Good Judgment: The Intersection of Intelligence and Personality

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"*No psychologist has ever observed **intelligence**; many have observed intelligent behavior. This observation should be the starting point of any theory of intelligence.*" (Chein, 1945, p. 111)

Managers and executives must frequently decide how best to allocate scarce financial and human resources. Each decision they make is the end result of a problem solving exercise. The history of every organization is the cumulative sum of the decisions that result from these efforts at problem solving. The quality of individual managerial problem solving and decision making is a function of good judgment. This chapter concerns how to define and evaluate good judgment. Our central argument is that good judgment is a function of intelligence and personality. The statement seems simple, but it is not. The topic of how to define intelligence is quite vexed, and the largest part of this chapter concerns just that problem. Once that is accomplished, we then try to show how good judgment comes from crossing intelligence (as we define it) with personality.

Peter Drucker, the fabled philosopher of management, constantly emphasized that businesses get in trouble because senior managers exercise bad judgment (cf. Drucker, 2006). Managers are supposed to direct money and energy toward activities that increase profitability. More often, however, they spend time and money solving problems and completing projects that don't matter. It takes clear minded analysis to determine how appropriately to use money and energy. Clear mindedness is a function of good judgment.

Drucker also emphasized that virtually every major business crisis results from the fact that the assumptions on which the business was built and is being run no longer fit reality. Drucker called these assumptions the "theory of the business". Constructing a valid theory of the business, and then subsequently evaluating and revising it, is a function of good judgment.

Menkes (2005) notes that, although most people understand the importance of clear mindedness for the success of business, new managers and executives are rarely hired based on their ability to think clearly. There is a clear need for sound and defensible methods to evaluate the ability of managers and executives to think clearly and exercise good judgment.

In the mid-1990s, a group of academic researchers issued a statement on scientific evidence on intelligence (see Gottfredson, 1997, p.13). Their first two conclusions are useful for our discussion:

> 1. Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test taking smarts. Rather it reflects a broader and deeper capability for comprehending our surroundings—"catching on," "making sense" of things, or "figuring out" what to do.
> 2. Intelligence, so defined, can be measured, and intelligence tests measure it well. They are among the most accurate (in technical terms, reliable and valid) of all psychological tests and assessments. They do not measure creativity, character, personality or other important differences among individuals, nor are they intended to.

Standardized intelligence testing was developed to predict academic performance (Binet & Simon, 1905). In contrast, an effective measure of executive intelligence should predict clear thinking, good judgment, and effective management decision making. Drucker describes the key components of this in very general terms: thinking critically about the theory of the business by reviewing the assumptions on which it was founded and in terms of which it is being operated. We believe this process can be usefully specified in terms of time perspective as follows:

1. *Past perspective*: Are the operating assumptions of the business still valid?

2. *Present perspective*: Given the stated goals of the business, are people currently working on the right problems and tasks?

3. *Future perspective*: Given the stated goal of the business, have people appropriately anticipated the potential future problems and possible future outcomes correctly?

Within each of these perspectives two kinds of thinking will apply. We call them "problem-finding " and "problem-solving"; we also refer to these two kinds of thinking as "strategic reasoning" and "tactical reasoning". Problem-finding involves detecting gaps, errors, or inconsistencies in data, trends, textual materials, existing processes and procedures, or verbal arguments. Problem solving involves finding answers to the problems once they are identified, following arguments to their logical conclusions, and applying well-understood methods to new problem categories.

Our view of competent business reasoning and good judgment starts with the preceding discussion. It assumes that the word “intelligence” refers to clear thinking and is a key component of successful managerial performance. It assumes that intelligence facilitates good judgment. It assumes that two kinds of reasoning are essential to this process—problem finding and problem solving. It assumes that these two kinds of thinking can be measured, and that the results from this measurement process can be used to evaluate good judgment. It assumes that good judgment is a function of both intelligence and personality, that personality can be measured, and that a person’s reasoning style can be best estimated using measures of intelligence and personality. And finally, it assumes that the results of this measurement process will predict successful occupational performance.

