# National Leadership Study Results

## Table of contents

- The *National Leadership Study* .......................................................... 1
  - Task definition .................................................................................. 1
  - About cognitive development .......................................................... 1
  - Method ............................................................................................. 5
  - Results ............................................................................................. 11
  - Subject area content by Lectical™ level ......................................... 17
- Discussion and recommendations ......................................................... 22
  - Functional and optimal level performances ..................................... 22
  - Developmentally informed curricula and assessments ...................... 23
  - Management standards ................................................................... 23

## Appendix A: Interview format ............................................................ 24

- Interviews and interviewer instructions .............................................. 24
  - Interviews ....................................................................................... 24
- Form 1 ............................................................................................... 25
  - Reflective judgment interview .......................................................... 25
  - Problem-solving interviews .............................................................. 25
  - Feelings interview ........................................................................... 26
  - Good leader interview and standard probes ..................................... 26
  - Self-understanding interview and standard probes ......................... 26
  - Concept map (good leader) .............................................................. 26
- Form 2 ............................................................................................... 28
  - Reflective judgment interview .......................................................... 28
  - Problem-solving interviews .............................................................. 28
  - Feelings interview ........................................................................... 29
  - Good leader interview and standard probes ..................................... 29
  - Self-understanding interview and standard probes ......................... 29
  - Concept map (good leader) .............................................................. 29
- Form 3 ............................................................................................... 31
  - Reflective judgment interview .......................................................... 31
  - Problem-solving interviews .............................................................. 31
  - Feelings interview ........................................................................... 32
  - Good leader interview and standard probes ..................................... 32
  - Self-understanding interview and standard probes ......................... 32
  - Concept map (good leader) .............................................................. 32
Appendix B: Lectical™ Assessment System........................................................................ 34
  Lectical™ levels defined........................................................................................................ 34

Appendix C: ACE Management Criteria ............................................................................. 40
  Table I: Leadership ................................................................................................................ 40
  Table II: Communication ........................................................................................................ 43
  Table III: Teamwork skills and concepts .............................................................................. 44
  Table IV: Problem-solving skills and concepts ..................................................................... 45
The National Leadership Study

Task definition

With the end goal of providing data required to implement an on-line developmental assessment system (part of an effort to support the mass customization of leadership training):

1. Study epistemological reasoning, problem solving, emotional conceptions, self-understanding (self-as-leader), and conceptions of the good employee and good leader in a diverse sample of NSA employees.

2. Assess the developmental level of respondents' performance on interviews designed to probe reasoning in each of these domains.

3. Compare the developmental level of performances on each of these interviews with the developmental level of job requirements as specified in the ACE Standards.

4. Produce descriptions of the sequence of conceptual development in each of these domains:
   a. Identify the major themes explored by respondents in their responses to each of the interviews;
   b. Code all of the interviews for their thematic content; and
   c. Conduct a detailed analysis of the relation between the thematic content of interviews and their developmental level.

5. Examine the relation between functional (unsupported/everyday) and optimal (supported/best) performance on the leadership interview.

6. Discuss the implications of our findings for leadership assessment and education.

About cognitive development

When we employ the term development, we are referring to an increase in the complexity and integration of thought. This perspective on cognitive development is embedded in a rich...
research tradition with its origins in the work of Baldwin, Piaget, and Werner. During the last 25 years, it has become clear that developments in the complexity and integration of thought are not confined to childhood and adolescence. They can take place at almost any point in the life span, given an appropriately stimulating intellectual environment. This means that adult learning is much more than the accumulation of facts. It involves changes in the way we think—the same kind of changes that occur in childhood development. Given the complexity of problems faced in today’s work environments and rapid changes in the world in which we live, this is good news.

One of the greatest advances in developmental science during the last few years is the development of a valid, reliable, and accurate domain- and content-independent measure of cognitive development. We call this measure the Lectical™ Assessment System (LAS). We describe adult developmental levels and scoring procedures in Appendix B. This system can be employed in any knowledge domain to assess the developmental level of text performances such as interview responses and essays. A content-independent developmental assessment system has numerous implications for curricula and assessments:

1. The complexity and integration of thinking on a variety of subjects can be placed on the same scale, making it possible to compare performance across knowledge domains, as shown in Figure 1. This makes it possible to identify and target areas of relative strength and weakness.

2. Developmental progress in multiple knowledge domains can be tracked over time, as shown in Figure 2.

3. The developmental level of an individual’s functioning over time can be compared to hiring or promotion criteria, as shown in Figure 3. This is possible because hiring and promotion criteria can be placed on the same scale as an individual’s developmental assessments.

4. Scored performances can be employed to trace conceptual development, making it possible to produce comprehensive accounts of the pathways through which learning takes place in a given domain. Such accounts can be paired with expert knowledge of a domain to inform curriculum development, thus improving learning outcomes by allowing teachers to customize curricula to meet the developmental needs of individual learners.

5. Developmentally informed curricula can be appropriately assessed for their developmental impact.

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Cognitive development, as we understand it, is a slow process. In adulthood, it can take several years to move from one level of complexity and integration to another. To address this issue, the LAS is designed to permit raters to award scores in increments of 1/5 of a Lectical™ level, making it possible to observe relatively small developmental differences. In Figures 1 through 3, the range from 20 to 30 represents two full Lectical™ levels.

Development is best understood as a slow process characterized by dips, spurts, and contextual variability. Individuals do not function at a single developmental level. Subject area, testing conditions, testing modalities, and other features of the testing context have an impact on the developmental level of a performance. For this reason, examinations of developmental progress should be multiple and varied, yielding more of a developmental profile than a developmental score, as shown in Figure 2.

Figure 1: Level of reasoning performance by knowledge domain

![Graph showing level of reasoning performance by knowledge domain.](image)

Figure 2: Level of reasoning performance at multiple test times by knowledge domain

![Graph showing level of reasoning performance at multiple test times by knowledge domain.](image)

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The acquisition of conceptual content, which we call learning, is a part of development in the sense that conceptual elaboration precedes and supports the kind of increase in complexity and integration that we think of as developmental. An adequate amount of conceptual elaboration is a necessary but not sufficient precondition for cognitive development in any knowledge domain. In other words, individuals will not move from one developmental level to another without an adequate amount of conceptual elaboration at their current level, but an adequate amount of conceptual elaboration does not ensure development to the next level. Educational interventions can be focused on conceptual elaboration, complexification/integration, or both conceptual elaboration and complexification/integration.

Fischer\textsuperscript{5} refers to functional and optimal levels of developmental functioning. The functional level is the everyday level at which a person performs without support (guidance, examples, etc.). The optimal level is the level at which a person performs with support. We also think of the optimal level as the highest level at which a person is able to perform in a given subject area.

There is an important relation between cognitive development and real-world behavior. If one is unable to conceptualize or reason through a potential course of action or process, it is highly unlikely that one will be able to implement it. However, motivation, practice, emotional maturity, and a variety of personality characteristics also play a role in determining behavior. The present project focuses on the development of reasoning skills, but this should not be taken as an indication that development of these skills, on its own, will produce better leaders.

\textsuperscript{5} Fischer & Biddel, 1998.
Method
During the fall of 2002 and spring of 2003, we conducted and transcribed 113 probed, semi-structured, clinical interviews (averaging 2 hours in length) of a heterogeneous sample of NSA employees. We made an effort to interview individuals from all areas of the agency and all levels of management and technical expertise. The interviews consisted of 3 forms and examined reasoning in 6 content domains—epistemological reasoning, problem solving, emotional conceptions, self-understanding (self-as-leader), and conceptions of the good employee and good leader. (See Appendix A for the interview forms.) The interviews were transcribed and scored for developmental level with the LAS. These scored interviews were then submitted to a variety of concept analyses in order to examine how conceptual knowledge differs from one developmental level to the next.

Sample
Sample demographics are shown in Figures 4 through 9. Unfortunately, we did not receive demographic information for all respondents.

Figure 4: Age distribution

![Age distribution graph]

Figure 5: Educational attainment

![Educational attainment graph]
Figure 6: Specializations

Figure 7: Management level
Performances in each content domain were individually scored with the LAS. To determine the relation between Lectical™ levels and ACE management standards, we also scored the Standards with the LAS. Table 1 lists the correspondences between Ace standards and Lectical™ levels for 3 management levels (M1–M3) and one non-management level (M0), along with the number of respondents performing at each level in each knowledge domain. Respondents’ performances were strongest when reasoning about what it means to be a good leader or employee. Weaker performances were evident on the epistemology, problem solving, feelings, and self-as-leader interviews.

In all of the tables and figures below, we will designate the Lectical™ levels as L0, L1, L2, and L3, which correspond to ACE management levels, M0, M1, M2, and M3. Appendix C shows the relation between ACE management standards and Lectical™ levels along with
brief summaries of conceptualizations of leadership, communication, teamwork, and problem solving associated with these levels.

