate the time and effort put forth by Pam Frugoli. Moreover, we greatly acknowledge the feedback from Ross Andel, Joe Grzywacz, Shelly Rauvola, Kathleen Mullen, Theresa Andrasfay, and Jim Grosch.

Table of Contents

1. Overview of Project	3
2. O*NET Database Linkage to HRS Sample through 2010-Census Occupational Codes.....	3
2.1 Creation of Crosswalk Linkage	3
2.2 Linkage to HRS Data	4
3. Overview of Occupational Information Network (O*NET) Database.....	5
3.1 O*NET Data Collection Process	5
4. What Measures from the O*NET database is included in this dataset?.....	6
5. Variables in HRS-O*NET Dataset: Creation and Meaning	7
5.1 Dimension 1: Knowledge (IM and LV).....	8
5.2 Dimension 2: Skills (IM and LV)	10
5.3 Dimension 3: Abilities (IM and LV)	13
5.4 Dimension 4: Interests.....	16
5.5 Dimension 5: Work Values.....	18
5.6 Dimension 6: Work Styles (IM).....	20
5.7 Dimension 7: Work Context	22
5.8 Dimension 8: Job Zones	26
5.9 Dimension 9: Work Activities (IM and LV)	27
6. If You Need to Know More	7
Appendix A.....	32

Data Description and Usage

1. Overview of Project

This document describes a dataset that provides a linkage between measures and variables provided in the Occupational Information Network (O*NET) with detailed 2010 Census occupational codes found in 2010-2020 restricted access Health and Retirement Study (HRS) data releases. Specifically, this project links detailed worker and occupational characteristics data taken from the O*NET 26.1 database with detailed 2010 Census occupational codes found in restricted access HRS datasets (releases for years 2010 to 2020). Using the HRS “hhidpn” respondent identification variable, the HRS-O*NET datasets can be linked with any user-accessible HRS dataset at the respondent level.

The 2022 Health and Retirement Study Linkage to Occupational Information Network Data details occupational data for up to 463 unique 2010 Census occupational codes per HRS wave.¹ It contains over 3,000 variables related to worker and occupational characteristics. The variables are distributed across nine datasets that are reflective of nine different O*NET dimensions: Knowledge, Skills, Abilities, Interests, Work Values, Work Styles, Work Activities, Work Context, and Job Zones. The constructed variables found in the 2022 HRS Linkage to O*NET Data are based on data files released by the O*NET (26.1 database) and are current as of January 2022. For more details concerning O*NET data and measurement, see the current O*NET data files page:

<https://www.onetcenter.org/database.html#individual-files>.

2. HRS Linkage to O*NET Database through 2010 Census Occupational Codes

Recent data releases for the HRS (2010-present) utilize the 2010 Census occupational codeframe. The HRS collects detailed respondent information on occupations, resulting in respondent-level occupational information for up to 463 2010 Census level occupations. In the finalized 2022 HRS Linkage to O*NET Data, restricted access HRS respondent level data was linked to O*NET data through 2010 Census occupational codes. Military occupational codes were excluded from the HRS to O*NET linkage because detailed occupational information for military occupations is not included in the O*NET database. Overall, the final HRS-O*NET data release provides worker and occupational characteristics for over 3,000 measures.

2.1 Creation of Crosswalk Linkage

The 2022 HRS Linkage to O*NET Data were derived by linking O*NET occupation-specific data (26.1 database) to respondent data in the HRS, through 2010 Census occupational codes. The O*NET database provides detailed occupational information at the 2019 O*NET-SOC level. Therefore, a crosswalk linking 2019 O*NET-SOC occupational codes to 2010 Census occupational codes was created to enable linkage

¹ For the 2010 wave of data, there are 446 unique 2010 Census occupational codes. For the 2012 wave of data, there are 463 unique 2010 Census occupational codes. For the 2014 wave of data, there are 454 unique 2010 Census occupational codes. For the 2016 wave of data, there are 450 unique 2010 Census occupational codes.

of the final HRS-O*NET dataset. The creation of the 2019 O*NET SOC-2010 Census crosswalk was performed in three steps:

- (1) The 2019 O*NET-SOC codes were linked to 2018 SOC codes by using a crosswalk provided on the O*NET website (<https://www.onetcenter.org/taxonomy/2019/soc.html>), resulting in a 2019 O*NET SOC-2018 crosswalk.
- (2) The 2019 O*NET SOC-2018 SOC crosswalk was merged to 2010 SOC codes using a crosswalk provided by the U.S. Bureau of Labor Statistics (BLS) (https://www.bls.gov/soc/2018/crosswalks_used_by_agencies.htm), resulting in a 2019 O*NET SOC-2010 SOC crosswalk.
- (3) The 2019 O*NET SOC-2010 SOC crosswalk was merged to 2010 Census occupational codes using a crosswalk provided by the BLS: (<https://www.census.gov/topics/employment/industry-occupation/guidance/code-lists.html>)

The end result was a crosswalk that linked 2019 O*NET-SOC occupational codes to 2010 Census occupational codes. Because the 2019 O*NET-SOC taxonomy is a more detailed occupational coding scheme, the final crosswalk resulted in some cases where multiple 2019 O*NET-SOC codes linked to a single 2010 Census code. Moreover, in some cases a single 2019 O*NET-SOC code linked to multiple 2010 Census codes, resulting in instances where we had to make decisions about the linkage of particular occupations. **Appendix A** details the particular decisions we made regarding crosswalk linkages in instances where a single 2019 O*NET-SOC code linked to multiple 2010 Census codes. In some instances, we decided to link the 2019 O*NET-SOC code to a single 2010 Census occupational code. In other cases, we allowed the 2019 O*NET-SOC code to link to two or three different 2010 Census occupational codes.² The crosswalk was examined in detail for face validity by multiple members of our project team and validated by Pam Frugoli (O*Net and Competency Model Team Lead, Employment and Training Administration, and U.S. Department of Labor).

2.2 Linkage to HRS Data

To merge the O*Net-Census 2010 dataset with the HRS, we started with the HRS Cross-Wave Occupation and Industry Dataset. Starting with occupation codes from 2010 through 2016, we first forward- and backfilled J168_2010 occupation codes for respondents who indicated they were in the same jobs and occupations as a wave in which their occupation code was available. We also filled with corrected occupation codes from the J062_2010 items where relevant. We then merged the O*Net dataset to each non-missing occupation observation from 2010-2016³. The 2022 HRS Linkage to O*NET Data files contain the HRS “hhidpn” respondent identification variable; therefore, the 2022 HRS Linkage to O*NET Data can be linked with any user-accessible HRS dataset at the respondent level.

² As part of the process of creating our final crosswalk, we also experimented with creating a crosswalk that linked the 2019 O*NET-SOC codes to the 2010 O*NET-SOC codes, which were then linked to the 2010 SOC codes and finally the 2010 Census codes. However, the results of this crosswalk had some linkages that didn’t make sense, and many more cases in which one 2019 O*NET-SOC code linked to multiple 2010 Census codes. The approach we took in the end reduced the frequency and the oddness of such cases.

³ As part of this process, it emerged that there are some “wild codes” imputed for 2010 Census occupations in the HRS data. Therefore, in some waves of data, there are census codes that do not link the 2010 Census Occupational codeframe. These “wild codes” do not have O*NET data linked to them and can therefore be excluded from analysis.

3. Overview of the Occupational Information Network (O*NET) Database

The O*NET database is a high-quality, detailed source of occupational information that is useful for understanding the changing nature of work and how it impacts the U.S. workforce and economy. The O*NET database provides standardized, occupation-specific measures related to approximately 1,000 occupations. It includes measures that describe work and worker characteristics. Details about the O*NET database can be found on the O*Net website: <https://www.onetcenter.org/overview.html>.

O*NET measures are derived from the O*NET Content Model, which is a framework that identifies the most important information needed for understanding the rapidly changing context of work. Measures are broken down into six major domains: Worker Characteristics, Worker Requirements, Experience Requirements, Occupational Requirements, Workforce Characteristics, and Occupation-Specific Information. For more information about the O*NET Content Model, please refer to their website: <https://www.onetcenter.org/content.html>.

The most up-to-date version of the O*NET database uses the “O*NET-SOC 2019 taxonomy.” The database includes O*NET-SOC codes, titles, and descriptions for all 1,016 occupations in the taxonomy. Task statements are included for 923 of the O*NET-SOC occupations, and a total of 889 occupations have occupational data on knowledge, skills, abilities, and other measures in the current O*NET database release (O*NET 26.1 database).

The 2019 O*NET-SOC taxonomy identifies 62 new occupations relative to the previous O*NET-SOC taxonomy. Data available for these new occupations include titles, descriptions, alternate titles, task statement listings, and detailed work activities. Data for these occupations will be forthcoming in future data releases; future versions of the HRS Linkage to O*NET Data will include the data for these occupations as they become available. For more information about newly added occupations, please refer to the website: <https://www.onetcenter.org/taxonomy/2019/added.html>.

