

Reference Support - Psychology Test III - IAS (Mains) 2016**1.a. "What is considered intelligent varies with culture." Explain.****10****Reference:**

In recent years, researchers in Africa, Asia and elsewhere have found that people in non-Western cultures often have ideas about intelligence that differ fundamentally from those that have shaped Western intelligence tests.

Research on those differences is already providing support for some of the more inclusive Western definitions of intelligence, such as those proposed by APA President Robert J. Sternberg, PhD, of Yale University and Howard Gardner, PhD, of Harvard University's Graduate School of Education (see related article). Eventually, it may also help researchers design new intelligence tests that are sensitive to the values of the cultures in which they are used.

Researchers of cultural differences in intelligence face a major challenge, however: balancing the desire to compare people from various cultures according to a standard measure with the need to assess people in the light of their own values and concepts, says Elena Grigorenko, PhD, deputy director of the Center for the Psychology of Abilities, Competencies and Expertise at Yale.

"On the one hand, mindless application of the same tests across cultures is desired by no one," she suggests. "On the other, everyone would like to be able to do at least some comparisons of people across cultures."

Thinking about thinking

Some cultural differences in intelligence play out on a global scale. In "The Geography of Thought" (Free Press, 2003), Richard Nisbett, PhD, co-director of the Culture and Cognition Program at the University of Michigan, argues that East Asian and Western cultures have developed cognitive styles that differ in fundamental ways, including in how intelligence is understood.

People in Western cultures, he suggests, tend to view intelligence as a means for individuals to devise categories and to engage in rational debate, while people in Eastern cultures see it as a way for members of a community to recognize contradiction and complexity and to play their social roles successfully.

Other researchers have come to similar conclusions. In a study published in *Intelligence* (Vol. 25, No. 1), Sternberg and Shih-ying Yang, PhD, of National Chi-Nan University in Taiwan, found that Taiwanese-Chinese conceptions of intelligence emphasize understanding and relating to others—including knowing

when to show and when not to show one's intelligence. Such differences between Eastern and Western views of intelligence are tied, says Nisbett, to differences in the basic cognitive processes of people in Eastern and Western cultures.

University of California, Berkeley, psychologist Kaiping Peng, PhD, who has collaborated with Nisbett on a number of studies, also believes that there are differences between the cognitive styles of people raised in Eastern and Western cultures. But, like Nisbett, he cautions against the simplistic idea that everyone raised in a particular culture will share equally in that culture's style of thinking, or that someone raised in one culture will be unable to learn the cognitive style of another.

"I don't believe that simply because you are born Asian means you will think like Asians," says Peng. "Culture is not just race, nationality or any particular social category--culture is experience."

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The distinction between East Asia and the West is only one of many cultural distinctions that separate different ways of thinking about intelligence. Robert Serpell, PhD, who is returning this year to the University of Zambia after 13 years at the University of Maryland, Baltimore County, has studied concepts of intelligence in rural African communities since the 1970s.

Serpell and others have found that people in some African communities--especially where Western schooling has not yet become common--tend to blur the Western distinction between intelligence and social competence. In rural Zambia, for instance, the concept of nzelu includes both cleverness (chenjela) and responsibility (tumikila).

"When rural parents in Africa talk about the intelligence of children, they prefer not to separate the cognitive speed aspect of intelligence from the social responsibility aspect," says Serpell.

Over the past several years, Sternberg and Grigorenko also have investigated concepts of intelligence in Africa. Among the Luo people in rural Kenya, Grigorenko and her collaborators have found that ideas about intelligence consist of four broad concepts: riekio, which largely corresponds to the Western idea of academic intelligence, but also includes specific skills; luoro, which includes social qualities like respect, responsibility and consideration; paro, or practical thinking; and winjo, or comprehension. Only one of the four--riekio--is correlated with traditional Western measures of intelligence.