**Table 1: Distribution of respondents by Lectical™ phase (with corresponding management level, as described in the ACE Standards)**

<table>
<thead>
<tr>
<th>ACE standards</th>
<th>Lectical™ range</th>
<th>Lectical™ level</th>
<th>Epistemology</th>
<th>Problem-solving</th>
<th>Feelings</th>
<th>Good Employee</th>
<th>Good Leader</th>
<th>Self-as-leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0</td>
<td>&lt;24.00 (L0)</td>
<td>Abstract mappings</td>
<td>15</td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>M1</td>
<td>24.00–26.49 (L1)</td>
<td>Highly elaborated abstract mappings to the transition to abstract systems</td>
<td>43</td>
<td>45</td>
<td>50</td>
<td>29</td>
<td>30</td>
<td>46</td>
</tr>
<tr>
<td>M2</td>
<td>26.50–28.99 (L2)</td>
<td>Unelaborated abstract systems to elaborated abstract systems</td>
<td>48</td>
<td>48</td>
<td>51</td>
<td>58</td>
<td>67</td>
<td>39</td>
</tr>
<tr>
<td>M3</td>
<td>29.00+ (L3)</td>
<td>Highly elaborated abstract systems to the transition to single principles</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>11</td>
<td>6</td>
</tr>
</tbody>
</table>

**Concept analysis**

In addition to being scored for their Lectical™ level, all of the interviews were subjected to detailed content analyses, which were conducted to provide a comprehensive account of the conceptual content associated with each Lectical™ level in each domain. To provide some indication of the level of detail of these analyses, in Appendix D we provide tables listing the concepts and/or themes employed to code the interviews from each knowledge domain. In most cases, concepts are sorted into themes that are more general. These themes are best thought of as loose categories with fuzzy boundaries. Often we assigned the “same” concept to two or more themes. This loose categorization of concepts into themes simplifies the process of analyzing the relations among of hundreds of conceptions without collapsing categories (the strategy most often employed in this kind of research). This allows us to track conceptual differences across Lectical™ levels with a high degree of specificity.

To describe the process of concept coding and analysis, we provide the example of the ethical qualities of the good employee. In the first step of our analysis, we employed the concept categories shown in Appendix D, Table IV, under the ethical theme, to code the good employee interviews. When coding was complete, we examined the distribution of coding categories across Lectical™/ACE levels, identifying 23 qualities, which were distributed by Lectical™/ACE level as shown below in Table 2. The numbers in each of the cells represent the number of interviews in which each quality was mentioned one or more times at the corresponding Lectical™/ACE level.

We have a number of observations about the distribution of concepts in Table 2. First, concepts are not equally distributed across Lectical™ levels. Some concepts do not occur at one or more levels, but appear in fairly large numbers at other levels. For example, the notion that a good leader should be respectful toward others does not occur at the L0 level, but is among the most popular concepts at the L1 and L2 levels. Second, some qualities are more often mentioned than others. Honesty, trustworthiness, goodness, and respectfulness are the most populated categories, while the ability to admit mistakes, a lack of selfishness, and

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6 The self-as-leader and good leadership conceptions, which were virtually identical, are presented in a single table.
credibility are among the least populated. Third, some of the categories seem redundant, while others are clearly distinct. For example, credibility and trustworthiness are usually very similar in meaning, as are the notions of having character, being honorable, and having integrity, while political correctness, the ability to admit mistakes, and the idea of limited loyalty have clearly distinct meanings from those of other qualities listed in the table.

As explained above, the pattern of development is one of differentiation and integration, in which new meanings are constructed from previously existing meanings. This can also be understood as a process of emerging and subsuming, where new conceptions emerge from and subsume previously existing conceptions. Our analysis of the distribution of concepts across Lectical™ levels focuses on conceptual changes that appear to involve integrations. We use tables of concept distributions like the one shown in Table 2 to scaffold our understanding of these kinds of changes. To do this, we move back and forth between the interviews and the tables, asking ourselves if a concept that appears for the first time at a new level represents an integration of earlier concepts into a new concept with a distinct meaning. For example, to determine if accountability is an emergent concept at the L2 level, we asked if its meaning integrates the meanings of concepts that appear at earlier levels. To determine this, we examined the way in which the term was employed in performances. In the example below, the concept of accountability integrates a conception of responsibility—the ability or willingness to reliably do those things to which one has committed—with conceptions of honesty and respect.

I think your word is your bond and your handshake is your bond. If you make the decision and it turns out to be the wrong one, I think you should own up to it. I think it’s part of being honest as an individual—having respect for the organization and for the people in it. Accountability is critical. (55)

It should be understood that when we refer to a concept, we are referring to the meaning of a word (or group of words) rather than the word itself. There are meanings for the word responsibility associated with every Lectical™ level represented in the NSA database (and with three earlier levels). For example, in the Lectical™ range we have assigned to the M3 management level, one conception of responsibility refers to the social force that binds human beings to their obligations: “Every right implies a responsibility; every opportunity, an obligation; every possession, a duty” (John D. Rockefeller, Jr.). However, at one childhood level responsibility means the same thing as job: “It is my responsibility to clean my room.”
Table 2: Distribution of the ethical qualities of the good employee by Lectical™ level

<table>
<thead>
<tr>
<th>Concept</th>
<th>L0</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is helpful</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Is not selfish</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is loyal</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Is responsible</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Has integrity</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Is trustworthy</td>
<td>2</td>
<td>7</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Is honest</td>
<td>4</td>
<td>10</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Is respectable</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Does no harm</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Is fair</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is ethical</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is caring</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Is a good person</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Is respectful</td>
<td>7</td>
<td>8</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Is considerate</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Is honorable</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Is politically correct</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Is accountable</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Values others</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Admits mistakes/errors</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Is loyal to a point</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Is credible</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Has character</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
Results

**Lectical™ analysis**

In all of the following analyses, T1, T2, and T3 management levels were considered equivalent to M1, M2, and M3 management levels. Appendix E contains the mean Lectical™ scores for each case, organized by knowledge domain. Figure 10 shows Lectical™ scores by domain and management level. Statistically significant differences were found between L2 and L3 scores in the epistemology [F(1,69) = 9.75, p<.05], feelings [F(1,70) = 6.16, p<.05], self-as-leader [F(1,67) = 3.82, p<.06], and good leader [F(1,69) = 9.81, p<.05] knowledge domains. There is also a statistically significant difference between the performances of M0 and M1 employees in the problem-solving domain [F(1,31) = 4.89, p<.05]

No other statistically significant differences were found between the performances of respondents in the different management levels.

Mean scores for M0 and M1 employees were within the M1 ACE Standards range. Mean scores for the M2 and M3 managers were below the ACE standards ranges specified for those levels. The mean scores for M2 employees approach or reach the transition between M1 and M2 ACE standards, which corresponds to a point in the cognitive developmental sequence when a new level of integration emerges. We call this new level of integration abstract systems. It is the point at which reasoning moves from linear logic to a systems-based logic. (See Appendix B for more detail.) ACE standards for M2 managers require the ability to coordinate systems of variables, yet more than half of the M2 managers failed to demonstrate this kind of coordination.

Table 2 shows the distribution of scores by management level and knowledge domain. Figures 11 through 13 graphically illustrate the percentage of M1, M2, and M3 managers scoring at each Lectical™ level by domain.

Figure 10: Mean Lectical™ level by knowledge domain and management level

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7 The performances of M2 respondents in this sample was similar to the performance of M2 managers reported in our July 31, 2004 report on the Critical Thinking Seminar.
Table 3: Distribution of performances (percentage) by management level and domain

<table>
<thead>
<tr>
<th>Lecture level</th>
<th>Management level</th>
<th>Epistemology</th>
<th>Problem-solving</th>
<th>Feelings</th>
<th>Good employee</th>
<th>Good leader</th>
<th>Self-as-leader</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M1</td>
<td>M2</td>
<td>M3</td>
<td>M1</td>
<td>M2</td>
<td>M3</td>
<td>M1</td>
</tr>
<tr>
<td>L0</td>
<td>15.4</td>
<td>13.0</td>
<td>3.6</td>
<td>0</td>
<td>10.9</td>
<td>3.6</td>
<td>15.4</td>
</tr>
<tr>
<td>L1</td>
<td>53.8</td>
<td>39.1</td>
<td>17.9</td>
<td>38.6</td>
<td>37.0</td>
<td>28.6</td>
<td>46.2</td>
</tr>
<tr>
<td>L2</td>
<td>23.1</td>
<td>45.7</td>
<td>71.4</td>
<td>46.2</td>
<td>45.7</td>
<td>57.1</td>
<td>38.5</td>
</tr>
<tr>
<td>L3</td>
<td>7.7</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3.6</td>
<td>0</td>
</tr>
<tr>
<td>Tot</td>
<td>13</td>
<td>45</td>
<td>26</td>
<td>11</td>
<td>43</td>
<td>26</td>
<td>13</td>
</tr>
</tbody>
</table>

Figure 11: Percentage of M1 managers scoring at each Lectical™ level by knowledge domain

![Bar chart showing distribution by knowledge domain and Lectical™ level]
Figure 12: Percentage of M2 managers scoring at each Lectical™ level by knowledge domain.
Most of the interviews conducted for this study were low support interviews intended to assess the functional (everyday) level of respondents’ reasoning. In the case of the good leadership interviews, we added a high support test condition in the form of the leadership map, which was intended to assess the optimal (highest) level of respondents’ reasoning. During the course of the leadership interview, interviewers wrote down (onto post-it notes) the qualities of good leaders mentioned by respondents. Following the interview, respondents were asked to construct a concept map of their conceptions of a good leader by placing the post-it notes on a large sheet of paper and describing the relations between qualities. Figures 14–17 show somewhat idealized examples of these maps from each Lectical™ level.
Figure 15: Leadership map, Lectical™ level L1

Good Leader

- provides the right direction
  
- requires
  
  - good people skills
  
  - good work ethic
  
  - ability to direct the organization

- how to motivate people

- recognizing good people

- how to reward people

- coaching skills

- because

- they will meet company goals

Figure 16: Leadership map, Lectical™ level L2

Good leader

- has strong people skills

- line of communication open at any level

- promote the demonstration of integrity

- value individual qualities of persons / persons as individuals

- when individuals work together they get something grander than themselves

- let people get a sense of your character

- recognize and praise integrity in the actions of others

- demonstrate integrity by example

- find out who people are

- utilize an active listening style

- not just preparing your rebuttal
Figure 17: Leadership map, Lectical™ level L3

All of the maps (and the explanations given as the maps were constructed) were scored for their Lectical™ level. We then compared scores in the high support mapping condition (optimal level) to scores in the low support (functional level) interview condition. The distance between the functional and optimal level of performances differed by management level as shown in Figure 18. These contrasts are statistically significant for M1 ($t=2.80$, $df=12$, $p<.05$) and M2 ($t=4.05$, $df=42$, $p<.05$) managers, and for the entire sample ($t=4.69$, $df=105$, $p<.05$).

