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Life, Death, and Intelligence[1]

Abstract

General intelligence (g) is a highly practical ability that affects personal well-being in many aspects of life. This article reviews five key facts documenting its pervasive utility, and then illustrates how higher levels of intelligence enhance an individual's performance and well-being in four realms of daily life: work, daily self-maintenance, chronic illness, and accidents.

The first key fact is that people who do well on one mental test tend to perform well on all of them; that is, all mental tests correlate with one other. All measure mostly the same underlying ability factor, no matter what their manifest content or purpose. Mental abilities differ in their generality-specificity, and the general mental ability factor, *g*, is the most general of all. Second, high intelligence is expressed as a set of generic thinking skills that includes learning efficiently, reasoning well, thinking abstractly, and solving novel problems. These information-processing skills can be applied to virtually any kind of content in any context. Hence, third, everyday life continually requires individuals to learn and reason well. Fourth, ample evidence shows that general intelligence not only predicts many forms of success and well-being but usually does so better than socioeconomic status. More specific mental abilities add little to prediction beyond that contributed by g alone. Fifth, intelligence predicts performance better when tasks are more complex. Although higher intelligence is somewhat useful in many life arenas, it is particularly advantageous when jobs and daily tasks are more cognitively demanding. It is therefore important to know the distribution of task demands in different life areas.

Four life arenas illustrate how more cognitively demanding tasks put less intelligent individuals at greater risk. Job analysis research has repeatedly shown that the major distinction among jobs is their cognitive complexity, for example, their requirements for obtaining, analyzing, communicating, and applying oral, written, pictorial, and behavioral information. Consistent with this finding, intelligence predicts job performance progressively better in higher level jobs,

[1] Based on a paper presented in the symposium, "Futures of Intellectual Assessment and Psychometrics," at Peabody College, Vanderbilt University, December 4, 2002.

and higher level jobs tend to recruit workers from higher levels of IQ.

Daily self-maintenance refers here to carrying out the many small reading, writing, and reasoning tasks that modern societies impose on their members, such as reading labels and filling out forms. Research shows that the difficulty of these functional literacy tasks, like that of jobs, rests on the complexity of their information processing demands, most generally, on the need to learn and reason. Functional literacy, like IQ itself, predicts various forms of socioeconomic success and failure.

Preventing and managing both chronic disease and accidental injury, the leading causes of death today, is a highly cognitive process. Studies of health literacy, which is learning and reasoning applied to health matters, show that less literate individuals have difficulty understanding and adhering to treatment regimens. Lower adherence predicts higher mortality. Accident prevention models reveal that it requires the same information processing skills that job analyses document as distinctive requirements of high-level, complex jobs: for instance, learning and recalling relevant information, identifying problem situations quickly, and reacting swiftly to unexpected situations. Health providers can reduce excess complexity in their communications and treatment regimens. They can also increase cognitive assistance when tasks are inherently complex, such as in the daily self-management of diabetes, hypertension, and asthma.

Many people assume that intelligence, as measured by IQ tests, is just an academic ability—that it has little practical value on the job, in the home, or in conducting one's daily business with banks, restaurants, and the local health clinic. But is that true? Much evidence suggests that IQ tests actually measure the single most useful tool in the toolkit of human mental abilities, namely, a general intelligence that affects our personal well-being in many ways throughout our lives. If practitioners knew better which life tasks make the most mental demands, they might know better how to help people, especially less able ones, cope with the cognitive complexities of modern life. The dividends could be especially large in the realm of physical health and well-being.

Five Key Facts About General Intelligence (g)

The practical value of general intelligence arises from five well-documented facts. The first, discovered almost a century ago, is that all mental tests measure mostly the same thing. No matter what a test is meant to measure (e.g., math or spatial aptitude), whether it is administered in written or spoken form (or even pantomimed), or whether its items use numbers, words, or symbols, the test still measures mostly the same underlying factor as all other mental tests. Factor analysis can be used to extract this common factor from scores on any battery of mental tests (Carroll, 1993). The general mental ability (*g*) factor so extracted is the key active ingredient in all mental tests, and tests retain little or no

predictive validity after their *g* component is removed (e.g., Jencks et al., 1979, ch. 4; Thorndike, 1986).

Being the most general of all mental abilities, *g* is represented at the top of the three-stratum hierarchical structure of mental abilities that psychometricians now use to organize the plethora of broad and specific mental abilities (Carroll, 1993). Figure 1 provides a simplified version. *g* is the most generally applicable of all mental abilities. It is also relatively stable over the lifecourse and not very manipulable, if at all (Deary, 2000; Jensen, 1998). Abilities in successively lower strata are narrower, that is, they enhance performance in a narrower range of tasks. Relatively broad abilities such as verbal (V) and spatial ability (S) are moderately highly intercorrelated because of their large *g* components, but the unique component of each enhances performance in a different broad realm of human activity, such as writing or the graphic arts. The narrowest skills and abilities are the most trainable.

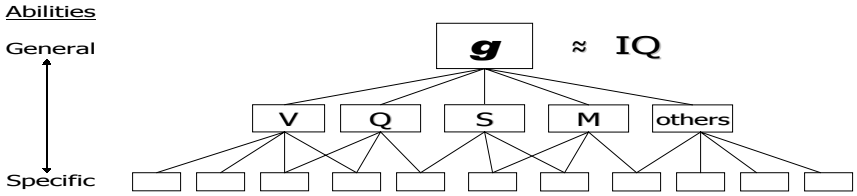


Figure 1. Simplified version of hierarchical model of mental abilities. (V=verbal, Q=quantitative, S=spatial, M=memory)

Second, being so general in scope, g not surprisingly represents a set of generic thinking skills. The manifest skills that are most associated with a high IQ include learning quickly and efficiently, reasoning well, thinking abstractly, and solving novel problems. These are highly general information-processing skills that can be applied to virtually any kind of content, any kind of problem, at any time, in any place.

Third, as discussed shortly, everyday life continually requires us to exercise these very thinking skills. Individuals who are ineffective learners, reasoners, and problem solvers in non-academic settings have difficulty prospering in modern economies and preventing both chronic disease and accidental injury (Gottfredson, 1997, 2002, 2004).

Fourth, *g* predicts many kinds of life outcomes. Indeed, it usually predicts socioeconomic success and physical well-being better than does socioeconomic status (Deary, Whiteman, Starr, Whalley, & Fox, 2004; Gordon, 1997; Gottfredson, 2004; Herrnstein & Murray, 1994). Specific mental skills and abilities add little or nothing to the prediction of school and job performance beyond that contributed by *g* alone. Personality traits are

more important than *g* in strictly socioemotional tasks, but such attributes tend to contribute far less than *g* to performance of instrumental tasks in school, jobs, and everyday life (Gottfredson, 2002).

Fifth, and very importantly, *g*'s practical value differs greatly depending on the kinds of tasks involved. Tasks that are more complex and require more information processing (are more "*g* loaded" tasks) put a bigger premium on *g*, that is, have a higher payoff for being more intelligent. Some life arenas (e.g., education and training) are much more *g* loaded than others (e.g., obtaining a job or spouse), which means that high (or low) IQ represents a larger advantage (or disadvantage) in some aspects of life than others (Gottfredson, 1997).