The Academic Study of Intelligence

Although psychologists have great faith in the importance of measures of cognitive ability, traditional measures of intelligence have at least five problems. First, the study of intelligence is the most anti-intellectual part of American psychology. The Europeans—Piaget (1952), Vygotsky (1978), and Spearman (1923)—have developed some substantive ideas about the nature of intelligence. However, with the exception of Sternberg (1997) and possibly Gardner (1983), there is nothing resembling a plausible theory of intelligence in the American literature. Sternberg and Detterman (1986) asked two dozen experts in the field to define intelligence and each one gave a different answer! In America, conceptual understanding has not greatly advanced past the view that "intelligence is what intelligence tests test" (cf. Neisser, Boodoo, Bouchard, Boykin, Brody, Ceci, Halpern, Loehlin, Perloff, Sternberg, & Urbina, 1996). In a nutshell, the study of intelligence is a conceptual muddle.

Second, existing measures of cognitive ability may not predict occupational performance as well as the proponents of cognitive ability testing claim. For example, Judge, Colbert, and Ilies (2004) report a fully corrected meta-analytic correlation of .27 between intelligence and leadership (emergence and effectiveness); although they were dismayed by the modest size of the correlation, it is typical. Third, when business decision makers are asked why they want to use a measure of cognitive ability to evaluate job candidates, they seem not to know; this suggests that using measures of cognitive ability to evaluate people is often a faith-based initiative.

Fourth, blacks tend to get lower scores than whites on measures of cognitive ability (cf. Gottfredson, 1997) , and we do not believe that blacks are inherently less intelligent than whites (cf. Diamond, 1997); there is something questionable about an assessment methodology that stigmatizes a major segment of the human population. And this stigmatization is very real. The "race realists" Lynn (2006) and Lynn and Vanhanen (2006), for example, state that blacks are inherently less intelligent and less law-abiding than whites, concluding that certain "less intelligent" subgroups threaten the stability of "white" democracies.

Finally, the concept of intelligence has low social penetrance—scores on measures of cognitive ability seem uncorrelated with everyday performance in individuals. For example, we all know people with high cognitive ability scores who are unable to manage their personal affairs; this is an indictment of the validity of the measures. Conversely, anyone who has taught at the college level has met students with modest test scores who have acute powers of analysis.

Perhaps the clearest indication that academic studies of intelligence are unconcerned with everyday performance is that fact that Jensen (1999, p.48) recommends dropping the word "intelligence" from the language of scientific psychology. He argues researchers should focus on precisely defined abilities such as naming vocabulary, symbol search, arithmetic operations, mental rotation etc. Jensen also uses the term "psychometric intelligence" to refer to that which is measured by tests of mental abilities. Indeed, in a book on the general factor of intelligence found by analyzing mental ability tests, Jensen (2002) entitled his chapter "Psychometric g".

This change of terminology only seems reasonable if we study cognitive attributes in isolation from everyday human performance. In contrast, Grigorenko (2004) described a substantive body of research on cognitive functioning that has persisted for many years without using the term "intelligence", and notes that Russian psychology has never used the concept while analyzing cognition in more depth than many Western investigators of psychometric intelligence. The Russian work is theoretically rich and focused on understanding cognitive processes rather than describing features of it as "mental ability" psychologists typically do. Similarly, researchers in computational intelligence define intelligence explicitly, and build machines that display features of the defined attributes. Consider, for example, this textbook definition (Poole, Mackworth, & Goebel 1998, p. 1-2) :

> Computational intelligence is the study of the design of intelligent agents. An agent is something that acts in an environment - it does something. Agents include worms, dogs, thermostats, airplanes, humans, organizations, and society. An intelligent agent is a system that acts intelligently: What it does is appropriate for its circumstances and its goal, it is flexible to changing environments and changing goals, it learns from experience, and it makes appropriate choices given perceptual limitations and finite computation.
>
> The central scientific goal of computational intelligence is to understand the principles that make intelligent behavior possible, in natural or artificial systems. The main hypothesis is that reasoning is computation. The central engineering goal is to specify methods for the design of useful, intelligent artifacts.
> The obvious intelligent agent is the human being. Many of us feel that dogs are intelligent, but we wouldn't say that worms, insects, or bacteria are intelligent. There is a class of intelligent agents that may be more intelligent than humans, and that is the class of organizations. Ant colonies are the prototypical example of organizations. Each individual ant may not be very intelligent, but an ant colony can act more intelligently than any individual ant. The colony can discover food and exploit it very effectively as well as adapt to changing circumstances. Similarly, companies can develop, manufacture, and distribute products where the sum of the skills required is much more than any individual could understand. Modern computers, from the low level hardware to high-level software, are more complicated than can be understood by any human, yet they are manufactured daily by organizations of humans. Human society viewed as an agent is probably the most intelligent agent known. We take inspiration from both biological and organizational examples of intelligence.