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In another study in the same community, Sternberg and his collaborators found that children who score highly on a test of knowledge about medicinal herbs--a measure of practical intelligence--tend to score poorly on tests of academic intelligence.

The results, published in the journal *Intelligence* (Vol. 29, No. 5), suggest that practical and academic intelligence can develop independently or even in conflict with each other, and that the values of a culture may shape the direction in which a child develops.

They also agree with studies in a number of countries, both industrialized and nonindustrialized, that suggest that people who are unable to solve complex problems in the abstract can often solve them when they are presented in a familiar context.

The end result of this research is twofold. As Sternberg has pointed out, lay theories of intelligence often lack the precision of scientific theories, but they can suggest new avenues of research, shed light on how people use intelligence in everyday life and highlight aspects of intelligence that scientific theories have ignored. Studying intelligence in different cultures can thus be a way of challenging conventional Western ideas about intelligence.

Research in non-Western cultures can also be directly useful to people in those cultures. It indicates the extent to which Western intelligence tests measure what those cultures are interested in measuring, and it may suggest alternative, culturally appropriate methods of assessing skills and abilities.

'Culture free?'

Are "culture-free" or "culture-fair" intelligence tests possible, or is success on a test inevitably influenced by familiarity with the culture in which the test was developed?

Moreover, is it desirable--or even possible--to adapt Western tests to non-Western cultures, or should new tests be designed from the ground up to measure skills and abilities valued by the culture in which they are to be used?

Many psychologists believe that the idea that a test can be completely absent of cultural bias--a recurrent hope of test developers in the 20th century--is contradicted by the weight of the evidence. Raven's Progressive Matrices, for example, is one of several nonverbal intelligence tests that were originally advertised as "culture free," but are now recognized as culturally loaded.

Patricia Greenfield, PhD, of the University of California, Los Angeles, argues that nonverbal intelligence tests are based on cultural constructs, such as the matrix, that are ubiquitous in some cultures but almost nonexistent in others. In societies where formal schooling is common, she says, students gain an early familiarity with organizing items into rows and columns, which gives them an advantage over test-takers in cultures where formal schooling is rare.

Similarly, says Greenfield, media technologies like television, film and video games give test-takers from cultures where those technologies are widespread an advantage on visual tests, while test-takers from cultures where the language-based media are more common have advantages on verbal tests.

"I think it's important to point out that nonverbal tests or visual tests are the most culture-bound of all," she says. "They are not 'culture free' and they are not 'culture fair'; in fact, they are less fair than verbal tests."

Greenfield does not, however, believe that administering valid tests of ability in other cultures is impossible--just that it requires a deep familiarity with each culture's values and practices.

Recently, she and Ashley Maynard, PhD, now a professor of psychology at the University of Hawaii, conducted studies of cognitive development among children in a Zinacantec Mayan village in Chiapas, Mexico, using toy looms, spools of thread and other materials drawn from the local environment. The research convinced Greenfield that the children's development can be validly compared to the progression described by Western theories of development, but only by using testing materials and experimental designs based on the Zinacantec culture.

According to Serpell, simply translating a Western test into the local language is not enough. Instead, it is critical to tailor each test to the needs and values of the culture in which it is to be used.

Unless that happens, says Serpell, "you're just going to be able to pick out more efficiently those individuals who would be considered intelligent by Western standards, but you're not going to be able to answer the question of whether you're picking out people who are most intelligent according to the standards of their culture."