On average, individuals scoring at the L1 level on the low support leadership interview made more improvement in the high support mapping condition (from a mean of 25.38 to 26.30, ($t=4.25$, $df=29$, $p<.05$) than individuals scoring at the L2 level on the low support leadership interview (from a mean of 27.46 to 27.92 [$n=62$]). As noted above, the L1 range represents a developmental transition, from linear reasoning to systems reasoning. The mean score of 26.30 (from the high support mapping condition) shows that many of the respondents functioning in the transition without support are able to demonstrate systems thinking with support. The similarity between the mean scores in the low and high support conditions for the respondents performing at the L2 level in the low support condition suggests that additional support does not enhance the performances of individuals who are able to demonstrate systems thinking without support. The implications of this finding are explored further in the discussion section.

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8 There were too few M0 and M3 performances to conduct low and high support comparisons for these Lectical™ levels.
Subject area content by Lectical™ level

All of the interviews were subjected to content analyses to examine changes in conceptions from one developmental level to the next. We found distinct differences in the conceptions of epistemology, problem solving, feelings, good employee, and leadership at each Lectical™/ACE level. These conceptions are summarized in Table 4 and elaborated in Appendix F. As you read the material in the Appendix and tables, keep in mind that we have based our conceptual analyses on a relatively small sample of interviews. The order in which concepts occur on the lists is therefore approximate. Despite this, the reader will soon begin to see similarities within Lectical™ levels across themes and domains. The limitations of L0 and L1 level thinking will soon become apparent, and the extraordinary complexity and integrative capacity of L3 level thinking will stand out from the systems thinking at level L2.

Epistemology

We identified three central components of epistemological reasoning—conceptions of truth or reality, perspectives, and research or inquiry. The truth/reality theme refers to those facets of a subject’s reasoning that address issues surrounding the meaning of truth and reality. The perspectives theme encompasses those facets of an individual’s reasoning that address how perspectives are implicated in epistemological questions. These include explanations of what constitutes a perspective and explanations of epistemologically relevant effects of perspectives. The research/inquiry theme includes those facets of a subject’s reasoning that address the nature of research, including research methods, issues, and outcomes.

Problem-solving

We selected three components of reasoning about problems—considerations, processes, and solutions. The considerations theme refers to the variables in a given workplace dilemma that respondents found important to consider in order to arrive at an optimal solution. The processes theme encompasses the problem-solving processes or procedures recommended by respondents. Conceptions categorized under the solutions theme are the solutions suggested by respondents.

Feelings

We identified three central components of reasoning about feelings—conceptions of emotion, causes of emotion, and effects of emotion. The emotion theme refers to those facets of a subject’s reasoning that address the meaning of various emotions. The causes of emotion theme encompasses those facets of an individual’s reasoning that address their understanding of the sources and causes of emotions. The effects of emotion theme includes those facets of a subject’s reasoning that address the behavioral effects of emotion. Because
respondents had less to say about their feelings in problem-solving situations than they had to say on any of the other topics explored in the interviews, there was not enough material to cover each of these components separately. Instead, we conducted a single analysis.

**Good employee and good leader**

We identified several themes in respondents’ reasoning about the good employee and the good leader—emotion, cognition, communication, social skills, ethics, personality, style, and skills. Traits or behaviors with an affective component are categorized under emotion. Traits or behaviors that refer to thinking or knowing are categorized under cognition. Traits or behaviors that involve written or verbal interaction, other than those classified under ethics, are classified under communication. Traits or behaviors that refer to human interaction, other than those classified under communication or ethics, are classified under social skills. Traits or behaviors with a moral component are categorized under ethics; traits that refer to psychological qualities—except those categorized under emotion, cognition, communication, social skills, or ethics—are categorized under personality. Traits or behaviors that refer to the way in which an individual approaches his or her work—except this categorized under emotion, ethics, or communication—are categorized under style. Finally, traits that refer to capabilities not already classified are categorized under skills.
Table 4: Summary of conceptions identified at 4 developmental levels in 5 knowledge domains

<table>
<thead>
<tr>
<th>Lectical™ level</th>
<th>Epistemology</th>
<th>Problem-solving</th>
<th>Feelings</th>
<th>Good employee</th>
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<tr>
<td>L0</td>
<td>At this level, truth/ reality is what has been scientifically proven or is a matter of personal belief or opinion. Research is gathering data, facts, or information, which are used to prove things. Anything can be proven if enough research is done, although some questions may not be researchable (religious questions and/ or questions regarding human nature and emotion). There are better and worse ways of doing research. Experiments are described in simple terms.</td>
<td>At this level abstract concepts such as challenged, frustrated and gratified are related in a linear manner, forming propositions comprised of a few logically related abstractions. For example, the idea that workplace dilemmas can produce frustration is common at this level.</td>
<td>Individuals performing at this level focus on stereotypical attributes of employees such as confidence, kindness, unselfishness, honesty, trustworthiness, intelligence, common sense, and willingness to work hard. They also may think that good employees should communicate well, be cooperative, and ask questions. Good employees are also helpful, organized, productive, and dedicated.</td>
<td>Individuals performing at this level focus on stereotypical attributes such as confidence, kindness, courage, honesty, trustworthiness, intelligence, common sense, and good people skills. They also may think that good leaders should communicate well, be inspiring and know how to cooperate and compromise. Good leaders are also organized, productive, and dedicated.</td>
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<tr>
<td>Lexical™ level</td>
<td>Epistemology</td>
<td>Problem-solving</td>
<td>Feelings</td>
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<td>L1</td>
<td>Individuals performing at this level assert that there is one right way to solve any given problem, though it may be impossible to arrive at this solution, because it is difficult to be certain one has all of the relevant facts. Consequently, solutions are only as correct as the facts or research upon which they are based. Information can be biased due to misinterpretation or manipulation/selection of data. It is therefore essential to evaluate information sources.</td>
<td>At this level, problem-definition is guided by the goal or intended outcome of the problem situation. Unbiased expertise and scientific knowledge are valued. Different people have different skills and views relative to a given problem. It is necessary to initiate discussion so that a problem can be understood and solved.</td>
<td>At this level several abstract concepts, such as apprehension, pressure, and anxiety, are combined into sets, groups, or lists. These are most commonly coordinated in linear arguments, but may also be observed in unelaborated multivariate structures. For example, an individual performing at this level might report feeling hesitant, nervous, and uncertain in response to some kinds of problems, but exhilarated, confident, and satisfied in response to others.</td>
<td>Individuals performing at this level become more specific in their description of employee qualities, asserting that good employees should pursue the goals of the organization and be creative, open-minded, thoughtful, accessible, responsible, self-motivated, and ambitious. Good employees should also have personal integrity, a positive outlook, and a desire to succeed. People-skills are differentiated, including tolerance, compassion, the ability to communicate about difficult issues, and a willingness to solicit feedback.</td>
<td>Individuals performing at this level become more specific in their description of leadership qualities, asserting that good leaders/managers should pursue the goals of the organization and uphold values of honesty, fairness, loyalty, hard work, dedication, competence, approachability, decisiveness, thoughtfulness, attentiveness, patience, and open-mindedness. Good leaders should also provide resources and tools for employees to perform their work. People-skills are differentiated, including communication skills (listening, verbalizing, writing) and the ability to help employees grow and keep them happy. The latter involve the ability to identify areas for growth and provide effective feedback, including the fair distribution of recognition and rewards.</td>
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<td>Level</td>
<td>Lexical™</td>
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<td>L2</td>
<td>Individuals performing at this level assert that there is no one right way to solve any problem, because of diversity, chance, variation, differing perspectives, or incomplete knowledge. Reality, truth, and facts are relative or bound to interpretation. Because most problems involve many variables, these will inevitably be understood, evaluated, and weighted differently by different individuals. Moreover, people, including researchers and scientists, are inherently biased. The inevitability of variability and bias means that decision-making always takes place in the presence of ambiguity, even when data are of a very high quality. A skilled leader copes with this ambiguity by seeking out and evaluating alternate perspectives/sources and arriving at &quot;the best&quot; solution. This is sometimes characterized as finding the middle ground or arriving at a compromise.</td>
<td>At this level, problem-definition is guided by concerns about long- and short-term goals, risks, and benefits. Problem framing, which involves seeking out alternative perspectives during the problem definition phase, directs data gathering. The evaluation of data is guided by the necessity to have the most comprehensive perspective possible. A number of procedures are suggested as ways to verify the quality of factual and technical types of data, while verification of other types of data depends upon unbiased input from individuals. Discussion is seen as a valuable tool in the interpretation and validation of data.</td>
<td>At this level sets of abstract concepts are coordinated in fully elaborated multivariate systems. Conceptions such as self-pity, emotionally instability, and inadequacy are coordinated in arguments that specify multiple relations between the conceptions. This can be seen in the idea that a feeling of insecurity, provoked by the self-righteousness of another, can lead to defensiveness or withdrawal, both of which are counterproductive.</td>
<td>Individuals performing at this level see personality traits, cognitive capacities, communication skills, and technical skills as malleable and affected by context. They may assert that employees should be emotionally mature, self-reflective, objective, accountable, self-respecting, self-assured, resourceful, and goal-oriented. They may also argue that good employees should be able to take the initiative, take on multiple roles, take personal responsibility, collaborate effectively, foster trust, solicit the perspectives of others, conceive of multiple solutions to problems, and effectively challenge the ideas of others. Groups of conceptions are coordinated with other concepts in arguments that specify multiple relations. This can be seen in the idea that good employees should feel empowered so they have the courage to present their perspective on an issue, even when it feels uncomfortable, because this kind of openness fosters a better working environment.</td>
<td>Individuals performing at this level assert that good leader/managers should have deep knowledge of (and concern for) both their organization and their employees, so they can effectively complete existing tasks and envision and implement change. Good leader/managers are also expected to be able to act as effective mentors to employees, actively promoting individual development within the context of the organization while recognizing that employees are complex individuals with diverse needs and abilities. In addition to acting with integrity (upholding personal and organizational values), leader/managers are expected to be able to deal with complex, multifaceted problems and tasks. Management and leadership skills are differentiated. Management refers to the set of skills required to work toward objectives, and leadership refers to the complex of skills employed to develop a vision or objective and to inspire or motivate others to adopt that vision or objective.</td>
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<tr>
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<td>L3</td>
<td>Individuals performing at this level assert that all knowledge, facts, and science are open to change, and there is no such thing as certainty. Given constant change and uncertainty, all theories, models, or solutions can work for a certain period of time and then be invalidated. Consequently, successful decision-making requires the capacity to develop new solutions. It is essential for leaders to seek out, evaluate, and integrate a variety of perspectives, even (especially) if these appear to be in opposition. Rather than characterizing decisions as compromises, individuals performing at this level talk about synthesizing knowledge to arrive at an optimal decision—the best decision possible, given the current state of knowledge.</td>
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<td>At this level, problem-definition is guided by concerns with clarifying possible processes for planning and implementation. The relative importance of long- and short-term goals, risks, benefits, contributing factors, and possible consequences are considered. Source-specific criteria are applied to considerations of the validity of data. Facilitated discourse is employed to reconcile divergent views. This involves arriving at a new view that integrates the perspectives of the individuals involved. It is important to identify the individuals who possess the requisite skills for providing these perspectives.</td>
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<td>At this level, the personality traits, cognitive capacities, communication skills, and technical skills of employees are seen as contextual, malleable, or developing. Their expression is often viewed as contingent upon environmental conditions. There is a focus on the structure of the institution—particularly with respect to social atmosphere (moral tone, institutionalized channels of communication, hierarchy). Individuals performing at this level may assert that good employees should be morally autonomous, emotionally self-sufficient, sensitive to group dynamics, able to maintain some distance from the collective intelligence, capable of mature interpersonal engagement, and able to express ethically motivated dissent.</td>
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<td>Individuals performing at this level assert that good leaders should develop a broad perspective on the Agency, its people, and its customers, making it possible to coordinate the perspectives/needs/objectives of different organizations and individuals. This ability to tap into, coordinate, and encourage the expression of diverse perspectives supports the development of the agency and its people as well as the execution of the agency’s mission. Good leaders (sometimes courageously) model exemplary professional and ethical behavior and expect the same from others. They create a safe environment in which the potential contribution and well-being of each individual can be optimized.</td>
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Discussion and recommendations