This statement contains a perspective that is totally missing from the academic study of intelligence. In computational intelligence, the goal is to design systems that display intelligence, not some abstract statistical model of "psychometric intelligence". It is an attempt to understand what makes organisms, people, and systems "intelligent".

Our work also regards intelligence as a substantive causal component of everyday human performance, in a way that is consistent with the computational, the evolutionary, and the ecological basis of intelligence (Todd & Gigerenzer, 2007).

An Evolutionary Model of Intelligence: Meta-Representation

This section outlines our model of intelligence. The word "intelligence" is a recent addition to our language, and it is instructive to note that the ancient Greeks did not use the word. Rather they used words like clever, cunning, and wise to describe individual differences in performance. More importantly, all of these words have behavioral referents—people are only called clever if they routinely manifest a certain kind of performance. In our view, intelligence should be defined in terms of certain behaviors, and people refer to these behaviors when they conclude that someone has "good judgment" or, conversely, "poor judgment."

If the word "intelligence" denotes something real, then it must be rooted in biology and promote individual and group survival—there must be adaptive consequences associated with individual differences in intelligent behavior. In a study of self-consciousness, Sedikides and Skowronski (1997) argue that self-awareness—the ability to think about one's impact on one's social environment—is an adaptive outcome of human evolution. They propose that self-awareness gave early humans an advantage relative to their major competitors.

We think that Sedikides and Skowronski (1997) are correct as far as they go—the capacity for self-reflection is a necessary precursor to intelligent behavior. However, we propose that intelligent performance depends on a more general capacity that can be called "meta-representation". By meta-representation, we mean the ability to reflect on our performance (physical, social, intellectual) across all aspects of experience, to review it, and then evaluate it. The definition of stupidity is to continue doing something that yields a poor outcome but to expect that the outcome will improve if one persists in doing the same thing. In contrast, when smart athletes fall behind in a game, they reflect on their performance both on its own terms and relative to the competition, change their tactics, and then improve their performance—and this is why they are called "smart".

Our hominid ancestors evolved (as group living animals) in an environment that was more demanding and less forgiving than ours. In the ancestral environment, survival depended on being able to solve a wide variety of problems, including finding food, water, shelter, and protection from very nasty predators, keeping the peace within the group, and defending oneself and family against attacks by competing human groups. If the group members did not solve these problems correctly, they died; those that solved the entire range of problems prevailed. But present success is no guarantee of future success. The demands of survival changed constantly; those groups that adapted and improved their survival techniques in the face of constantly shifting environmental pressures became our more recent ancestors—the ultimate winners in the race for survival. Improving one's performance involves correctly anticipating future problems or recalling past performance that yielded better outcomes than those resulting from current performance. In either case, improving performance depends on the capacity for meta-representation, the ability to reflect on and evaluate one's performance, and then use the results of this reflection to improve subsequent performance.

Intelligent people can detect problems in their performance and then change it. They can also detect problems in other peoples' performance and encourage them to change it. Anthropologists and psychologists have traditionally argued that behavioral flexibility is the most important single human characteristic. *Meta-representation is the key to behavioral flexibility*. Crocodiles are competent hunters and proficient predators. Over time they have eaten many humans, but because crocodilian behavior is largely wired and inflexible, humans can hunt them to extinction.

Measuring Intelligence

We believe intelligence is manifested in the ability to solve a wide range of problems correctly—and this includes solving the problem of what to do when the old methods and solutions no longer work. We propose that the capacity for meta-representation provides the basis for the ability to do this. Spearman (1927) said something similar; namely, he argued that "g", or general intelligence, is the ability to solve a variety of problems correctly. Binet (1903) suggested that the optimal method for measuring intelligence is to give people a large number of qualitatively different problems to solve. Intelligence is whatever underlies the ability to solve the various problems correctly. Such an assessment process, however, would be too unwieldy and time consuming to be useful; in addition, it ignores individual differences in personality. We think that the generic process of problem solving can be broken down into two components, "problem finding" and "problem solving" or "strategic and tactical intelligence". Also, we believe that many previous writers have essentially concluded the same thing.