To summarize, many life domains require people to perform g-loaded tasks. The more complex and more frequent such tasks are, the larger and more pervasive are the disadvantages they create for lower-g individuals relative to more intelligent persons. It is therefore important for scientists and practitioners to know not only how individuals differ in ability but also how life tasks differ in the cognitive demands they make.

Cognitive Demands in Four Domains of Daily Life

Common tasks in four life arenas illustrate concretely why general intelligence has such pervasive practical value in daily affairs, not just in school. I begin with work, then turn to personal business conducted on a daily basis, and conclude with the two major causes of death in developed nations—chronic disease and accidents.

Work

Although jobs are often distinguished as head vs. hand work, mental tests predict performance in both kinds of work equally well when they are equally complex (e.g., clerical and crafts work). The reason is that both kinds of work require learning, planning, exercising judgment, and preventing, spotting, and solving problems. Meta-analyses show that general mental ability is the best single predictor of on-the-job performance when looking across the full spectrum of jobs in the United States economy, the correlations averaging 4-.5 (Schmidt & Hunter, 1998). Such correlations are typical of individual middle-level jobs, many of them in the skilled trades and clerical sector (Hunter, 1986).

Job performance research also shows that jobs differ greatly in their demands for *g*. The occupations in Table 1 range from the highest level, such as lawyer and engineer, to about the lowest, packer and custodian, with meter reader and bank teller near the middle. The second column shows the IQ ranges of the middle 50% of applicants to these jobs, as measured by the Wonderlic Personnel Test (Wonderlic, Inc., 1999). All occupations recruit their workers from a wide range of IQs, but those ranges fall for successively lower-level jobs. For jobs at the top of the list, the middle 50% of applicants range between IQs 108 and 128, which corresponds to about the 70th to 97th percentiles of the general population in the United States. The middle 50% of applicants for jobs at the

bottom of the list range between IQs 80 and 100, which is the 10th to 50th percentiles. This IQ range is almost two standard deviations below that for attorney and engineer. No jobs in the United States routinely recruit their workers from below IQ 80, and federal law prohibits the military from inducting anyone below that level. In fact, for many years, the minimum threshold for all the military services has been about IQ 85, because recruits below that level are not sufficiently trainable to warrant their cost. The last column of Table 1 explains why higher levels of *g* are functionally important in higher-level jobs: differences in *g* have a bigger impact on job performance in those jobs. The criterion-related validities range from .2 in the lowest level jobs to about .8 in the highest (Hunter, 1986).

Table 1.
Typical IQ levels and Predictive Validity ofIQ in Different Occupations

Occupation	**IQs: Middle 50%** (Applicants)	%ile	**Criterion validity** (Corrected)
Attorney, Engineer	108-128	70-97	.80
Teacher, Programmer	100-120	50-90	
Secretary, Lab tech	96-116	40-85	
Meter reader, Teller	91-110	27-75	
Welder, Security guard	85-105	15-63	
Packer, Custodian	80-100	10-50	.20

Table 2 helps to explain, in turn, why differences in *g* level predict performance better in successively higher level jobs. The data in this table come from a factor analysis of many dozen tasks that workers in different jobs must perform and the typical conditions under which they must perform them (Gottfredson, 1997). As indicated to the left in the table, jobs differ most in their overall complexity. The others columns list the job attributes that correlate most highly with (i.e., contribute most to) job complexity.

Table 2.
Correlations of Selected job Attributes with Job Complexity

	r		
Complex	.88	Self-direction **Attorney**	Combine information
↑	.86	Reason	Advise
	.85	Update knowledge	Write
	.83	Analyze	Plan
	.79	Lack of structure	Negotiate, Persuade
	.71	Criticality of position	Coordinate
		Teller	Instruct **Parent?**
	.51	Transcribe	
	.36	Recognize	
	-.49	Repetitive	
	-.56	Physical exertion	
Simple	-.73	Supervision **Custodian**	

At the top of the list are information-processing skills that are practically synonymous with intelligence: reasoning, updating knowledge (learning on one's own), and analyzing information. But note that the organization of job duties also affects a job's complexity, for instance, more self-direction and less structure mean that workers themselves must often decide what to do, and when. Such attributes characterize high-level jobs such as attorney and physician. Simpler information-processing skills such as transcribing information rather than analyzing it typify bank teller, meter reader, and other jobs near the middle of the complexity scale. Simple jobs such as packer and custodian tend to be repetitive and highly supervised and to require physical rather than mental strengths.

Non-work roles can also be arrayed along the job complexity scale. Parenting, for example, requires much negotiation, coordination, and instruction, all of which are task attributes high on the complexity scale. Parenting includes many other tasks, of course, which range from high to low in cognitive complexity. It also requires non-intellectual strengths, such as being loving and patient. This one important life role illustrates, however, that we commonly perform in daily life many of the same tasks that workers are paid to do, such as driving, advising, teaching, budgeting, and negotiating. The learning and reasoning skills that workers must exercise in accomplishing them effectively and safely are no less useful when we carry them out ourselves. Brighter individuals will tend to perform such tasks more proficiently, all else being equal.

Daily self-maintenance

Modern, literate societies routinely require their members to carry out transactions with a wide variety of institutions for many purposes. Chores like filling out job applications, figuring out how to get from one place to another using bus or train schedules, or maps if we are driving, are part and parcel of negotiating the corridors of everyday life. But these

seemingly little things can loom large for intellectually less able individuals. Most individuals can probably learn most of these myriad little tasks, but having to learn them is precisely the challenge: there are so many of them and they keep changing. Adults must be active, self-directed learners to cope effectively with the incessant but shifting flow of demands on citizens for giving, receiving, and using information. No single task may be decisive in an individual's life, but many small mistakes and inefficiencies can cumulate into lost opportunities.

Technological advances require us to learn new things, often rendering old skills obsolete and taxing the abilities of less able individuals. The increased use of computers for personal banking, communication, and information search is a clear example of new technologies requiring old dogs to learn new tricks, often to the amusement of their children. Less amusingly, advances in medical technology and other aspects of life can widen the gaps in well-being between more and less intelligent persons because the latter are less proficient at exploiting them. The introduction of new technologies can also create special obstacles for older individuals because raw mental horsepower (fluid *g*) tends to decline steadily after middle age.

One subset of daily self-maintenance tasks has been extensively studied: functional literacy, which is the use of written and spoken information in daily life. Concerns about inadequate functional literacy in the general population led the U.S. Department of Education in the 1990s to commission the Educational Testing Service to conduct a large national survey of adults, called the National Adult Literacy Survey (NALS; Kirsch, Jungeblut, Jenkins, & Kolstad, 1993). All NALS test items simulate everyday tasks, and performance correlates with socioeconomic success and pathology in the same pattern as does IQ (Gottfredson, 1997).

Table 3 lists two sample items at each of the five score intervals for which NALS results are typically reported. Examples of Level 1 tasks include totaling a bank deposit entry and locating the expiration date on a driver's license. Fourteen percent of white adults—one in 7—routinely function at no higher level than this. Such individuals are not routinely able to perform Level 2 tasks, such as locating a specified intersection on a map or determining the price difference between two show tickets.

