Social Security Administration

W O R K I N G   P A P E R

SSA Plans and Methods for Developing a Content Model: Key Questions to be Addressed

April, 2009

This working paper was prepared by staff of the Social Security Administration's Office of Program Development and Research in the Office of Retirement and Disability Policy for the Occupational Information Development Advisory Panel.

SSA Plans and Methods for Developing a Content Model: Key Questions to be Addressed

The Social Security Administration (SSA) is developing an Occupational Information System (OIS) designed to provide us with a long-term replacement for the data we currently obtain from the *Dictionary of Occupational Titles* (DOT) and companion volumes, including *Selected Characteristics of Occupations* (SCO) and *Revised Handbook for Analyzing Jobs* (RHAJ).

A key requirement for the new OIS is that it must provide data that are optimized for SSA's disability assessment and adjudication functions. Specifically, the data must describe:

- *work as it actually exists in the economy*, using a taxonomy of occupational titles that is specific enough to meet our disability-related needs;
- *the major work activities, job demands, and contextual characteristics* present in each occupation, in a fashion that makes them amenable to accurate description; and,
- *the personal abilities and other characteristics* that individuals must possess in order to be able to perform each occupation, defined in a fashion that is maximally useful when assessing the residual functional capacity (RFC) of claimants so that we can conduct a medical-vocational assessment of their ability to work at step 4 or at steps 4 and 5 of the sequential evaluation process.[1]

This document provides an overview of several key issues and questions that must be addressed during the process of developing a new *content model* for the new OIS. The following general questions are addressed below:

- What is a content model?
- What key issues must be considered when developing the OIS content model?

---

[1] According to Section 223(d)(2)(A) of the Social Security Act, "an individual shall be determined to be under a disability only if his physical or mental impairment or impairments are of such severity that he is not only unable to do his previous work but cannot, considering his age, education, and work experience."

1. *What is a content model?*

In occupational analysis, a "content model" simply specifies the types of *entities* that will be described in the database, as well as the *characteristics* on which the entities will be rated. For the OIS being developed for SSA, the entities that we will describe are *occupations*, with each being defined at a level of specificity that is optimal for use in SSA's disability programs.

Each occupation will be described in terms of attributes drawn from two major domains of content (see Figure 1). That is, although many people simply refer to this as the "world of work," it is important to differentiate between *two* qualitatively distinct "worlds" of work:

- **Person-side elements:** These describe characteristics that individual *workers* bring to the job situation (left side of Figure 1) that may be required to perform the work successfully. These can include relatively stable personal traits such as *abilities* (the physical, mental, interpersonal traits that allow workers to perform the demands of a given job) and temperaments, as well as more trainable characteristics termed *skills* (the learned capacity to perform the specific activities required on jobs, based on past experience, training and knowledge). The important point is that person-side elements describe job-relevant *characteristics or properties of a human being*. For an OIS that is optimal for disability determination purposes, these person-side requirements must be defined in terms of the *minimum* required levels to perform the work, a level that is typically lower than the *optimal* level of the trait needed to produce the highest level of job performance.

- **Job-side elements:** These describe the *work activities* and related demands (right side of Figure 1) that the job requires of workers; that is, the things that must be performed or accomplished to do the job. Depending on their specificity, these describe tasks, duties, responsibilities, and contextual characteristics such as environmental conditions or hazards. The essential point for job-side elements is that they describe *characteristics or properties of the work itself*, without reference to the personal traits of individuals who perform the work.

Figure 1 illustrates the ways in which person- and job-side elements vary in terms of the degree of *specificity* at which they are defined (note that a 5-level numbering system is indicated on the right side of the chart to denote the relative degree of abstraction). To be useful to SSA, a range of information spanning many levels of specificity will need to be collected. The specific issues and questions regarding the kind of content that must be included are discussed in more detail below.

2. *What issues must be considered when developing the SSA OIS content model?*

On both the person- and job-sides of the world of work summarized in Figure 1, the number of possible elements that can be described is infinite. To develop a practical content model, we must specify which types of information are essential for SSA to effectively administer its disability programs, versus which types of data are not essential for our purposes.

