

Testing transformation TRANSFORMING TESTING



Developmental Testing Service

Grow all the way up™

We help people realize
their potential.

Are you ready for the
challenge?

Are your clients ready?



Table of contents

What we do	3
Why you need us	3
Everything we do is grounded in solid research	4
Some of the scholars who paved the way	4
With the LAS we measure one thing only—hierarchical complexity	6
What exactly is hierarchical complexity?	6
There is only one universal cognitive developmental dimension	7
What are the qualities of a good measure?	8
A comparison of lectical levels to the levels of 7 other developmental sequences	9
Scoring with the LAS	10
Scoring example 1: Elaborated qualitative mappings	10
Scoring example 2: Elaborated qualitative systems	11
Scoring example 3: Unelaborated single syntheses	11
Our assessment system compared to Mehtretter & Carter's	12
How lectical levels line up with strata	13
Sample application: Strategic thinking	14
Sample application: Leading Change	15
Sample application: The Lectical Reflective Judgment Assessment	16



What we do

We employ a developmental ruler called the **Lectical Assessment System™ (LAS)** as part of a methodology called *developmental maieutics*, to understand how cognitive development progresses in different domains of knowledge over the course of the life-span. We use what we learn to provide a range of services to consultants, clinicians, governments (including the United States federal government), colleges & universities, and the public:

Online developmental assessments including (at present) assessments of:

- workplace decision making,
- leadership reasoning,
- reflective judgment,
- self-understanding,
- ethical reasoning in the workplace, &
- evaluative reasoning about the good.

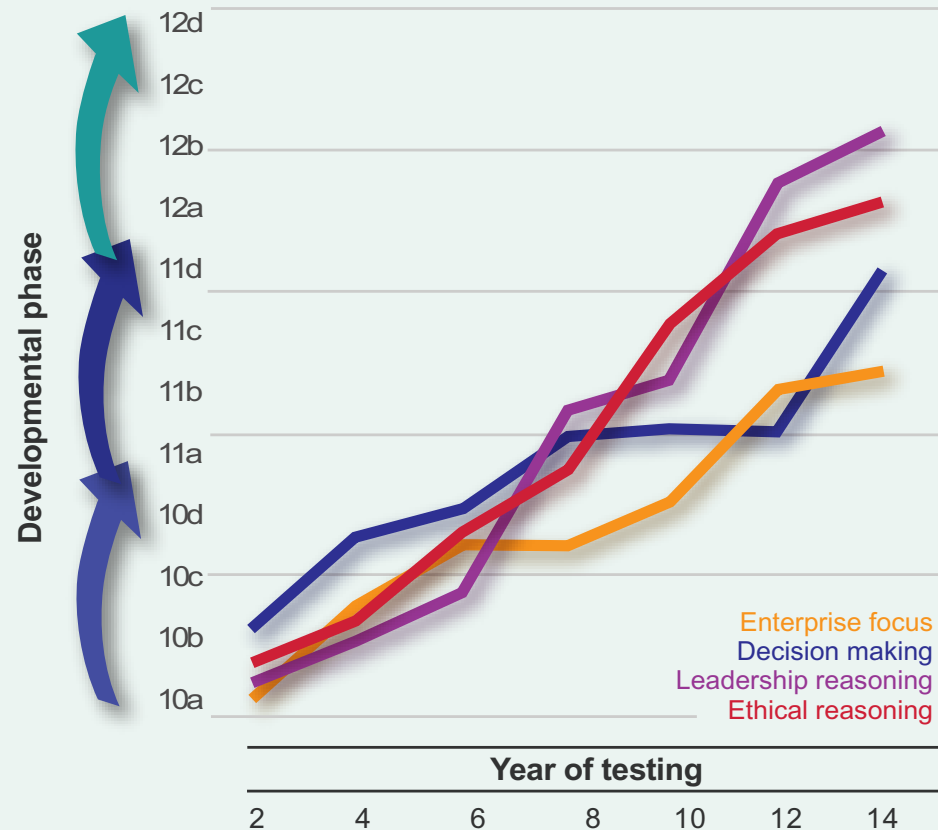
Developmental curriculum design, which is informed by tried & true pedagogy, Kurt Fischer's *Dynamic Skill Theory*, and solid evidence about how people learn important skills (such as workplace decision making, leadership reasoning, self-understanding, etc.) in real life contexts.

Developmental program evaluations in which we assess the amount of cognitive change that occurs as a result of participation in a course, program, or other learning intervention.

Why you need us

Because we can provide you and your clients with the kind of information displayed in the figure below. With one developmental metric, we can assess developmental progress in any domain of knowledge, producing what Ken Wilber calls a **psychograph**—a new kind of report card that shows an individual how his or her reasoning develops in multiple domains (or “lines”) over time.

But this is just the tip of the iceberg. As you will discover as you read on, our developmental metric, the Lectical Assessment System (LAS), makes many things possible...