The 2019 O*NET-SOC taxonomy also includes codes for occupations that include the designation “All Other” (e.g., Managers, All Other). These occupations with the “All Other” designation are not data-level occupations. Therefore, no data are available for these occupations and no data will be forthcoming for these occupations in future data releases of the O*NET database or future release of the HRS Linkage to O*NET Data.

3.1 O*NET Data Collection Process

O*Net uses a continuous data collection program aimed at providing regularly updated data that are valid, reliable, and current. The O*NET data collection methodology involves data collection from two domain sources: incumbent and occupational analysts.

Information collected from job incumbents follows a two-stage sampling design. The first stage uses a statistically random sample of businesses and workplaces expected to employ workers in the target occupations. Once a random sample of businesses are identified, a random sample of workers in the targeted occupations is selected from those businesses. After job incumbents are selected, data is collected by surveying the job incumbents using standardized questionnaires.

Information collected from occupational experts (or analysts) uses a nonprobability sampling design. O*NET data collection experts connect with professional associations to attempt to obtain a

representative sample that covers the targeted occupations. Since the data derived from occupational experts follows a nonprobability sampling design, confidence intervals and standard errors are not computed for these data values. Additional information regarding the O*NET data collection process can be found on their website: <https://www.onetcenter.org/dataCollection.html>.

In some cases, the O*NET data files flag a third domain source category: *analyst-transition*. The analyst-transition domain source refers to the (as of January 2022) 53 occupations that have data aggregated from one or more predecessor 2010 O*NET-SOC occupations. Data values (but not sample sizes, confidence intervals, or standard errors) are available for these 53 occupations; however, more current data derived from job incumbents and occupational experts will be included in future releases.

**Note: All datasets have variable flags designating which domain source the data are derived from.*

4. What measures from the O*NET database are included in this dataset?

The O*NET database provides standardized, occupation-specific measures related to approximately 1,000 occupations. It includes measures that describe work and worker characteristics. Our HRS-O*NET dataset provides data on nine different O*NET dimensions, which we thought would be useful to analysts and used in analyses of HRS data. For more information about O*NET dimensions, please refer to the website: https://www.onetcenter.org/dictionary/26.1/excel/content_model_reference.html.

The nine dimensions are outlined and briefly discussed below.

- (1) **Knowledge:** Worker requirements defined as organized sets of principles and facts applying in general domains. The knowledge dimension consists of two types of attributes:
 - a. How important is this knowledge for the current job [on a scale from 1 (not important to 5 (extremely important))]?]
 - b. What level of this knowledge is needed for the current job [on a scale from 1 (lowest) to 7 (highest)]?
- (2) **Skills:** Worker requirements defined as developed capacities that facilitate learning or the more rapid acquisition of knowledge and performance including (1) basic skills, (2) complex problem solving skills, (3) resource management skills, (4) social skills, (5) systems skills, and (6) technical skills. The skills dimension consists of two types of attributes:
 - a. How important is this skill for the current job [on a scale from 1 (not important to 5 (extremely important))]?]
 - b. What level of this skill is needed for the current job [on a scale from 1 (lowest) to 7 (highest)]?
- (3) **Abilities:** Worker characteristics defined as enduring attributes of the individual that influence performance, including (1) cognitive abilities, (2) physical abilities, (3) psychomotor abilities, and (4) sensory abilities. The abilities dimension consists of two types of attributes:
 - a. How important is this ability for the current job [on a scale from 1 (not important to 5 (extremely important))]?]
 - b. What level of this ability is needed for the current job [on a scale from 1 (lowest) to 7 (highest)]?

- (4) **Interests:** Worker characteristics defined as preferences for work environments and outcomes. There are six dimensions of occupational interests: (1) Realistic, (2) Investigative, (3) Artistic, (4) Social, (5) Enterprising, and (6) Conventional.
- (5) **Work Values:** Worker characteristics defined as the occupational reinforcer patterns (ORPs) that indicate which work values and needs are likely to be reinforced or satisfied by a particular O*NET-SOC occupation. There are six dimension of work values: (1) Achievement, (2) Working Conditions, (3) Recognition, (4) Relationships, (5) Support, and (6) Independence.
- (6) **Work Styles:** Worker characteristics defined as personal characteristics that can affect how well someone performs a job. The work styles dimension consists of one attribute, “how important are the work style characteristics for the performance of the current job [on a scale from 1 (not important) to 5 (extremely important)]?”
- (7) **Work Context:** Occupational requirements that relate to the physical and social factors that influence the nature of work including (1) interpersonal relationships, (2) physical work conditions, and (3) structural job characteristics.
- (8) **Job Zones:** Refers to the occupational preparation level (education, experience, and on-the job training) generally required for specific O*NET-SOC occupations. There are five job zones: (1) Little or No Preparation Needed; (2) Some Preparation Needed; (3) Medium Preparation Needed; (4) Considerable Preparation Needed; and (5) Extensive Preparation Needed.
- (9) **Work Activities:** Occupational requirements that refer to work behaviors that typically occur across a very large number of occupations, including (1) information inputs, (2) interactions with others, (3) mental processes, and (4) work output. These are performed in almost all job families and industries. The work activities dimension consists of two types of attributes:
 - a. How important is the activity for the current job [on a scale from 1 (not important) to 5 (extremely important)]?
 - b. What level of activity is needed to perform the current job [on a scale from 1 (lowest) to 7 (highest)]?

5. Variables in the HRS-O*NET Dataset: Creation and Meaning

The HRS-O*NET data product contains variables related to nine O*NET dimensions: knowledge, skills, abilities, interests, work styles, work values, work activities, work context, and job zones. To reduce dataset size, nine separate datasets have been created, one for each of the nine O*NET dimensions. Any or all of these datasets may be combined by merging the datasets using the HRS “hhidpn” respondent identification variable. The nine datasets are named descriptively:

- 1) Knowledge: **hrs_onet_knowledge_2010-2016v1.dta**
- 2) Skills: **hrs_onet_skills_2010-2016v1.dta**
- 3) Abilities: **hrs_onet_abilities_2010-2016v1.dta**
- 4) Interests: **hrs_onet_interests_2010-2016v1.dta**
- 5) Work Values: **hrs_onet_workvalues_2010-2016v1.dta**
- 6) Work Styles: **hrs_onet_workstyles_2010-2016v1.dta**
- 7) Work Context: **hrs_onet_workcontext_2010-2016v1.dta**

- 8) Job Zones: **hrs_onet_jobzones_2010-2016v1.dta**
- 9) Work Activities: **hrs_onet_workactivities_2010-2016v1.dta**

The nine dimensions outlined above resulted in the creation of over 3,000 variables that were included in the final 2022 HRS Linkage to O*NET Data release. For some dimensions, two types of values are calculated. One is the importance (IM) value of a job characteristic for a given occupation, and one is the level (LV). Importance is defined as the degree to which particular forms of knowledge are important to each occupation. This is measured on a scale ranging from “Not Important” (1) to “Extremely Important” (5). Level is defined as the degree to which a particular form of knowledge is required or needed to perform each occupation. This is measured on a continuum ranging from 1 to 7. Variables for other dimensions, such as job zones or interests, do not depend upon data calculated from importance or level values. We discuss the creation of variables for each dimension in sections 5.1-5.9, below.

5.1 Dimension 1: Knowledge (IM and LV)

The knowledge dimension has variables indicating, for the respondent’s 2010 Census occupation code, the mean data value (for both the importance or level rating of each knowledge element), median data value (for both the importance and level rating of each knowledge element), the sample size (total, max and min), the standard error (min and max), the lower bound of the confidence interval (min), and the upper bound of the confidence interval (max). In some cases, these measures are based on data from only one O*Net-SOC code; in others, they reflect the full range of O*Net SOC codes that have been mapped to the relevant 2010 Census occupation code. In addition, the knowledge dimension dataset contains variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, the type of domain source the data for that dimension is derived from (incumbent, occupational expert, analyst, or analyst transition), and the date for when the data (taken from the O*NET database) was last updated.

The knowledge dimension also has variables relating to 33 different knowledge elements, including: Administration and Management; Clerical; Economics and Accounting; Sales and Marketing; Customers and Personal Service; Personnel and Human Resources; Production and Processing; Food Production; Computers and Electronics; Engineering and Technology; Design; Building and Construction; Mechanical; Mathematics; Physics; Chemistry; Biology; Psychology; Sociology and Anthropology; Geography; Medicine and Dentistry; Therapy and Counseling; Education and Training; English Language; Foreign Language; Fine Arts; History and Archeology; Philosophy and Theology; Public Safety and Security; Law and Government; Telecommunications; Communications and Media; and Transportation.