In many cases, tradeoffs are required when developing a content model. The major questions and tradeoffs that must be addressed in the process of developing a content model for SSA's use include the following:

- **What elements should SSA include in its OIS?**

    o **Job-side.**

        ▪ **What level of detail?** As Figure 1 illustrates, work activities may be described across a wide range of specificity. Although it would be desirable to have a database that describes each occupation across a full range of specificity – that is, from highly detailed tasks (Level 1) through very abstract constructs such as the Data, People, and Things dimensions from the DOT – that is probably not feasible due to the high amount of labor required to describe Level 1-type tasks for all occupations in the economy.

        For the new OIS, two main issues drive the decision as to what levels of specificity should be included. First, what kind of information *must* we have to administer disability programs? Second, what types of job characteristics can be rated *accurately* and reliably?

        Regarding the first issue, SSA currently makes decisions using information at both the Level 4-5 degree of abstraction (e.g., SVP, Strength), as well as at a more detailed level (e.g., when evaluating the Level1-2 activities performed by a claimant on his/her past jobs). Accordingly, SSA needs the new OIS to describe activities from Level 2 up (given the impracticality of collecting Level 1 information on this large a scale).

        Regarding the second issue, past research has shown that the higher the level of abstraction, the more difficult it becomes to obtain accurate direct ratings of a given job activity. Given that, it is advisable that the new OIS begin the data collection process at the Level 2 degree of specificity, and then use quantitative means

for deriving more abstract descriptors (i.e., a "decomposed judgment" measurement strategy).

- **How comprehensive?** The main issue here is, do we need to focus primarily on describing the physical aspects of work, or should we strive to assess a full and comprehensive profile of physical and non-physical work activities? One might argue that because SSA focuses heavily on physical demands of occupations when making disability determinations, the new OIS should focus primarily on describing the physical demands of work.

  However, many arguments in favor of taking a more comprehensive approach, and describing the full range of physical/mechanical, interpersonal, and cognitive/information-processing aspects of work, can be offered. Most significantly, although many claims are based primarily on physical disabilities, a growing number involve non-physical aspects as well. Hence, the job-side database must be able to describe the relevant non-physical aspects of occupations to provide a firm basis for making determinations in such cases.

  Additionally, when dealing with our burden of proof at Step 5 of the sequential evaluation process, it is essential that SSA be able to make an informed decision regarding the existence of occupations in the economy that can still be performed by a given individual with given impairments. Having a comprehensive description of the physical and non-physical work demands of each occupation is essential to allow claims adjudicators to determine which occupations match the residual capacity of a given claimant.

1. **How does this relate to skills?** A related reason for being as comprehensive as possible in terms of job-side content in the new OIS involves the question of skills transferability. Although the term "skill" is used to refer to a very wide range of things, here it is defined simply as the *capacity* of a person to perform specific duties, tasks, or other psychomotor activities that are required by an occupation.

   Viewed in that light, the skill requirements of occupations can be defined quite directly as the capacity of a worker to perform the various Level 2-4 activities that the OIS database indicates are part of a given occupation (e.g., operate a bulldozer, use a micrometer, read gauges/displays, prioritize and delegate tasks, etc.). Accordingly, having a comprehensive job-side description of work will allow a range of skill-based decisions to be made, both with respect to matching claimants' residual capacities/skills to the demands of occupations, as well as in guiding the

person-side process of assessing skills in claimants.

2. **How can we address accommodations and job restructuring?** In short, what (if any) information should SSA include in its database describing work regarding general accommodations that may be available within and among occupations or industries for specific occupations? For example, what are the "core" activities of occupations? Are workers offered options regarding how they perform the core tasks, such as a sit/stand option?

Obviously, given that a key aspect of the disability determination process is evaluating the degree to which an individual possessing physical or other limitations can perform a given occupation, it would clearly be advantageous to have our descriptions of the job-side requirements include information as to which activities are essential, and whether strategies for accommodating workers with limitations exist for them. However, including such information arguably increases the complexity of the task associated with collecting the job-side database.