This study of NSA managers reveals a disturbing pattern. On average, M2 and M3 respondents perform well below the Lectical™ levels corresponding to the ACE standards for these management levels. In fact, there is little difference between the performances of M1 and M2 managers, suggesting that M2 managers are not learning the cognitive skills they need to fulfill M2 management level requirements. While performances were somewhat stronger on the interviews that directly probed leadership conceptions (good employee and good leader), they were surprisingly low on epistemological reasoning, reasoning about feelings, reasoning about the self as a leader, and problem solving. While lower level reasoning on the feelings and self-as-leader interviews might be explained in terms of a general discomfort discussing the self, lower level reasoning on the epistemology and problem-solving interviews is less easily dismissed. Evaluating knowledge and solving problems are central to the work of leadership: they are critical skills.

As we scored the data, we often found ourselves commenting on the unusual proportion of individuals in this sample who exhibited enormous conceptual elaboration without evidence of systems thinking. In our experience, most persons who demonstrate systems thinking do not demonstrate such a high level of conceptual elaboration. In fact, one of the ‘engines’ of developmental change—such as the move from linear to systems logic—appears to be the unwieldiness of an increasingly differentiated knowledge base. One hypothesis is, that at any one time, the mind can juggle only a limited number of concepts, and most of us compensate for this upper limit through hierarchical integration (and other ‘chunking’ operations that reduce the number of variables we are working with at any one time). We wonder if the high average level of intelligence of NSA employees confers the capacity to maintain a larger than usual level of conceptual differentiation, counteracting a natural tendency to reduce the processing load through hierarchical integration. Unfortunately, the failure to move from linear to systems thinking has serious consequences when decision-making contexts are complex and multivariate. Almost all leadership contexts have this quality—they require working with other people, who are unarguably complex. Leadership dilemmas are rife with competing claims that require coordination. Individuals reasoning at the L1 level arrange competing claims in a hierarchy of more or less important to consider, and choose the one they consider most relevant. This could mean that an individual reasoning at the L1 level would choose to optimize progress toward the completion of an important project by firing a woman who wanted to spend more time with her new baby, while an individual reasoning at the L2 level would also consider the long-term consequences of such a decision—the future effects of the loss of a productive employee (who will only be a new mother for a short period of time)—and weigh the short and long-term consequences before making a decision.

Functional and optimal level performances

In our investigation of differences between functional (low support interview) and optimal (high support map) level performances, the mean scores of both M1 and M2 managers increased. Further analysis showed that, in the support condition, higher level performances were most likely to occur among managers who performed at the L1 level (characterized by linear thinking) in the low support condition, and that, overall, movement was to the L2 level (characterized by systems thinking). This means that most of the managers displaying linear thinking are ready to move toward systems thinking. Individuals who display this kind of readiness to make the transition to a new way of thinking need to be exposed to problem situations in which (1) they are asked to confront the inadequacies of their current functional mode of thinking, and (2) encouraged to generate (with support) more complex and integrated solutions.

Interestingly, integration (movement to the next developmental level) does not occur in the absence of a minimum amount of conceptual differentiation at the current level.
It is important to keep in mind that there is a necessary but not sufficient relation between cognitive-developmental level in the knowledge domains central to leadership and leadership performance. Other factors, such as motivation, emotional maturity, and socialization play important roles. A good leadership program should attend to all aspects of leader development.

**Developmentally informed curricula and assessments**

The long-term goal of this research is to inform the implementation of developmentally informed curricula and assessments that will support the mass customization of leadership education within the Agency. There are a number of steps toward this goal:

1. Identify and articulate the range of skills required for good leadership. Without a solid conception of the skills and qualities of leaders within the Agency, all subsequent steps are compromised.

2. Construct an understanding of the pathways through which these skills and qualities develop. We recommend:
   a. Cataloging the skills identified by experts in a given skill domain (supplemented with an understanding of the particular objectives of a specific organization);
   b. Creating a working model of the skills within each domain (for example, in a *skill map*[^11]) in order to provide a working model of the domain; and
   c. Performing a developmental analysis of each skill to determine how new levels of a skill are built upon previous levels.

3. Develop or select learning interventions that focus specifically on the development of the skills identified and elaborated in point 2.

4. Assess the developmental level of individual managers’ performance on each of these skills.

5. Direct managers toward learning opportunities that are designed to develop these skills (within their current level or to the next level, depending on their readiness for movement to the next level).

6. Provide managers with ample real-world opportunities to put new skills to work.

7. Periodically reassess the developmental level of individual managers’ performance in order to:
   a. Provide managers with information about their own development; and
   b. Provide the Agency with information about the effectiveness of learning interventions.

**Management standards**

The information provided in Appendices E and F can be employed by the Agency to inform the further development of management level definitions. By bringing requirements for each management level into greater alignment with knowledge about the way in which competencies develop, the Agency will be moving toward a single language governing management level definitions, promotion criteria, evaluation and assessment, and educational interventions. It is now possible to construct a meaningful system in which level 4, for example, always means the same thing—no matter whether you are talking about management level, an individual’s developmental level, or the target level of a given curriculum.

[^11]: Ibid.
Appendix A: Interview format

Interviews and interviewer instructions

Interviews

1. Use Form 1, Form 2, or Form 3 according to instructions provided.

2. Use exact wording for standard probe questions (the ones in italics). Follow up probes can be changed to suit the circumstances.