Below are the naming convention and content description for each variable associated with the knowledge dimension.

Variable Naming and Description for Knowledge Dimension

Naming Convention

Content Description

Measure type

ki
kl (lowercase “L”)

Scale ID of importance for knowledge dimension
Scale ID of level for knowledge dimension

Knowledge element	
1	"Administration and Management"
2	"Biology"
3	"Building and Construction"
4	"Chemistry"
5	"Clerical"
6	"Communications and Media"
7	"Computers and Electronics"
8	"Customer and Personal Service"
9	"Design"
10	"Economics and Accounting"
11	"Education and Training"
12	"Engineering and Technology"
13	"English Language"
14	"Fine Arts"
15	"Food Production"
16	"Foreign Language"
17	"Geography"
18	"History and Archeology"
19	"Law and Government"
20	"Mathematics"
21	"Mechanical"
22	"Medicine and Dentistry"
23	"Personnel and Human Resources"
24	"Philosophy and Theology"
25	"Physics"
26	"Production and Processing"
27	"Psychology"
28	"Public Safety and Security"
29	"Sales and Marketing"
30	"Sociology and Anthropology"
31	"Telecommunications"
32	"Therapy and Counseling"
33	"Transportation"

Statistic or measure	
val	Data value statistic
n	Sample size statistic
ub	Upper bound confidence interval statistic
lb	Lower bound confidence interval statistic
se	Standard error statistic

Statistic or measure type: In cases where more than one O*NET-SOC code mapped to one Census 2010 code, measures were created by collapsing to the Census 2010 code level*

mean	"Mean" data value
median	"Median" data value
total	"Total" sample size
max	"Max" sample size, standard error, or upper bound CI
min	"Min" sample size, standard error, or lower bound CI

**Note: Some 2010 Census codes may have multiple 2019 O*NET-SOC codes collapsed into them. Therefore, max (or min) sample size, standard error, and upper (or lower) bound C.I. refer to the largest (or smallest) sample size, standard error or upper (or lower) bound C.I. amongst the collapsed 2019 O*NET-SOC codes.*

Variable Naming and Description of Additional/Special Variables for Knowledge Dimension

Variable Name	Content
<i>census_num_2010</i>	2010 Census Code
<i>census_occ_title</i>	2010 Census detailed occupation title
<i>count_onet2019_codes</i>	Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code
<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>incumb</i>	Flag for the domain source of job incumbent (1=Domain source is job incumbent, 0=Domain source is not job incumbent)
<i>occ_expert</i>	Flag for the domain source of occupational expert (1=Domain source is occupational expert, 0=Domain source is not occupational expert)
<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)
<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into them; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

Variables constructed from the knowledge dimension are named beginning with “k”, for “knowledge,” followed by either a “i” or “l”, which refers to scale ID ratings (e.g., “importance” or “level”). An integer (ranging from 1 to 33) signifies the knowledge element (e.g., “Administration and Management”) follows. Next follows a series of up to three letters designating the statistical values (e.g., n (sample size) or se (standard error)). After the statistical value descriptor, a separator “_”, and then up to six letters are included to indicate the statistic or measure type. For example, *ki1val_mean* is the variable that refers to the mean importance data value for the “Administration and Management” knowledge element.

For additional/special variables constructed from the knowledge dimension, variables are named beginning with “k”, for knowledge measure, followed by either a “i” or “l”, which refers to scale ID ratings (e.g., importance or level). A separator “_” and a variable descriptor (e.g., *incumb* or *an_trans*) then completes the variable name. For example, *ki_incumb* is the variable that refers to the flag for the domain source of job incumbent for the important knowledge element.

5.2 Dimension 2: Skills (IM and LV)

The skills dimension has variables related to the mean data value (for both the importance or level rating of each skills element), median data value (for both the importance and level rating of each skills element), the sample size (total, max and min), the standard error (min and max), the lower bound of

the confidence interval (min), and the upper bound of the confidence interval (max). In some cases, these measures are based on data from only one O*Net-SOC code; in others, they reflect the full range of O*Net SOC codes that have been mapped to the relevant 2010 Census occupation code. In addition, the skills dimension dataset contains variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, the type of domain source the data for that dimension is derived from (analyst or analyst transition), and the date for when the data (taken from the O*NET database) was last updated.

The skills dimension also has variables relating to 35 different skills elements, including: Reading Comprehension; Active Listening; Writing; Speaking; Mathematics; Science; Critical Thinking; Active Learning; Learning Strategies; Monitoring; Social Perceptiveness; Coordination; Persuasion; Negotiation; Instructing; Service Orientation; Complex Problem Solving; Operations Analysis; Technology Design; Equipment Selection; Installation; Programming; Operations Monitoring; Operation and Control; Equipment Maintenance; Troubleshooting; Repairing; Quality Control Analysis; Judgement and Decision Making; Systems Analysis; Systems Evaluation; Time Management; Management of Financial Resources; Management of Material Resources; and Management of Personnel Resources.

Below are the naming convention and content description for each variable associated with the skills dimension.

Variable Naming and Description for Skills Dimension

Naming Convention	Content Description
Measure type	
si	Scale ID of importance for skills dimension
sl (lowercase "L")	Scale ID of level for skills dimension
Skills element	
1	"Active Learning"
2	"Active Listening"
3	"Complex Problem Solving"
4	"Coordination"
5	"Critical Thinking"
6	"Equipment Maintenance"
7	"Equipment Selection"
8	"Installation"
9	"Instructing"
10	"Judgment and Decision Making"
11	"Learning Strategies"
12	"Management of Financial Resources"
13	"Management of Material Resources"
14	"Management of Personnel Resources"
15	"Mathematics"
16	"Monitoring"
17	"Negotiation"
18	"Operation and Control"
19	"Operations Analysis"
20	"Operations Monitoring"
21	"Persuasion"
22	"Programming"

23	"Quality Control Analysis"
24	"Reading Comprehension"
25	"Repairing"
26	"Science"
27	"Service Orientation"
28	"Social Perceptiveness"
29	"Speaking"
30	"Systems Analysis"
31	"Systems Evaluation"
32	"Technology Design"
33	"Time Management"
34	"Troubleshooting"
35	"Writing"

Statistic or measure

val	Data value statistic
n	Sample size statistic
ub	Upper bound confidence interval statistic
lb	Lower bound confidence interval statistic
se	Standard error statistic

Statistic or measure type (These are computed over all O*Net SOC codes that are collapsed to create the Census 2010-level data)*

mean	"Mean" data value
median	"Median" data value
total	"Total" sample size
max	"Max" sample size, standard error, or upper bound CI
min	"Min" sample size, standard error, or lower bound CI

**Note: Some 2010 Census codes may have multiple 2019 O*NET-SOC codes collapsed into them; therefore, the max (or min) sample size, standard error, and upper (or lower) bound C.I. refer to the largest (or smallest) sample size, standard error and upper (or lower) bound C.I. amongst the collapsed 2019 O*NET-SOC codes.*

Variable Naming and Description of Additional/Special Variables for Skills Dimension

Variable Name	Content
<i>census_num_2010</i>	2010 Census Code
<i>census_occ_title</i>	2010 Census detailed occupation title
<i>count_onet2019_codes</i>	Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code
<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>analyst</i>	Flag for the domain source of analyst (1=Domain source is analyst, 0=Domain source is not analyst)
<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)

<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)
-------------	---

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into them; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

Variables constructed from the skills dimension are named beginning with “s”, for “skills” measure, followed by either a “i” or “l”, which refers to scale ID ratings (e.g., “importance” or “level”). An integer (ranging from 1 to 35) signifies the skills element (e.g., “Reading Comprehension”). Next follows a series of up to three letters indicates the statistical values (e.g., n (sample size) or se (standard error)), then follows the identifier for the skills element. Last, a separator “_”, and then up to six letters are included to indicate the statistic or measure type completes the variable name. For example, *si24val_mean* is the variable that refers to the mean importance data value for the “Reading Comprehension” skills element.

For additional/special variables constructed from the skills dimension, variables are named beginning with “s”, for skills measure, followed by either a “i” or “l”, which refers to scale ID ratings (e.g., “importance” or “level”). A separator “_” and a variable descriptor (e.g., *analyst* or *an_trans*) then complete the variable name. For example, *si_analyst* is the variable that refers to the flag for the domain source of *analyst* for the important skills element.

5.3 Dimension 3: Abilities (IM and LV)

The abilities dimension has variables related to the mean data value (for both the importance or level rating of each abilities element), median data value (for both the importance and level rating of each abilities element), the sample size (total, max and min), the standard error (min and max), the lower bound of the confidence interval (min), and the upper bound of the confidence interval (max). In some cases, these measures are based on data from only one O*Net-SOC code; in others, they reflect the full range of O*Net SOC codes that have been mapped to the relevant 2010 Census occupation code. The abilities dimension also has variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, detail whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, detail the type of domain source the data for that dimension is derived from (*analyst* or *analyst transition*), and detail the date for when the data (taken from the O*NET database) was last updated.