Therefore, we should consider identifying potential opportunities for accommodations and job restructuring for occupational core tasks, particularly when both of the following apply: a) the type of accommodation or job restructuring is possible in a significant number of occupations nationally (e.g., for occupations within a given industry); and b) the type of accommodation or job restructuring is possible for the occupation as it is generally performed throughout the nation. That is, we do not intend for the OIS to include highly customized accommodations or job restructuring that are specific to a given employer, to a specific individual, a specific impairment, or to tasks that are not occupational core tasks.

- **How do we address terminology and operational definitions?** The OIS will need to use terminology and definitions, including measures that are consistent with medical practice and thinking, as well as that which adjudicators and medical personnel can readily associate with human function. Claimants and their representatives must also be able to readily understand the terminology used in the OIS.

- **Do we include data for program or policy development purposes**? **If so, what data should we include?** We need to consider if the OIS should include other data elements[2], such as job incumbent's age, education, and work experience, for policy development purposes. In other words, what type of data elements might be valuable for SSA to collect to assist with program evaluation and policy development as opposed to disability

---

[2] These data elements would not be personally-identifiable.

adjudication?

o **Person-side.**

- **Do we refine the physical side more?** In the past, SSA has focused heavily on describing the physical demands of work, and in making disability determinations based on the residual functional capacity (RFC) of claimants in the physical domain. Separate from the following question of whether or how we broaden our focus to non-physical characteristics, we can also ask whether we should further refine our descriptions of the physical RFC elements that are evaluated.

  Again, a tradeoff can be seen. In this case, the benefit of being able to more precisely assess a claimant's RFC must be balanced against the increased time and effort required to perform the RFC assessments while processing claims. However, it is not difficult to argue that the existing RFC form and assessed dimensions could benefit from additional refinement, both to potentially cover physical functionality that is not explicitly addressed, as well as to ease the process of making the assessments (e.g., via changes in the rating format).

- **How do we broaden RFC process beyond physical traits?** Likewise, another area that arguably is in need of additional attention concerns the range of non-physical RFC elements that are evaluated in claimants. Given the increasing number of claims that involve non-physical disabilities, expanding beyond the existing mental RFC process (both with respect to breadth of coverage as well as ease of making ratings) is clearly desirable.

  However, as with the issue of refining the physical RFC process, a tradeoff exists between increased content coverage and precision versus increased time and costs to actually collect the RFC data. Especially if standardized psychological or other assessments are included in the expanded process, the time and cost of collecting such data may both increase significantly.

- **What other tradeoffs exist in the non-physical domain?** Beyond the above noted practical/economic tradeoffs, what other issues must SSA consider when considering whether or how to expand the non-physical domain of characteristics assessed in claimants? Here, a number of potentially troublesome tradeoffs can be identified.

  First, underperformance for a variety of reasons (e.g., fear of pain or is always a potential concern when both physical and non-physical traits are assessed, However, it is especially troublesome with respect to assessing psychological and similar traits (e.g., general cognitive ability, critical

thinking, attention span, ability to follow instructions). That is, although it is difficult to "fake good" on such psychological assessments (e.g., to appear more intelligent than you actually are), it is often possible to "fake bad" and present one's self as less intelligent, having limited attention span, being unable to follow instructions., etc. This is particularly the case for assessments that are not given in a one-on-one setting (e.g., when standardized tests are administered via computer). Trading off the potential benefit from having additional information of this type against the concerns regarding its quality or veracity is not a clear-cut question.

Second, policy implications regarding adverse impact must be considered. That is, based on decades of psychological research, we can confidently predict that when tests of cognitive ability are administered, it is possible that certain subgroups (especially based on ethnicity and gender) will exhibit consistent mean differences in their scores vis a vis other subgroups. For example, some ethnic groups may tend to score higher on tests of general cognitive ability than other ethnic groups, and one gender routinely scores higher on tests of spatial ability than the other. Obviously, if constructs such as these were included in an expanded profile of non-physical RFC characteristics, potentially significant concerns from the public might result . Thus, at a policy level, it may be the case that the decision is made not to pursue a number of non-physical person-side characteristics that otherwise might be seen as relevant information to guide the process of adjudicating claims.