1.b. What could be the possible functions of stimulus generalization? Give a suitable example. 10

Reference:

A number of attempts have been made to understand the causes of generalization (reviewed in Kalish 1969; Mackintosh 1974). Theorizing about mechanisms has considered properties of stimuli, sense organs and neural processing, and how these factors interact. Physical similarity between stimuli is one cause of generalization. Stimuli may be similar because they share common components, and generalization may follow because novel stimuli include components also present in familiar stimuli (e.g. Thorndike 1911; Guthrie 1930, 1935; Blough 1975; Rescorla 1976). However, not all stimuli are made up of 'components' in this sense (e.g. light and sound spectra). In general, what is similar and different to an organism depends also on properties of receptors and the organization of sense organs (including early processing of neural signals within sense organs). These factors determine how physical similarity translates into similarity of nervous signals to the brain, and will thus contribute to generalization. Receptors and sense organs have often been ignored, especially in contemporary psychological models (but not always in early ones, Hull 1943; Schlosberg & Solomon 1943; Hebb 1949). By considering them it may be possible to account for both rearrangement generalization and intensity generalization within the same model, by recognizing that similarity depends upon which receptors are stimulated and to what degree (Ghirlanda 2002).

Generalization is also modulated centrally in the nervous system. Suggestions about how this occurs vary in detail, but the core idea is that processing of stimuli that are distinctly different can rely, at least to some extent, on the same nerve cells and connections (Pavlov 1927; Hebb 1949; Horne 1965; Thompson 1965; Baerends & Krujit 1973; Blough 1975; Lorenz 1981). Distinct stimuli may thus come to elicit similar responses. Generalization of this kind is strongly dependent on experience (including the species'

experience, coded in the genes). Often generalization is substantial along dimensions with which the organism has little experience (Peterson 1962; Rubel & Rosenthal 1975; Kerr et al. 1979). Along familiar dimensions organisms generalize less: latent learning, perceptual learning and discriminations between similar stimuli all decrease generalization (Mackintosh et al. 1991; Bennett et al. 1994; see also above). Discrimination learning, in particular, can substantially lower generalization, presumably up to sensory limits.

There is of course also a functional side to generalization. Evolution has favoured those behaviour mechanisms that are 'intelligent' towards the real world. For instance, stimuli that are similar to one another often share some causal relation with events in the outside world. Animals detect and use such regularities, generalizing knowledge about familiar situations to novel ones. In addition, animals use general methods to cope with novelty, including exploratory and avoidance behaviour. Observed similarities in generalization across taxa may indicate that evolutionary strategies to deal with novelty are limited. Note that, without generalization, learning itself would be seriously limited: by trying out different responses to novel stimuli animals can adapt by learning, but without generalization possibly productive responses would never be tested. Whether everything about generalization is functional is more uncertain (Enquist & Arak 1998; Enquist et al. 2002a). Characteristics that seem difficult to explain as adaptive include, for instance, the two- or three-fold increase in responding along intensity dimensions, and biases within sets of stimuli with the same consequences.

1.c. What do you understand by Mand and Tact, as verbal operants of language development? 10

Reference:

MAND

Mand is a term that B.F. Skinner used to describe a verbal operant in which the response is reinforced by a characteristic consequence and is therefore under the functional control of relevant conditions of deprivation or aversive stimulation. One cannot determine, based on form alone, whether a response is a mand; it is necessary to know the kinds of variables controlling a response in order to identify a verbal operant. A mand is sometimes said to "specify its reinforcement" although this is not always the case. Skinner introduced the mand as one of six primary verbal operants in his 1957 work, *Verbal Behavior*.

Chapter three of Skinner's work, *Verbal Behavior*, discusses a functional relationship called the mand. A mand is a form of verbal behavior that is controlled by deprivation, satiation, or what is now called motivating operations (MO), as well as a controlling history. An example of this would be asking for water when one is water deprived ("thirsty"). It is tempting to say that a mand describes its reinforcer, which it sometimes does. But many mands have no correspondence to the reinforcer. For example, a loud knock may be a mand "open the door" and a servant may be called by a hand clap as much as a child might "ask for milk".

Mands differ from other verbal operants in that they primarily benefit the speaker, whereas other verbal operants function primarily for the benefit of the listener. This is not to say that mands function exclusively in favor of the speaker, however; Skinner gives the example of the advice, "Go west!" as having the potential to yield consequences which will be reinforcing to both speaker and listener. When warnings such as "Look out!" are heeded, the listener may avoid aversive stimulation.