Everything we do is grounded in solid research

The reliability and validity of the Lectical Assessment System (LAS)—our ruler—have been tested extensively, using the most demanding psychometric techniques. Most of the results have been published in peer reviewed journals. Articles are available on our web site.

The developmental scale we use—the **lectical scale**—is the direct product of Kurt Fischer’s *Dynamic Skill Theory*, which has provided the theoretical underpinnings for hundreds of published developmental studies by dozens of researchers.

We are proud to be part of the rich research tradition that has spawned our approach to developmental research, assessment, and evaluation.

Some of the scholars who paved the way

James Mark Baldwin



At the turn of the last century, James Mark Baldwin revolutionized psychology by suggesting that human learning was more than the accumulation of knowledge. He was the first to describe a series of qualitatively distinct, and increasingly abstract ways of thinking. His work continues to inform psychology and philosophy.

Jean Piaget



Heralded by Time magazine as the most important psychologist of the 20th century, Jean Piaget left behind an enormous body of work and provided the foundation for the cognitive revolution. He not only expanded on Baldwin’s idea that cognitive development involves changes in the way we think, he painstakingly described the processes through which these changes take place. Although aspects of his theory have been justly criticized, many of his ideas have stood the test of time.

Kurt Fischer



The work of several neo- and post-Piagetians, including Kohlberg, Armon, Case, Commons, and Turiel have influenced our work. But Kurt Fischer’s *Dynamic Skill Theory* has provided the primary theoretical basis upon which we have constructed our methodology. He currently holds a chair at Harvard’s Graduate School of Education, where he continues to build his theory and influence new generations of cognitive developmentalists.



Most developmental assessment systems have one or more serious flaws

First, many developmental scoring systems, despite claims that they focus on structure, require some degree of concept-matching. In other words, the rater compares the conceptual content of a performance with the conceptual content of examples in a manual, making it difficult or impossible to score atypical performances.

Second, many of these systems are based on an analysis of the development of a small sample of individuals over a limited time period. Sample sizes smaller than 60 have been common. This means that the scoring rules are based on the performances of individuals in the sample, which may represent only a narrow range of possible conceptual content.

Third, some popular developmental assessment systems are multidimensional. They either (1) confound the developmental dimension with other psychological constructs, such as personality, preferences, & biases, or (2) they provide a score that averages performances across multiple knowledge domains.

Fourth, some developmental assessment systems measure performance in one domain and call the result a general measure of an individual's cognitive complexity. There is no such thing as an accurate general measure of cognitive complexity, because cognitive development generally occurs at different rates in different knowledge domains.

Fifth, the statistical reliability of most developmental assessments is inadequate for the assessment of individuals. Further, scores lack precision because the confidence interval (margin of error) around a score is often greater than one developmental level.

The LECTICAL Assessment System (LAS) addresses these flaws

→ As shown on page 8, LAS analysts determine the level of a performance by “looking through” its particular conceptual content to examine what we call its *logical structure* and *hierarchical order of abstraction*. After determining the level of the performance, they examine the amount of elaboration in it to provide a phase score.

→ The LAS was (and continues to be) validated on a growing database containing thousands of interviews on a variety of topics. Respondents have been from 5 to 86 years old and represent a wide demographic range. Using these data, we have shown the LAS to be a domain general assessment system that can be used to score linguistic performances in any domain of knowledge.

→ Multidimensionality is a problem, because, in the first case, it can bias developmental assessments toward particular content, and in both cases it makes it impossible to say exactly what has been measured. The LAS is a unidimensional measure, like a ruler. This is a powerful property, as we show on page 7.

→ All of our assessments are domain specific. We never claim that a single assessment can determine an individual's overall cognitive complexity. Instead, since cognitive development usually progresses at different rates in different domains, we produce assessments for particular skills. This makes it possible to produce psychographs like the one on page 3.

→ We maintain a level of statistical reliability that is consistently above .85—the gold standard in individual assessment. And our Certified Analysts must minimally maintain an agreement rate of 85% within 1/3 of a level with a Certified Master Analyst.



With the Lectical Assessment System (LAS) we measure one thing only—hierarchical complexity

And we do it one knowledge domain at a time, using a single, domain general metric.

Why do we do we insist on measuring only one thing?

Because stable, unidimensional, calibrated measures are essential for progress in science.

- We measure a stable, universal dimension of performance;
- with a measure that has been shown to have many of the properties of a ruler—any performance in any domain can be placed on the ruler without reference to its particular conceptual content; thus
- maintaining objectivity with respect to particular belief systems, theoretical perspectives, cultures, or contexts.

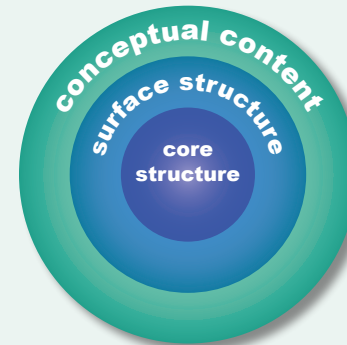
Then we look at the relation between developmental level and conceptual content.