The abilities dimension also has variables relating to 52 different abilities elements including: Oral Comprehension; Written Comprehension; Oral Expression; Written Expression; Fluency of Ideas; Originality; Problem Sensitivity; Deductive Reasoning; Inductive Reasoning; Information Ordering; Category Flexibility; Mathematical Reasoning; Number Facility; Memorization; Speed of Closure; Flexibility of Closure; Perceptual Speed; Spatial Orientation; Visualization; Selective Attention; Time Sharing; Arm-Hand Steadiness; Manual Dexterity; Finger Dexterity; Control Precision; Multilimb Coordination; Response Orientation; Rate Control; Reaction Time; Wrist-Finger Speed; Speed of Limb Movement; Static Strength; Explosive Strength; Dynamic Strength; Trunk Strength; Stamina; Extent Flexibility; Dynamic Flexibility; Gross Body Coordination; Gross Body Equilibrium; Near Vision; Far Vision; Visual Color Discrimination; Night Vision; Peripheral Vision; Depth Perception; Glare Sensitivity; Hearing Sensitivity; Auditory Attention; Sound Localization; Speech Recognition; and Speech Clarity.

Below is the naming convention and content description for each variable associated with the abilities dimension:

Variable Naming and Description for Abilities Dimension

Naming Convention	Content Description
Measure type	
ai	Scale ID of importance for abilities dimension
al (lowercase "L")	Scale ID of level for abilities dimension
Abilities element	
1	"Arm-Hand Steadiness"
2	"Auditory Attention"
3	"Category Flexibility"
4	"Control Precision"
5	"Deductive Reasoning"
6	"Depth Perception"
7	"Dynamic Flexibility"
8	"Dynamic Strength"
9	"Explosive Strength"
10	"Extent Flexibility"
11	"Far Vision"
12	"Finger Dexterity"
13	"Flexibility of Closure"
14	"Fluency of Ideas"
15	"Glare Sensitivity"
16	"Gross Body Coordination"
17	"Gross Body Equilibrium"
18	"Hearing Sensitivity"
19	"Inductive Reasoning"
20	"Information Ordering"
21	"Manual Dexterity"
22	"Mathematical Reasoning"
23	"Memorization"
24	"Multilimb Coordination"
25	"Near Vision"
26	"Night Vision"
27	"Number Facility"
28	"Oral Comprehension"
29	"Oral Expression"
30	"Originality"
31	"Perceptual Speed"
32	"Peripheral Vision"
33	"Problem Sensitivity"
34	"Rate Control"
35	"Reaction Time"
36	"Response Orientation"
37	"Selective Attention"
38	"Sound Localization"
39	"Spatial Orientation"
40	"Speech Clarity"
41	"Speech Recognition"
42	"Speed of Closure"
43	"Speed of Limb Movement"
44	"Stamina"

45	"Static Strength"
46	"Time Sharing"
47	"Trunk Strength"
48	"Visual Color Discrimination"
49	"Visualization"
50	"Wrist-Finger Speed"
51	"Written Comprehension"
52	"Written Expression"

Statistic or measure

val	Data value statistic
n	Sample size statistic
ub	Upper bound confidence interval statistic
lb	Lower bound confidence interval statistic
se	Standard error statistic

Statistic or measure type (These are computed over all O*Net SOC codes that are collapsed to create the Census 2010-level data)

mean	"Mean" data value
median	"Median" data value
total	"Total" sample size
max	"Max" sample size, standard error, or upper bound CI
min	"Min" sample size, standard error, or lower bound CI

**Note: Some 2010 Census codes may have multiple 2019 O*NET-SOC codes collapsed into it; therefore, the max (or min) sample size, standard error, or upper (or lower) bound C.I. refers to the largest (or smallest) sample size, standard error or upper (or lower) bound C.I. amongst the collapsed 2019 O*NET-SOC codes.*

Variable Naming and Description of Additional/Special Variables for Abilities Dimension

Variable Name	Content
<i>census_num_2010</i>	2010 Census Code
<i>census_occ_title</i>	2010 Census detailed occupation title
<i>count_onet2019_codes</i>	Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code
<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>analyst</i>	Flag for the domain source of analyst (1=Domain source is analyst, 0=Domain source is not analyst)
<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)
<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into it; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

Variables constructed from the abilities dimension are named beginning with “a”, for “abilities” measure, followed by either a “i” or “l”, which refers to scale ID ratings (e.g., “importance” or “level”). A number (ranging from 1 to 52) signifying the abilities element (e.g., “Oral Comprehension”) follows the scale ID designator. Next follows a series of up to three letters designating the statistical values (e.g., n (sample size) or se (standard error)), then follows the identifier for the “abilities” element. After the statistical value descriptor, a separator “_”, and then up to six letters are included to indicate the statistic or measure type completes the variable name.

For example, *ai28val_mean* is the variable that refers to the mean importance data value for the “Oral Comprehension” abilities element.

For additional/special variables constructed from the abilities dimension, variables are named beginning with “a”, for abilities measure, followed by either a “i” or “l”, which refers to scale ID ratings (e.g., “importance” or “level”). A separator “_” and a variable descriptor (e.g., analyst or an_trans) then completes the variable name.

For example, *ai_analyst* is the variable that refers to the flag for the domain source of analyst for the importance abilities element.

5.4 Dimension 4: Interests

The interest dimension has variables related to the mean, median, min, and max data value for each interest element. Moreover, the interest dimension contains measures that identify the top three “occupational interest highpoints.” In some cases, these measures are based on data from only one O*Net-SOC code; in others, they reflect the full range of O*Net SOC codes that have been mapped to the relevant 2010 Census occupation code. Therefore, the interests dataset includes variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, the type of domain source the data for that dimension is derived from (analyst or analyst transition), and the date for when the data (taken from the O*NET database) was last updated.

The interest dimension has variables relating to 6 different occupational interest elements, including: Artistic; Conventional; Enterprising; Investigative; Realistic; and Social.

Below is the naming convention and content description for each variable associated with the interest dimension:

Variable Naming and Description for Interest Dimension

Naming Convention	Content Description
Measure type in	Interest dimension

Interest element	
1	"Artistic" Interest Measure
2	"Conventional" Interest Measure
3	"Enterprising" Interest Measure
4	"Investigative" Interest Measure
5	"Realistic" Interest Measure
6	"Social" Interest Measure
Statistic or measure	
val	Data value statistic

Statistic or measure type (These are computed over all O*Net SOC codes that are collapsed to create the Census 2010-level data)

mean	"Mean" data value
median	"Median" data value
max	"Max" data value
min	"Min" data value
highpoint_1	First highest occupational interest element for all O*NET-SOC codes in Census occupation
highpoint_2	Second highest occupational interest element for all O*NET-SOC codes in Census occupation
highpoint_3	Third highest occupational interest element for all O*NET-SOC codes in Census occupation

**Note: Some 2010 Census codes may have multiple 2019 O*NET-SOC codes collapsed into it; therefore, the max (or min) data value refers to the largest (or smallest) data value amongst the collapsed 2019 O*NET-SOC codes.*

**Note: Occupational interest highpoints are constructed using the mean data values for each interest element for all O*NET-SOC codes within a single Census Occupation. Using the means for each interest element, the interest element with the highest mean is designated as the first highest occupational interest element (highpoint 1). The interest element with the second highest mean is designated as the second highest occupational interest element (highpoint 2). The interest element with the third highest mean is designated as the third highest occupational interest element (highpoint 3).*

Variable Naming and Description of Additional/Special Variables for Interest Dimension

Variable Name	Content
<i>census_num_2010</i>	2010 Census Code
<i>census_occ_title</i>	2010 Census detailed occupation title
<i>count_onet2019_codes</i>	Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code
<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>analyst</i>	Flag for the domain source of analyst (1=Domain source is analyst, 0=Domain source is not analyst)
<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)

<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)
-------------	---

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into it; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

Variables constructed from the interest dimension are named beginning with “in”, for interest measure, followed by a number (ranging from 1 to 6) signifying the interests element (e.g., “Artistic”), then a series of up to three letters designating the statistical values (e.g., val (data value)), a separator “_”, and then the statistic or measure type completes the variable name (e.g., mean or median). For variables that capture the highpoints for all the interest elements, the variables are named beginning with “in” for interest measure, followed by a separator “_”, and then the highpoint type (e.g., highpoint_1 or highpoint_2).

For example, *in1val_mean* refers to the mean data value for the artistic interest element. Furthermore, *in_highpoint_1* refers to the first occupational interest highpoint for a Census code.