Table 3.
Sample Itens at 5 Levels of NALS Literacy and Percentage of White Adults Performing at Each Level but No Higher

NALS Level	% pop. (white)	Simulated Everyday Tasks
5	4%	▪ Use calculator to determine cost of carpet for a room ▪ Use table of information to compare 2 credit cards
4	21%	▪ Use eligibility pamphlet to calculate SSI benefits ▪ Explain difference between 2 types of employee benefits
3	36%	▪ Calculate miles per gallon from mileage record chart ▪ Write brief letter explaining error on credit card bill
2	25%	▪ Determine difference in price between 2 show tickets ▪ Locate intersection on street map
1	14%	▪Total bank deposit entry ▪ Locate expiration date on driver's license

Turning to Level 5, these two items require using tables of information. The first one requires determining the cost of carpet for a room and the second involves comparing the merits of two credit cards. Only 4% of white adults in the United States routinely function at this level. If these tasks do not seem difficult to the reader, it is because the reader is used to operating at this cognitive level. Most people cannot.

Table 2 revealed that the major distinction among jobs lies in the overall complexity of the information processing they require. The same is true of NALS items, too. Regardless of item content, NALS item difficulty rests on what NALS researchers label processing complexity, which includes degree of inference required, abstractness of information, and amount of distracting information present. The NALS psychometrically mimics an IQ test in many other ways as well (Gottfredson, 1997).

Two sample items, one each at NALS Levels 2 and 4, illustrate how tasks differ in cognitive complexity. The Level 2 item, shown in Figure 2, requires examining a trend in quarterly sales and then predicting what. the next data point (spring sales) will be. The task requires only a simple inference and contains little distracting information.

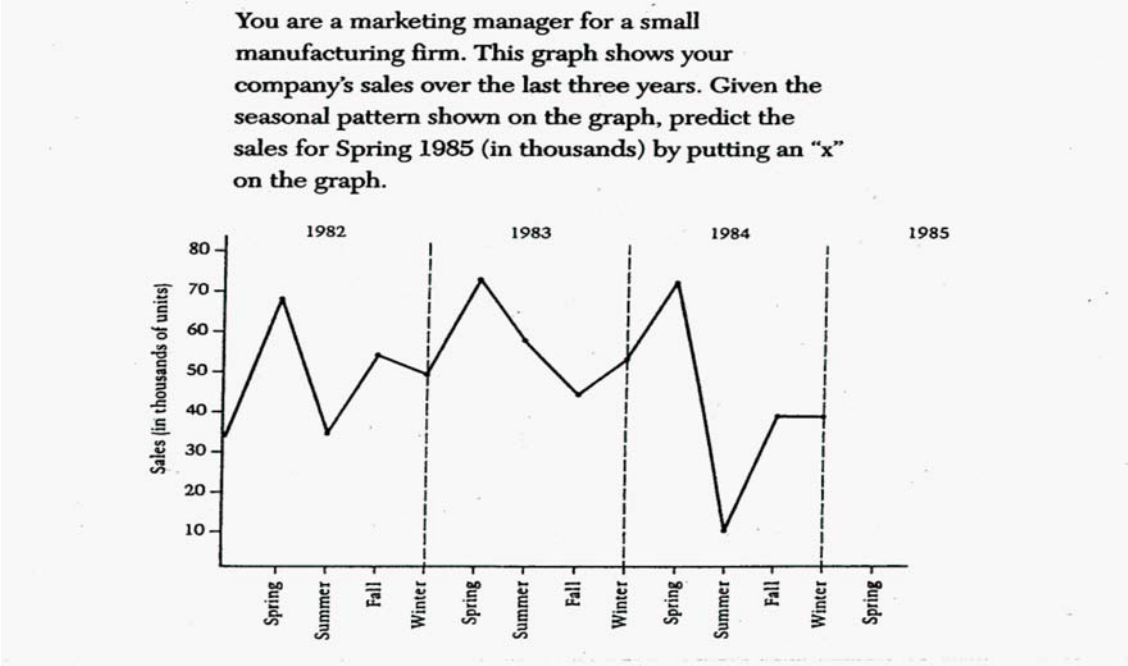
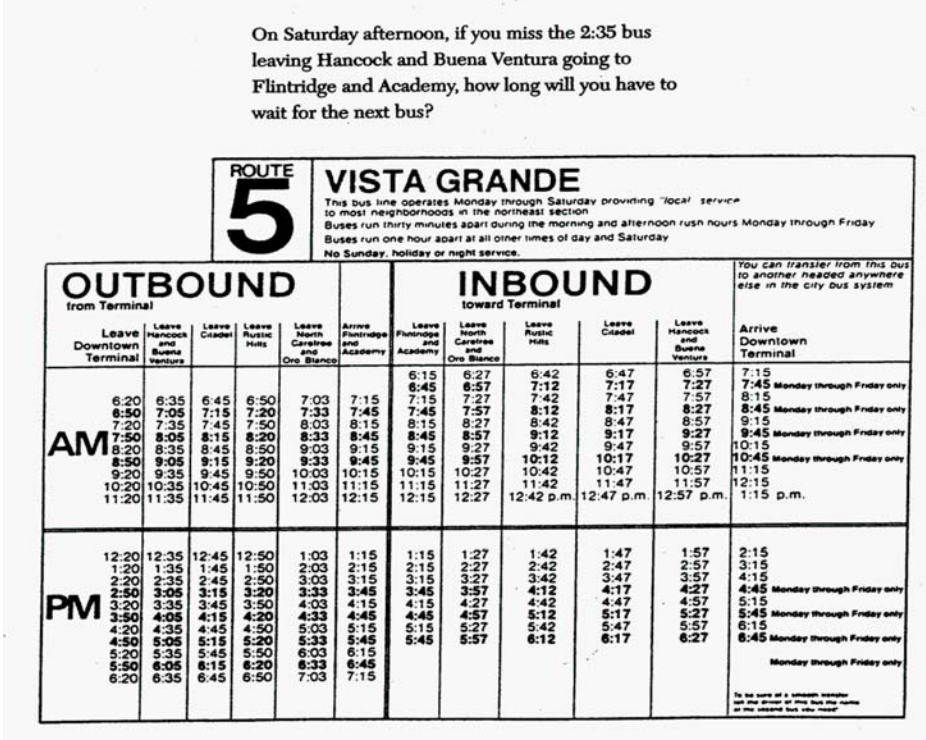


Figure 2. Example of NALS Item at Level 2

The Level 4 item in Figure 3 asks the following: "On a Saturday afternoon, if you miss the 2:35 bus leaving Hancock and Buena Ventura going to Flintridge and Academy, how long will you have to wait for the next bus?" If you notice the sentence not far below (saying that buses run one hour apart on Saturdays), you will have the correct answer (one hour). If you do not notice that sentence, then you must locate the entry for the bus departing the specified intersection at 2:35. However, you will get the wrong answer if you take the departure time for the very next bus listed. Getting the correct answer requires noticing that the next bus listed does not run on Saturdays. This Level 4 task is considerably more difficult than the Level 2 task because it is embedded in much irrelevant information and requires matching multiple features in the array of data—day, time, and intersection.