Early farmers learned to predict when the Nile would flood by watching the stars; certain regular changes in the position of the stars guided the planting process. This model of learning is the essence of science—science emerged and evolved through the process of detecting covariations ("When we do X, Y happens"). In many if not most cases that is as far as the analysis goes: neuroscientists still don't know *how* anesthesia works, oenologists still don't know in detail *how* wine fermentation works, every sailor knows the mantra, "Red skies at night, sailors delight; red skies in the morning, sailors take warning", but they don't know why. Based on these considerations, we initially proposed that "intelligence" is formed from two components: The ability (a) to detect covariations (i.e., to identify events that go together reliably), and (b) to recognize when the sequence is recurring or going to reoccur. More complex combinations come quickly to mind—for example, recognizing when covariations don't occur—as in the case of Sherlock Holmes' dog that didn't bark. A more contemporary way of saying the same thing is that intelligence consists of: (a) developing schemas to forecast sequences of events in the world; and (b) subsequently applying those schemas appropriately. In any case, it is a two-step process.

The Structure of Intelligence: The Ubiquitous Two Component Model

Spearman (1923) suggested that "g" is composed of two components that necessarily work together, but are measured separately, and are only modestly correlated. He called these components *eduction* and *reproduction*. *Eduction* is the ability to abstract meaning from the chaotic information of the world around us; *reproduction* is the ability to recall or describe that information at a later time. Reproduction depends on memory, which can be efficiently assessed using vocabulary measures. Although memory facilitates intelligent performance, it is not the same as intelligence.

Drawing on Spearman's distinction between *eductive* and *reproductive* mental activities, Raven (Raven, Styles, & Raven, 1998) developed the Raven's Progressive Matrices and the Mill Hill Vocabulary test. The matrices are intended to capture *eductive* abilities, and the vocabulary test is intended to capture *reproductive* abilities. These two measures correlate .30, which means that a person can have high scores on one, the other, or both measures. Curiously, although most people regard Raven's matrices as a nearly pure measure of Spearman's "g", it is the vocabulary test that loads most highly on the "g" factor. This is, of course, a problem because memory is not intelligence; rather, it enables intelligent performance.

Spearman's most famous student, R. B. Cattell, proposed that intelligence is composed of what he called fluid and crystallized components. Cattell's most famous student, John Horn, evaluated this model carefully and concluded (Horn, 1994) that Cattell's two factors closely approximated those that Spearman had originally proposed—eduction and reproduction .

Charles Saunders Peirce, along with his friend William James, is the author of the school of American philosophy called pragmatism, a blend of functionalism and evolutionary theory. Peirce, who was a philosopher of science, disagreed with the claim that inductive and deductive logic characterize how scientists reason. He proposed the concept of "abduction" to describe how ordinary people (and scientists) solve problems, as contrasted with how professional logicians claim they solve problems. Abduction is a holistic thinking process that involves: (a) forming hypotheses about how things work, and then (b) evaluating those hypotheses. Forming hypotheses resembles eduction; reproduction is essential to evaluating hypotheses.

L. L. Thurstone (1938) also was interested in the distinction between inductive and deductive reasoning. Thinking about the problem from a measurement perspective, Thurstone proposed that inductive reasoning concerned rule finding—inferring rules from a set of particular instances. He then suggested that deductive reasoning concerned applying those rules to new material. The point here is that modern views of the structure of intelligence suggest a hierarchical model with "g" at the top, then verbal, quantitative, and spatial reasoning at the next level below "g" (cf. Lubinski, 2004). In contrast, however, Thurstone suggested (and we agree) that the structure of intelligence is actually composed of rule finding and rule applying, regardless of the stimulus or problem material. In an elegant little paper, Shye (1988) used Guttman's (1968) Smallest Space Analysis and recovered rule finding and rule applying factors within the content domains of verbal, quantitative, and spatial reasoning. We think that rule finding and rule applying correspond to strategic and tactical reasoning (or detecting covariations and deciding correctly when they will reoccur).

In the 1930s, Piaget (1952) proposed a highly influential model of the development of intelligence. Piaget had worked with Binet and became interested in the problem of why children made mistakes on Binet's test. He attributed the errors to certain characteristic shortcomings in their reasoning capacity that reflected their level of intellectual development. He proposed a stage theory of cognitive development, and labeled the two final stages

"Concrete Operations" and "Formal Operations". In Concrete Operations, children are able to solve problems that are placed in front of them; in Formal Operations, they are able to think about the process of problem solving itself. We believe that Concrete Operations resembles what we have called problem solving or tactical reasoning, and Formal Operations resembles what we have called problem finding or strategic reasoning.