3. Do all major probes.

4. If respondent has already addressed an issue that is raised in a standard (numbered) probe, it is still important to do that probe (with an apology). In addition, state on the tape where in the interview you believe the probe question was already addressed.

5. It is not a good idea to provide respondents with a copy of the interview. We want them to focus on one question at a time.

6. Leadership interview (good leader): Use small post-it notes. It is very important to give everyone the same materials.
Form 1

Reflective judgment interview

There have been frequent reports about the relationship between chemicals that are added to foods and the safety of these foods. Some studies indicate that such chemicals can cause cancer, making these foods unsafe to eat. Other studies, however, show that chemical additives are not harmful, and actually make the foods containing them safer to eat.

Standard probes

1. *What do you think of these statements?* Have you formed an opinion on this issue? How did you come to form this opinion?
2. *How is it possible that studies have such contradictory findings?*
3. *What is the ideal way to go about forming an opinion on a problem like this one? Why?*
4. *Can you be certain that your conclusions are correct? Why or why not?*
5. *You have used the term reality/truth/facts. What does reality/truth/facts mean to you?*
6. *How do you know when you have identified reality/truth/facts?*
7. *Do you think there are any absolute truths? Why or why not?*

Problem-solving interviews

*Hierarchy:* You notice that your supervisor’s calendar indicates that he is meeting with one of your employees next week and that the employee scheduled the meeting. You pride yourself on being approachable and easily accessible to your employees. In addition, over the last several months, you have been blindsided on several occasions by your supervisor’s tendency to deal directly with your employees on his favorite projects.

Standard Probes

8. *What are the important things to consider in this situation? Why?*
9. *What do you think is an appropriate response to this situation? Why?*
10. *Are there other possible responses to this situation? Can you describe it/them? Why wouldn’t that be as good as the response you described before?*

Changes: You have been a division chief in one of the most technically savvy offices in the Agency for the last three years. Almost 80% of the employees have at least Master’s degrees and many have doctoral degrees in engineering or computer science. This has been much easier than your last management position, because here you have such great respect for the ability and drive of your employees. When your office chief retired 3 months ago, the senior leadership team decided to replace her with an executive hired from the private sector. The individual that was finally selected after a lengthy interview process has only been on the job for 1 week and is already stirring things up. After his first walk-through of the spaces, essentially a large cubicle farm, he announced that he was going to redesign the space to “open things up” and encourage greater collaboration and exchange of ideas among the group. You have been presented with a drawing of how the space will be reconfigured and a very aggressive timeline for the work, both of which you share with your employees. This normally quiet, reserved group is visibly outraged. How can they be expected to do highly technical work without the quiet and privacy of their cubicles? What’s wrong with using a conference room when collaboration is called for? They are looking to you to stand up for them.

Standard Probes

11. *What are the important things to consider in this situation? Why?*
12. *What do you think is an appropriate response to this situation? Why?*
13. *Are there other possible responses to this situation?* Can you describe it/them? Why wouldn’t that be as good as the response you described before?

**Feelings interview**

14. *How do you generally feel (think you might feel) when confronted with situations like these?* Can you tell me more about that feeling (ask about each feeling separately)? (The idea here is to get them to define the feelings, so we know exactly what they mean.)

15. *What about situations like these brings up that feeling (one feeling at a time)?* Why do you think this is the case? (Probe each feeling separately.)

16. *How do you think a feeling like that would affect the your response in a situation of this kind?* Why do you think it would affect/not affect your actions in this way? Alternatively, how is it that you can have the feeling without it affecting your decisions? (The idea here is to get a deeper insight into their thinking. The probes should be geared to the individual response.)

17. *Are there any other feelings that come up in situations of this kind?* (Repeat probe sequence.)

**Good leader interview and standard probes**

18. *From your perspective, what are the qualities of a good leader/manager?* Why is X important in a good leader/manager? (Ask for each quality mentioned.)

19. *From your perspective, what are the qualities of a good employee/subordinate?* Why is X important in a good employee/subordinate? (Ask for each quality mentioned.)

20. *You have said (it is often said) that vision is important to good leadership. From your perspective, what is vision and where does it come from?* (When it comes time to do the concept map, only include the word “vision” if it was spontaneously employed by the respondent before this question was asked. If the respondent specifically asks to include the word during the mapping interview, then it can be included.)

**Self-understanding interview and standard probes**

21. *What are you like as a leader/manager?* Tell me more about what you mean by… (If a respondent does not have leadership experience within the Agency, it is okay to ask him/her to respond in terms of other contexts.)

22. *What are your most positive qualities as a leader/manager?* Why do you see X as positive? (Probe each quality separately.)

23. *What are your most negative qualities as a leader/manager?* Why do you see X as negative? (Probe each quality separately.)

**Concept map (good leader)**

Provide the respondent with post-it notes and ask him or her to:

a. Place the post-it notes on the page with those items that are most central to good leadership toward the center, and those things that are more peripheral at the edges.

b. Ask the respondent to show you how qualities are grouped and connected by encircling qualities that belong together and using lines or arrows to show connections.

c. Let the respondent know that it is okay to add new qualities.

**Probes**

24. *Okay, now, tell me about this group of qualities (list them) at the center. Why are they grouped together?* If you were to give a name to this group of qualities what would it be? Why that name? Why did you draw this (one direction, two direction) arrow (or line) joining the center group to these qualities (list them)? If you were to name the relationship...
between these two groups of qualities, what name would you choose? Okay, now, tell me about this next quality (or group of qualities) (list them). Why are they grouped together? (Repeat previous probe cycle as appropriate, until map is fully explained.)
Form 2

Reflective judgment interview

Several scientists have raised concerns about global warming, warning us that pollutants released into the air are likely to cause rapid warming of the Earth over the next few decades. They argue that this rapid warming of the planet will result in widespread devastation, and should be curtailed by dramatically reducing airborne pollutants. Other scientists argue that global warming due to pollution is unlikely to cause changes more extreme than minor fluctuations in mean global temperatures. They argue that, though it is desirable to reduce pollution in the long term (for quality-of-life reasons), the dramatic reduction of airborne pollutants advocated by the first group of scientists would be costly and ineffective.

Standard probes

1. What do you think of these statements? Have you formed an opinion on this issue? How did you come to form this opinion?
2. How is it possible that studies have such contradictory findings?
3. What is the ideal way to go about forming an opinion on a problem like this one? Why?
4. Can you be certain that your conclusions are correct? Why or why not?
5. You have used the term reality/truth/facts. What does reality/truth/facts mean to you?
6. How do you know when you have identified reality/truth/facts?
7. Do you think there are any absolute truths? Why or why not?

Problem-solving interviews

Confidentiality: Your office has become extremely dependent on its sole contracting expert. If she left, you know that it would be nearly impossible to replace her, and your organization would be in serious trouble. You have insider information that senior management believes that she is not promot-able. You were in a meeting where this was discussed and it was made very clear that this information was “not to leave the room.” The contracting person trusts you and comes to you for career advice.

Standard Probes

8. What are the important things to consider in this situation? Why?
9. What do you think is an appropriate response to this situation? Why?
10. Are there other possible responses to this situation? Can you describe it/them? Why wouldn’t that be as good as the response you described before?

People skills: You have just had a one-on-one with the technical superstar of your division to go over his P3 rating. As usual, his numbers are in the stratosphere reflecting his hard charging, take-no-prisoners approach to work. His high energy and intelligence have helped the division to become one of the most productive in the Agency. You were totally taken by surprise when he asked you to consider him for an upcoming management position, so you told him you’d think about it and get back to him. You are concerned about his interpersonal skills; he has never been a particularly good team player because he prefers to be out in front of the pack. In addition, the other employees are a little intimidated by him because he is so confident and capable and, you admit to yourself, on occasion a little arrogant and impatient. You are feeling overwhelmed by all the factors to consider in this decision: the obvious sincerity of this individual in wanting a new challenge, his track record of bringing in numerous home runs for your organization, the potential downside of some of his personality traits, your hunch that maybe he could become a superstar manager if he put his mind to it, etc.
**Standard Probes**

11. **What are the important things to consider in this situation? Why?**

12. **What do you think is an appropriate response to this situation? Why?**

13. **Are there other possible responses to this situation? Can you describe it/them? Why wouldn’t that be as good as the response you described before?**

**Feelings interview**

14. **How do you generally feel (think you might feel) when confronted with situations like these? Can you tell me more about that feeling (ask about each feeling separately)?** (The idea here is to get them to define the feelings, so we know exactly what they mean.)

15. **What about situations like these brings up that feeling (one feeling at a time)? Why do you think this is the case?** (Probe each feeling separately.)

16. **How do you think a feeling like that would affect the your response in a situation of this kind? Why do you think it would affect/not affect your actions in this way? Alternatively, how is it that you can have the feeling without it affecting your decisions?** (The idea here is to get a deeper insight into their thinking. The probes should be geared to the individual response.)

17. **Are there any other feelings that come up in situations of this kind?** (Repeat probe sequence.)

**Good leader interview and standard probes**

18. **From your perspective, what are the qualities of a good leader/manager? Why is X important in a good leader/manager?** (Ask for each quality mentioned.)

19. **From your perspective, what are the qualities of a good employee/subordinate?** Why is X important in a good employee/subordinate? (Ask for each quality mentioned.)