On Saturday afternoon, if you miss the 2:35 bus leaving Hancock and Buena Ventura going to Flintridge and Academy, how long will you have to wait for the next bus?

ROUTE 5

VISTA GRANDE

This bus line operates Monday through Saturday providing "local" service to most neighborhoods in the northeast section
Buses run thirty minutes apart during the morning and afternoon rush hours Monday through Friday
Buses run one hour apart at all other times of day and Saturday
No Sunday, holiday or night service.

OUTBOUND from Terminal

	Leave Downtown Terminal	Leave Hancock and Buena Ventura	Leave Citadel	Leave Rustic Hills	Leave North Carefree and Oro Bianco	Arrive Flintridge and Academy
AM	6:20	6:35	6:45	6:50	7:03	7:15
	6:50	7:05	7:15	7:20	7:33	7:45
	7:20	7:35	7:45	7:50	8:03	8:15
	7:50	8:05	8:15	8:20	8:33	8:45
	8:20	8:35	8:45	8:50	9:03	9:15
	8:50	9:05	9:15	9:20	9:33	9:45
	9:20	9:35	9:45	9:50	10:03	10:15
	10:20	10:35	10:45	10:50	11:03	11:15
	11:20	11:35	11:45	11:50	12:03	12:15
PM	12:20	12:35	12:45	12:50	1:03	1:15
	1:20	1:35	1:45	1:50	2:03	2:15
	2:20	2:35	2:45	2:50	3:03	3:15
	2:50	3:05	3:15	3:20	3:33	3:45
	3:20	3:35	3:45	3:50	4:03	4:15
	3:50	4:05	4:15	4:20	4:33	4:45
	4:20	4:35	4:45	4:50	5:03	5:15
	4:50	5:05	5:15	5:20	5:33	5:45
	5:20	5:35	5:45	5:50	6:03	6:15
	5:50	6:05	6:15	6:20	6:33	6:45
	6:20	6:35	6:45	6:50	7:03	7:15

INBOUND toward Terminal

Leave Flintridge and Academy	Leave North Carefree and Oro Bianco	Leave Rustic Hills	Leave Citadel	Leave Hancock and Buena Ventura	Arrive Downtown Terminal
6:15	6:27	6:42	6:47	6:57	7:15
6:45	6:57	7:12	7:17	7:27	7:45 Monday through Friday only
7:15	7:27	7:42	7:47	7:57	8:15
7:45	7:57	8:12	8:17	8:27	8:45 Monday through Friday only
8:15	8:27	8:42	8:47	8:57	9:15
8:45	8:57	9:12	9:17	9:27	9:45 Monday through Friday only
9:15	9:27	9:42	9:47	9:57	10:15
9:45	9:57	10:12	10:17	10:27	10:45 Monday through Friday only
10:15	10:27	10:42	10:47	10:57	11:15
11:15	11:27	11:42	11:47	11:57	12:15
12:15	12:27	12:42 p.m.	12:47 p.m.	12:57 p.m.	1:15 p.m.
1:15	1:27	1:42	1:47	1:57	2:15
2:15	2:27	2:42	2:47	2:57	3:15
3:15	3:27	3:42	3:47	3:57	4:15
3:45	3:57	4:12	4:17	4:27	4:45 Monday through Friday only
4:15	4:27	4:42	4:47	4:57	5:15
4:45	4:57	5:12	5:17	5:27	5:45 Monday through Friday only
5:15	5:27	5:42	5:47	5:57	6:15
5:45	5:57	6:12	6:17	6:27	6:45 Monday through Friday only
					Monday through Friday only

You can transfer from this bus to another headed anywhere else in the city bus system

Figure 3. Example of NALS Item at Level 4

Almost 40% of white adults routinely function no higher than NALS Levels 1 or 2. One national panel concluded that such individuals do not have sufficient learning and reasoning skills to compete successfully in a global economy and exercise fully their rights and responsibilities as citizens (Baldwin, Kirsch, Rock, & Yamamoto, 1995, p. 16).

Chronic illness

We all want highly intelligent doctors who never make mistakes. In actuality, our own intelligence and misjudgments are more important to our health. In essence, we are our own primary health care providers. Why is that so?

The answer lies in the fact that the major killers today are heart disease, cancer, and other chronic illnesses. Health professionals describe them as "slow-acting, long-term killers that can be treated but not cured" (Strauss, 1998). The surgeon general pointed out decades ago (U.S. Department of Health, Education, and Welfare, 1979), and a task force

of the American Psychological Society more recently (American Psychological Society, 1996), that health self-care is at least as important as medical care. Effective self-care, in turn, requires us continually to learn, reason, and solve problems. In other words, chronic illnesses are very much like careers—never-ending ones that can also become more cognitively demanding as we age. IQ at age 11 predicts mortality and functional independence over 60 years later (Deary et al., 2004; Gottfredson & Deary, 2004). Good health obviously depends on more than intelligence, but cognitive competence is more useful in guarding health than most people realize. Contrary to common expectation, health inequalities do not disappear when governments provide more health care, for example, when Great Britain instituted universal health care for all its citizens beginning in the 1950s and when the United States instituted Medicare and Medicaid for the elderly, disabled, and the indigent in the 1960s. On the contrary, differences in health increase with broader access to health care (Pappas, Queen, Hadden, & Fisher, 1993; Townsend & Davidson, 1982). Average levels of health improve, but brighter and more educated individuals appear to use their greater access more appropriately and effectively than do less mentally adept individuals.

Although chronic diseases cannot be cured, they can often be prevented, their progression slowed, and their damage minimized. Disease prevention requires foresight and acting in health-enhancing ways: most importantly, by adhering to medical recommendations, following a prudent diet, exercising, not smoking, and not taking drugs or drinking to excess (American Psychological Society, 1996). Individuals need to stay informed about what constitutes a healthy diet and lifestyle, seek preventive exams (e.g., Pap smears) on a regular basis, and judge whether particular symptoms are serious enough to warrant seeing a doctor without delay.

We get most of our health information from the mass media, not our doctor—whom we seldom see and with whom we converse even less. Local and national media regularly provide basic health information that many individuals are otherwise not likely to obtain, at least before it is too late. For example, the State of Delaware has been concerned that a third of its diabetics do not know they have the disease. It therefore mounted a campaign, partly through the local newspaper, to teach the public what the disease is, why it is serious, what symptoms to watch for, who is most at risk, and how to take action. Such campaigns succeed, however, only to the extent that individuals at risk attend to and understand the information. Studies of information diffusion find that about a third of citizens are largely beyond the reach of the media-disseminated information because they either do not expose themselves to it (e.g., by reading news articles) or they understand little when exposed (Bennett, 1988; Feldman, 1966; Weenig & Midden, 1997).

Managing a chronic disease is also cognitively demanding, because chronic diseases tend to require much self-regulation on a daily basis. For example, managing diabetes requires patients to follow a daily regimen, but the regimen is not a simple recipe that can be mechanically followed. Patients continually have to exercise independent judgment. With diabetes, they have to monitor their blood glucose levels during the day and adjust their diet, medication, and physical activity accordingly. Good self-regulation is essential because it can slow the progress of the disease and limit its damage.