The Lamarre & Holland (1985) study on mands would be one example of a research study in this area.

Dynamic properties

The mand form, being under the control of deprivation and stimulation, will vary in energy level. Dynamic qualities are to be understood as variations that arise as a function of multiple causes. Dynamic in this case is opposed how someone reading from a text might sound if they do not simulate the normal dynamic qualities of verbal behavior. Mands tend to be permanent when they are acquired.

Extended mands

Emitting mands to objects or animals that cannot possibly supply an appropriate response would be an example of the extended mand. Telling "stop!" to someone out of earshot, perhaps in a film, who is about to hurt themselves is an example of the extended mand. Extended mands occur due to extended stimulus control. In the case of an extended mand, the listener is unable to deliver consequences that would reinforce the mand, but they have enough in common with listeners that have previously reinforced the mand that stimulus control can be inferred.

Superstitious mands

Mands directed to inanimate objects may be said to be superstitious mands. Mands to an unreliable car to "come on and start" for example may be due to a history of intermittent reinforcement.

Magical mands

A magical mand is a mand form where the consequences have never occurred that are specified in the mand. The form "I wish I had a million dollars" has never before produced a million dollars might be said to be magical. Skinner posits that many literary mands are of the magical form. Prayer might also be analyzed as belonging in one of the above three categories, depending upon one's opinion of the likelihood and mechanism of its answer.

TACT

Tact is a term that B.F. Skinner used to describe a verbal operant in which a certain response is evoked (or at least strengthened) by a particular object or event, or property of an object or event. More generally, the tact is verbal contact with the physical world.

Chapter Five of Skinner's Verbal Behavior discusses the tact in depth. A tact is said to "make contact with" the world, and refers to behavior that is under the control of generalized reinforcement. The controlling antecedent stimulus is nonverbal, and constitutes some portion of "the whole of the physical environment".

Less technically, a tact is like a label for something, though the concept of a tact is far more complicated. Some portion of the environment is present, for example a tree, a person makes a particular response pattern (in this case he or she will say "Tree") and a listener will provide some non-specific reinforcer (the listener might say "Correct!").

The tact can be extended, as in generic, metaphorical, metonymical, solecistic, nomination, and "guessing" tact. It can also be involved in abstraction. Lowe, Horne, Harris & Randle (2002) would be one example of recent work in tacts.

Extensions

The tact is said to be capable of generic extension. For example, something might be called a car; then something like the old object called a car is also called a car.

Tacts can be extended metaphorically, as when we describe something as "exploding with taste" by drawing the common property of an explosion with the response to our having eaten something (perhaps a strong response, or a sudden one).

Tacts can undergo metonymical extension when things that are paired together frequently are then used to stand for each other; as "The White House released a statement" when the President and The White House are paired together frequently so as to be "interchangeable".

When controlling variables unrelated to standard or immediate reinforcement take over control of the tact, it is said to be solecistically extended. Malapropisms, solecism and catachresis are examples of this.

Skinner notes things like serial order, or conspicuous features of an object, may come to play as nominative tacts. A proper name may arise as a result of the tact. For example, a house that is haunted becomes "The Haunted House" as a nominative extension to the tact of its being haunted.

A guess may seemingly be the emission of a response in the absence of controlling stimuli. Skinner notes that this may simply be a tact under more subtle or hidden controlling variables, although this is not always the case in something like guessing the landing side of a coin toss where the possible alternatives are fixed and there is no subtle or hidden stimuli to control responding.