Finally, policy implications also exist regarding SSA's bigger-picture role in the disability determination process; in particular, should we include person-side traits that are arguably more relevant to identifying *optimal* requirements for occupations than *minimum* requirements? In particular, dimensions of concern here are ones that fall in the non-cognitive domain such as personality traits and other temperament or dispositional characteristics. That is, although many employers use personality and other traits to identify the *best candidate* out of a larger pool of applicants (and the DOT reported the required levels of a number of temperaments), it could be argued that we should not focus on describing such characteristics, but rather we should direct our efforts toward identifying and assessing the characteristics needed to be minimally successful on the occupation.

- **What conceptual frameworks may guide the identification of these moderate-specificity elements and their groupings?**

  o **Job-side.**

    ▪ **Taxonomic structures.** Considerable research has been conducted over the past half-century in personnel psychology regarding the question of what general taxonomic structure exists for work. That is, both data-based and theory-based attempts have been made to parallel the hierarchical structure illustrated in Figure 1 to describe the general structure of how work is performed (typically, by forming a hierarchy ranging from highly detailed activities to highly abstract work-activity constructs).

      The question facing us is, which ones of these taxonomies seem to be the most useful given SSA's needs? Are some more useful for disability determination purposes than others? As was noted above, it is easy to argue that SSA should have the most comprehensive description of job-side work activities possible; however, determining how to relate this goal to the range of existing taxonomic views of work is not as straightforward a matter.

    3. **Must we choose between empirically based versus rational?** The existing work taxonomic structures tend to fall into two types: some were developed based on a rational process, and others were derived via empirical methods (for example, factor analysis of standardized job analysis questionnaires). This suggests that a choice is present: that is, are the rational or empirical taxonomies "better" for SSA's goals?

      One could instead argue that we don't need to choose, and that we may selectively use whichever portions of both rationally and empirically derived taxonomies we feel best meet our goals. That is, if one adopts the view that SSA must comprehensively describe all work activities that are relevant to assessing RFC and determining the degree of match between a claimant's residual functions and skills versus those of occupations, it follows that the intersection of the rational and empirical taxonomies offers the most utility for our purposes.

  2. **Person-side.**

    1. **Taxonomic structures.** Ample empirical and theoretically driven research also exists with respect to defining taxonomies on the person-side (e.g., mental abilities, personality traits, physical abilities, interests, etc.). As with the job-side, although some degree of convergence exists, such taxonomic views also diverge in significant ways; however, unlike the

job-side, a strong stimulus exists with respect to forming more unified and widely-accepted taxonomies (e.g., as part of the move toward automated medical records).

Unlike the job-side question of which taxonomic approach should be used, the corresponding decisions on the person-side are arguably more complicated. That is, as was noted above, policy considerations may play an important role with respect to determining that some domains (even ones that are relatively clearly defined from a taxonomic standpoint, such as cognitive abilities or personality traits) will not be included in the person-side list of characteristics to be assessed in claimants. For such traits, the policy implications of including them arguably hold a more critical role than the relative degree of agreement that exists among researchers regarding their taxonomic structure.

2. **Must we choose between empirically based versus rational?** As with the similar job-side question described above, SSA arguably does not need to be bound to express a preference for rationally derived versus empirically derived taxonomic views of person-side personal traits. As with the job-side question, arguably the question of which traits/taxonomies are most relevant to SSA's needs – and especially, which ones can be assessed with the best balance of precision versus cost to conduct the assessments – will drive the final determination.

2. **How should we link the person- and job-side domains?**

1. **Physical requirements.**

1. **Specific physical RFC elements.** The task of linking the two worlds of work shown in Figure 1 is critically important in any occupational information system, and that is no less the case for SSA's new OIS. That is, it is typically a much easier task to accurately *describe* the activities performed on an occupation (especially if they are defined at an appropriate degree of specificity and objectivity) than it is to accurately *infer* the levels of various person-side traits or attributes that would be required to perform the occupation successfully.

