DOWNLOAD PDF CHANGING CONCEPTIONS OF INTELLIGENCE AND INTELLECTUAL FUNCTIONING

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Costa and Bena Kallick Chapter 1. Costa and Bena Kallick What is intelligence if not the ability to face problems in an unprogrammed creative manner? The notion that such a nebulous socially defined concept as intelligence might be identified as a "thing" with a locus in the brain and a definite degree of heritabilityâ€”and that it might be measured as a single number thus permitting a unilinear ranking of people according to the amount they possess[â€”]is a principal error â€¦ [,] one that has reverberated throughout the country and has affected millions of lives. It also is a vital influence behind the development of the Habits of Mind, which are detailed more fully in the next chapter. To better understand those habits, though, it is important to grasp how the concept of intelligence has changed over the last century. This chapter traces the evolution of conceptions of intelligence. It also considers how some significant researchers, educators, and psychologists influenced and transformed mental models of the intellect. Intelligence for a Bygone Era At the turn of the 19th century in the United States, society was undergoing great shifts. Masses of immigrants poured into the nation, moving inland from their ports of entry or staying in the large eastern cities to fill the needs of the job-hungry Industrial Revolution. In retrospect, it is easy to see that the society of that day was elitist, racist, and sexist, its actions fueled by a fear of diluting "Anglo-Saxon purity. World War I contributed to homogenizing classes, races, and nationalities. Through military travels, enhanced communication, and industrialization, our population was becoming more cosmopolitan. Metaphorically the song proclaimed that to protect the existing separation of the masses into their "rightful" places, there was a need to analyze, categorize, separate, distinguish, and label human beings who were "not like us. Thanks to a mentality ruled by ideas of mechanism, efficiency, and authority, many came to believe that everything in life needed to be measured. Lord Kelvin, a 19th century physicist and astronomer, stated, "If you cannot measure it, if you cannot express it in numbers, your knowledge is of a very meager and unsatisfactory kind. Immersed in the "efficiency" theories of the day, educators strived for the one best system for curriculum, learning, and teaching. Into this scene of educational management entered Edward L. Thorndike from Columbia University. He went beyond theory to produce usable educational tools including textbooks, tests, curriculums, and teacher training. Thorndike continues to wield a tremendous influence on educational practice. His "associationist" theory suggests that knowledge is a collection of links between pairs of external stimuli and internal mental responses. In this context, learning is thought to be a matter of increasing the strength of the "good," or correct, bonds and decreasing the strength of the incorrect ones. When people view their intelligence as a fixed and unchangeable entity, they strive to obtain positive evaluations of their ability and to avoid displaying evidence of inadequate ability. They believe their intelligence is demonstrated in task performance: This negative self-concept influences effort. Toward a New Vision Clearly, something new is needed if schools are to break out of this traditional, aptitude-centered mentality and make it possible for young people to acquire the kinds of mental habits needed to lead productive, fulfilling lives. We need a definition of intelligence that is as attentive to robust habits of mind as it is to the specifics of thinking processes or knowledge structures. Incremental thinkers are likely to apply self-regulatory, metacognitive skills when they encounter task difficulties. They are likely to focus on analyzing the task and trying to generate and execute alternative strategies. They will try to garner internal and external resources for problem solving. When people think of their intelligence as something that grows incrementally, they are more likely to invest the energy to learn something new or to increase their understanding and mastery of tasks. They display continued high levels of task-related effort in response to difficulty. Learning goals are associated with the inference that effort and ability are positively related, so that greater efforts create and make evident more