20. **You have said (it is often said) that vision is important to good leadership. From your perspective, what is vision and where does it come from?** (When it comes time to do the concept map, only include the word “vision” if it was spontaneously employed by the respondent before this question was asked. If the respondent specifically asks to include the word during the mapping interview, then it can be included.)

**Self-understanding interview and standard probes**

21. **What are you like as a leader/manager?** Tell me more about what you mean by… (If a respondent does not have leadership experience within the Agency, it is okay to ask him/her to respond in terms of other contexts.)

22. **What are your most positive qualities as a leader/manager? Why do you see X as positive?** (Probe each quality separately.)

23. **What are your most negative qualities as a leader/manager? Why do you see X as negative?** (Probe each quality separately.)

**Concept map (good leader)**

Provide the respondent with post-it notes and ask him or her to:

a. Place the post-it notes on the page with those items that are most central to good leadership toward the center, and those things that are more peripheral at the edges.

b. Ask the respondent to show you how qualities are grouped and connected by encircling qualities that belong together and using lines or arrows to show connections.

c. Let the respondent know that it is okay to add new qualities.
Probes

24. Okay, now, tell me about this group of qualities (list them) at the center. Why are they grouped together? If you were to give a name to this group of qualities what would it be? Why that name? Why did you draw this (one direction, two direction) arrow (or line) joining the center group to these qualities (list them)? If you were to name the relationship between these two groups of qualities, what name would you choose? Okay, now, tell me about this next quality (or group of qualities) (list them). Why are they grouped together? (Repeat previous probe cycle as appropriate, until map is fully explained.)
Form 3

Reflective judgment interview

There have been frequent reports about the relationship between fat consumption and heart disease. While scientists agree that the substance that clogs the arteries (plaque) is composed of cholesterol, they disagree about the best way to prevent its build-up. Today, most scientists agree that the best way to reduce the development of plaque is to reduce cholesterol consumption. However, a growing number of scientists point to evidence that the consumption of refined carbohydrates (sugars) may play a larger role in the development of plaque than cholesterol consumption. They therefore advocate reducing the consumption of refined carbohydrates.

Standard probes

1. What do you think of these statements? Have you formed an opinion on this issue? How did you come to form this opinion?
2. How is it possible that studies have such contradictory findings?
3. What is the ideal way to go about forming an opinion on a problem like this one? Why?
4. Can you be certain that your conclusions are correct? Why or why not?
5. You have used the term reality/truth/facts. What does reality/truth/facts mean to you?
6. How do you know when you have identified reality/truth/facts?
7. Do you think there are any absolute truths? Why or why not?

Problem-solving interviews

Favoritism: Over the last 6 months in your new organization, you have come to see that several of the people you manage are extraordinarily productive, clearly your top performers, and several appear to be retired in place. At your last town meeting with your employees, one person observed that you didn't seem to treat everyone fairly, and several others chimed in with supportive comments. They brought up the example that if one of your “favorites” took a two-hour lunch, you wouldn’t seem to notice; but if one of your “less favorites” took a one-hour lunch, you’d comment on it.

Standard Probes

8. What are the important things to consider in this situation? Why?
9. What do you think is an appropriate response to this situation? Why?
10. Are there other possible responses to this situation? Can you describe it/them? Why wouldn’t that be as good as the response you described before?

Motherhood: As the manager of a recently downsized production organization, you are becoming increasingly concerned about your employees burning out. Your workload seems to be constantly increasing, yet it has been made very clear to you that you aren’t getting any more billets. One of your employees has just returned from 6 weeks of maternity leave and is in your office asking to work 4-day weeks because her highest priority has become spending more time with her baby. You agree to try it for 3 months since she is a new mother. Then she announces to you that because of the baby, she will have to leave promptly at 4:30 every afternoon to get to daycare, she won’t be available for any late meetings, and she won’t be able to go on any TDYs. She gets up and leaves your office, waving goodbye, leaving you feeling stunned. Most of the other employees in your organization are either single or married with no children. They have all had to put in even more hours than usual for the last 6 weeks and you’re wondering how they’ll react to all these new demands.
**Standard Probes**

11. *What are the important things to consider in this situation? Why?*

12. *What do you think is an appropriate response to this situation? Why?*

13. *Are there other possible responses to this situation? Can you describe it/them? Why wouldn’t that be as good as the response you described before?*

**Feelings interview**

14. *How do you generally feel (think you might feel) when confronted with situations like these?* Can you tell me more about that feeling (ask about each feeling separately)? (The idea here is to get them to define the feelings, so we know exactly what they mean.)

15. *What about situations like these brings up that feeling (one feeling at a time)?* Why do you think this is the case? (Probe each feeling separately.)

16. *How do you think a feeling like that would affect your response in a situation of this kind?* Why do you think it would affect/not affect your actions in this way? Alternatively, how is it that you can have the feeling without it affecting your decisions? (The idea here is to get a deeper insight into their thinking. The probes should be geared to the individual response.)

17. *Are there any other feelings that come up in situations of this kind?* (Repeat probe sequence.)

**Good leader interview and standard probes**

18. *From your perspective, what are the qualities of a good leader/manager?* Why is X important in a good leader/manager? (Ask for each quality mentioned.)

19. *From your perspective, what are the qualities of a good employee/subordinate?* Why is X important in a good employee/subordinate? (Ask for each quality mentioned.)

20. *You have said (it is often said) that vision is important to good leadership. From your perspective, what is vision and where does it come from?* (When it comes time to do the concept map, only include the word “vision” if it was spontaneously employed by the respondent before this question was asked. If the respondent specifically asks to include the word during the mapping interview, then it can be included.)

**Self-understanding interview and standard probes**

21. *What are you like as a leader/manager?* Tell me more about what you mean by… (If a respondent does not have leadership experience within the Agency, it is okay to ask him/her to respond in terms of other contexts.)

22. *What are your most positive qualities as a leader/manager?* Why do you see X as positive? (Probe each quality separately.)

23. *What are your most negative qualities as a leader/manager?* Why do you see X as negative? (Probe each quality separately.)

**Concept map (good leader)**

Provide the respondent with post-it notes and ask him or her to:

a. Place the post-it notes on the page with those items that are most central to good leadership toward the center, and those things that are more peripheral at the edges.

b. Ask the respondent to show you how qualities are grouped and connected by encircling qualities that belong together and using lines or arrows to show connections.

c. Let the respondent know that it is okay to add new qualities.


Probes

24. Okay, now, tell me about this group of qualities (list them) at the center. Why are they grouped together? If you were to give a name to this group of qualities what would it be? Why that name? Why did you draw this (one direction, two direction) arrow (or line) joining the center group to these qualities (list them)? If you were to name the relationship between these two groups of qualities, what name would you choose? Okay, now, tell me about this next quality (or group of qualities) (list them). Why are they grouped together? (Repeat previous probe cycle as appropriate, until map is fully explained.)
Appendix B: Lectical™ Assessment System

The scoring procedures employed with the Lectical™ Assessment System (LAS) are partially derived from Commons’ (Commons et al., 1995) and Rose & Fischer’s (1989) assessment systems. This scoring system, like its predecessors, is designed to make it possible to assess the level of complexity and integration (hierarchical complexity) of a performance without reference to its particular conceptual content. Rather than making the claim that a person occupies a Lectical™ level because he or she, for example, has elaborated a particular conception of justice, the LAS permits us to identify performances at a particular Lectical™ level and then ask (empirically) what the range of justice conceptions are at that Lectical™ level.

It is possible to determine the Lectical™ level of text performances, because hierarchical complexity is reflected in two aspects of performance that can be abstracted from particular conceptual content. These are hierarchical order of abstraction and the logical organization of arguments. Hierarchical order of abstraction is observable in texts because new concepts are formed at each Lectical™ level as the operations of the previous Lectical™ level are “summarized” into single constructs. The logical organization of a text is observable in its syntax.

Note that logical and conceptual structures are definitionally identical. We make a distinction between the two types of structure for heuristic and pragmatic reasons. When scoring texts, hierarchical order of abstraction refers primarily to the structure of the elements of arguments, which often must be inferred from their meaning in context, whereas logical structure refers to the explicit way in which these elements are coordinated in a given text.

Lectical™ levels defined

Only the 4 Lectical™ levels commonly identified in adult performances are included in the following definitions. The examples provided in these definitions are from Dawson and Gabrielian’s (2003) analysis of the conceptions of authority and contract associated with Lectical™ levels in a sample of 747 moral judgment interviews scored with the LAS. They are all responses to the “Joe” Dilemma. In this dilemma, Joe, a fourteen-year-old boy, wants to go to camp. His father promises him that he can go if he saves his own money. So, Joe works hard at his paper route and saves up enough to go to camp. However, just before camp begins, his father changes his mind, and decides he wants Joe’s money to go on a fishing trip. Naturally, Joe does not want to give up going to camp, so he thinks he might not give his father the money. Follow-up questions probe for respondents’ understanding of the dilemma and their reasoning about promises, ownership, and familial obligations. For example, respondents are asked if it is important for a father to keep a promise to his son, and the response is probed to reveal the reasoning behind it.