In yet another attempt by philosophers to characterize the nature of scientific thinking, Reichenbach (1951) famously distinguished between "the context of discovery" and "the context of justification". He argued (correctly in our view) that the context of discovery involves finding problems that need to be solved, and the context of justification involves actually solving them. More importantly, he argued that the rules of the scientific method only apply to the justification process, that the process of discovery was not subject to methodological specification. Not surprisingly, we think that Reichenbach's "context of discovery" corresponds to problem finding and "the context of justification" corresponds to problem solving.

Perhaps the most flamboyant effort to describe the components of intelligence is Guilford's (1957) three-dimensional structure of intellect model. Guilford described intelligence in terms of 120 facets. These facets depended on five types of mental operations which seem to fit the two variable model we are proposing. On the one hand, Guilford hypothesized *Evaluation*—deciding what problems are worth solving—and *Divergent thinking*—using information to generate a variety of hypotheses regarding solutions to a problem. On the other hand Guilford hypothesized *Memory*—retention of information—*Cognition*—recognizing patterns and facts—and *Convergent thinking*—using the information to find a specific right answer. We propose that the mental operations Guilford called Evaluation and Divergent thinking correspond to problem finding and the operations Guilford called Memory, Cognition, and Convergent thinking correspond to problem solving.

Following Francis Galton's (1885) efforts to measure the range of individual differences in human performance, James McKeen Cattell developed a series of psychomotor tests (e.g., tapping speed) which he thought should reflect intelligence—if intelligence rests on a neuro-psychological foundation, then the speed with which people react to various stimuli should reflect intelligence. A paper by Wissler (1901) brought this interesting line of research to an end. Wissler tested Columbia students using Cattell's measures, correlated their test performance with their grade point average, and found nothing. This measurement effort failed, not because the premise was necessarily wrong, but because of the problem of aggregation—the measures used in the study were unreliable. Modern chronometric research (Luo, Thompson, & Detterman, 2003) has solved the problem of aggregation. Researchers now use what are called elementary cognitive tasks (ECTs) to study intelligence. These tasks fall into two categories: (a) inspection time—the amount of time required to discriminate between a set of stimuli; and (b) response time—the time required to respond to an experimental stimulus. When scores from ECTs are aggregated across *modalities* (auditory, visual), *content* (pictures, numbers, words), and *tasks* (reaction time, inspection time), two general factors emerge: processing speed and working memory. Jensen (2005) suggests that "g" is a function of these two dimensions. This seems plausible; moreover, we believe these factors are related to our notions of problem finding and problem solving.

In a very important paper on the philosophy of science as applied to the behavioral sciences, Haig (2005) critiques the prevailing hypothetico-deductive and inductive theories of science. He argues instead that theory building is about explanation, which he calls abduction. He describes the process of theory building in terms of two very general phases, which he calls phenomena detection and theory construction. Phenomena detection can be characterized as detecting large scale covariations; moreover, "The importance of phenomena detection in science is underscored by the fact that more Nobel prizes are awarded for the discovery of phenomena than for the construction of explanatory theories (p. 384)." Theory construction involves devising models to explain the phenomena that have been detected.

Finally, it is conventional in the business literature to distinguish between strategic reasoning and tactical reasoning. Strategic reasoning involves anticipating and detecting major movements in customer demand, new technology, and the economy (i.e., problem finding). In contrast, tactical reasoning concerns using established methods to solve problems on a day to day basis, so as to promote the larger strategic vision (i.e., problem solving). We think the distinction between strategic and tactical reasoning parallels the two dimensions of cognitive ability that run through the history of cognitive ability measurement. Table 1.1 summarizes the discussion so far.

An Adaptive Model of Intelligence: Power, Structure, and Style

R. Hogan (1980) critically reviewed the intelligence literature and then, drawing on ideas outlined by Webb (1978), proposed that intelligence is not an entity. Rather it is an evaluation that we place on another person's behavior based on its adaptive adequacy. What constitutes intelligent behavior depends on a person's life circumstances—the demands to which he/she is adapting. The next question concerns the factors underlying or generating intelligent behavior. Webb (1978) called these factors "power, structure, and style".

Power refers to the general efficiency of a person's neurological machinery or his/her capacity for meta-representation. It is much like Spearman's "g" and it is largely heritable (Deary, Spinath, & Bates, 2006; Petrill, 2002; Plomin, 2003). Power is seen in the speed with which a person acquires new information or "catches on" to ideas, trends, and procedures. It makes sense that academic achievement should be a rough index of power in modern societies—the speed with which a child acquired the technology of its culture once had survival value. This line of reasoning also suggests that power will be less relevant to intelligent behavior in adulthood because the problem for adults is less about acquiring new information and more about integrating and applying the information already acquired. In any case, power is a "meta-concept" and is hard to measure *per se*.