Scoring with the LAS allows us to address questions about the relation between developmental levels and content. This is important, because people functioning at the same level can think differently from one another, and as a consequence, often come to very different conclusions.

What exactly is hierarchical complexity?

Hierarchical complexity is a universal property of all linguistic performances, and this is what made it possible for us to devise a domain general scoring system. In fact, during the process of designing the LAS, we demonstrated that many developmental assessment systems (**all** that we studied) tap the hierarchical dimension. In fact, **88% to 95% of the variance in other developmental assessment systems was explained by hierarchical complexity.**

Over the last 110 years, numerous scholars have observed that human thinking undergoes several transformations over the course of the lifespan. These are thought to result from



hierarchical integrations of existing knowledge structures. Each hierarchical integration is associated with a new way of thinking that is increasingly integrated, differentiated, and abstract.

Most developmental assessment systems are designed to identify these qualitative differences, but they employ different strategies. The figure on the left illustrates what we mean. It represents layers of structure. Some developmental assessment systems, like those designed by Don Beck and Cook-Greuter, make extensive use of the conceptual content layer. Others, like those of Kohlberg, Armon, & Jaques primarily look at surface structures—logical structures that are more or less domain specific. The LAS goes straight to the core, because **isolating the hierarchical complexity dimension**, rather than mixing it in with surface structure and content, **increases accuracy and makes it easier to understand development in particular skill domains.**



Like Jaques, we believe there is only one universal cognitive developmental dimension

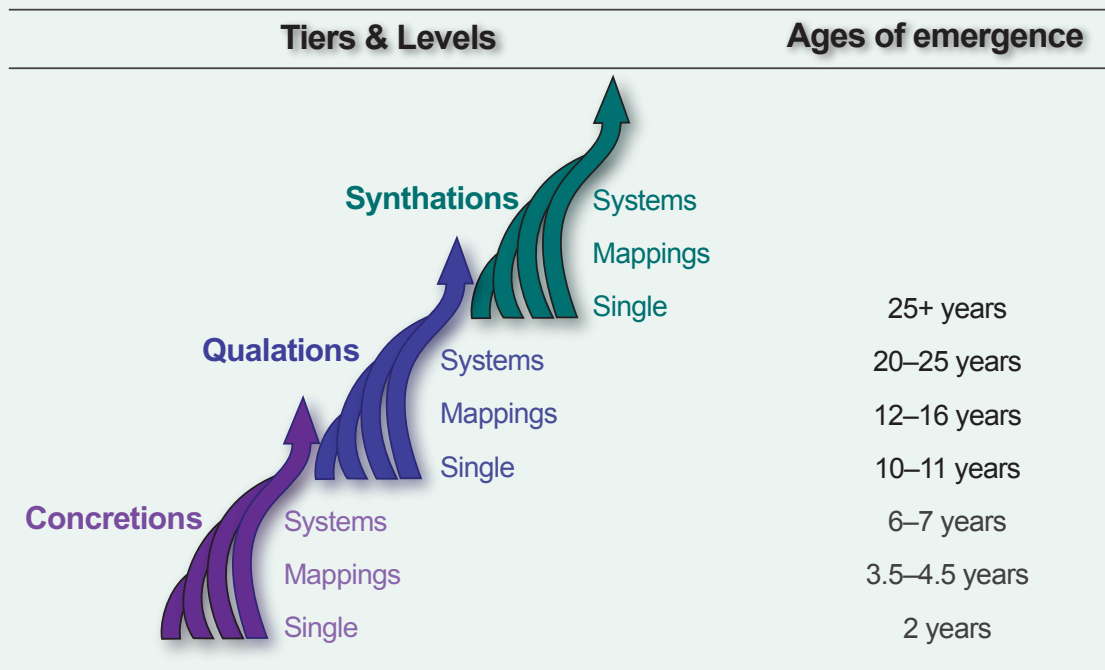
We make the strong claim that there is only one universal cognitive developmental dimension. And we make the claim that this dimension is “true” in the same sense that other measurable universals, like length, time, and temperature are true.

If you are unfamiliar with the vast body of research on hierarchical development you will find this claim difficult to believe, perhaps even arrogant. But if you look closely at the evidence, we think you will change your mind. The evidence comes from too many sources to be ignored.

Here are some of the reasons

1. Convergence of perspectives. Over 100 years of research by hundreds of researchers have led to the same basic formulation for general levels of development. The top researchers in this area (Case, Fischer, Commons, Dawson, and Noelting) pretty much agree on three of the 5 tiers in Fischer’s model. (The first and last are not as well understood.)
2. As shown in the figure on the left, lectical levels behave like each one is a reorganization of a complex system, just as Jaques originally surmised (page 49, RO). Sophisticated models from dynamic systems theory show that transitions from one level to another look just like state changes (or catastrophes). In addition, psychometric models show gaps between the levels that can be interpreted as state changes.