Table 4 illustrates how better knowledge and reasoning about one's disease enables individuals to manage it more effectively. The data are from a study of health literacy, which is functional literacy applied to health matters—such as understanding an appointment slip or directions for how many doses of a prescription medicine to take per day. The table provides data for insulin-dependent outpatients under treatment at a large urban hospital (Williams, Baker, Parker, & Nurss, 1998). The percentage of diabetics who did not know the most elementary facts about their disease is shocking.

Table 4.
Chronic Illnesses Require Self-Regulation to Limit Damage

Urban hospital outpatients: % diabetics *not* knowing that:	**Health literacy level**		
	Very low	**Low**	**OK**
Signal: Thirsty/tired/weak usually means blood sugar too high	40	31	25
Action: Exercise lowers blood sugar	60	54	35
Signal: Suddenly sweaty/shaky/hungry usually means blood sugar too low	50	15	6
Action: Eat some form of sugar	62	46	27

High blood sugar levels pose no short-term danger, but when frequent they can lead to blindness, amputation of limbs, and damage to many other organs. As the first two rows of the table show, knowledge fell with literacy level and was quite low among the least literate: 40% of diabetics with very low functional health literacy did not know the signs of high blood sugar, and even more did not know that exercise (a major control mechanism) can bring it back down. Low blood sugar, on the other hand, can precipitate a life-threatening emergency if the patient does not recognize its early signals and react swiftly by eating something appropriate. The last two rows of the table reveal distressing data on this score too: over half of low-literacy diabetics did not know the signs of low blood sugar or what to do about it.

As if such results were not worrisome enough, medical treatments are becoming ever more complex. Consider heart disease. An individual who had a heart attack in the 1960s was sent home from the hospital with little more than a pat on the back and a wish for good luck. In contrast, many patients go home today with a complex regimen of multiple medications with different doses and schedules, a new diet, an exercise program, and much more besides. How well a patient understands and implements this regimen can

make the difference between controlling the disease and spiraling down into disability and death (Baker, Parker, Williams, & Clark, 1998).

Accidental injury

Everyone wants safer products, safer roads, and smart airline pilots. Once again, however, life is full of hazards from which we must protect ourselves. Accidental injuries are currently the fourth leading cause of death in the United States, surpassed only by cancer, heart disease, and stroke (Baker, O'Neill, Ginsburg, & Li, 1992). Motor vehicle fatalities alone account for half of all accidental deaths in the United States. A large longitudinal study of veterans in Australia found that IQ was the best predictor of all-cause mortality by age 40, but also of motor vehicle fatalities in particular (O'Toole, 1990). Men of somewhat below average IQ (IQ 85-100) had a motor vehicle death rate twice that of men above IQ 100 (IQ 100-115), and men in the lowest IQ range (IQ 80-85, the lowest the Australian army accepted) had a rate three times as high. The author speculated that the less intelligent men had greater difficulty estimating risk.

The large literature on industrial accidents demonstrates that accidents are not random events, but that risk varies systematically by kind of person and circumstance (Hale & Glendon, 1987). It also makes it clear that the key question is what prevents accidents, not what causes them. It makes one realize that life is one long exercise in "defensive driving." Models of accident prevention note that individuals must first recognize the hazards surrounding them—the accidents waiting to happen, such as ice on a sidewalk, a sleepy spouse smoking in bed, and knives, matches, or medications left within reach of small children. Individuals must take action to prevent these incubating hazards from erupting into accidents. And if an accident does occur, they must react swiftly and appropriately to limit its severity.

This process of preventing, limiting, and recovering from accidents is essentially the same cognitive process that is involved in preventing, limiting, and recovering from chronic disease. It also resembles the cognitive demands of complex jobs, as illustrated by another job analysis in Table 5 (Arvey, 1986): complex jobs tend to require continued learning, reasoning, dealing with unexpected situations, and reacting swiftly to them.

Table 5.
Accident Prevention Also Resembles Complex Jobs

Complex jobs require workers to:	*r* with job complexity
▪ Learn and recall relevant information	.75
▪ Reason and make judgments	.71
▪ Deal with unexpected situations	.69
▪ Identify problem situations quickly	.69
▪ React swiftly when unexpected problems occur	.67
▪ Apply common sense to solve problems	.66
▪ Learn new procedures quickly	.66
▪ Be alert & quick to understand things	.55

Implications for Assessment

What does all this mean for assessment practice? First, we might develop simple psychometric instruments to help service providers unobstrusively assess people's capabilities for self-care. Face-valid, authentic assessments similar to the NALS and health literacy scales could be useful in hospitals and other institutional settings, especially ones serving elderly and indigent populations.

Second, we ought to be assessing tasks too, not just people. We need to know which life tasks are inherently complex and to what degree. When they are inherently complex—as in managing a chronic illness—service providers can adjust their assistance to better accord with the cognitive capacities of their clients. When the complexity is unnecessary, they can reduce or eliminate it. Many hospital forms, medical instructions, and health education materials are too complicated for many people.

Figure 4 shows the back of a packet of over-the-counter cold medicine. It breaks all the rules of communicating effectively with patients (Doak, Doak, & Root, 1996). For instance, it presents just one thick glob of text rather than chunking information into meaningful units with clear headings. It uses difficult vocabulary, such as "indications" for use and "cause marked drowsiness" for make you sleepy. It does not highlight the most crucial information, such as warnings. In short, it is needlessly complex and off-putting. Few people of any ability level are apt to read it.

INDICATIONS: These **Maximum Strength** Tablets contain four effective ingredients for the temporary relief of these major cold and flu symptoms: A **Nasal Decongestant** — to relieve stuffy nose and sinus congestion. An **Antihistamine** — to dry up runny nose and relieve sneezing. A **Cough Suppressant** — to quiet cough. A **Non-aspirin Analgesic** — to relieve headache, fever, minor sore throat pain and body aches and pain.

DIRECTIONS: **Adults:** 2 tablets every 6 hours while symptoms persist, not to exceed 8 tablets in 24 hours, or as directed by a doctor. **Children under 12:** Consult a doctor.