Fortunately, in the case of physical requirements, this linkage task tends to be considerably more straightforward than the task of linking work activities to non-physical personal traits. And in the case of linking work requirements to person-side physical traits that are defined at a relatively specific level (e.g., Levels 2-3 in the left side of Figure 1), the task is very straightforward.

That is, effectively the same kinds of questions are asked on the job-side

when describing jobs (e.g., "how frequently does the job involve lifting objects that weigh 50 pounds?") as might be asked on the person-side when determining a claimant's RFC (e.g., "can the person lift a 50-pound object, and if so, how frequently?"). Hence, the most important part of the process in this regard is ensuring that a fully comprehensive description of the desired specific physical activities (on the job-side) and capacities (on the person-side) is identified, and that there is a direct linkage between the elements in the job-side data collection instrument and the corresponding person-side RFC instrument.

2. **Abstract physical RFC elements.** Things are more complex with respect to making linkages between descriptions of work activity versus specifications of required personal functionality, primarily due to the above-mentioned fact that as the level of abstraction of a rated item increases, the difficulty in obtaining accurate ratings of it increases as well. That is, although the DOT and other instruments (e.g., O*NET) directly rate highly abstract physical requirements of occupations using single-item scales (e.g., the DOT *Strength* scale), research clearly indicates that it is inadvisable for SSA to perpetuate this practice due to the inherent subjectivity involved in making such abstract judgments.

   Several alternative approaches are available for consideration as SSA designs its OIS. First, one might well argue that this would be an excellent time to reassess the advisability of making disability decisions at the highly "macro" level of analysis seen for scales such as the DOT *Strength* scale. That is, especially in SSA's case, the nominally 5-point *Strength* scale effectively reduces to a 2-choice decision when considering individuals who have significant physical disabilities: i.e., is the individual's RFC *Sedentary*, or is it *Light,* and is the occupation under consideration (or the remaining occupational base at step 5, for example) *Sedentary* or *Light* in terms of overall physical demands? The remaining points on the *Strength* scale are largely irrelevant for many cases.

   In view of this reality, it becomes extremely critical that a very precise determination be made as to whether a given occupation is *Sedentary* or not. However, it is readily apparent that this is not an especially easy determination to make, either with respect to describing the job as a whole (especially if the issue of reasonable accommodations is considered as well), or with respect to matching a given claimant's residual physical functionality to the demands of jobs (e.g., at Step 5 of the sequential evaluation process). That is, how should individuals who can walk, climb, crawl, and lift – but not stoop – be handled? Or claimants who can perform a range of strenuous physical activities, but not sit for extended periods? When decisions are made only at the "is this occupation *Sedentary* or not?" level, a considerable lack of precision is effectively

unavoidable.

As an alternative, decision making using a macro-level scale such as *Strength* can be replaced by a process that instead makes determinations at a more specific level, assessing both claimants and occupations in terms of physical activities and capacities defined in the middle levels of Figure 1. This arguably provides considerable benefits in terms of improved precision, and given that the existing physical RFC process collects information that is considerably more specific than the overall *Strength* scale, significant additional time or expense on the person-side is not required.

Other options exist as well. If the capacity to continue to make macro-level characterizations of occupations on overall *Strength* or similar scales is desired, ratings of detailed Level 2-3 information on the job-side can be empirically combined to produce much higher-precision estimates of the abstract strength requirements than is possible using a DOT-type scale. And of course, the capacity to characterize occupations in terms of both a macro-level and more molecular descriptions of their physical requirements is always available as well. However, in any event, the task of developing an overall macro-level assessment of a given claimant's RFC in terms of general physical functionality remains problematic, especially in cases in which the individual's lack of function is more localized versus global.