3. Most adults have an implicit model of the developmental dimension. In over 50 implementations of various sorting tasks, in which we ask groups of people to sort 10 cards containing interview responses into the correct developmental sequence, we and our colleagues have **invariably** found that groups can distinguish between lectical levels with 100 percent accuracy, but are often unable to distinguish between two performances at the same level, even when one is much more highly elaborated.





What are the qualities of a good measure?

Good measures have the following features:

- They are based on a unidimensional, content and context-independent property or dimension;
- There is a system for assessing the amount of the property or position on the dimension;
- There is a method for evaluating the reliability and validity of the system;
- The measure can be standardized so that everyone who uses it is measuring the same thing.

The story of science is also the story of measurement.

Most of the things we measure today were once loosely defined dimensions. For example, temperature was once evaluated qualitatively—hot, very hot, hot enough to melt glass, etc.—and it took some time before scientists invented and standardized its measurement. Once they did, there was an explosion of progress in science. Well, we've been working on a measure like the thermometer, but instead of measuring temperature, we measure hierarchical complexity. **We have taken a common intuition about development and found a way to deliver it's essence.**

Ruler power! Or, what a good ruler can do for you.

Right now the field of developmental assessment is somewhat of a Tower of Babel. Scholars acknowledge that they are tapping into the same dimension, but they lack a common language, and this means that a level 3 in one system can mean something completely different than a level 3 in another system. But just like a tape measure can be used to measure anything with length, the LAS can measure anything with hierarchical complexity—including the scoring rules of other scoring systems!

And just like you can measure something like the length of a hand knotted rug and then independently count the number of knots in a square inch, you can use the LAS to measure the developmental level of a performance and then independently analyze the conceptual content of the performance.

And just as you can determine the relation between knots per square inch and what people are willing to pay for a rug, you can determine the relation between the conceptual content of performances of a particular developmental level and the likelihood of success in a specific management position.

The LAS measures an abstract dimension, free of content, just like a ruler or thermometer. One square inch is an abstract idea that does not take on life until it is put to work in a specific context. Level 10a on the LAS is the same. It is a position on an abstract dimension. The context puts it to work, where it can be used in an endless variety of ways to inform our knowledge of human cognitive development, help us optimize the structure of our institutions, and help individuals reach their cognitive potential.



A comparison of lectical levels to the levels of 7 other developmental sequences

	Skill levels (Fischer)	GSSS [†] (Commons)	SISS [†] (Kohlberg)	GLSS [†] (Armon)	RJ [†] (Kitchener & King)	SOI* (Kegan)	SD* (Beck)	Perspective* (Cook- Greuter)
14	synthatic systems	cross-paradigmatic					coral	cosmic
13	synthatic mappings	paradigmatic	stage 6		stages 6 & 7		global holistic	global/6th person
12	single synthations	meta-systematic	stage 5	stage 5	stage 5		systematic/integrative	5th person
11	qualative systems	systematic	stage 4	stage 4	stage 4	institutional	relativistic	4th person
10	qualative mappings	formal	stage 3	stage 3	stage 3	interpersonal	individualistic achiever	3rd person
9	single qualations	abstract	stage 2				absolutist	
8	concrete systems	concrete		stage 2		imperial	power gods	2nd person
7	concrete mappings	primary	stage 1				magical/animistic	
6	single concretions	operational		stage 1		impulsive		1st person
5	overtional systems	pre-operational						
4	overtional mappings	sentential						
3	single overtional actions	nominal						
2	flexative systems	circular sensory & motor						
1	flexative mappings	sensory & motor						
0								

*We employed the LAS to determine the hierarchical complexity of the task demands embedded in the level definitions for this sequence. †We have studied the empirical relation between the LAS and the scoring system for this sequence.



Scoring with the LAS

Lectical analysts score texts by examining their semantic and grammatical structure. As shown in the figure below, every lectical level is associated with a tier (shown in green) and a level (shown in orange).

Tiers represent the *level of abstractness* of the concepts or ideas expressed in a performance.



The three tiers shown in the figure on the left cover early childhood through adulthood. Adults generally perform in the top two tiers.