WARNINGS: **KEEP THIS AND ALL OTHER MEDICATIONS OUT OF THE REACH OF CHILDREN.** IN CASE OF ACCIDENTAL OVERDOSE, SEEK PROFESSIONAL ASSISTANCE OR CONTACT A POISON CONTROL CENTER IMMEDIATELY. PROMPT MEDICAL ATTENTION IS CRITICAL FOR ADULTS AS WELL AS FOR CHILDREN EVEN IF YOU DO NOT NOTICE ANY SIGNS OR SYMPTOMS. As with any drug, if you are pregnant or nursing a baby, seek the advice of a health professional before using this product. Do not give this product to children under 12 years of age or use for more than 7 days or for fever for more than 3 days unless directed by a doctor. If symptoms do not improve within 7 days or are accompanied by a fever that lasts for more than 3 days, if new symptoms occur, or if redness or swelling is present, consult a doctor. **Do not exceed recommended dosage.** If nervousness, dizziness, or sleeplessness occur, discontinue use and consult a doctor. A persistent cough may be a sign of a serious condition. If cough persists for more than 7 days, tends to recur or is accompanied by rash, persistent headache, fever that lasts for more than 3 days, or if new symptoms occur, consult a doctor. Do not take this product for persistent or chronic cough such as occurs with smoking, asthma or emphysema, or if cough is accompanied by excessive phlegm (mucus/sputum) unless directed by a doctor. If sore throat is severe, persists for more than 2 days, is accompanied or followed by a fever, headache, rash, nausea or vomiting, consult a doctor promptly. Do not take this product, unless directed by a doctor, if you have a breathing problem such as emphysema or chronic bronchitis, or if you have heart disease, high blood pressure, thyroid disease, diabetes, glaucoma or difficulty in urination due to enlargement of the prostate gland. May cause marked drowsiness; alcohol, sedatives and tranquilizers may increase the drowsiness effect. Avoid alcoholic beverages while taking this product. Do not take this product if you are taking sedatives or tranquilizers without first consulting your doctor. Use caution when driving a motor vehicle or operating machinery. May cause excitability, especially in children.

ALCOHOL WARNING: If you generally consume 3 or more alcohol-containing drinks per day, you should consult your physician for advice on when and how you should take this product and other pain relievers.

DRUG INTERACTION PRECAUTION: Do not use this product if you are now taking a prescription monoamine oxidase inhibitor (MAOI) (certain drugs for depression, psychiatric or emotional conditions, or Parkinson's disease), or for two weeks after stopping the MAOI drug. If you are uncertain whether your prescription drug contains an MAOI, consult a health professional before taking this product.

ACTIVE INGREDIENTS (PER TABLET): Acetaminophen 500mg; Dextromethorphan HBr 15mg; Chlorpheniramine Maleate 2mg; Pseudoephedrine HCl 30mg.

OTHER INGREDIENTS: Carnauba Wax, Croscarmellose Sodium, D&C Yellow No. 10 Aluminum Lake, FD&C Red No. 40 Aluminum Lake, Hydroxypropyl Methylcellulose, Magnesium Stearate, Microcrystalline Cellulose, Polydextrose, Polyethylene Glycol, Povidone, Sodium Starch Glycolate, Starch, Stearic Acid, Titanium Dioxide, Triacetin.

STORE AT ROOM TEMPERATURE.

*This product is not manufactured or distributed by Bristol-Myers Products, distributor of Comtrex®.

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Figure 4. Medicine Label Illustrating Unnecessary Complexity

There are new standards in labeling, but this old label is a metaphor for the sorts of obstacles that complexity strews in the paths of less able persons every day. Non-adherence to medical treatments is a major problem, and health literacy researchers attribute it largely to lack of patient comprehension. Many patients fail to understand what their doctors tell them, even face-to-face during office visits, unbeknownst to the physician. Lower adherence rates forecast higher mortality rates (e.g., Gallagher, Viscoli, & Horwitz, 1993).

Psychometricians and research psychologists have contributed much to educational practice and employee selection. Perhaps they could help protect lives as well.

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Résumé

La Vie, la Mort, et l'Intelligence

L'intelligence générale (g) est une capacité hautement pratique qui affecte les êtres vivants dans de multiples aspects de leur vie. Cet article passe en revue cinq données de base illustrant la permanence de son utilité et illustre comment les niveaux d'intelligence les plus élevés augmentent les performances individuelles et le bien être dans quatre domaines de la vie quotidienne : le travail, la gestion de soi, la maladie chronique et les accidents.

La première donnée de base est que les personnes qui ont un score élevé dans un test performent bien sur tous les autres puisque tous les test d'intelligence corrèlent entre eux. Tous les tests mesurent globalement le même facteur sous-jacent en dépit de leur contenu manifeste ou objectif. Les capacités mentales diffèrent dans leur

dimension généralité-spécificité et le facteur g est la plus générale de toutes ; Le seconde est que l'intelligence s'exprime comme un ensemble de savoir-faire cognitifs qui incluent l'efficience de l'apprentissage, le bien raisonner, la pensée abstraite et la résolution de problèmes nouveaux. Ceci conduit au troisième point : apprendre et bien raisonner sont continuellement requis dans la vie quotidienne. Quatrièmement, les données nous démontrent que non seulement l'intelligence générale prédit de nombreuses de succès et de bien être mais encore les prédit mieux que le statut social. La prise en compte de compétences plus spécifiques ajoute peu à la prédiction qui peut être faite sur la base du seul facteur g. Cinquièmement, l'intelligence prédit d'autant mieux que les tâches sont complexes. Bien que les niveaux supérieurs d'intelligence sont utiles dans certains domaines spécialisés, c'est dans les emplois et les tâches complexes de la vie quotidienne qu'ils sont les plus rentables. Il est donc important de connaître les exigences des différentes tâches de la vie quotidienne.

Quatre domaines de la vie quotidienne illustrent comment des tâches cognitives particulièrement exigentes plevcent les individus moins intelligents en situation de risque. L'analyse des emplois a montré de manière répétée que leur différenciation majeure concerne leur complexité, par exemple les exigences en matière d'acquisition, d'analyse, de communication et d'application d'informations orales, écrites, imagées et comportementales. De manière cohérente avec ce résultat, l'intelligence prédit mieux l'efficience professionnel dans les emplois les plus exigeants et les emplois les plus exigeants sont tenus par des travailleurs ayant les plus hauts niveaux de QI.

La gestion personnelle renvoie à l'accomplissement des petites tâches de la vie quotidienne qui impliquent la lecture, l'écriture et le raisonnement que nos sociétés modernes imposent à leurs membres, telles que lire des étiquettes et remplir des formulaires. Les recherches montrent que les difficultés de ces tâches fonctionnelles reposent sur la complexité de leurs exigences de traitement de l'information et le plus généralement sur la nécessité d'apprendre et de raisonner. La fonctionnalité de la lecture, de l'écriture et de l'arithmétique prédit, comme le QI, différentes formes d'échec et de réussite sociale.

Prévenir et gérer les maladies chroniques et les accidents, principales causes de décès aujourd'hui, est un processus éminemment cognitif. Les travaux relatifs à la connaissance des facteurs de santé, qui correspondent à l'apprentissage et au raisonnement dans le domaine de la santé, montrent que les individus les moins informés éprouvent de la difficulté à comprendre et à adhérer aux traitements et aux

régimes. Une adhérence plus faible prédit une plus forte mortalité. Les modèles de la prévention des accidents retiennent les mêmes capacités de résolution de problème que celle de l'analyse des emplois les plus exigeants. par exemple, apprendre et se souvenir des informations pertinentes, identifier rapidement les situations et réagir rapidement aux situations inattendues. Ceux sont en charge de la santé doivent réduire la complexité de leurs communications et de leurs régimes de traitement. Ils peuvent aussi accroître l'assistance cognitive quand les tâches sont intrinsèquement complexes, telles que la gestion de la santé dans les cas de diabète, d'hypertension et d'asthme.