The tact described by Skinner in chapter 5 of his book Verbal Behavior includes three important and related events, known as the 3-term-contingency: a stimulus, a response, and a consequence, in this

case reinforcement. A verbal response is occasioned by the presence of a stimulus, such as when you say “ball” in the presence of a ball. In this scenario, “ball” is more likely to be reinforced by the listener than saying “cat,” showing the importance of the third even, reinforcement, in relation to the stimulus (ball) and response (“ball”). Although the stimulus controls the response, it is the verbal community which establishes the stimulus’ control over the verbal response of the speaker. For example, a child may say “ball” in the presence of a ball (stimulus), the child’s parent may respond “yes, that is a ball,” (reinforcement) thereby increasing the probability that the child will say ball in the presence of a ball in the future. But if the parent never responds to the child saying “ball” in the presence of a ball then that response will cease to be emitted. It is important to note, though, that tact can only occur in the presence of, or immediately after the stimulus; so talking about a ball you saw yesterday would be tacting. While naming is also a form of a tact, saying “the red book” in the presence of a red book, a tact involves more than what is described above. For example, saying “Good Morning” to a person for the first time in the morning is also a tact, the presence of that person is the stimulus for the response.

1.d. Write a short note on interactionist perspective of language development.

10

Reference:

The interactionist perspective of language development, consists of two components. This perspective is a combination of both the nativist and behaviorist theories. The first part, the information-processing theories, tests through the connectionist model, using statistics. From these theories, we see that the brain is excellent at detecting patterns. The second part of the interactionist perspective, is the social-interactionist theories. These theories suggest that there is a native desire to understand others as well as being understood by others.

SOCIAL INTERACTIONIST THEORY

Social Interactionist Theory is number of proven hypotheses of language acquisition methods in which a variety of its forms including written, spoken, or visual as a social tool consisting of a complex system of symbols and rules on the question of language acquisition and development—the compromise between “nature” and “nurture” is the “Interactionist” approach which demands a particular type of syntagma in recognizing that many factors influence language development.

Initial stages

The Social Interactionist approach to language acquisition research has focused on three areas, namely the cognitive approach to language acquisition or the developmental cognitive theory of Jean Piaget, the information processing approach or the information processing model of Brian MacWhinney and Elizabeth Bates (the competition model), and the social interactionist approach or social interaction model of Lev Vygotsky (socio-cultural theory). Although the initial research was essentially descriptive in an attempt to describe language development from the stand point of social development, more recently, researchers have been attempting to explain a few varieties of acquisition in which learner

factors lead to differential acquisition by the process of socialization; called the theory of “social interactionist approach”.

1.e. In what ways was Tolman’s approach similar to that of behaviorists such as Watson? In what ways did it differ?

10

Reference:

The emergence of two theories

S–R theory

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When a cat escaped from the puzzle box and ate the food, Thorndike believed that the resulting pleasure stamped in an association between the impulse to make the response and the sense impressions that accompanied it. This associative account differed markedly from the mentalistic interpretations of animal behavior that preceded it, but in one respect it was still not sufficiently radical for early behaviorists such as John B. Watson (1913). The problem, for Watson, was that Thorndike still assumed that associations were formed between *sensations* and *impulses* – mental events inside the animal’s head. The stamping in of an association, moreover, was attributed to the feelings of *pleasure* that followed it. But how could anyone know what sensations or emotions were going on inside an animal’s head? And what value is there in explaining an animal’s behavior in terms of its mental states if there is no way of determining the accuracy of these explanations?

The essence of the scientific method – the quality that distinguishes it from other intellectual pursuits such as literary criticism or philosophy – is that scientific debates are settled by evidence. If a physicist makes what on the surface seems a totally absurd claim – for example, that no object can move faster than the speed of light, and that no matter how much energy is invested, this maximum speed cannot be exceeded by even 1 millimeter per second – then this claim is evaluated solely by how it fits with evidence, rather than whether it sounds plausible. This emphasis on evidence rather than on opinion allows science to progress, rather than becoming bogged down in unresolvable differences of opinion. Watson argued that mental explanations do not allow this evidence-based approach, because we cannot know what an animal is thinking or feeling.