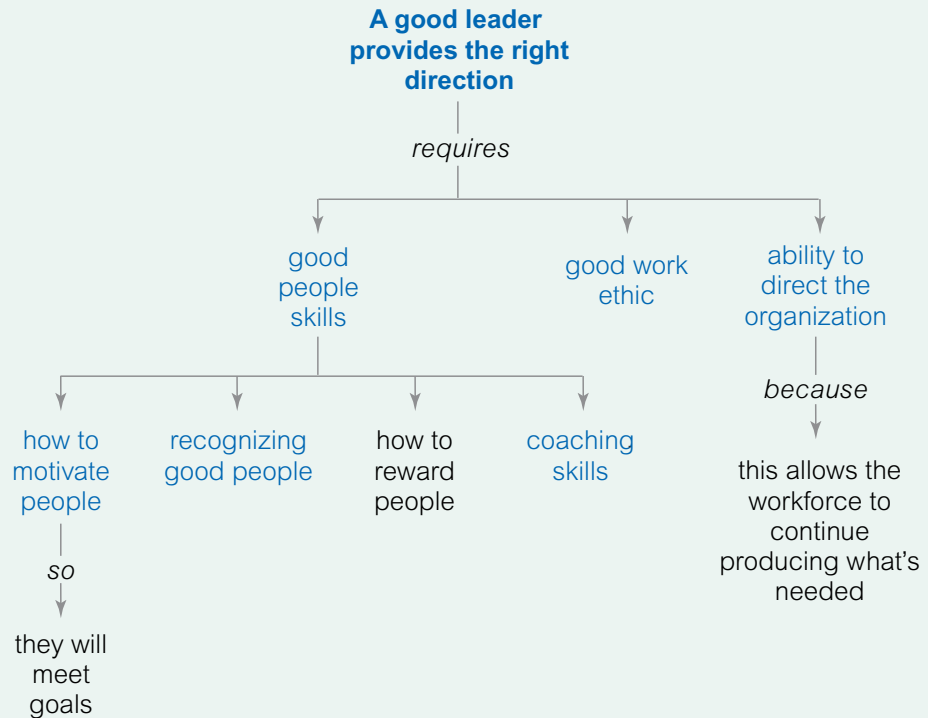
Qualations subsume concrete instances or events into abstract qualitative categories. In their turn, **synthations subsume qualations** to form conceptions that are even more general and abstract.

Each tier consists of 3 levels—concepts, mappings, and systems.

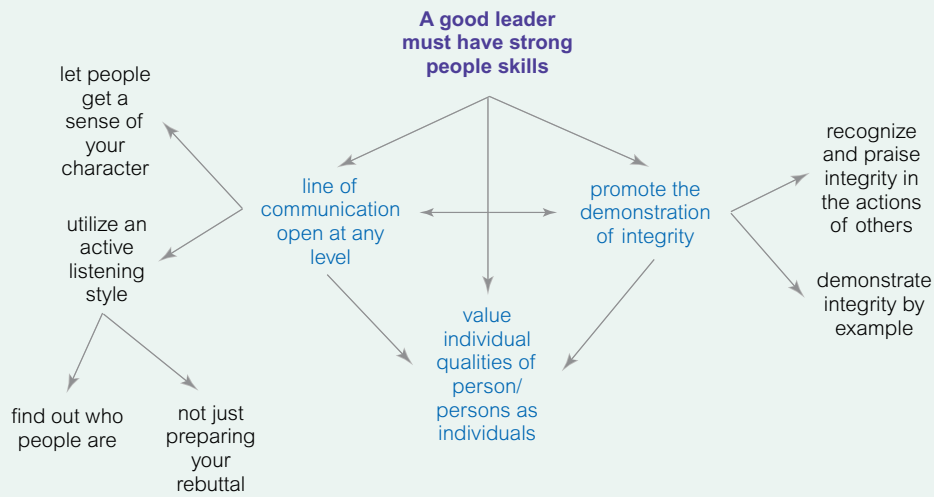
And **each level consists of 4 phases—transitional, unelaborated, elaborated, and highly elaborated.**

Scoring example 1: Elaborated qualitative mappings

To score a text, we first create a mental map of the structure of the performance. The figure below illustrates one of the most useful ways to visualize the structure of a performance. We immediately recognize that this performance



consists of mappings. There are two arguments (concepts connected by *so* and *because*), and these are linear in structure. We know it is in the elaborated phase, because there are several concepts (highlighted in teal) that can be unpacked as mappings, and because several of these are nested in other mappings. Note the differences between this performance and the one on page 11, which has fewer mappings and less hierarchy.