Structure refers to individual differences in problem finding and problem solving—or strategic and tactical reasoning. Some people excel at problem finding, some at problem solving, some at both, and some at neither. These two domains of reasoning seem important for understanding good judgment; they can also be used to specify a measurement model for assessment. This brings us to the issue of style.

Style refers to how a person uses his/her intellectual capabilities. Some people solve problems in a reflective and deliberative manner, some are cautious and defensive problem solvers, others are brash and impetuous. We conceptualize style as a combination of: (a) strategic/tactical reasoning; (b) personality. It is the combination of these characteristics that forms the components of good judgment—that is, good judgment is a function of intelligence and personality.

Defining Personality

The foregoing discussion concerns defining (and measuring) intelligence; now we need to define personality. Personality is best defined from two perspectives: that of the actor and that of the observer. Personality from the actor's view is a person's identity—a person's idealized self-view, including his/her hopes, dreams, aspirations, and core values. Personality from the observers' view is a person's reputation, and it is defined in terms of how others describe that person—i.e., as conforming, helpful, talkative, competitive, calm, curious, and so forth; reputation reflects a person's characteristic ways of behaving in public. Reputation describes a person's behavior; identity explains it.

Identity is hard to study and we don't know much about it in a scientific way. Reputation is easy to study, and the science of personality largely rests on the study of reputation. For example, Goldberg (1981) notes that the well-known Five-Factor Model (FFM; Wiggins, 1996) represents the structure of observers' ratings based on 75 years of factor analytic research. These factors are a taxonomy of reputation (cf. Digman, 1990; John, 1990; Saucier & Goldberg, 1996), and are labeled as follows: Factor I, Extraversion or Surgency; Factor II, Agreeableness; Factor III, Conscientiousness; Factor IV, Emotional Stability; and Factor V, Intellect/Openness to Experience (John, 1990).

The FFM reflects the "bright side"of personality and there are well-validated measures for assessing it (cf. R. Hogan & Hogan, 1995, 2007; J. Hogan & Holland, 2003). We believe that we can cross intelligence with bright side personality to evaluate good judgment.

Reputations are also coded in such terms as bratty, arrogant, and self-centered. These terms point to the "dark side" of personality, an aspect of reputation that coexists with the bright side. The dark side appears when people are stressed, tired, or simply not paying sufficient attention to their social performance. Dark side tendencies are often masked by good impression management and typically they are seen only after prolonged exposure.

Perhaps the first taxonomy of dark side tendencies can be attributed to Horney (1950). She identified ten "neurotic needs" that she later summarized in terms of three themes: (a) moving toward people—i.e., managing one's insecurities by building alliances; (2) moving away from people—i.e., managing one's inadequacy by avoiding contact with others; and (c) moving against people—i.e., managing one's self doubts by dominating and intimidating others. Horney's taxonomy provides a useful first step in classifying the dysfunctional dispositions that comprise the dark side of personality.

Following Horney, R. Hogan and Hogan (1997) developed the Hogan Development Survey (HDS). The inventory, which has been validated on several thousand managers and executives, contains scales measuring 11 dark side dimensions. These dimensions reduce rather neatly into three factors that parallel those originally described by Horney.

The FFM largely concerns competence. The extremes of each FFM dimension reflect interpersonal excesses and deficiencies. For example, an excess of conscientiousness turns into compulsive behavior and a deficit of conscientiousness turns into delinquency. In our view, then, the dark side (as evaluated by the HDS) represents extremes of normal personality factors.

Because the domain of cognitive ability is relatively independent of personality, it is possible to develop a taxonomy linking strategic and tactical reasoning with bright side/dark side personality dimensions. Three generalizations seem apparent. First, good judgment is the absence of poor judgment. Low strategic and tactical reasoning ability will lead to problems in judgment for which personality can not compensate, although a shiny bright side personality may mask poor reasoning. Second, high strategic and tactical reasoning ability coupled with elevated bright side personality dimensions should lead to good judgment. Third, virtually everyone has some dark side tendencies. To evaluate a person's reasoning style, therefore, it is probably most efficient to cross strategic and tactical reasoning with the dark side—because dark side tendencies degrade judgment. Although good judgment is a critical competency in any management model, it is bad judgment that people want to identify when they ask candidates to complete an assessment. Poor judgment from otherwise good strategic and tactical reasoning is influenced by three dark side personality configurations.