ability. Children develop cognitive strategies and effort-based beliefs about their intelligenceâ€”the habits of mind associated with higher-order learningâ€”when they continually are pressed to raise questions, accept challenges, find solutions that are not immediately apparent, explain concepts, justify their reasoning, and seek information. When we hold children accountable for this kind of intelligent behavior, they take it as a signal that we think they are smart, and they come to accept this judgment. Self-help author Liane Cordes states: The following discussion traces the historical pathways of influential theories that have led to this new vision of intelligent behavior Fogarty, Whimbey argued that intelligence could be taught, and he provided evidence that certain interventions enhance the cognitive functioning of students from preschool to college level. Participants in such studies, however, ceased using the cognitive techniques as soon as the specific conditions of training were removed. To accommodate new learning, the brain builds more synaptic connections between and among its cells. It has been found that IQ scores have increased over the years Kotulak, These increases demonstrate that instead of being fixed and immutable, intelligence is flexible and subject to great changes, both up and down, depending on the kinds of stimulation the brain gets from its environment. Structure of the Intellect J. Hoeptner believed that all students have intelligence, but they defined it in terms of "what kind" instead of "how much. Operations include such mental capabilities as comprehending, remembering, and analyzing; contents refer to words, forms, and symbols; and products refer to complexity: Twenty-six of these factors were found to be relevant to school success. Theory of Cognitive Modifiability Iconoclast Reuven Feuerstein, working with disadvantaged children in Israel, challenged the prevailing notion of a fixed intelligence with his theory of cognitive modifiability. Multiple Forms of Intelligence Howard Gardner , , believes that there are many ways of knowing, learning, and expressing knowledge. Gardner has identified several distinct intelligences that function in problem solving and in the creation of new products: Gardner also believes that these intelligences can be nurtured in all human beings. Although each individual may have preferred forms, all of us can, with proper mediation and experience, continue to develop these capacities throughout our lifetime. Intelligence as Success in Life Robert Sternberg found that "mythological" IQ scores had little predictive quality in regard to success in later life. He argues for three types of intelligence: Analytical intelligence in which comparisons, evaluations, and assessments are made. Creative intelligence involving imagination, design, and invention. Practical intelligence in which use, practicality, and demonstration are paramount. Learnable Intelligence David Perkins further supports the theory that intelligence can be taught and learned. He believes that three important mechanisms underlie intelligence: Neural intelligence cannot be altered much. Experiential intelligence is context-specific knowledge that is accumulated through experience. Reflective intelligence is the "good use of the mind; the artful deployment of our faculties of thinking. Perkins refers to this capacity as "mindware" p. Emotional Intelligence Drawing on vast amounts of brain research, Daniel Goleman asserts that the intellect and emotions are inextricably intertwined. One cannot be developed without the other. Educating the emotions may be as important as educating the intellect. Developing self-awareness, managing impulsivity and emotions, empathizing, and developing social skills are the most basic forms of intelligence. If these capacities are neglected, inadequacies may cause people to fall short of developing fuller intellectual capacities. Moral Intelligence Robert Coles believes that children can become "more intelligent" by developing their inner character. Coles believes that every child grows up by building a "moral archeology," a moral code of ethics through interactions with parents, peers, and significant others. A Fully Developed Intellect Luis Alberto Machado , former Venezuelan minister of intellectual development, reminds us that all human beings have a basic right to the full development of their intellect. Industrial leaders realize that to survive and progress, any corporation must invest in its intellectual capital by continuing to enhance the mental resources of its employees. Educators, too, are realizing that our minds, bodies, and emotions must be engaged and transformed for learning to occur. Social Intelligence Daniel Goleman cites neurological research that suggests that the human brain is a "social brain" with an innate capacity to bond with others, to empathize with others, to engage in social reasoning, and to have concern for others. He suggests that social prowess, not cognitive or physical superiority, is what

allowed Homo sapiens to achieve its highest evolutionary accomplishments. Goleman makes the case that intelligence is not all "cognitive" but rather is composed of emotional and social intelligence as well. Habits of Mind Carol Dweck found that the highest achievers in school Have the highest vulnerability to helplessness. Are most likely to believe their intelligence is a fixed trait. Are more likely to want tasks they are sure they can do well. Are more likely to blame their abilities and show impairment in the face of difficulties. You might think that students who were highly skilled would be the ones who relish a challenge and persevere in the face of setbacks. Instead, many of these students are the most worried about failure, and the most likely to question their ability and to wilt when they hit obstacles. The Habits of Mind provide a set of behaviors that discipline intellectual processes. Taken as a whole, the many definitions and interpretations of what is meant by intelligence lead us to conclude that the habits can be cultivated, articulated, operationalized, taught, fostered, modeled, and assessed. They can be an integral component of instruction in every school subject, and they may determine achievement of any worthy goal as one moves out into life. We need to do such work if we truly are to be guided by the rhetoric "all kids can learn. We can no longer be satisfied with a system that is willing to classify, categorize, and sort students on the basis of misaligned test scores. The moral intelligence of children: How to raise a moral child. The role of motivation, personality and development. An intervention program for cognitive modifiability. SkyLight Training and Publishing. The theory of multiple intelligences. Why it can matter more than IQ. The new science of human relationships. The mismeasure of man. The analysis of intelligence. Revolutionary discoveries of how the mind works. The right to be intelligent. The emerging science of learnable intelligence.

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The second way of approaching lay conceptions of intelligent functioning is inspired by Neisser's assumption () that there can be no process based definition of intelligence since it is not a.