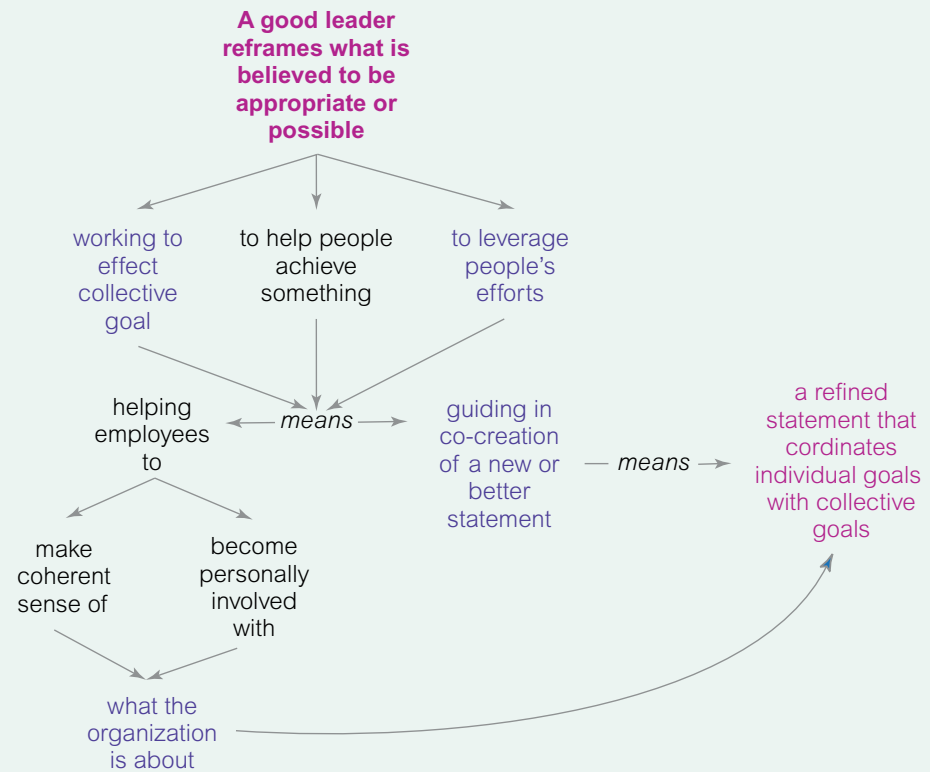
Scoring example 3: Unelaborated single synthations

In the example below, the single synthations are shown in purple, and the qualative systems are shown in blue. (We know the systems are systems because of the way this individual unpacked them in successive probes.) The single synthation shown in bold type is supported by an argument that also supports the single synthation shown in regular type. We call these kinds of arguments definitional, and they are very common at this level.

Scoring example 2: Elaborated qualitative systems

The structure of the argument in the above figure is a system. We know this because there are several concepts linked with one another in non-linear relations. We also know that most of the concepts in the performance are at least qualative mappings (shown in teal). We consider the performance to be elaborated because it coordinates more than two rich qualative mappings.

Qualative systems are easy to score relative to single synthations. This is because single synthations are composed of multiple systems, and this is also often the case with elaborated and highly elaborated qualative systems. What distinguishes single synthations is that they subsume multiple systems by coordinating them to extract a governing principle or axiom.





Our assessment system compared to Mehtretter & Carter’s

Example from Mehtretter & Carter, 2005:

“Well, we should ask them what we can be doing better. It’s important that they know we care. We need to train our representatives on how to offer exceptional customer service—make it part of their visit procedures. Treating customers like family is what I do to make sure they are happy, and my customers always say I give good customer service.”

Interview issues

We may not be seeing an adequate representation of the structure of the respondent’s reasoning, because they have not been asked to unpack their concepts. If we scored this statement we would be concerned about the possibility that our score would not fairly represent the individual’s competence.

We would have probed some of the statements in this performance to give the respondent the opportunity to provide a more complete account of her reasoning. There is substantial research evidence showing that when respondent’s answers are probed in this way, assessments are more accurate. They are also more equitable, because probes provide every respondent with the same opportunity to show off his or her reasoning.

We would have included at least two probes:

1. What do you mean by exceptional customer service?
2. Why is it important to treat customers like family?

Scoring

Mehtretter & Carter scored this performance at S1. The paragraph, as it stands, would be scored with our system at unelaborated qualitative mappings (10a+b).

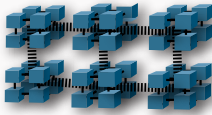
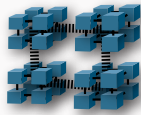









To score the performance, we first looked at the structure of the argument. Here, we identified three simple mappings (linear arguments). We also identified 4 clear qualations, which are concepts that subsume specific instances. For example, the notion of “exceptional customer service” subsumes a variety of possible behaviors. (Grey text represents implicit content.)

Elaborated qualitative mappings (10c+d) incorporate more qualations, logical chains, and hierarchies (page X).