2. **Non-physical requirements.**

   1. **Specific job activities/skills.** Similar to the above mentioned issue with physical activities, in the non-physical domain it is possible – assuming one has the adequate data in the job-side database at the Level 2-3 degree of specificity – to make direct linkages between the job-side and person-side domains with respect to *skills*. As was discussed earlier, the most direct definition of a "skill" is simply the capacity on the part of a person to perform work activities phrased at the intermediate and higher levels of specificity illustrated in Figure 1. If a comprehensive job-side database is in place to describe occupations in terms of a full profile of these moderate-specificity work activities, it is a straightforward task to perform a similar RFC assessment of an applicant with respect to determining what his/her residual skills profile is, and then searching for occupations that match those levels. However, for SSA's purposes, we will need to determine what data elements are critical for skills assessment for forensic purposes, as opposed to other purposes such as case management or career exploration.

   2. **Abstract job activities/work dimensions.** As was the case for matching

more abstract physical RFC elements to descriptions of work, it is also the case that determining the levels of abstract, non-physical personal traits that are required to perform occupations represents a much more challenging task. That is, in this case we lack the ability to directly link job-side and person-side elements using common descriptors, as is possible in the physical domain.

Rather, the linkage process is much more indirect. For example, occupations may be described accurately in terms of a range of abstract work activities (e.g., involving decision making, information processing, supervision, resource responsibility), and although the levels of such macro-level job characteristics may well be related to the levels of various non-physical personal traits (e.g., cognitive abilities, personality dimensions), the task of determining *how much* of each non-physical personal trait is required has no easy solution. In particular, research has shown that attempts to rationally make such linkages (e.g., by making direct holistic ratings of the levels of various abstract non-physical traits are required, as was done by both the DOT and O*NET) produce results that lack accuracy and validity.

Some empirical methods are available for making this linkage; for example, the DOT's developers advocated testing large numbers of job incumbents on the traits in question, and setting an appropriate cutoff score for each trait for each occupation based on those empirical results (the cutoff can be set at various levels to reflect minimum-required versus optimal levels, as desired). However, this represents a very costly solution to the problem. Other empirical methods, particularly *job component validation* (JCV), are available; these attempt to develop statistical prediction equations that use the logic of the "test everybody" approach in a subset of occupations, and produce equations that let us predict the levels of the personal traits that would be required in the remaining occupations.

In sum, several options for linking descriptions of work activity to high-abstraction, non-physical, personal-trait requirements are available, although all have potentially significant associated costs during the database-population process. However, depending on the choices that are made regarding other decisions noted earlier – particularly, the degree to which we decide that we actually want to broaden the domain of non-physical traits assessed during the RFC process – the process of choosing a method for making these linkages could be simplified.

A final issue that must be considered with respect to the decision as to which abstract non-physical person-side traits will be described in the new OIS (that is, listing the required *levels* of the traits needed for each

occupation) concerns the question of who bears the burden of proof with respect to documenting the *job relatedness* and *validity* of such specifications. Especially for non-physical personal traits that have the potential to produce significant *adverse impact* in applied use (i.e., producing applied decisions that may be seen to favor members of one protected class over another, such as on the basis of race, sex, age, etc.), this is a nontrivial applied issue that has significant legal implications.

In short, if SSA includes, for example, specifications in its new OIS regarding the levels of various cognitive abilities that are required for each occupation, who will bear the burden of defending the *validity* of such specifications when (not if) they produce adverse impact with respect to approving disability claims? Arguably, if SSA is the entity that develops the OIS database, and performs the data collection and analytical steps involved in producing the specifications of how much of each non-physical trait each occupation requires, SSA would be the entity who must defend their validity.

One potential way to deal with this issue would be to simply leave the task of developing (and defending) the linkages between the job-side OIS database and abstract person-side non-physical constructs to external entities (e.g., commercial test publishers). That is, using either JCV or the brute-force method of testing large numbers of incumbents in a large number (if not all) of the occupations described in SSA's new OIS, such external entities could do the development work required to link their tests to the SSA database, and SSA could then take administrative notice of such results and use them as desired (assuming the publishers could offer convincing documentation of the linkages).

In sum, the above discussion may have raised more in the way of questions than it provided in the way of answers. However, the important point is that the process of developing an OIS to meet SSA's disability-determination needs is going to be an iterative one, and one that it will involve answering a range of questions and making some potentially tough choices.