In Table , findings are presented jointly for two adaptive behavior scales that are well standardized and supply a composite score and four part scores, the VABS Sparrow et al. The part scores conform generally to the adaptive behavior domains recommended in Table and to the factor analytic results discussed in Chapter 4. The four VABS part scores included in the Monte Carlo analyses were motor, independent living, communication, and social. Examination of the proportions of cases in the simulations with various combinations of low IQ and low adaptive behavior scores provides an estimate of the effects of altering the cutoff scores for both measures. Six adaptive cutoff scores were used in one domain at â€"2. Proportions of cases in the simulations that met various combinations of IQ and adaptive behavior cutoff scores are shown in the table. The results in column 3 of Table indicate that many people with IQs of less than 60 do not meet the cutoff score requirements for a deficit in adaptive behavior. As noted earlier, SSA defines all persons with an IQ of less than 60 as presumptively eligible to be considered for a diagnosis of mental retardation, and the committee recommends continuing that practice. The imperfect classification agreement between IQ and adaptive behavior at low IQ levels indicates that caution must be used in proposing the adoption of adaptive behavior cutoff scores. Consider individuals with IQs of less than 60 and the most lenient adaptive behavior cutoff score, deficits in one domain at or below 85 see row three: Adoption of any adaptive behavior cutoff score even with persons presumptively eligible due to IQs below 60 could result in 12 to 18 percent of those currently eligible to be considered for a diagnosis of mental retardation becoming ineligible. Examination of other combinations of IQ and adaptive behavior scores further supports the use of caution in setting an adaptive behavior cutoff score. In column 4 of Table , an IQ between 60 and 70 and a stringent criterion of two adaptive behavior domains at or below 70 yields a hit rate of only 6 to 12 percent, a level that is far below the stipulation that most people with IQs at or below 70 should be eligible to be considered for a diagnosis of mental retardation. Even the most lenient criterion included in the simulation, a deficit in one adaptive behavior area at a cutoff at or below 85, resulted in only 64 to 78 percent of cases meeting the dual criteria of an IQ score between 60 and 70 and an adaptive behavior score at or below Other combinations also are instructive. At the criterion of two adaptive behavior domains at or below 85, only 38 to 55 percent of persons with IQs between 60 and 70 met the dual classification criteria see last row in column 4. The two adaptive behavior inventories differed regarding the rate of classification agreement with IQ in the Monte Carlo simulations in Table Using these scales, the classification agreement for adults probably should not be done because both scales have ceiling problems for individuals with mild mental retardation or borderline functioning who are in the late adolescent or adult years. Finally, it bears repeating that these simulations adopted assumptions that probably enhanced the degree of classification agreement and therefore are likely to overestimate the degree of classification agreement in actual practice. The combined results for children and adults are presented in Table The number of ABAS adaptive skills areas is 9 for children and 10 for adults. It is easier to achieve classification agreement when more adaptive skills areas are included. Generally, it should be expected that the proportions indicating classification agreement will be higher in Table than Table due to the greater number of adaptive skills areas 9 or 10 areas in Table versus 4 areas in Table and the higher correlations for the ABAS than the VABS or the SIB-R. Nevertheless, a significant number of cases in the Monte Carlo simulation with IQs in the range of mental retardation do not have significant adaptive behavior deficits using the ABAS. The uncertainty regarding the effects of different adaptive behavior cutoff scores is further increased by comparing the results in Tables and Both tables use data from the ABAS. For that group, the authors reported that 76 percent had two or more adaptive skills area scores at or below The ABAS Monte Carlo analyses using the cutoff of adaptive behavior at or below 70 revealed far lower proportions meeting the

criterion of two or more adaptive behavior areas in the range of mental retardation. Having no way to reconcile these inconsistent results regarding the ABAS, the committee had to take the uncertainty caused by these results into consideration when recommending an adaptive behavior cutoff score. Conclusions Caution in the adoption of precise adaptive behavior cutoff scores is warranted by the limited evidence on the classification agreement between IQ and adaptive behavior measures at varying cutoff scores. Monte Carlo simulations, conducted to estimate the probable effects of varying adaptive cutoff scores, yielded results indicating the classification agreement often was rather low using the best of the currently available adaptive behavior measures. The inconsistencies between ABAS actual data, albeit from a limited sample, and the ABAS simulations provide further support for caution in recommending precise cutoff scores. It is not possible to simulate score distributions for people who would actually be referred for benefits; such a distribution may be somewhat different and possibly reflect more pronounced functional limitations. It may also be the case that a simulation, as in the current instance, must be based on parameters for all people in a norming sample for whom information is available, rather than on people with a more restricted IQ range. Such considerations will affect the degree to which the simulation reflects actual circumstances and the functional characteristics of cases reviewed for benefits eligibility. We explicitly rejected the use of a â€”2 SD adaptive behavior cutoff score. The committee was, however, reluctant to allow an arbitrary adaptive behavior cutoff score to be used or to adopt the most lenient of the various scores that were investigated. In order to fulfill our charge of providing more guidance to SSA regarding adaptive behavior and our obligation to use the best available science in making recommendations, the committee decided to recommend some discretion regarding the interpretation of the results of formal measures of adaptive behavior. That is, a formal assessment of adaptive behavior should be provided in all cases. However, a person may be diagnosed as having mental retardation even if the adaptive behavior results do not meet the cutoff criteria if there is compelling evidence of adaptive behavior deficits that significantly impair performance of expected behaviors. It is the obligation of those gathering and interpreting adaptive behavior information to make a compelling case if it is warranted. Since there are four possible outcomes in any diagnostic setting and two of them are errors Coombs et al. Anything else is an error: Incorrectly denying eligibility has equally harsh consequences for individuals and families involving, in extreme cases, lack of access to the basic necessities of life. Decisions with consequences of this magnitude must be made by knowledgeable persons using the best information available and applying a principle of convergent validity. They must also understand the types of errors that are likely to occur in situations as complex and challenging as determination of mental retardation. Common Judgment Errors A confirmation bias can occur when a decision maker seeks information that confirms an already existing hypothesis or judgment Evans, The best course of action when examining a hypothesis is to seek evidence that tests the idea by seeking disconfirming evidence. This tendency to look for confirming, rather than disconfirming, evidence has clear implications for eligibility decisions. If examiners focus primarily on seeking supporting evidence, then errors are almost inevitable. Furthermore, examiners are unlikely to know that they have made errors or why, since the evidence they have gathered will tend to support their decisions. Thus, the confirmation bias can lead to a pattern of self-perpetuating errors. Active countermeasures are needed to reduce the impact of judgment biases, like seeking disconfirming evidence in a systematic fashion or using a structured examination process instead of an unstructured one. In many judgment situations, initial impressions have been found to heavily influence the final decision. In a classic paper, Asch described the primacy effect, in which later evidence is interpreted in the light of earlier evidence; the early evidence actually causes a change of meaning in the later evidence. Stewart was one of the first to propose attention decrement as an explanation for primacy. He reasoned that changing a task so that subjects were forced to attend to later evidence should diminish the primacy effect. He found this to be true, but only when subjects responded at the end of the task sequence. If responses are made to each new piece of evidence as it becomes available, the effect is reversed; evidence appearing later in the sequence actually had a greater impactâ€”a recency effect. Many studies have shown that primacy effects can be reversed to recency effects