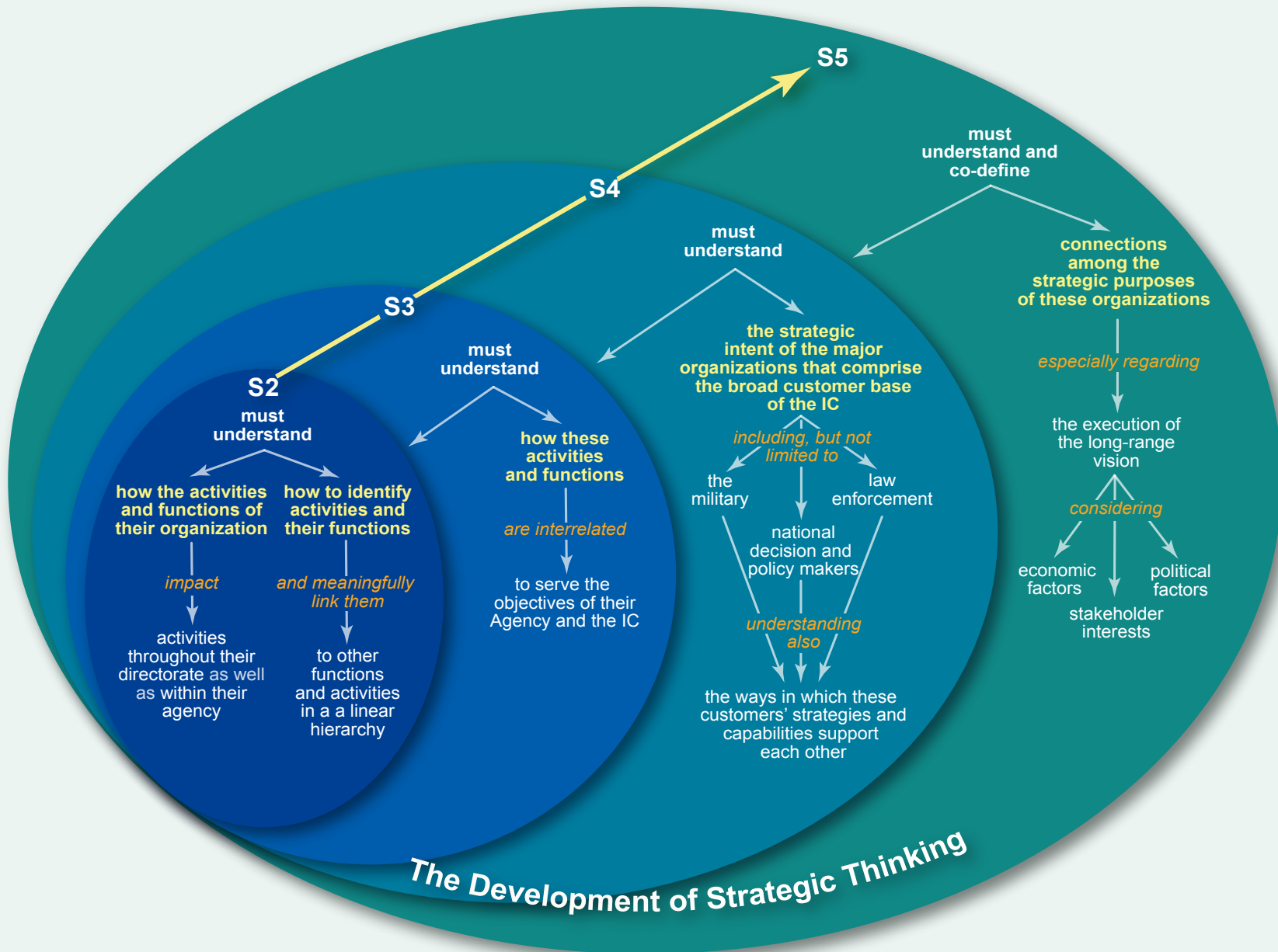
How lectical levels line up with strata

Lectical levels—adult tiers			Strata Adapted from Jaques (RO)		
tiers	levels & phases	levels	time horizon	judgment making patterns	
	 14c&d elaborated systems of synthations			4th order chains of primary sets	
	 14a&b unelaborated systems of synthations			4th order primary sets	
	 13c&d elaborated synthatic mappings	8	up to 100 years	2 ^{9y} sets: sensed universal	
	 13a&b unelaborated synthatic mappings	7	up to 50 years	3rd order partial secondary sets	
	 12c&d elaborated single synthations	6	up to 20 years	3rd order primary sets	
	 12a&b unelaborated single synthations	5	up to 10 years	2 ^{9y} sets: sensed intangibles	
	 11c&d elaborated systems of qualations	4	up to 5 years	2nd order partial secondary sets	
	 11a&b unelaborated systems of qualations	3	up to 2 years	2nd order chains of primary sets	
	 10c&d elaborated qualative mappings	2	up to 1 year	2nd order primary sets	
	 10a&b unelaborated qualative mappings	1	up to to 3 months	2 ^{9y} sets: sensed tangibles	
	 9 single qualations				





Sample application: Strategic thinking—what managers must understand



Sample application: Leading Change—Recognize & understand the need for change

L2

design & oversee implementation of structures, systems, & processes

understand the full range of important perspectives on leading change, including those of one's peers.
LC01a

design systems for gathering & disseminating the information required to recognize areas for improvement
LC01b

work with other IC leaders to understand current states of affairs, identify areas for improvement, and design solutions
LC01c

working with peers develop a compelling vision for agency or IC-wide change
LC01d