For additional/special variables constructed from the interest dimension, variables are named beginning with “in”, for interest measure, followed by a separator “_” and a variable descriptor (e.g., analyst or an_trans). For example, *in_analyst* is the variable that refers to the flag for the domain source of analyst for the interest element.

5.5 Dimension 5: Work Values

The work values dataset contains variables for the mean, median, min, and max data value of each work value element. It also contains measures that identify the top three occupational work values highpoints. In some cases, these measures are based on data from only one O*Net-SOC code; in others, they reflect the full range of O*Net SOC codes that have been mapped to the relevant 2010 Census occupation code. The work values dimension has variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, the type of domain source the data for that dimension is derived from (analyst or analyst transition), and the date for when the data (taken from the O*NET database) was last updated.

The work values dimension has variables relating to 6 different occupational work values elements including: Achievement; Working Conditions; Recognition; Relationships; Support; and Independence.

Below is the naming convention and content description for each variable associated with the work values dimension:

Variable Naming and Description for Work Values Dimension

Naming Convention	Content Description
Measure type wv	Work values dimension

Work values element	
1	"Achievement" Work Values Measure
2	"Independence" Work Values Measure
3	"Recognition" Work Values Measure
4	"Relationships" Work Values Measure
5	"Support" Work Values Measure
6	"Working Conditions" Work Values Measure

Statistic or measure	
val	Data value statistic

Statistic or measure type (These are computed over all O*Net SOC codes that are collapsed to create the Census 2010-level data)

mean	"Mean" data value
median	"Median" data value
max	"Max" data value
min	"Min" data value
highpoint_1	First highest occupational work values element for all O*NET-SOC codes in Census occupation
highpoint_2	Second highest occupational work values element for all O*NET-SOC codes in Census occupation
highpoint_3	Third highest occupational work values element for all O*NET-SOC codes in Census occupation

**Note: Some 2010 Census codes may have multiple 2019 O*NET-SOC codes collapsed into it; therefore, the max (or min) data value refers to the largest (or smallest) data value amongst the collapsed 2019 O*NET-SOC codes.*

**Note: Occupational work values highpoints are constructed by using the mean data values for each work values element for all O*NET-SOC codes within a single Census Occupation. Using the means, the work values element with the highest mean is designated as the first highest occupational work values element (highpoint 1). The work values element with the second highest mean is designated as the second highest occupational work values element (highpoint 2). The work values element with the third highest mean is designated as the third highest occupational work values element (highpoint 3).*

Variable Naming and Description of Additional/Special Variables for Work values Dimension

Variable Name	Content
<i>census_num_2010</i>	2010 Census Code
<i>census_occ_title</i>	2010 Census detailed occupation title
<i>count_onet2019_codes</i>	Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code
<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>analyst</i>	Flag for the domain source of analyst (1=Domain source is analyst, 0=Domain source is not analyst)

<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)
<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into it; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

Variables constructed from the work values dimension, variables are named beginning with “wv”, for work values measure, followed by a number (ranging from 1 to 6) signifies the work values element (e.g., “Independence”), then a series of up to three letters designating the statistical values (e.g., val (data value)), a separator “_”, and then the statistic or measure type completes the variable name (e.g., mean or median). For variables that capture the highpoints for all the work values elements, the variables are named beginning with “wv” for interest measure, followed by a separator “_”, and then the highpoint type (e.g., highpoint_1 or highpoint_2).

For example, *wv1val_mean* refers to the mean data value for the achievement work values element. Furthermore, *wv_highpoint_1* refers to the first work values highpoint for a Census code.

For additional/special variables constructed from the work values dimension, variables are named beginning with “wv”, for work values measure, followed by a separator “_” and a variable descriptor (e.g., analyst or an_trans). For example, *wv_analyst* is the variable that refers to the flag for the domain source of analyst for the work values element.

5.6 Dimension 6: Work Styles (IM)

The work styles dataset contains variables related to the mean and median data values for the importance rating of each work styles element, the sample size (total, max and min), the standard error (min and max), the lower bound of the confidence interval (min), and the upper bound of the confidence interval (max). In some cases, these measures are based on data from only one O*Net-SOC code; in others, they reflect the full range of O*Net SOC codes that have been mapped to the relevant 2010 Census occupation code. Therefore, the work styles dataset contains variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, the type of domain source the data for that dimension is derived from (incumbent, occupational expert, analyst, or analyst transition), and the date for when the data (taken from the O*NET database) were last updated.

The work styles dataset has variables relating to the 16 different work styles elements, including: Achievement/Effort; Persistence; Initiative; Leadership; Cooperation; Concern for Others; Social Orientation; Self-Control; Stress Tolerance; Adaptability/Flexibility; Dependability; Attention to Detail; Integrity; Independence; Innovation; and Analytic Thinking.

Below are the naming convention and content description for each variable associated with the work styles dataset:

Variable Naming and Description for Work Styles Dimension

Naming Convention**Content Description**

Measure type

wsi

Scale ID of importance for Work Styles dimension

Work Styles element

1

"Achievement/Effort"

2

"Adaptability/Flexibility"

3

"Analytical Thinking"

4

"Attention to Detail"

5

"Concern for Others"

6

"Cooperation"

7

"Dependability"

8

"Independence"

9

"Initiative"

10

"Innovation"

11

"Integrity"

12

"Leadership"

13

"Persistence"

14

"Self-Control"

15

"Social Orientation"

16

"Stress Tolerance"

Statistic or measure

val

Data value statistic

n

Sample size statistic

ub

Upper bound confidence interval statistic

lb

Lower bound confidence interval statistic

se

Standard error statistic

Statistic or measure type (These are computed over all O*Net SOC codes that are collapsed to create the Census 2010-level data)

mean

"Mean" data value

median

"Median" data value

total

"Total" sample size

max

"Max" sample size, standard error, or upper bound CI

min

"Min" sample size, standard error, or lower bound CI

**Note: Some 2010 Census codes may have multiple 2019 O*NET-SOC codes collapsed into it; therefore, the max (or min) sample size, standard error, or upper (or lower) bound C.I. refers to the largest (or smallest) sample size, standard error or upper (or lower) bound C.I. amongst the collapsed 2019 O*NET-SOC codes.*

Variable Naming and Description of Additional/Special Variables for Work Styles Dimension**Variable Name****Content**

census_num_2010

2010 Census Code

census_occ_title

2010 Census detailed occupation title

count_onet2019_codes

Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code

<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>incumb</i>	Flag for the domain source of job incumbent (1=Domain source is job incumbent, 0=Domain source is not job incumbent)
<i>occ_expert</i>	Flag for the domain source of occupational expert (1=Domain source is occupational expert, 0=Domain source is not occupational expert)
<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)
<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into it; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

Variables constructed from the work styles dimension are named beginning with “ws”, for work styles measure, followed by an “i”, which refers to the scale ID ratings of “importance.” A number (ranging from 1 to 16) signifying the work styles element (e.g. “Leadership”) follows the scale ID designator. Next follow a series of up to three letters designating the statistical values (e.g., n (sample size) or se (standard error)), then follows the identifier for the work styles element. After the statistical value descriptor, a separator “_”, and then up to six letters are included to indicate the statistic or measure type completes the variable name.

For example, *ws12val_mean* is the variable that refers to the mean importance data value for the “Leadership” work styles element.

For additional/special variables constructed from the work styles dimension, variables are named beginning with “ws”, for work styles measure, followed by an “i”, which refers to scale ID rating of importance. A separator “_” and a variable descriptor (e.g., *incumb* or *an_trans*) then completes the variable name. For example, *ws1_incumb* is the variable that refers to the flag for the domain source of job incumbent for the important work styles element.

5.7 Dimension 7: Work Context

The work context dataset contains variables related to the mean and median data values for each work context element, the sample size (total, max and min), the standard error (min and max), the lower bound of the confidence interval (min), and the upper bound of the confidence interval (max). In some cases, these measures are based on data from only one O*Net-SOC code; in others, they reflect the full range of O*Net SOC codes that have been mapped to the relevant 2010 Census occupation code. The work context dataset also contains variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, the type of domain source the data for that

dimension is derived from (incumbent, occupational expert, analyst, or analyst transition), and when the data (taken from the O*NET database) were last updated.