using a variety of attentional manipulations. When left to our own resources, however, we tend to emphasize whatever we know first about a personâ€”a primacy effect. In the context of eligibility determination, the same information can lead to different impressions depending on the selection and order of the assessments. Thus, the order of the impression formation can be significant in determining the outcome of the process. Comprehensive Evaluation Eligibility decisions must be based on a comprehensive evaluation of the person and the environment in which he or she lives and works. Physical, emotional, adaptive, and cognitive functioning must be considered, and current SSA guidelines are consistent with this principle. Information about low intelligence and poor adaptive functioning has been known to overshadow other clinical information that suggests the presence of other mental or emotional disorders that meet formal diagnostic criteria. A number of studies conducted since confirms that type of bias on the part of the clinician and the frequent existence of psychopathology accompanying mental retardation e. Many persons with mental retardation are eligible for dual diagnoses, a simultaneous diagnosis of mental retardation and some other physical or mental disorder, such as depression, conduct disorder, or sensory impairment. It is crucial that clinicians evaluating individuals for the diagnosis of mental retardation also look for other emotional, mental, and physical disorders that may complicate adaptive and intellectual functioning and confer eligibility in other SSA categories see Chapter 6. Consideration of Other Information on Intellectual and Adaptive Functioning There is clear consensus in the human services professions that a broad variety of information must be collected and evaluated regarding the individual in addition to and, in many cases, independent of the results of standardized tests and inventories. No single test or inventory score should be the sole basis for a significant decision. None of the authors of major testing instruments claims that other information is irrelevant or that information from other sources confirming or disconfirming the results of a standardized instrument should be ignored. It is useful to consider different methods of data collection, different sources of information, and performance in different settings. Methods for Collecting Data Four methods of collecting assessment information have been described in the literature: Disability determination examiners should be familiar with and utilize each of the methods in developing a well-informed perspective on the functioning levels of clients considered for a mental retardation diagnosis. Yet, at least some direct testing is appropriate with adaptive functioning. For example, functional academic skills, such as basic literacy, understanding temporal relationships, and quantitative concepts, are crucial to adaptive functioning for children, adolescents, and adults. Adults who cannot tell time or meet time-related work obligations are at a significant disadvantage in coping with everyday demands. Information from third-party respondents on these skills may or may not be accurate, especially as these skills relate to everyday functioning. Interviews with third-party respondents by using standardized adaptive inventories is the most common method for collecting adaptive behavior information. For children, the third party is most often a parent or a teacher. While third-party interview is not used extensively in intellectual assessment, the results of IQ tests should be further evaluated through interviews with the client and significant others to determine if the observed test performance is consistent with day-to-day functioning. In addition to third-party respondents, interviews with clients and other parties are components of a comprehensive adaptive behavior assessment. The accuracy of individuals with mild mental retardation in reporting their own adaptive behavior on this instrument is not yet clear; nevertheless, unstructured and structured interviews with clients are necessary for determining if adaptive behavior deficits exist. Both techniques yield valuable information for understanding overall functioning. Moreover, many adaptive behaviors that are crucial to adequate functioning do not occur frequently, making systematic observation even more difficult. Therefore, even informal and anecdotal observations from different people and across different settings are valuable to an overall decision about adaptive behavior and should be obtained to the extent feasible. Review of records is another data collection method with strong applicability to the determination of intellectual and adaptive behavior deficits. School records are especially useful if evaluators understand the nature of mental retardation, classification practices in schools, and subtle indicators of low functioning in classrooms and schools. However, school records indicating either a diagnosis of mental