At the single abstractions level (16-20), the new concepts are referred to as 1st order abstractions. These coordinate 3rd order representations, which are equivalent to representational systems (the constructions of the previous level). For example, the concept of trustworthiness, articulated for the first time at this Lectical™ level, defines those qualities that make a person trustworthy rather than describing situations in which trust is felt or not felt. It is composed of qualities that produce trust, such as telling the truth, keeping secrets, and keeping promises. “It’s always nice… to be trustworthy. Because then, if [someone has] a secret, they can come and talk to you.” Concepts like kindness, keeping your word, respect, and guilt are also rare before the single abstractions level. “If you don’t do something you promise, you’ll feel really guilty.” The most complex logical structure of this Lectical™ level often identifies one aspect of a single abstraction, as in “Making a promise is giving your word” in which giving one’s word is an “aspect” of a promise.

Figure 1 portrays a visual representation, in the form of a concept map, of a 54-year-old respondent’s argument about why promises should be kept. The respondent argues that a person should keep a promise because keeping promises is “the right thing to do.” When probed, the respondent comes up with three separate (uncoordinated) reasons for keeping promises: because people expect promises to be kept, because “people will trust you” if you keep a
promise, and because “you might feel guilty if you break a promise.” All three of these reasons for keeping promises are considered to be 1st order abstractions, because they extract general,

**Figure 1**

![Diagram](image)

Figure 1 provides a map of the performance of a 58-year-old male, who provides three reasons for keeping promises. There are two mappings in this performance. The first is the assertion that “broken promises can harm relationships because they cause pain and reduce trust.” This
Figure 2

It is important to keep a promise because 0833 (age 58)

- A person's word should mean something
- Broken promises can harm relationships
- If people keep promises
- They can depend on each other
- Because they
- Cause pain
- Reduce trust

Mapping coordinates two abstract consequences of promise breaking into the general notion that broken promises do harm to relationships. The second is the assertion that keeping promises makes it possible for people to “depend on one another.” This mapping coordinates the perspectives of at least two individuals to form the notion that keeping promises produces mutual benefits. Note how this idea builds on the single abstractions notion that people will trust you if you keep promises.

At the abstract systems level (26-30), the new concepts are referred to as 3rd order abstractions. These coordinate elements of abstract systems. For example, the concept of personal integrity, which is rare before the abstract systems level, refers to the coordination of and adherence to notions of fairness, trustworthiness, honesty, preservation of the golden rule, etc. in one’s actions. “[You should keep your word] for your own integrity. For your own self-worth, really. Just to always be the kind of person that you would want to be dealing with.”
It is important to keep a promise 1001 (age 51) because although it is not always possible due to unforeseen circumstances, if one makes a commitment, one stands by it to preserve one's integrity because keeping promises builds a sense of trust which keeps society functioning.

Concepts like verbal contract, moral commitment, functional, development, social structure, and foundation are also uncommon before the abstract systems Lectical™ level. "A promise is the verbal contract, the moral commitment that the father made to his son. It is the only way for the child to ... develop his moral thinking—from watching his parent's moral attitude." The most complex logical structure of this Lectical™ level coordinates multiple aspects of two or more abstractions. "Following through with his commitment and actually experiencing camp combine to promote Joe's growth and development, not just physically but psychologically, emotionally, and spiritually." Here multiple facets of Joe's personal development are promoted when he both keeps his commitment and accomplishes his goal.

Figure 3 provides a map of the performance of a 51-year-old female. The respondent describes a system in which keeping promises is both obligatory and sometimes impossible, "due to unforeseen circumstances." The reason for keeping promises is that one must stand by one's commitments. Doing so not only preserves one's personal integrity, but also builds a sense of trust, "which keeps society functioning." The notion of standing by one's commitments, the idea that doing so preserves one's integrity, the argument that the sense of trust built through promise-keeping keeps society functioning, and the notion of unforeseen circumstances are all examples.
of 2nd order abstractions. Note how this notion—that the trust built from honoring promises keeps society functioning (even in the presence of the effects of unforeseen circumstances)—builds on the abstract mappings idea that keeping promises makes it possible for people to depend on one another.

**Figure 4**

It important to keep promises because 0070 (age 57)

they are articulations of a unique human quality, mutual trust

which is the basis for

most of social conventions all moral principles

At the single principles level (31-35), the new concepts are referred to as first order principles. These coordinate abstract systems. An elaborated notion of the social contract, for example, results from the coordination of human interests (where individual human beings are treated as systems). “Everybody wants to be treated equally and have a sense of fair play. Because this is so, we have an obligation to one another to enter into a social contract that optimizes equality and fairness.” Concepts like autonomy, fair play, heteronomy, higher order principle, and philosophical principle are rare before the single principles Lectical™ level. “The only time we’re justified in breaking the social contract is when a higher principle, such as the right to life, intervenes.” The most complex logical structure of this Lectical™ level often identifies one aspect of a principle or axiom coordinating systems, as in “Contracts are articulations of a unique human quality, mutual trust, which coordinates human relations.” Here, contracts are seen as the instantiation of a broader principle coordinating human interactions.

Figure 4 presents a map of the performance of a 57-year-old male. Here, “mutual trust” is employed as a single principle supporting an argument for keeping promises. The rationale for employing this principle is that “most social conventions” and “all moral principles” are based on trust. Both “all moral principles” and “most social conventions” are 3rd order abstractions. Note how this single principles argument builds on the abstract systems notion that trust keeps society functioning.
References


### Appendix C: ACE Management Criteria with conceptions from performances scored at corresponding Lectical™ levels

#### Table I: Leadership

<table>
<thead>
<tr>
<th>Lectical™ level</th>
<th>ACE criteria</th>
<th>Conceptions identified in sample</th>
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<tbody>
<tr>
<td>L1</td>
<td>Actively manages the performance of employees, effectively administering the policies and guidelines of the performance management system (e.g., clarifying goals and expectations; providing frequent feedback; accurately evaluating employee contributions to the mission); incorporates constructive communications about progress and performance into daily work. Effectively encourages and motivates positive performance and contributions with recognition and rewards; identifies impediments to effective performance and actively works to address performance problems. Helps employees identify their strengths, limitations, and development needs, and works with employees to find growth opportunities to enhance the strengths and address the needs.</td>
<td>NSA employees performing at this level assert that good leaders/managers should pursue the goals of the organization and uphold values of honesty, fairness, loyalty, hard work, dedication, competence, approachability, decisiveness, thoughtfulness, attentiveness, patience, and open-mindedness. Good leaders should also provide resources and tools for employees to perform their work. People-skills are emphasized, including communication skills (listening, verbalizing, writing) and the ability to help employees grow and keep them happy. The latter involve the ability to identify areas for growth and provide helpful feedback, including the fair distribution of recognition and rewards.</td>
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<tr>
<td>L2</td>
<td>Provides direction for future changes in the organization’s priorities and actions based on its business strategy and operations; leads and supports change efforts and new ideas to improve the organization or Agency, encouraging others to respond constructively and implement change effectively. Actively manages the performance of employees, effectively administering the policies and guidelines of the performance management system (e.g., clarifying goals and expectations; providing frequent feedback; accurately evaluating employee contributions to the mission); incorporates constructive communications about progress and performance into daily work; deliberately models these behaviors for others and ensures they do the same. Motivates and recognizes individuals and teams; rewards them consistent with their level of contribution through a variety of means; identifies and deals with performance problems fairly and in a timely manner; takes disciplinary actions as appropriate. Coaches employees, guiding and supporting them in building competencies (knowledge, skills, and abilities) and trying new activities and approaches; deliberately seeks opportunities for employees to enhance their strengths or address their development needs; mentors</td>
<td>NSA employees performing at this level assert that good leader/managers should have deep knowledge of (and concern for) both their organization and their employees, enabling them to complete existing tasks effectively, and envision and implement change. Good leader/managers are also expected to be able to act as effective mentors to employees, actively promoting individual development within the context of the organization while recognizing that employees are complex individuals with diverse needs and abilities. In addition to acting with integrity—upholding personal and organizational values—leader/managers are expected to be able to deal with complex, multifaceted problems and tasks. Management and leadership skills are differentiated. Management refers to the set of skills required to work toward objectives, and leadership refers to the complex set of skills employed to develop a vision or objective and to inspire or motivate others to adopt that vision or objective.</td>
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employees regarding career opportunities and growth.

Creates a positive and safe work environment conducive to creativity; establishes processes for soliciting input from a wide range of people, and welcomes diverse, innovative ideas; treats everyone fairly and in accordance with EEO and merit principles, and ensures that others do the same.

L3

Creates and communicates a compelling vision for the organization’s future, authoring and executing strategic guidance that positions the organization to support the Agency's mission.

Leads and supports significant Agency or organizational change efforts; sets an example that inspires others to embrace and implement change; conveys rationale behind Agency plans—even when controversial—encouraging others to respond constructively and implement change effectively.

Actively manages the performance of employees, effectively administering the policies and guidelines of the performance management system (e.g., clarifying goals and expectations; holding regular feedback sessions; accurately evaluating employee contributions to the mission); incorporates constructive communications about progress and performance into daily work; deliberately models these behaviors for others and ensures they do the same; oversees consistent implementation of the performance management system throughout the organization, reviewing relevant data and taking appropriate actions for effective organizational functioning.

Creates opportunities to encourage and motivate employees, especially during times of low morale or extreme pressure and stress using appropriate recognition and rewards; oversees appropriate implementation of rewards and recognition processes throughout the organization; effectively handles difficult and sensitive performance problems with tact and objectivity so that the employee’s and Agency’s needs are met; follow through on disciplinary actions as appropriate.