Resumen

Vida, Muerte, e Inteligencia

La inteligencia general (g) es una habilidad altamente práctica que afecta al bienestar de las personas en muchos aspectos de su vida. Este artículo revisa cinco tipos clave argumentando su utilidad generalizada y muestra cómo altos niveles de inteligencia aumentan los resultados de los individuos y el bienestar en cuatro esferas de la vida diaria: trabajo, automantenimiento cotidiano, enfermedad crónica y accidentes.

El primer hecho clave es que las personas que hacen bien un test mental obtienen resultados mejores en otros ámbitos; esto es, todos los tests mentales correlacionan con dichos ámbitos. Todas las medidas tienen relación con un factor de habilidad general subyacente, independientemente de lo que manifiesta su contenido o propósito. Las habilidades mentales difieren en su grado de generabilidad y especificidad, siendo el factor de habilidad general (g) el más generalizable de todos. Segundo, la elevada inteligencia se refiere a un conjunto de habilidades de pensamiento que incluyen aprendizaje eficiente, buen razonamiento, pensamiento abstracto y resolución de nuevos problemas. Esas habilidades de procesamiento de la información pueden ser aplicadas virtualmente a cualquier tipo de contenido y contexto. Eso nos lleva al tercer punto: las actividades de la vida diaria continuamente requieren que los individuos aprendan a razonar bien. El cuarto punto muestra que existe amplia evidencia en el sentido de que la inteligencia general no sólo produce muchas formas de éxito y de bienestar, sino también contribuye a un mejor estatus socioeconómico. Las habilidades mentales más específicas tienen menos capacidad predictiva, más allá de lo que contribuye el factor g sólamente. En quinto lugar, hoy se sabe que la inteligencia predice mejor los resultados en otros

ámbitos cuando las tareas son más complejas. Aunque una muy elevada inteligencia es, en cierto modo, muy útil en muchas esferas de la vida, es particularmente ventajosa cuando los trabajos y las actividades diarias demandan más capacidad cognitiva. Esto es particularmente importante para conocer la distribución de las demandas de las tareas en diferentes ámbitos de la vida.

Cuatro esferas de la vida ilustran cómo las tareas que demandan más capacidad cognitiva pueden llevar a los individuos menos inteligentes a altos riesgos. El análisis de la investigación sobre este tema muestra repetidamente que la mayor distinción entre trabajos es su complejidad cognitiva; por ejemplo: los requerimientos para obtener, analizar, comunicar y aplicar la información oral, escrita, pictórica y comportamental. De acuerdo con esos datos, se puede afirmar que la inteligencia predice mejor los resultados progresivos en los trabajos de alto nivel y que este tipo de trabajos requieren recrutar trabajadores con altos niveles de CI.

El automantenimiento de la vida diaria exige poder llevar a cabo muchas tareas de lectura, escritura y de razonamiento que las modernas sociedades imponen a sus miembros, tales como clasificación de lecturas y confección de impresos. La investigación muestra que la dificultad para realizar esas tareas funcionales se apoya en la complejidad de sus demandas de procesamiento de la información y, más generalmente, en la necesidad de aprender y de razonar. La lectura funcional, e igualmente el CI, predicen varias formas de éxito y fracaso socioeconómico.

La prevención y el control de las enfermedades crónicas y de los daños accidentales, así como el control de las causas de la muerte es un proceso cognitivo de alto nivel. Estudios de la literatura sobre la salud, que es como decir el aprendizaje y el razonamiento aplicado a la salud, muestran que los individuos iletrados tienen dificultad para comprender y controlar los regímenes de tratamiento. Los niveles inferiores de inteligencia predicen una más alta mortalidad. Los modelos de prevención de accidentes revelan que dicha prevención requiere las mismas habilidades de procesamiento de la información que los análisis documentales de los trabajos cuya característica distintiva es requerir altos niveles de complejidad; por ejemplo: aprendizaje y recolección de información relevante, identificación rápida de las situaciones problemáticas, y capacidad para reaccionar ante situaciones inesperadas. Los servicios de provisión de la salud deberían reducir el exceso de complejidad en sus comunicaciones y en los regímenes de tratamiento. También deberían incrementar la asistencia cognitiva cuando las tareas son intrínsecamente complejas, tales como el autocontrol diario de la diabetes,

hipertensión y asma.

Zusammenfassung

Leben, Tod, und Intelligenz

Allgemeine Intelligenz (g) ist eine in hohem Maße praktische Fähigkeit, die persönliches Wohlbefinden in vielen Aspekten des Lebens beeinflusst. Dieser Beitrag geht auf fünf entscheidende Tatbestände ein, die diese durchgreifende Nützlichkeit dokumentieren und illustriert dann, wie höhere Ausprägungen von Intelligenz die Performanz eines Individuums und sein Wohlbefinden in vier Bereichen des täglichen Lebens verbessern: Arbeit, tägliche Selbstbesorgung, chronische Erkrankung, und Unfälle. Der erste Tatbestand ist dadurch gegeben, dass Personen, die in einem kognitiven Fähigkeitstest gut abschneiden, dies auch in allen anderen tun, das heißt, diese Tests korrelieren miteinander. Alle erfassen weitgehend den gleichen zugrunde liegenden Fähigkeitsfaktor, unabhängig von ihrem manifesten Inhalt bzw. ihrer Zielstellung. Geistige Fähigkeiten unterscheiden sich in ihrer Generalität/Spezifität, und der allgemeine geistige Fähigkeitsfaktor (g) ist hiervon der am höchsten generalisierende.

Zweitens, hohe Intelligenz wirkt sich in einer Reihe von grundlegenden Fertigkeiten des Denkens aus, die effizientes Lernen, vernünftiges Urteilen, abstraktes Denken und das Lösen neuer Probleme beinhalten. Diese Fertigkeiten der Informationsverarbeitung können auf praktisch jede Art von Inhalt oder Kontext angewandt werden. Dies führt zum dritten Punkt: Alltagsleben erfordert fortlaufend gutes Lernen und Denken. Viertens wird durch reichhaltige Evidenz bestätigt, dass allgemeine Intelligenz nicht nur viele Formen von Erfolg und Wohlbefinden vorhersagt, sondern dies normalerweise auch besser leisten kann als der sozioökonomische Status. Spezifischere geistige Fähigkeiten fügen der Vorhersage, die durch g alleine bewerkstelligt wird, nur wenig hinzu. Fünftens, Intelligenz sagt Performanz besser voraus, wenn Aufgaben komplexer sind. Obwohl höhere Intelligenz in vielen Lebensbereichen eine gewisse Nützlichkeit hat, ist sie von besonderem Vorteil, wenn Berufe und tägliche Aufgaben höhere kognitive Anforderungen stellen. Es ist daher wichtig, die Verteilung der Aufgabenanforderungen in verschiedenen Lebensbereichen zu kennen.

Vier Lebensbereiche illustrieren, wie Aufgaben mit höherem kognitiven Anforderungscharakter weniger intelligente Individuen

einem größeren Risiko aussetzen. Die Berufsforschung hat wiederholt gezeigt, dass das Hauptunterscheidungskriterium zwischen Berufen ihre kognitive Komplexität ist, beispielsweise in den Anforderungen, mündliche, schriftliche, bildliche oder verhaltensgebundene Information aufzunehmen, zu analysieren, zu kommunizieren und anzuwenden. Konsistent mit diesen Befunden ist, dass Intelligenz die Arbeitsperformanz in Arbeiten mit höherem Niveau progressiv besser vorhersagt und dass für Tätigkeiten auf höherem Niveau Personen mit höheren Ausprägungen des IQs rekrutiert werden.