retardation or the absence of one cannot be used as a definitive indication of intellectual and adaptive behavior status. Records from agencies other than schools can also be useful in determining adaptive behavior deficits. Medical, social service, and legal sources may yield further information that is useful in making judgments about deficits. Further discussion of the use of records from schools and other agencies in order to make diagnostic decisions appears below. Sources of Information Judgments about intellectual and adaptive functioning should be based on multiple sources of information including, at a minimum, the individual client and significant others such as depending on age parents, teachers, peers, neighbors, and family members. The kind and amount of information gathered from different people will vary significantly across clients. In some cases, judgments must be based primarily on an interview with a single third-party respondent and on observations or interviews with the client, while in other cases there will be multiple sources of information. SSA disability examiners have to make judgments about the sufficiency of the information in deciding whether to actively seek additional sources of information. For preschoolers, the relevant setting is the home and, depending on the client, day care or preschool settings. For children between ages of about 5 and 18, the school and home settings are crucial for nearly all clients, as are skills in meeting expectations as they age for roles in the neighborhood and the community.

Chapter 3 : Intellectual Functioning (Mental Abilities)

Controversy exists over whether children can be said to differ in a unitary abstract ability called intelligence or whether each child might better be described as possessing a set of specific cognitive abilities. Some children are especially proficient with verbal problems and less proficientâ€¦ Theories of intelligence Theories of intelligence, as is the case with most scientific theories, have evolved through a succession of models. Four of the most influential paradigms have been psychological measurement , also known as psychometrics; cognitive psychology , which concerns itself with the processes by which the mind functions; cognitivism and contextualism, a combined approach that studies the interaction between the environment and mental processes; and biological science , which considers the neural bases of intelligence. What follows is a discussion of developments within these four areas. Psychometric theories Psychometric theories have generally sought to understand the structure of intelligence: What form does it take, and what are its parts, if any? Such theories have generally been based on and established by data obtained from tests of mental abilities, including analogies e. Psychometric theories are based on a model that portrays intelligence as a composite of abilities measured by mental tests. This model can be quantified. For example, performance on a number-series test might represent a weighted composite of number, reasoning, and memory abilities for a complex series. Mathematical models allow for weakness in one area to be offset by strong ability in another area of test performance. In this way, superior ability in reasoning can compensate for a deficiency in number ability. One of the earliest of the psychometric theories came from the British psychologist Charles E. Spearman â€" , who published his first major article on intelligence in He noticed what may seem obvious nowâ€"that people who did well on one mental-ability test tended to do well on others, while people who performed poorly on one of them also tended to perform poorly on others. To identify the underlying sources of these performance differences, Spearman devised factor analysis , a statistical technique that examines patterns of individual differences in test scores. He concluded that just two kinds of factors underlie all individual differences in test scores. In other words, regardless of the task, if it requires intelligence, it requires g. The second factor is specifically related to each particular test. For example, when someone takes a test of arithmetical reasoning, his performance on the test requires a general factor that is common to all tests g and a specific factor that is related to whatever mental operations are required for mathematical reasoning as distinct from other kinds of thinking. But what, exactly, is g? After all, giving something a name is not the same as understanding what it is. Although the debate between Spearman and Thurstone has remained unresolved, other psychologistsâ€"such as Canadian Philip E. Vernon and American Raymond B. Cattell â€"have suggested that both were right in some respects. Vernon and Cattell viewed intellectual abilities as hierarchical, with g, or general ability, located at the top of the hierarchy. But below g are levels of gradually narrowing abilities, ending with the specific abilities identified by Spearman. Cattell, for example, suggested in Abilities: Crystallized abilities, which are thought to derive from fluid abilities, include vocabulary, general information, and knowledge about specific fields. The American psychologist John L. The American psychologist Joy Paul Guilford proposed a structure-of-intellect theory, which in its earlier versions postulated abilities. In The Nature of Human Intelligence , Guilford argued that abilities can be divided into five kinds of operation, four kinds of content, and six kinds of product. These facets can be variously combined to form separate abilities. Guilford later increased the number of abilities proposed by his theory to Eventually it became apparent that there were serious problems with the basic approach to psychometric theory. A movement that had started by postulating one important ability had come, in one of its major manifestations , to recognize Moreover, the psychometricians as practitioners of factor analysis were called lacked a scientific