Skillfully identifies and discusses with employees their strengths and development needs so that they understand them; creates opportunities which foster employees' long-term development and career growth; mentors others across the Agency and fosters mentoring and coaching behavior in others.

NSA employees performing at this level assert that good leaders should develop a broad perspective on the Agency, its people, and its customers—making it possible to coordinate the perspectives, needs, or objectives of different organizations and individuals. This ability to tap into, coordinate, and encourage the expression of diverse perspectives supports the development of the agency and its people as well as the execution of the agency's mission.

Good leaders courageously exhibit exemplary professional and ethical behavior and expect the same from others. They create a safe environment in which the potential contribution and well being of each individual can be optimized.
all are being treated fairly and in accordance with EEO and merit principles.
Takes the initiative to exploit opportunities and tackle challenges for the organization or Agency, exhibiting courage and integrity in pursuing the best interest of the organization and the Agency.
## Table II: Communication

<table>
<thead>
<tr>
<th>Level</th>
<th>ACE criteria</th>
<th>Conceptions identified in sample</th>
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<tbody>
<tr>
<td>L1</td>
<td>NSA employees performing at this level assert that good leaders/managers should communicate well, which means having good listening, verbal, and writing skills. Good communication combines the ability to listen for understanding and the ability to convey ideas. Listening has its limits, however. Some individuals performing at this level assert that it is inappropriate for employees to express alternate perspectives, while others think good leaders should encourage honest feedback or disagreement.</td>
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<tr>
<td>L2</td>
<td>Clearly conveys complex or abstract ideas in both formal and informal oral communications; actively listens and solicits feedback to ensure a common understanding of the message, and adapts to the scope, level of detail, and communication style of the audience. Negotiates on behalf of the organization regarding complex issues to achieve desired outcomes, arrive at joint decisions, and make recommendations. Effectively resolves work-related conflicts or disagreements involving employees, coworkers, or customers; maintains control of the situation by dealing with the emotions of all involved. NSA employees performing at this level have a nuanced understanding of communication; they simultaneously think of it as a two-way process of engagement—in which openness and striving for understanding play important roles—and as an instrument of persuasion. In the former case, communication leads to new understandings, ideas, and relationships. In the latter case, communication skills are employed to generate passion, enthusiasm, effective action, loyalty, or agreement. Listening means both hearing and internalizing another person’s point of view. This involves learning to read verbal and non-verbal cues, checking with the other to see if their intended meaning has been conveyed, and matching one’s own communications to the level, needs, and knowledge of the other. Good leaders are good listeners in this sense, and are open to a range of perspectives, including negative feedback.</td>
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<tr>
<td>L3</td>
<td>Effectively presents highly complex, controversial, or sensitive information in both formal and informal oral communications; actively listens and solicits input from others to ensure a common understanding of the message; expertly anticipates the needs of the audience, and adjusts the scope, level of detail, and style of communications accordingly. Negotiates on behalf of the organization or Agency regarding significant programs or strategic issues to achieve desired outcomes, formulate policies, and arrive at joint decisions. Skillfully resolves even difficult, sensitive, or politically charged conflicts involving employees, coworkers, customers, or others in a highly professional, composed manner—leading them through difficult and challenging situations. NSA employees performing at this level assert that good leaders/managers should be skilled and subtle communicators, functioning at a high level in both written and verbal communication. Communication is conceptualized as discursive (multidirectional) and constructive (producing new ideas). A good leader fosters discourse throughout the organization—and between organizations—developing an atmosphere in which diverse ideas and perspectives are nurtured in order to promote the emergence of novel approaches to the advancement and articulation of the Agency’s mission.</td>
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### Table III: Teamwork skills and concepts

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<tr>
<th>Level</th>
<th>ACE criteria</th>
<th>Conceptions identified in sample</th>
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<tbody>
<tr>
<td><strong>L1</strong></td>
<td>NSA employees performing at this level assert that good leaders/managers should promote teamwork or team spirit. Teamwork is conceptualized as working together with members of a team toward a shared goal. Teamwork is a group effort that involves letting others know what you are doing and knowing what they are doing. A good team member can participate effectively even if he or she does not understand or agree with a given approach or objective. Some people find it easier to be members of a team than others, because they are more flexible, extroverted, or cooperative.</td>
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<tr>
<td><strong>L2</strong></td>
<td>Works collaboratively with others, fostering cohesion and a positive team environment; actively seeks out ways to facilitate cooperation with other individuals and organizations across the Agency to advance projects and corporate goals, establishing and leveraging effective working relationships with a wide variety of others. Ensures a common understanding of needs, perspectives, and sensitivities when working with others, even in difficult or sensitive situations; skillfully adjusts own approach to facilitate smooth and effective interactions.</td>
<td>NSA employees performing at this level assert that good leaders/managers should consider themselves as part of a team (or multiple teams). Good team members are highly skilled in their area of specialization, have multiple skills, demonstrate concern for their colleagues, and are able to actively listen to others and incorporate their ideas. Team building is a process of coordinating the mission or vision with the abilities and potentials of team members. A good leader must be able to capitalize on team members’ strengths and promotes development in areas of weakness. Teamwork is viewed as essential, because the problems confronted by the Agency are too complex and multifaceted to be solved by individuals.</td>
</tr>
<tr>
<td><strong>L3</strong></td>
<td>Sets a tone for collaboration through his/her interactions with others, ensuring that all members of the organization are actively participating and contributing to team efforts; actively seeks out ways to facilitate cooperation in order to advance projects and the overall success of the Agency’s mission—strategically establishing and leveraging working relationships with senior leaders within the Agency, other government agencies, and private organizations. Establishes a common framework for interactions in highly ambiguous, difficult, or politically charged settings (potentially characterized by cultural barriers, diverse viewpoints, or adversarial relationships); demonstrates tact, diplomacy, and the ability to view situations from others’ perspectives; alters own approach to interact more effectively with others.</td>
<td>NSA employees performing at this level view teams as meta-systems composed of a number of interpenetrating person-systems. A good team can produce well beyond the capabilities of its individual members because the effective synthesis of member skills and perspectives allows the emergence of new solutions or ideas. Fostering the development of healthy, productive teams of this kind involves being able to promote a collaborative environment in which diverse viewpoints and critical input are actively encouraged and viewed as essential to the decision-making process. This requires the ability to help team members see the importance of their own and others’ potential contributions, even in the face of politically sensitive or adversarial situations.</td>
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Table IV: Problem-solving skills and concepts

<table>
<thead>
<tr>
<th>Lecical™ level</th>
<th>ACE criteria</th>
<th>Conceptions identified in sample</th>
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<tbody>
<tr>
<td>L1</td>
<td></td>
<td>Individuals performing at this level assert that there is one right way to solve any given problem, though it may be impossible to arrive at this solution, because it is difficult to be certain that one has all of the relevant facts. Consequently, solutions are only as correct as the facts or research upon which they are based. Information can be biased due to misinterpretation or manipulation/selection of data. It is therefore essential to evaluate information sources.</td>
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<tr>
<td>L2</td>
<td>Gathers information to understand and resolve complex challenges and issues facing the organization by asking the right questions of the right people, identifying key underlying issues and assumptions, etc. Integrates and evaluates information to assess impact, often making connections between pieces of information that highlight issues of larger significance; draws on evaluations and interpretations to form sound conclusions and identify innovative solutions to complex problems affecting the organization. Makes well reasoned and timely decisions in complex and ambiguous circumstances, weighing benefits against the costs; takes reasonable risks.</td>
<td>Individuals performing at this level assert that there is no one right way to solve any problem because of diversity, chance, variation, differing perspectives, or incomplete knowledge. Reality, truth, and facts are relative or bound to interpretation. Because most problems involve many variables, these will inevitably be understood, evaluated, and weighted differently by different individuals. Moreover, people, including researchers and scientists, are inherently biased. The inevitability of variability and bias means that decision-making always takes place in the presence of ambiguity, even when data are of a very high quality. A skilled leader copes with this ambiguity by seeking out and evaluating alternate perspectives/sources and arriving at &quot;the best&quot; solution. This is sometimes characterized as finding the middle ground or arriving at a compromise.</td>
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<tr>
<td>L3</td>
<td>Gathers information from a variety of sources to understand and resolve even highly complex challenges and issues facing the organization or Agency as a whole by targeting the critical questions the right people to answer them, identifying the key underlying issues and assumptions, etc. Effectively assimilates large volumes of complex information; regularly makes connections between pieces of information that others miss; draws insightful conclusions, cutting through irrelevant or over-generalized information or unsubstantiated thinking; develops alternative, innovative solutions to highly complex problems that effect the organization or Agency as a whole. Makes well-reasoned and timely decisions under pressure or in extremely difficult circumstances, even when decisions may be unpopular or there is a high degree of uncertainty about the outcome; considers the long-term, corporate implications of decisions; takes reasonable risks.</td>
<td>Individuals performing at this level assert that all knowledge, facts, and science are open to change, and there is no such thing as certainty. Given constant change and uncertainty, all theories, models, or solutions can work for a certain period and then be invalidated. Consequently, successful decision-making requires the capacity to develop new solutions. It is essential for leaders to seek out, evaluate, and integrate a variety of perspectives, even (especially) if these appear to be in opposition. Rather than characterizing decisions as compromises, individuals performing at this level talk about synthesizing knowledge to arrive at an optimal decision—the best decision possible, given the current state of knowledge.</td>
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