Tägliche Selbstbesorgung bezieht sich hier auf das Ausführen der vielen kleinen Lese-, Schreib- und Denkaufgaben, die moderne Gesellschaften ihren Mitgliedern auferlegen, beispielsweise beim Lesen von Etiketten und beim Ausfüllen von Formularen. Studien zeigen, dass die Schwierigkeit dieser funktionalen Leseaufgaben, wie die von Arbeitstätigkeiten, auf der Komplexität der geforderten Informationsverarbeitung beruht, oder generell, auf der Notwendigkeit zu lernen und zu denken. Funktionale Lese- und Schreibfähigkeit, wie auch der IQ, sagen vielfältige Arten des sozioökonomischen Erfolges bzw. Misserfolges voraus.

Das Vorbeugen und Handhaben von sowohl chronischer Erkrankungen als auch unfallbedingter Verletzung, heutzutage Hauptursachen bei Todesfällen, ist ein in hohem Maße kognitiver Prozess. Studien zur gesundheitsbezogenen Bildung, verstanden als Lernen und Denken in Anwendung auf gesundheitsbezogene Angelegenheiten, zeigen, dass in dieser Hinsicht weniger gebildete Individuen Schwierigkeiten haben, Behandlungskonzepte zu verstehen und anzuwenden. Ein niedriges Maß an Anwendung dieser Behandlungsprinzipien sagt höhere Mortalität voraus. Unfallpräventionsmodelle machen deutlich, dass in diesem Bereich die selben Informationsverarbeitungsfertigkeiten gefordert sind, die in Arbeitsanalysen als distinktive Anforderungen von komplexen, auf hohem Niveau angesiedelten Arbeitstätigkeiten imponieren: beispielsweise Lernen und Wieder-Erinnern relevanter Information, schnelles Identifizieren von Problemsituationen, und promptes Reagieren auf unerwartete Situationen. Zur Abhilfe können Anbieter von Gesundheitsdienstleistungen überschießende Komplexität in ihren Kommunikationen und Behandlungsabfolgen reduzieren. Sie können darüber hinaus die kognitive Unterstützung bei Anforderungen von hoher inhärenter Komplexität erhöhen,

beispielsweise in der täglichen Selbstorganisation bei Diabetes, Hypertension und Asthma.

Abstract Italiano

Vita, Morte, e Intelligenza

L'intelligenza genererale (g) è un'abilità prettamente pratica che riguarda in molti modi il benessere degli individui. Questo articolo propone cinque aspetti chiave che documentano la sua utilità pervasiva e illustra come livelli più elevati di intelligenza possano migliorare le attività e il benessere di un individuo in quattro ambiti della vita quotidiana: lavoro, cura di sé, malattia cronica e incidenti.

Il primo aspetto emblematico è che le persone che hanno buone prestazioni in uno dei vari test di intelligenza tendono di solito ad avere buoni risultati anche negli altri, il che implica che i test sono tutti in qualche modo correlati. Tutti infatti misurano principalmente lo stesso fattore fondamentale legato all'abilità, indipendentemente dal loro contenuto o dal loro scopo dichiarato. Le capacità mentali differiscono per generalità-specificità e il fattore riferito alla capacità mentale generale (g) è il più ampio di tutti. In secondo luogo, l'intelligenza elevata si esprime come un insieme di abilità di pensiero generiche che comprendono un apprendimento efficiente, una buona capacità di ragionamento, il pensiero astratto e la risoluzione di problemi nuovi. Queste capacità a livello di elaborazione dell'informazione possono essere applicate a quasi tutti i tipi di situazione in qualunque contesto, il che ci conduce direttamente al terzo punto: la vita quotidiana comporta costantemente che le persone imparino e ragionino bene. In quarto luogo, numerose prove indicano che l'intelligenza generale può aiutare a prevedere il successo e il benessere in modo più efficace di quanto non faccia lo status socioeconomico. Le abilità mentali più specifiche aggiungono poco alla previsione, rispetto a quanto non faccia il fattore *g* da solo. Infine, il quinto punto fornisce esempi di come l'intelligenza sia un più efficace predittore di prestazioni quando i compiti sono più complessi. L'intelligenza elevata è utile in molti campi della vita ma risulta particolarmente vantaggiosa soprattutto quando il lavoro e le situazioni quotidiane comportano un impegno cognitivo maggiore. E' quindi importante conoscere la distribuzione della difficoltà delle attività quotidiane nei vari ambiti.

Quattro situazioni di vita mostrano in che modo i compiti cognitivi più impegnativi comportino rischi maggiori per gli individui con un livello di intelligenza inferiore. Gli studi sulla analisi dei compiti lavorativi hanno mostrato che la differenza

principale è rappresentata dalla complessità cognitiva, ossia per esempio la variazione dei requisiti necessari per ottenere, analizzare, comunicare ed applicare l'informazione orale, scritta, pittorica e comportamentale. Coerentemente con questi risultati, l'intelligenza predice la performance di lavoro meglio nelle mansioni di alto livello e tali mansioni vengono tendenzialmente assegnate a lavoratori con QI più elevati.

La cura di sé si riferisce allo svolgimento dei compiti di lettura, scrittura e ragionamento che la società moderna impone ai propri membri, come la lettura delle etichette presenti sui prodotti e dei moduli da compilare. La ricerca mostra che la difficoltà di questi compiti funzionali legati all'alfabetizzazione, come anche nel caso delle mansioni lavorative, dipenda dalla complessità dell'elaborazione di informazioni richiesta e, più in generale, sulla necessità di apprendere e ragionare. L'alfabetizzazione funzionale, come lo stesso QI, è predittiva rispetto a varie forme di successo o fallimento socioeconomico.

Saper prevenire e gestire sia la malattia cronica che le lesioni accidentali, causa principale di morte ai giorni nostri, è un processo altamente cognitivo. Studi riguardanti l'alfabetizzazione sanitaria, che si occupa dell'apprendimento e dell'elaborazione dell'informazione nell'ambito di questioni di salute appunto, mostrano che gli individui meno alfabetizzati hanno difficoltà nel comprendere e nel rispettare i regimi di cura. Un minore rispetto della cura porta ad una più alta mortalità. I modelli di prevenzione degli incidenti rivelano che è necessaria la stessa capacità di elaborazione dell'informazione necessaria per l'analisi delle mansioni lavorative, tratto caratteristico questo dei lavori complessi e di alto livello: per esempio, l'apprendimento e la capacità di ricordare informazioni importanti, l'identificazione veloce delle situazioni problematiche e la capacità di reagire prontamente a situazioni inaspettate. Chi si occupa di salute potrebbe ridurre l'eccessiva complessità che caratterizza la comunicazione e i regimi di cura. Sarebbe anche possibile incrementare l'assistenza cognitiva quando si ha a che fare con compiti complessi, come nella cura quotidiana del diabete, dell'ipertensione e dell'asma.