means of resolving their differences. Any method that could support so many theories seemed somewhat suspect. Most important, however, the psychometric theories failed to say anything substantive about the processes underlying intelligence. The solution to these problems, as proposed by cognitive psychologists, was to study directly the mental processes underlying intelligence and, perhaps, to relate them to the facets of intelligence posited by psychometricians. The American psychologist John B. In the first stratum, Carroll identified narrow abilities roughly 50 in number that included the seven primary abilities identified by Thurstone. According to Carroll, the middle stratum encompassed broad abilities approximately 10 such as learning, retrieval ability, speediness, visual perception, fluid intelligence, and the production of ideas. The third stratum consisted solely of the general factor, g, as identified by Spearman. It might seem self-evident that the factor at the top would be the general factor, but it is not, since there is no guarantee that there is any general factor at all. Both traditional and modern psychometric theories face certain problems. First, it has not been proved that a truly general ability encompassing all mental abilities actually exists. In The General Factor of Intelligence: How General Is It? Second, psychometric theories cannot precisely characterize all that goes on in the mind. Third, it is not clear whether the tests on which psychometric theories are based are equally appropriate in all cultures. Greenfield concluded that a single test may measure different abilities in different cultures. Her findings emphasized the importance of taking issues of cultural generality into account when creating abilities tests. In an address to the American Psychological Association in , the American researcher Lee Cronbach, a leader in the testing field, decried the lack of common ground between psychologists who studied individual differences and those who studied commonalities in human behaviour. Fair assessments of performance require an understanding of the processes underlying intelligence; otherwise, there is a risk of arriving at conclusions that are misleading, if not simply wrong, when evaluating overall test scores or other assessments of performance. Suppose, for example, that a student performs poorly on the verbal analogies questions in a psychometric test. One possible conclusion is that the student does not reason well. An equally plausible interpretation, however, is that the student does not understand the words or is unable to read them in the first place. By using cognitive analysis, the test interpreter is able to determine the degree to which the poor score stems from low reasoning ability and the degree to which it results from not understanding the words. Underlying most cognitive approaches to intelligence is the assumption that intelligence comprises mental representations such as propositions or images of information and processes that can operate on such representations. A more-intelligent person is assumed to represent information more clearly and to operate faster on these representations. Researchers have sought to measure the speed of various types of thinking. Through mathematical modeling, they divide the overall time required to perform a task into the constituent times needed to execute each mental process. Usually, they assume that these processes are executed serially one after another and, hence, that the processing times are additive. But some investigators allow for parallel processing, in which more than one process is executed at the same time. Regardless of the type of model used, the fundamental unit of analysis is the sameâ€”that of a mental process acting upon a mental representation. A number of cognitive theories of intelligence have been developed. Among them is that of the American psychologists Earl B. Hunt, Nancy Frost, and Clifford E. Lunneborg, who in showed one way in which psychometrics and cognitive modeling could be combined. Instead of starting with conventional psychometric tests, they began with tasks that experimental psychologists were using in their laboratories to study the basic phenomena of cognition, such as perception, learning, and memory. They showed that individual differences in these tasks, which had never before been taken seriously, were in fact related although rather weakly to patterns of individual differences in psychometric intelligence test scores. Their results suggested that the basic cognitive processes are the building blocks of intelligence. The following example illustrates the kind of task Hunt and his colleagues studied in their research: The psychologists hypothesized that a critical ability underlying intelligence is the rapid retrieval of lexical information, such as letter names, from memory. Hence, they were interested in the time needed to react to the question about letter names. By subtracting the reaction time to the question about physical match from the reaction time to the

question about name match, they were able to isolate and set aside the time required for sheer speed of reading letters and pushing buttons on a computer. They found that the score differences seemed to predict psychometric test scores, especially those on tests of verbal ability such as reading comprehension. Hunt, Frost, and Lunneborg concluded that verbally facile people are those who are able to absorb and then retrieve from memory large amounts of verbal information in short amounts of time. The time factor was the significant development in this research. A few years later, Sternberg suggested an alternative approach that could resolve the weak relation between cognitive tasks and psychometric test scores. He argued that Hunt and his colleagues had tested for tasks that were limited to low-level cognitive processes. Although such processes may be involved in intelligence, Sternberg claimed that they were peripheral rather than central. He recommended that psychologists study the tasks found on intelligence tests and then identify the mental processes and strategies people use to perform those tasks. Sternberg began his study with the analogies cited earlier: By applying mathematical modeling techniques to reaction-time data, Sternberg isolated the components of information processing. He determined whether each experimental subject did, indeed, use these processes, how the processes were combined, how long each process took, and how susceptible each process was to error. Sternberg later showed that the same cognitive processes are involved in a wide variety of intellectual tasks. He subsequently concluded that these and other related processes underlie scores on intelligence tests. A different approach was taken in the work of the British psychologist Ian Deary, among others. He argued that inspection time is a particularly useful means of measuring intelligence. It is thought that individual differences in intelligence may derive in part from differences in the rate of intake and processing of simple stimulus information. In the inspection-time task, a person looks at two vertical lines of unequal length and is asked to identify which of the two is longer. Inspection time is the length of time of stimulus presentation each individual needs in order to discriminate which of the two lines is the longest. Some research suggests that more-intelligent individuals are able to discriminate the lengths of the lines in shorter inspection times. Other cognitive psychologists have studied human intelligence by constructing computer models of human cognition. Called the General Problem Solver , it could find solutions to a wide range of fairly structured problems, such as logical proofs and mathematical word problems. Most of the problems studied by Newell and Simon were fairly well structured, in that it was possible to identify a discrete set of steps that would lead from the beginning to the end of a problem. Other investigators have been concerned with other kinds of problems, such as how a text is comprehended or how people are reminded of things they already know when reading a text.