The work context dimension has variables relating to 57 different work context elements including: Public Speaking; Telephone; Electronic Mail; Letters and Memos; Face-to-Face Discussions; Contact With Others; Work With Work Group or Team; Deal With External Customers; Coordinate or Lead Others; Responsible for Other's Health and Safety; Responsibility for Outcomes and Results; Frequency of Conflict Situations; Deal With Unpleasant or Angry People; Deal With Physically Aggressive People; Indoors, Environmentally Controlled; Indoors, Not Environmentally Controlled; Outdoors, Exposed to Weather; Outdoors, Under Cover; In an Open Vehicle or Equipment; In an Enclosed Vehicle or Equipment; Physical Proximity; Sounds, Noise Levels Are Distracting or Uncomfortable; Very Hot or Cold Temperatures; Extremely Bright or Inadequate Lighting; Exposed to Contaminants; Cramped Work Space, Awkward Positions; Exposed to Whole Body Vibration; Exposed to Radiation; Exposed to Disease or Infections; Exposed to High Places; Exposed to Hazardous Conditions; Exposed to Hazardous Equipment; Exposed to Minor Burns, Cuts, Bites, or Stings; Spend Time Sitting; Spend Time Standing; Spend Time Climbing Ladders, Scaffolds, or Poles; Spend Time Walking or Running; Spend Time Kneeling, Crouching, Stooping, or Crawling; Spend Time Keeping or Regaining Balance; Spend Time Using Your Hands to Handle, Control, or Feel Objects, Tools, or Controls, Spend Time Bending or Twisting the Body; Spend Time Making Repetitive Motions; Wear Common Protective or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets; Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection; Consequence of Error; Impact of Decisions on Co-workers or Company Results, Frequency of Decision Making; Freedom to Make Decisions; Degree of Automation; Importance of Being Exact or Accurate; Importance of Repeating Same Tasks; Structured versus Unstructured Work; Level of Competition; Time Pressure; Pace Determined by Speed of Equipment; Work Schedules; and Duration of Typical Work Week.

Below are the naming convention and content description for each variable associated with the work context dimension:

Variable Naming and Description for Work Context Dimension

Naming Convention	Content Description
Measure type wc	Scale ID of importance for Work Context dimension
Work context element	
1	"Consequence of Error"
2	"Contact With Others"
3	"Coordinate or Lead Others"
4	"Cramped Work Space, Awkward Positions"
5	"Deal with External Customers"
6	"Deal With Physically Aggressive People"
7	"Deal With Unpleasant or Angry People"
8	"Degree of Automation"
9	"Duration of Typical Work Week"
10	"Electronic Mail"
11	"Exposed to Contaminants"
12	"Exposed to Disease or Infections"

13	"Exposed to Hazardous Conditions"
14	"Exposed to Hazardous Equipment"
15	"Exposed to High Places"
16	"Exposed to Minor Burns, Cuts, Bites, or Stings"
17	"Exposed to Radiation"
18	"Exposed to Whole Body Vibration"
19	"Extremely Bright or Inadequate Lighting"
20	"Face-to-Face Discussions"
21	"Freedom to Make Decisions"
22	"Frequency of Conflict Decisions"
23	"Frequency of Decision Making"
24	"Impact of Decisions on Co-workers or Company Results"
25	"Importance of Being Exact or Accurate"
26	"Importance of Repeating Same Tasks"
27	"In an Enclosed Vehicle or Equipment"
28	"In an Open Vehicle or Equipment"
29	"Indoors, Environmentally Controlled"
30	"Indoors, Not Environmentally Controlled"
31	"Letters and Memos"
32	"Level of Competition"
33	"Outdoors, Exposed to Weather"
34	"Outdoors, Under Cover"
35	"Pace Determined by Speed of Equipment"
36	"Physical Proximity"
37	"Public Speaking"
38	"Responsibility for Outcomes and Results"
39	"Responsible for Others' Health and Safety"
40	"Sounds, Noise Levels Are Distracting or Uncomfortable"
41	"Spend Time Bending or Twisting the Body"
42	"Spend Time Climbing Ladders, Scaffolds, or Poles"
43	"Spend Time Keeping or Regaining Balance"
44	"Spend Time Kneeling, Crouching, Stooping, or Crawling"
45	"Spend Time Making Repetitive Motions"
46	"Spend Time Sitting"
47	"Spend Time Standing"
48	"Spend Time Using Your Hands to Handle, Control, or Feel Objects, Tools, or Controls"
49	"Spend Time Walking or Running"
50	"Structured Versus Unstructured Work"
51	"Telephone"
52	"Time Pressure"
53	"Very Hot or Cold Temperatures"
54	"Wear Common Protective or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets"
55	"Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection"
56	"Work Schedules"
57	"Work With Work Group or Team"
Statistic or measure	
val	Data value statistic
n	Sample size statistic
ub	Upper bound confidence interval statistic
lb	Lower bound confidence interval statistic

se	Standard error statistic
----	--------------------------

Statistic or measure type (These are computed over all O*Net SOC codes that are collapsed to create the Census 2010-level data)

mean	“Mean” data value
median	“Median” data value
total	“Total” sample size
max	“Max” sample size, standard error, or upper bound CI
min	“Min” sample size, standard error, or lower bound CI

**Note: Some 2010 Census codes may have multiple 2019 O*NET-SOC codes collapsed into them; therefore, the max (or min) sample size refers to the largest (or smallest) sample size amongst the collapsed 2019 O*NET-SOC codes.*

Variable Naming and Description of Additional/Special Variables for Work Context Dimension

Variable Name	Content
<i>census_num_2010</i>	2010 Census Code
<i>census_occ_title</i>	2010 Census detailed occupation title
<i>count_onet2019_codes</i>	Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code
<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>incumb</i>	Flag for the domain source of job incumbent (1=Domain source is job incumbent, 0=Domain source is not job incumbent)
<i>occ_expert</i>	Flag for the domain source of occupational expert (1=Domain source is occupational expert, 0=Domain source is not occupational expert)
<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)
<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into them; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

Variables constructed from the work context dimension are named beginning with “wc”, for work context measure, a number (ranging from 1 to 57) signifying the work context element (e.g., “Public Speaking”) follows the scale ID designator. Next follow a series of up to three letters designating the statistical values (e.g., n (sample size) or se (standard error)) then follows the identifier for the work context element. After the statistical value descriptor, a separator “_”, and then up to six letters are included to indicate the statistic or measure type completes the variable name.

For example, *wc37_n_total* is the variable that refers to the total sample size for the “Public Speaking” work context element.

For additional/special variables constructed from the work context dimension, variables are named beginning with “wc”, for work context measure, followed by a separator “_” and a variable descriptor (e.g., *incumb* or *an_trans*). For example, *wc_incumb* is the variable that refers to the flag for the domain source of job incumbent for the work context element.

5.8 Dimension 8: Job Zones

The job zones dataset contains variables related to the percentage of O*NET codes within a Census code that relate to five distinct job zones, as well as a variable that relates to the mean job zone for each Census occupational code. In addition, the job zones dataset contains variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, the type of domain source the data for that dimension is derived from (analyst or analyst transition), and when the data (in the O*NET database) were last updated.

The job zones dataset has variables relating to 6 different job zones elements including: Job Zone 1 (Little or No Preparation Needed); Job Zone 2 (Some Preparation Needed); Job Zone 3 (Medium Preparation Needed); Job Zone 4 (Considerable Preparation Needed); and Job Zone 5 (Extensive Preparation Needed). Below is the naming convention and content description for each variable associated with the job zones dimension:

Variable Naming and Description for Job Zones Dimension

Naming Convention

Content Description

Measure type

jz

Job Zones dimension

Job zones element

1

"Job Zone 1: Little or No Preparation Needed"

2

"Job Zone 2: Some Preparation Needed"

3

"Job Zone 3: Medium Preparation Needed"

4

"Job Zone 4: Considerable Preparation Needed"

5

"Job Zone 5: Extensive Preparation Needed"

Statistic or measure type (These are computed over all O*Net SOC codes that are collapsed to create the Census 2010-level data)

per

Percent of O*NET codes in each Census code that report corresponding job zone

mean

Average job zone for each Census code*

median

Median job zone for each Census code

min

Lowest job zone for each Census code

max

Highest job zone for each Census code

**Note: Occupational job zone averages represent the mean of ordinal categorical variables. These may not best represent the preparation level for any particular job category. As such, we recommend that analysts choose variables appropriate to their project goals. For example, some analysts might use the modal category identified by the “per” variables rather than the mean to indicate level of preparation.*

Variable Naming and Description of Additional/Special Variables for Job Zones Dimension

Variable Name	Content
<i>census_num_2010</i>	2010 Census Code
<i>census_occ_title</i>	2010 Census detailed occupation title
<i>count_onet2019_codes</i>	Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code
<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>analyst</i>	Flag for the domain source of analyst (1=Domain source is analyst, 0=Domain source is not analyst)
<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)
<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into it; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

In the job zones dataset, variables are named beginning with “jz”, for job zones measure, followed by a separator “_”, the job zones statistic type (e.g., mean or per). If applicable, another separator “_”, and then the job zone element designator (e.g., 1 for job zone 1) completes the variable name.