Reasoning Style

Table 1.2 is a two-by-two table defined by high and low scores for strategic and tactical reasoning. Consider first persons who score in the Low/Low quadrant. As a result of their limited cognitive abilities across the board, such people should have trouble identifying and solving problems in a timely and efficient manner, regardless of how pleasant and/or attractive they might seem.

Now consider persons who score in the High/High quadrant. As a result of their superior cognitive abilities across the board, they should be able to identify and solve problems in a timely and efficient manner—other things being equal, they should seem to be intelligent.

Next, consider people with high scores for tactical reasoning and low scores for strategic reasoning. Such people will be "over-focused"; they will do a good job solving whatever problem is placed before them without asking if the problem has been framed correctly or if it is worth their while to work on it. It parallels thinking in the professional military whose members state that "Our job is to go where the President says to go and fight whom the President says to fight." There are many circumstances in which such an attitude is not only helpful but even essential.

Finally, consider persons with high scores for strategic reasoning and low scores for tactical reasoning. Such people will be "under-focused". They are blessed with a highly developed critical intelligence that allows them to see problems where others don't. However, they are usually content with pointing out the problems and leaving the solution to others. These people are often professional critics and gad-flies; examples in academic psychology would include Paul Meehl or Hans Eysenck—people who are adept at pointing out the problems with other people's research, but unconcerned with finding solutions.

Consider next Table 1.3, which is the heart of our argument. To understand the table, we need to define the variables—specifically, we need to define the three factors of the HDS. Factor I of the HDS is a complex syndrome that can be labeled "negative affectivity" (Tellegen, 1985). High scorers see the world as a dangerous place; as a result, they are alert for signs of criticism, rejection, betrayal, or hostile intent; they are easily upset and hard to sooth. When high scorers think they have detected a threat, they react vigorously in a variety of ways to remove the threat. Low scorers are mellow, calm, and even placid.

Factor II is a complex syndrome that can be labeled "positive affectivity" (Tellegen, 1985). High scorers expect to be liked, admired, and respected; they are self-confident, self-centered, charming, attractive, and driven by their personal agendas. They expect to succeed at every undertaking, they resist acknowledging their mistakes and/or failures (which they blame on others), and they are often unable to learn from experience. Low scorers are typically modest, restrained, and even humble.

Factor III is a complex syndrome that can be labeled "restraint" Tellegen, 1985). High scorers want to please figures of authority; as a result, they have high standards of performance for themselves and others, they work hard, pay attention to details, follow the rules, worry about making mistakes, are easy to supervise and popular with their bosses. Their respect for authority seems inversely related to their concern for the welfare of their subordinates. Low scorers are typically independent, skeptical of authority, and considerate of subordinates.

Now consider the first column of Table 1.3 (Tactical Reasoning). Persons with high scores on the first HDS factor and high scores for tactical reasoning will display uneven performance on routine problem solving tasks. When they are calm, they will be able to focus and use their superior problem solving abilities, but when they feel threatened—which happens often—they will be distracted, worried, and preoccupied, which will create uneven performance over time.

Persons with high scores on the second HDS factor and high scores for tactical reasoning will perform carelessly routine problem solving tasks. Their work will tend to be hasty, they will resist checking their results, and they will not be concerned about making mistakes, and giving them feedback won't necessarily help the situation.

Persons with high scores on the third HDS factor and high scores for tactical reasoning will be very accurate problem solvers, but they will also tend to be slow, methodical, meticulous, and inefficient. They will often spend more time solving tactical problems than the problems may actually need or deserve.

Now consider the second column of Table 1.3 (Strategic Reasoning). Persons with high scores on the first factor of the HDS and high scores for strategic reasoning will have a bunker mentality that controls the way they scan the strategic horizon. Their cognitive style will be primarily defensive; they will be preoccupied with identifying ways in which they can be attacked, challenged, and threatened. They will approach the future in a wary and suspicious manner, expecting to be confronted with unpleasant surprises, and they will solve problems in ways that are primarily intended to minimize threats, injuries, and losses, rather than opening up future opportunities for growth.