Chapter 4 : Intelligence quotient - Wikipedia

Changing Conceptions of Intelligence and Intellectual Functioning: Current Theory and Research.

Flynn effect Since the early 20th century, raw scores on IQ tests have increased in most parts of the world. The phenomenon of rising raw score performance means if test-takers are scored by a constant standard scoring rule, IQ test scores have been rising at an average rate of around three IQ points per decade. Flynn , the author who did the most to bring this phenomenon to the attention of psychologists. Mackintosh , noted the Flynn effect demolishes the fears that IQ would be decreased. He also asks whether it represents a real increase in intelligence beyond IQ scores. The phenomenon has been termed the negative Flynn effect. However, later researchers pointed out this phenomenon is related to the Flynn effect and is in part a cohort effect rather than a true aging effect. A variety of studies of IQ and aging have been conducted since the norming of the first Wechsler Intelligence Scale drew attention to IQ differences in different age groups of adults. Current consensus is that fluid intelligence generally declines with age after early adulthood, while crystallized intelligence remains intact. Both cohort effects the birth year of the test-takers and practice effects test-takers taking the same form of IQ test more than once must be controlled to gain accurate data. It is unclear whether any lifestyle intervention can preserve fluid intelligence into older ages. Cross-sectional studies usually show that especially fluid intelligence peaks at a relatively young age often in the early adulthood while longitudinal data mostly show that intelligence is stable until mid-adulthood or later. Subsequently, intelligence seems to decline slowly. Their relative importance has been the subject of much research and debate. Heritability of IQ and Environment and intelligence Heritability is defined as the proportion of variance in a trait which is attributable to genotype within a defined population in a specific environment. A number of points must be considered when interpreting heritability. Heritability measures how much of that variation is caused by genetics. The value of heritability can change if the impact of environment or of genes in the population is substantially altered. A high heritability of a trait does not mean environmental effects, such as learning, are not involved. Since heritability increases during childhood and adolescence, one should be cautious drawing conclusions regarding the role of genetics and environment from studies where the participants are not followed until they are adults. This shared family environment accounts for 0. By late adolescence, it is quite low zero in some studies. The effect for several other psychological traits is similar. These studies have not looked at the effects of such extreme environments, such as in abusive families. One suggestion is that children react differently to the same environment because of different genes. More likely influences may be the impact of peers and other experiences outside the family. Deary and colleagues reported that no finding of a strong single gene effect on IQ has been replicated. In this model, the Flynn effect can be explained by an increase in environmental stimulation independent of it being sought out by individuals. More intensive, but much smaller projects such as the Abecedarian Project have reported lasting effects, often on socioeconomic status variables, rather than IQ. A study on young adults published in April by a team from the Universities of Michigan and Bern supports the possibility of the transfer of fluid intelligence from specifically designed working memory training. Among other questions, it remains to be seen whether the results extend to other kinds of fluid intelligence tests than the matrix test used in the study, and if so, whether, after training, fluid intelligence measures retain their correlation with educational and occupational achievement or if the value of fluid intelligence for predicting performance on other tasks changes. It is also unclear whether the training is durable of extended periods of time. However, multiple attempted replications e. Neuroscience and intelligence Several neurophysiological factors have been correlated with intelligence in humans, including the ratio of brain weight to body weight and the size, shape, and activity level of different parts of the brain. Specific features that may affect IQ include the size and shape of the frontal lobes, the amount of blood and chemical activity in the frontal lobes, the total amount of gray matter in the brain, the overall thickness of the cortex, and the glucose metabolic rate. Impact of health on intelligence and Cognitive