For example, *jz_per_1* refers to the percentage of O*NET codes in each Census code that relate to job zone 1. Additionally, *jz_mean* refers to the average job zone for each Census code.

For additional/special variables constructed from the job zones dimension, variables are named beginning with “jz”, for job zones measure, followed by a separator “_” and a variable descriptor (e.g., analyst or an_trans). For example, *jz_analyst* is the variable that refers to the flag for the domain source of analyst for the job zones element.

5.9 Dimension 9: Work Activities (IM and LV)

The work activities dataset has variables related to the mean data value (for both the importance and level rating of each work activities element), median data value (for both the importance and level rating of each work activities element), the sample size (total, max and min), the standard error (min and max), the lower bound of the confidence interval (min), and the upper bound of the confidence interval (max). In some cases, these measures are based on data from only one O*Net-SOC code; in others, they reflect the full range of O*Net SOC codes that have been mapped to the relevant 2010

Census occupation code. The work activities dimension has variables that detail the number of O*NET-SOC codes collapsed down into a single Census code, detail whether the Census code is one that relates to a 2019 O*NET-SOC code that aggregates to more than one 2010 Census code, detail the type of domain source the data for that dimension is derived from (incumbent, occupational expert, analyst, or analyst transition), and detail when the data (in the O*NET database) were last updated.

The work activities dataset also has variables relating to 41 different work activities elements, including: Getting Information; Monitoring Processes, Materials, or Surroundings; Identifying Objects, Actions, and Events; Inspecting Equipment, Structures, or Materials; Estimating the Quantifiable Characteristics of Products, Events, or Information; Judging the Qualities of Objects, Services, or People; Processing Information ; Evaluating Information to Determine Compliance with Standards; Analyzing Data or Information; Making Decisions and Solving Problems; Thinking Creatively; Updating and Using Relevant Knowledge; Developing Objectives and Strategies; Scheduling Work and Activities; Organizing, Planning, and Prioritizing Work; Performing General Physical Activities; Handling and Moving Objects; Controlling Machines and Processes; Operating Vehicles, Mechanized devices, or Equipment; Working with Computers; Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment; Repairing and Maintaining Mechanical Equipment; Repairing and Maintaining Electronic Equipment; Documenting/Recording Information; Interpreting the Meaning of Information for Others; Communicating with Supervisors, Peers, or Subordinates; Communicating with People Outside the Organization; Establishing and Maintaining Interpersonal Relationships; Assisting and Caring for Others; Selling or Influencing Others; Resolving Conflicts and Negotiating with Others; Performing for or Working Directly with the Public; Coordinating the Work and Activities of Others; Developing and Building Teams; Training and Teaching Others; Guiding, Directing, and Motivating Subordinates; Coaching and Developing Others; Providing Consultation and Advice to Others; Performing Administrative Activities; Staffing Organization Units; and Monitoring and Controlling Resources.

Below is the naming convention and content description for each variable associated with the work activities dimension:

Variable Naming and Description for Work activities Dimension

Naming Convention	Content Description
Measure type	
wai	Scale ID of importance for work activities dimension
wal (lowercase "L")	Scale ID of level for work activities dimension
Work activities element	
1	"Analyzing Data or Information"
2	"Assisting and Caring for Others"
3	"Coaching and Developing Others"
4	"Communicating with People Outside the Organization "
5	"Communicating with Supervisors, Peers, or Subordinates"
6	"Controlling Machines and Processes"
7	"Coordinating the Work and Activities of Others"
8	"Developing and Building Teams"
9	"Developing Objectives and Strategies"
10	"Documenting/Recording Information"
11	"Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment"

12	"Establishing and Maintaining Interpersonal Relationships"
13	"Estimating the Quantifiable Characteristics of Products, Events, or Information"
14	"Evaluating Information to Determine Compliance with Standards"
15	"Getting Information"
16	"Guiding, Directing, and Motivating Subordinates"
17	"Handling and Moving Objects"
18	"Identifying Objects, Actions, and Events"
19	"Inspecting Equipment, Structures, or Materials"
20	"Interpreting the Meaning of Information for Others"
21	"Judging the Qualities of Objects, Actions, and Events"
22	"Making Decisions and Solving Problems"
23	"Monitoring and Controlling Resources"
24	"Monitoring Processes, Materials, or Surroundings"
25	"Operating Vehicles, Mechanized Devices, or Equipment"
26	"Organizing, Planning, and Prioritizing Work"
27	"Performing Administrative Activities"
28	"Performing for or Working Directly with the Public"
29	"Performing General Physical Activities"
30	"Processing Information"
31	"Providing Consultation and Advice to Others"
32	"Repairing and Maintaining Electronic Equipment"
33	"Repairing and Maintaining Mechanical Equipment"
34	"Resolving Conflicts and Negotiating with Others"
35	"Scheduling Work and Activities"
36	"Selling or Influencing Others"
37	"Staffing Organization Units"
38	"Thinking Creatively"
39	"Training and Teaching Others"
40	"Updating and Using Relevant Knowledge"
41	"Working with Computers"
Statistic or measure	
val	Data value statistic
n	Sample size statistic
ub	Upper bound confidence interval statistic
lb	Lower bound confidence interval statistic
se	Standard error statistic
Statistic or measure type (These are computed over all O*Net SOC codes that are collapsed to create the Census 2010-level data)	
mean	"Mean" data value
median	"Median" data value
total	"Total" sample size
max	"Max" sample size, standard error, or upper bound CI
min	"Min" sample size, standard error, or lower bound CI

**Note: Some 2010 Census codes may have multiple 2019 O*NET-SOC codes collapsed into it; therefore, the max (or min) sample size, standard error, or upper (or lower) bound C.I. refers to the largest (or smallest) sample size, standard error or upper (or lower) bound C.I. amongst the collapsed 2019 O*NET-SOC codes.*

Variable Naming and Description of Additional/Special Variables for Work activities Dimension

Variable Name	Content
<i>census_num_2010</i>	2010 Census Code
<i>census_occ_title</i>	2010 Census detailed occupation title
<i>count_onet2019_codes</i>	Number of 2019 O*NET-SOC codes collapsed into a single 2010 Census code
<i>flag_onet_census</i>	Flag created to indicate that this particular 2010 Census code is one that relates to a 2019 O*NET-SOC that aggregates to more than one 2010 Census code (1=Flag applies, 0=Flag does not apply)
<i>incumb</i>	Flag for the domain source of job incumbent (1=Domain source is job incumbent, 0=Domain source is not job incumbent)
<i>occ_expert</i>	Flag for the domain source of occupational expert (1=Domain source is occupational expert, 0=Domain source is not occupational expert)
<i>an_trans</i>	Flag for the domain source of Analyst-Transition (1=Domain source is analyst-transition, 0=Domain source is not analyst-transition)
<i>date</i>	Date when data was last updated (<i>Note: Some Census codes may have more than one 2019 O*NET-SOC collapsed into them; this variable refers to the earliest date when relevant</i>)

**Note: Some 2010 Census codes have multiple 2019 O*NET-SOC codes collapsed into it; therefore, some 2010 Census codes have flags for multiple domain sources. Multiple flags indicate that at least one 2019 O*NET-SOC code (in the collapsed 2010 Census code) has values that come from that domain source.*

Variables constructed from the work activities dimension are named beginning with “wa”, for work activities measure, followed by either a “i” or “l”, which refers to scale ID ratings (e.g., “importance” or “level”). A number (ranging from 1 to 41) signifies the work activities element (e.g., “Getting Information”) follows the scale ID designator. Next follows a series of up to three letters designating the statistical values (e.g., n (sample size) or se (standard error)), then follows the identifier for the work activities element. After the statistical value descriptor, a separator “_”, and then up to six letters are included to indicate the statistic or measure type completes the variable name.

For example, *wai15val_mean* is the variable that refers to the mean importance data value for the “Getting Information” work activities element.

For additional/special variables constructed from the work activities dimension, variables are named beginning with “wa”, for work activities measure, followed by either a “i” or “l”, which refers to scale ID ratings (e.g., “importance” or “level”). A separator “_” and a variable descriptor (e.g., *incumb* or *an_trans*) then completes the variable name. For example, *wai_incumb* is the variable that refers to the flag for the domain source of job incumbent for the important work activities element.

6. If You Need to Know More

This document is intended to serve as a brief overview that provides guidelines for using this data

product. If you have questions or concerns that are not adequately covered here or on our Web site, or if you have any comments, please contact us. We will do our best to provide answers.

HRS Internet Site

Health and Retirement Study public release data and additional information about the study are available on the Internet. To access public data or to find out more about restricted data products and procedures, visit the [HRS Web site](https://hrs.isr.umich.edu).

Contact Information

If you need to contact us, you may do so by one of the methods listed below.