Persons with high scores on the second factor of the HDS and high scores for strategic reasoning will engage in more or less constant overreach. Their cognitive style will be bold, confident, and boundary-spanning. They will be preoccupied with identifying opportunities for dramatic accomplishment and visible success. For example, CEOs with high scores on the second HDS factor search for acquisitions make more acquisitions than their peers, pay more for their acquisitions than they should, and relatively more of their acquisitions ultimately fail. They approach the future in a positive and optimistic manner, expect to succeed, ignore failures, and pursue opportunities that others find lofty, grand, and risky. They solve problems in ways that open up opportunities for future success.

Persons with high scores on the third factor of the HDS and with high scores for strategic reasoning will be preoccupied with anticipating possible financial, legal, or procedural errors, and thereby avoiding external challenges, criticism, and litigation. Their cognitive style will be critical, skeptical, incisive, focused, and precise. Their general problem solving style will be to build solutions that are comprehensive, detailed, complex, and often unworkable as a result. They approach the future with a watchful eye toward minimizing exposure rather than maximizing opportunities.

The cognitive styles associated with high scores on each HDS factor tend to be effective in the short term—they persist because they yield results. For organizations using three month reporting cycles, this may not be a problem. Over the long term, however, making fear-based (Factor I), ego-based (Factor II), or compliance-based (Factor III) decisions will alienate external partners, internal team members, and subordinates. Ultimately, then, good judgment is a function of: (a) a balance between tactical and strategic reasoning capabilities; and (b) scores on the HDS that are only moderately elevated.

Conclusion

Although many businesses routinely evaluate managerial candidates using measures of cognitive ability, they tend not to be very clear about why they do this. We think they are interested in identifying good judgment. In apparent agreement, Menkes (2005) notes that most people understand that clear thinking and good judgment are important for management and business operations.

We suggest that good judgment is a function of intelligence and personality, but that the two terms have not been well-defined in much of the academic literature. We propose *conceptualizing* intelligence in terms of the capacity for meta-representation—the ability to reflect on one's performance and identify problems and performance inhibitors. We propose *measuring* intelligence in terms of two components: "problem finding" and "problem solving" where the former refers to detecting gaps, errors, and inconsistencies in assumptions, arguments, or information, and the later refers to solving problems correctly once they are identified. Then, we refer to these kinds of thinking as strategic reasoning and tactical reasoning, respectively.

We prefer to define intelligence in terms of a typical kind of performance—performance that is adapted and appropriate to a particular context. We proposed an adaptive model composed of power, structure, and style. Power is the capacity for meta-representation and is reflected in the speed with which people acquire new information. Structure refers to individual differences in problem finding and problem solving (or strategic and tactical reasoning). Style refers to individual differences in how people identify and solve problems—i.e., style refers to "cognitive style".

We proposed three factors of cognitive style that degrade or muddle thinking. The first factor involves seeing more danger in the world than actually exists. The second factor involves overestimating one's talents and capabilities and being unable to acknowledge (and learn from) one's mistakes. The third factor concerns being too conscientious, perfectionistic, and eager to please. Finally, we defined good judgment in terms of : (a) a balance between problem finding and problem solving; and (b) normal elevations on the three factors of cognitive style. Research is currently in progress that will allow us to evaluate these claims.

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Table 1.1 Models of the Structure of Intelligence

Source	Dimension: Strategic	Dimension: Tactical
R. Hogan	Problem Finding	Problem Solving
C. Spearman	Eduction (Problem Finding/Solving)	Reproduction (Describing the Solution)
C. S. Peirce	Forming Hypotheses	Evaluating Hypotheses
L. L. Thurstone	Rule Finding	Rule Applying
R. B. Cattell	Fluid Intelligence	Crystallized Intelligence
J. P. Guilford	Divergent Thinking/ Evaluation	Memory/Cognition/Convergent Thinking
J. Piaget	Formal Operations	Concrete Operations
H. Reichenback	Context of Discovery	Context of Justification
B. Haig	Phenomena Detection	Theory Construction
Business Speak	Strategic Reasoning	Tactical Reasoning

Table 1.2 Interpreting Tactical and Strategic Reasoning

TACTICAL \ STRATEGIC	LO	HI
HI	Focused Problem Solving	Good Problem Solving
LO	Poor Problem Solving	Unfocused Problem Solving

Table 1.3 Combining Dark Side Tendencies with Tactical and Strategic Reasoning

HDS Factor	**Tactical Reasoning**	**Strategic Reasoning**
I: Negative Affectivity	Uneven	Defensive
II: Positive Affectivity	Careless	Over-Reaching
III: Restraint	Slow	Complicated

Note. HDS refers to Hogan Development Survey (R. Hogan & Hogan, 1997).