epidemiology Health is important in understanding differences in IQ test scores and other measures of cognitive ability. Several factors can lead to significant cognitive impairment, particularly if they occur during pregnancy and childhood when the brain is growing and the bloodâ€"brain barrier is less effective. Such impairment may sometimes be permanent, sometimes be partially or wholly compensated for by later growth. Hassel postulated that it is by far the most important factor in determining population IQ. However, they also found that subsequent factors such as good nutrition and regular quality schooling can offset early negative effects to some extent. Developed nations have implemented several health policies regarding nutrients and toxins known to influence cognitive function. These include laws requiring fortification of certain food products and laws establishing safe levels of pollutants e. Improvements in nutrition, and in public policy in general, have been implicated in worldwide IQ increases. Researchers in the field argue that intelligence measured at an early age is an important predictor of later health and mortality differences. Knowns and Unknowns states that wherever it has been studied, children with high scores on tests of intelligence tend to learn more of what is taught in school than their lower-scoring peers. The correlation between IQ scores and grades is about. Achieving good grades depends on many factors other than IQ, such as "persistence, interest in school, and willingness to study" p. There have been two experiments with lowering this to 80 but in both cases these men could not master soldiering well enough to justify their costs. It is important to have enough of it, but having lots and lots does not buy you that much", [] [] large-scale longitudinal studies indicate an increase in IQ translates into an increase in performance at all levels of IQ: Some studies indicate that IQ is unrelated to net worth. Knowns and Unknowns stated that IQ scores accounted for explained variance about a quarter of the social status variance and one-sixth of the income variance. Statistical controls for parental SES eliminate about a quarter of this predictive power. Psychometric intelligence appears as only one of a great many factors that influence social outcomes. On pg of The g Factor , Arthur Jensen claims that although the correlation between IQ and income averages a moderate 0. A correlation of 0. The causal links between psychometric ability and social outcomes may be indirect. Children with poor scholastic performance may feel alienated. Consequently, they may be more likely to engage in delinquent behavior, compared to other children who do well. The Handbook of Crime Correlates stated that reviews have found that around eight IQ points, or 0. It has been suggested that this simply reflects that "only dumb ones get caught" but there is similarly a negative relation between IQ and self-reported offending. That children with conduct disorder have lower IQ than their peers "strongly argues" for the theory. These results were not "confounded by a measure of concentrated disadvantage that captures the effects of race, poverty, and other social disadvantages of the county.

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Chapter 5 : The Relationship of Intelligence and Adaptive Behavior - Mental Retardation - NCBI Bookshelf

Fry, P.S. (), INTRODUCTION: CHANGING CONCEPTIONS OF INTELLIGENCE AND INTELLECTUAL FUNCTIONING: CURRENT THEORY AND RESEARCH. International Journal of Psych,

An intellectual disability ID, formerly mental retardation is a specific type of disability. This disability is caused by significant limitations in intellectual functioning mental abilities. These limitations make it difficult to acquire important life skills. This is called adaptive functioning. Intellectual functioning is determined by many factors. However, a primary source of this capacity is mental ability or "intelligence. These abilities allow us to solve problems, to learn, and to use good judgment. One measure of intelligence is called the intelligence quotient, or IQ. There are standard tests that measure IQ. Because of how these tests are designed, These tests are discussed here. Although ID affects learning abilities, it is not the same as another type of disability called learning disability. Learning disabilities are limited to a specific type of learning. This type is called academic learning. These are the sorts of things taught in schools. Therefore, learning disabilities affect reading, writing, and math. In contrast, intellectual disabilities affect three different types of learning. These are academic learning, experiential learning, and social learning. Children with learning disabilities have trouble with one type; academic learning. Children with intellectual disabilities have trouble with all three: First, intellectual disabilities affect experiential learning. This type of learning occurs through cause and effect. For example, suppose a child touches a hot stove. This experience causes the child to learn to avoid touching a stove. A child with an ID does not learn from this painful experience. She does not understand the stove the cause caused the painful burn the effect. Second, intellectual disabilities affect social learning. This learning occurs by observing other people in social situations. We learn social customs and rules by watching others. For instance, we might notice it is customary to greet people by shaking hands or offering a hug. Social learning enables us to learn social skills. These skills are needed to get along well with other people. Moreover, social skills are critical to life success. Third, intellectual disabilities affect academic learning. We learn useful skills and knowledge via formal education. These skills are reading, writing, and math. Thus, learning disabilities differ from ID because learning disabilities are limited to academic skills. In contrast, IDs include many types of learning problems. These learning difficulties make it hard to develop many practical life skills. In addition to learning problems, limited intellectual functioning affects social and emotional functioning. Many persons with ID function on an emotional and social level far below what is average for their age. Some people consider this emotional immaturity an endearing quality. The child-like innocence, trust, wonder, and sincerity can be quite charming. However, these very same qualities make people vulnerable to victimization and cruelty.

Chapter 6 : Changing Perspectives About Intelligence

Abstract This special issue of The International Journal of Psychology is devoted to highlighting some of the writing and research being conducted in major laboratories in the western world: the United States, Canada, England, Europe and Australia.

Chapter 7 : Intelligence - Wikipedia

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Introduction Changing Conceptions of Intelligence and Intellectual Functioning: Current Theory and Research.