Internet: Help Desk at the HRS Web site
(<https://hrs.isr.umich.edu/help>) E-mail: hrsquestions@umich.edu

Postal Service:
Health and Retirement Study
The Institute for Social Research
426 Thompson Street, 3450 ISR
Ann Arbor, Michigan 48104

Appendix A

The following table shows all cases in which a single O*Net-SOC 2019 code was linked to more than one Census occupational title after the crosswalking process. Decisions about what to do in this cases followed based on a 3-step process:

- (1) We examined each set of titles, together with knowledge of the relative frequency of each Census occupation in the HRS data, to make a guess as to which Census occupation code(s) the O*Net SOC 2019 code seemed most closely related to.
- (2) We spoke with the occupation coding professional on the HRS staff, Stanley Hasper, who has been coding HRS occupational entries for decades, to decide which linkages, if any, made the most sense.
- (3) Pam Frugoli (O*Net and Competency Model Team Lead, Employment and Training Administration, and U.S. Department of Labor) validated our proposed crosswalk, suggesting a small number of additional changes.

Table 1. Crosswalk Linkage Decisions

O*NET-SOC 2019 Code	O*NET-SOC 2019 Title	2010 Census Code	2010 Census Title	Linkage Decision
13-1082.00	Project Management Specialists	0740	Business operations specialists, all other	Keep linkage to all three 2010 Census codes
		0430	Managers, all other	
		1107	Computer occupations, all other	
13-2054.00	Financial Risk Specialists	0840	Financial analysts	Keep only to 0840, Financial Analysts
		0950	Financial specialists, all other	
15-1243.00	Database Architects	1060	Database administrators	Keep only 1060, Database Administrators
		1107	Computer occupations, all other	
15-1243.01	Data Warehousing Specialists	1060	Database administrators	Keep only 1060, Database Administrators
		1107	Computer occupations, all other	
15-1253.00	Software Quality Assurance Analysts and Testers	1020	Software developers, applications and systems software	Keep only 1020, Software developers, applications and systems software
		1020	Software developers, applications and systems software	
		1107	Computer occupations, all other	
15-1255.00	Web and Digital Interface Designers	1030	Web developers	Keep only 1030, Web developers
		1107	Computer occupations, all other	
15-1255.01		1030	Web developers	

	Video Game Designers	1107	Computer occupations, all other	Keep only 1030, Web developers
15-1299.00	Computer Occupations, All Other	1107	Computer occupations, all other	Keep only 1107, Computer occupations, all others
		5800	Computer operators	
15-1299.01	Web Administrators	1107	Computer occupations, all other	Linked to 1105, Network and computer systems administrators ³
		5800	Computer operators	
15-1299.02	Geographic Information Systems Technologists and Technicians	1107	Computer occupations, all other	Linked to 1107, Computer systems occupations, all other
		5800	Computer operators	
15-1299.03	Document Management Specialists	1107	Computer occupations, all other	Linked to 1060, Database administrators ³
		5800	Computer operators	
15-1299.04	Penetration Testers	1107	Computer occupations, all other	Linked to 1107, Computer systems occupations, all other
		5800	Computer operators	
15-1299.05	Information Security Engineers	1107	Computer occupations, all other	Linked to 1107, Computer systems occupations, all other
		5800	Computer operators	
15-1299.06	Digital Forensics Analysts	1107	Computer occupations, all other	Linked to 1107, Computer systems occupations, all other
		5800	Computer operators	
15-1299.07	Blockchain Engineers	1107	Computer occupations, all other	Linked to 1105, Network and computer systems administrators ³
		5800	Computer operators	
15-1299.08	Computer Systems Engineers/Architects	1107	Computer occupations, all other	Linked to 1400, Computer hardware engineers ³
		5800	Computer operators	

³ Recommended by Pam Frugoli (O*Net and Competency Model Team Lead, Employment and Training Administration, and U.S. Department of Labor) on 5/10/2021.

15-1299.09	Information Technology Project Managers	1107	Computer occupations, all other	Linked to 0110, Computer and information systems managers ³
		5800	Computer operators	
17-3029.00	Engineering Technologists and Technicians, Except Drafters, All Other	1550	Engineering technicians, except drafters	Keep only 1550, Engineering technicians, except drafters
		9820	Military Enlisted Tactical Operations and Air/Weapons Specialists and Crew Members	
17-3029.01	Non-Destructive Testing Specialists	1550	Engineering technicians, except drafters	Keep only 1550, Engineering technicians, except drafters
		9820	Military Enlisted Tactical Operations and Air/Weapons Specialists and Crew Members	
17-3029.08	Photonics Technicians	1550	Engineering technicians, except drafters	Keep only 1550, Engineering technicians, except drafters
		9820	Military Enlisted Tactical Operations and Air/Weapons Specialists and Crew Members	
19-4044.00	Hydrologic Technicians	1930	Geological and petroleum technicians	Keep only 1930, Geological and petroleum technicians
		1965	Miscellaneous life, physical, and social science technicians	
25-4022.00	Librarians and Media Collections Specialists	2430	Librarians	Keep only 2430, Librarians
		2550	Other education, training, and library workers	
27-3099.00	Media and Communication Workers, All Other	2860	Miscellaneous media and communication workers	Keep only 2860, Miscellaneous media and communication workers
		2800	Announcers	
29-2099.00	Health Technologists and Technicians, All Other	3535	Miscellaneous health technologists and technicians	Keep only 3535, Miscellaneous health technologists and technicians
		3420	Health practitioner support technologists and technicians	
29-2099.01	Neurodiagnostic Technologists	3535	Miscellaneous health technologists and technicians	Keep only 3420, Health practitioner support technologists and technicians
		3420	Health practitioner support technologists and technicians	

29-2099.05	Ophthalmic Medical Technologists	3535	Miscellaneous health technologists and technicians	Keep only 3420, Health practitioner support technologists and technicians
		3420	Health practitioner support technologists and technicians	
29-2099.08	Patient Representatives	3535	Miscellaneous health technologists and technicians	Keep only 3420, Health practitioner support technologists and technicians
		3420	Health practitioner support technologists and technicians	
29-9021.00	Health Information Technologists and Medical Registrars	3540	Other healthcare practitioners and technical occupations	Keep only 3510, Medical records and health information technicians
		3510	Medical records and health information technicians	
35-3023.00	Fast Food and Counter Workers	4050	Combined food preparation and serving workers, including fast food	Keep linkage to both census codes
		4060	Counter attendants, cafeteria, food concession, and coffee shop	
35-3023.01	Baristas	4050	Combined food preparation and serving workers, including fast food	Keep only 4060, Counter attendants, cafeteria, food concession, and coffee shop
		4060	Counter attendants, cafeteria, food concession, and coffee shop	
43-2099.00	Communications Equipment Operators, All Other	5030	Communications equipment operators, all other	Keep only 5030, Communication s equipment operators, all other
		2900	Broadcast and sound engineering technicians and radio operators	
45-3031.00	Fishing and Hunting Workers	6100	Fishers and related fishing workers	Keep linkage to both census codes
		6110	Hunters and trappers	
47-5032.00	Explosives Workers, Ordnance Handling Experts, and Blasters	6820	Earth drillers, except oil and gas	Keep only 6830, Explosives workers, ordnance handling experts, and blasters
		6830	Explosives workers, ordnance handling experts, and blasters	
47-5044.00		9520	Dredge, excavating, and loading machine operators	

	Loading and Moving Machine Operators, Underground Mining	9730	Mine shuttle car operators	Keep only 9730, Mine shuttle car operators
47-5099.00	Extraction Workers, All Other	6940	Other extraction workers	Keep only 6940, Other extraction workers
		6840	Mining machine operators	
51-9161.00	Computer Numerically Controlled Tool Operators	8965	Production workers, all other	Keep only 7900, Computer control programmers and operators
		7900	Computer control programmers and operators	
51-9162.00	Computer Numerically Controlled Tool Programmers	8965	Production workers, all other	Keep only 7900, Computer control programmers and operators
		7900	Computer control programmers and operators	
53-1044.00	First-Line Supervisors of Passenger Attendants	9000	Supervisors of transportation and material moving workers	Keep only 9000, Supervisors of transportation and material moving workers
		4320	First-line supervisors of personal service workers	
53-3053.00	Shuttle Drivers and Chauffeurs	9120	Bus drivers	Keep only 9140, Taxi drivers and chauffeurs
		9140	Taxi drivers and chauffeurs	
53-4022.00	Railroad Brake, Signal, and Switch Operators and Locomotive Firers	9200	Locomotive engineers and operators	Keep only 9230, Railroad brake, signal, and switch operators
		9230	Railroad brake, signal, and switch operators	
53-7199.00	Material Moving Workers, All Other	9750	Material moving workers, all other	Keep only 9750, Material moving workers, all other
		9520	Dredge, excavating, and loading machine operators	