L1

implement & monitor structures, systems, & processes

understand several perspectives on leading change, in particular those favored by IC leaders.
LC01a

implement information systems to gather and disseminate the information required to recognize areas for improvement
LC01b₁

employ a wide array of information sources to stay ahead of political, economic, social, & technical trends
LC01b₂

employ appropriate information channels to disseminate information relevant to one's agency & its organizations
LC01b₃

work with others to understand current realities & their relations to possible, likely, & preferable futures.
LC01c₁

work with others to design & implement agency-wide solutions
LC01c₂

incorporate current vision for IC-wide change in agency-level planning
LC01d₁

establish structures and systems that support realization of the vision
LC01d₂

Mid-level

understand & employ structures, systems, & processes

understand a variety of techniques for leading change
LC01a

understand existing information systems & how to employ them to gather & disseminate information
LC01b₁

use sources representing different perspectives to keep up with information about political, economic, social, & technical trends
LC01b₂

understand the information dissemination channels that are relevant to one's agency & organization
LC01b_{3,1}

understand how change plans have been informed by current realities & their relations to possible, likely, & preferable futures
LC01c₁

evaluate key projects in light of overarching organizational change initiatives
LC01c_{2,1}

creatively implement organizational change initiatives
LC01c_{2,2}

understand current visions for agency and IC-wide change
LC01d₁

follow procedures that support realization of the vision
LC01d₂

employ all of the information dissemination channels that are relevant to one's organization
LC01b_{3,2}

Entry

understand & employ processes & procedures

understand the importance of learning basic techniques for leading change
LC01a

understand how to employ appropriate information systems to gather & disseminate information
LC01b₁

maintain awareness of key national & international news
LC01b₂

employ all of the information dissemination channels that are relevant to one's management team
LC01b_{3,2}

understand that the worlds of government & business are rapidly changing & require their institutions to do likewise
LC01c_{1,1}

actively participate in formal and informal discussions regarding potential change
LC01c_{1,2}, LC01d_{2,3}

understand the importance of changing procedures when necessary to improve efficiency & productivity
LC01d_{2,1}

embrace & convey enthusiasm for the vision
LC01d_{2,2}

understand how key projects fit into broader organizational change initiatives
LC01c_{2,1}

creatively implement management team level change initiatives
LC01c_{2,2}

understand current visions for organizational change
LC01d_{1,1}

understand that current visions for organizational change are part of a broader vision for agency and IC wide change
LC01d_{1,2}

Pre

understand the importance of your manager's role in leading change
LC01a

proactively learn how to employ appropriate information systems to gather & disseminate information
LC01b₁

understand the importance of keeping abreast of key national & international news
LC01b₂

understand that the worlds of government & business are rapidly changing & require their employees to do likewise
LC01c_{1,1}

actively participate in team-level discussions regarding potential change
LC01c_{1,2}, LC01d_{2,3}

understand the importance of adapting to changes in procedures that are necessary to improve efficiency & productivity
LC01d_{2,1}

understand that organizations adapt best to the changing worlds of business & government when every team member is motivated to move forward
LC01d_{2,2}

understand how personal projects fit into team-level change initiatives
LC01c_{2,1}

This figure shows the skills Intelligence Community managers are expected to master at 5 management levels for one strand of the competency called Leading Change.



Sample application: The Lectical Reflective Judgment Assessment

William Perry was the first to operationalize the reflective judgment construct, providing part of the basis for the reflective judgment interview and the scoring system later developed by Karen Kitchener and Patricia King. In the LRJA, we employ the same approach Kitchener and King used in their research. We ask testees to respond to an *ill-structured* dilemma that presents a complex problem for which there is no clear-cut answer. However, instead of using Kitchener & King’s scoring system, we use a universal scoring system, the **Lectical™ Assessment System** (LAS) to score the developmental level of the performance.


After reading the dilemma, testees respond to a series of questions designed to reveal the *structure* and *content* of their reasoning. They then fill out a short survey.

Essay responses are scored first for their lectical level and phase.* Then the conceptual content and domain structure of the essays and survey responses are evaluated to identify **four strengths** and **four areas for growth**. Finally, we identify **two learning activities** that can provide the skills and knowledge required to move to the next phase or level. All recommendations are based on research into how skills actually develop.

*Each phase score represents 1/4 of a lectical level.

What is reflective judgment?

Reflective judgment is an important component of critical thinking. The concept was pioneered by John Dewey, who was among the first to suggest that **how well people think about what they know is just as important as what they know.** It is a the set of skills individuals bring to reasoning about complex problems. These skills include seeking, acknowledging, elaborating, and balancing perspectives; grappling with truth & uncertainty; evaluating data sources; and coping with bias. To provide an example, the figure below shows how individuals who take a relativistic stance think about *truth* at different lectical levels.



Lectical Level	Form of relativism	Description
14	not observed	No empirical basis
13	paradigmatic relativism	Respondents argue that truth, though ultimately unknowable, is something to be worked toward through successive approximations or models.
12		
11	contextual relativism	Truth claims are viewed as difficult to evaluate, because people approach problems from different contexts.
10	subjective relativism	Respondents argue that there is no basis for evaluating truth claims, because everyone has his or her own opinion and there is no way to evaluate these different opinions.
9		
8	nascent relativism	Respondents understand that authority figures can disagree about what is true, good, or right, but they cannot elaborate on this idea beyond describing concrete instances.
7	unnamed	Very young children experience inconsistency in themselves and others.
6		