Injunctions to avoid all references to the mind were hard enough to accept with animal behavior, but Watson went further and argued that the same prohibition should apply to explanations of human behavior. The problem is fundamentally the same: We can observe other people’s behavior – we see them smiling, for example – but we cannot directly observe their emotions, and the inferences we make about these emotions might be very wrong. (As Shakespeare’s Hamlet warned, “one may smile, and smile, and be a villain.”) Any explanation that attributes people’s behavior to their thoughts or feelings, therefore, is untestable because we cannot be sure what these feelings are.

Watson therefore argued that behavior should be explained in terms of *visible* events, because only explanations stated in these terms could be objectively tested. Applying this analysis to reinforcement, Watson agreed with Thorndike's emphasis on associations but rejected the assumption that these associations were formed between mental events. Where Thorndike spoke of a sense impression or sensation, Watson and other behaviorists substituted the visible object in the environment that gave rise to it – the *stimulus*. And when Thorndike spoke of mental impulses to respond, behaviorists substituted the muscular movements that resulted from these impulses – the *response*. Reinforcement, in their view, strengthens an association between an environmental stimulus and a response, and for this reason this view became known as **stimulus–response** or **S–R theory**.

A cognitive rejoinder

Early cognitive psychologists vehemently disagreed with this behaviorist analysis. Even if mental states were sometimes difficult to observe, they play a crucial role in determining our behavior, and it would thus be folly to ignore them. A vivid statement of this view came from William McDougall, a social psychologist and contemporary of Watson's. In the course of an entertaining and sometimes caustic debate with Watson, staged in 1929, McDougall asked his listeners to imagine the following scene:

I come into the hall and see a man on the platform scraping the guts of a cat with hairs from the tail of a horse; and, sitting silently in attitudes of rapt attention, are a thousand persons who presently break out into wild applause. How will the Behaviorist explain these strange incidents: How explain the fact that vibrations emitted by the cat-gut stimulate all the thousand into absolute silence and quiescence; and the further fact that the cessation of the stimulus seems to be a stimulus to the most frantic activity? Common sense and psychology agree in accepting the explanation that the audience heard the music with keen pleasure and vented their gratitude and admiration for the artist in shouts and hand clappings. But the Behaviorist knows nothing of pleasure and pain, of admiration and gratitude. He has relegated all such "metaphysical entities" to the dust heap, and must seek some other explanation. Let us leave him seeking it. The search will keep him harmlessly occupied for some centuries to come. (Watson and McDougall, 1929, pp. 68–69)

One of the most influential of the early cognitive theorists was Edward C. Tolman, and his explanation of how animals learn differed markedly from that of S–R theorists. Tolman argued that learning was a far more complex, thoughtful process than simply forming associations. He said that animals did not blunder about responding blindly to the stimuli they happened to encounter; instead, they actively sought to understand the world around them and responded to this world purposefully, choosing the course of action best suited to achieving their goals. In the case of Thorndike's cats, Tolman would have said that the cats formed an **expectation** that pressing the latch would open the door, and that they pressed the latch with the deliberate intention of obtaining food.

Convergence: intervening variables

At this point the positions of the two sides were about as far apart as they could be, with behaviorists arguing that it was not possible to discuss mental events and cognitive psychologists arguing that it was not possible to ignore them. Over time, however, the positions of the two sides moved much closer. Tolman played a particularly influential role in this convergence. Although his work emphasized the role of mental or cognitive processes in behavior, he was also, perhaps surprisingly, a behaviorist. He was familiar with introspectionists' efforts to study the mind through introspective reports (see Chapter 1), and, like Watson, believed that these efforts had failed. Too much of the mind's workings was unconscious, and even when introspectionists were able to report on their experiences, their reports were often contradictory. The fact that we cannot observe other people's mental states directly, however, does not mean that we cannot have *theories* about what these processes might be.

To understand Tolman's approach, it may help to begin by considering the role of theories in other sciences. Consider Newton's theory of gravity. No one has ever seen gravity, but this did not prevent Newton from putting forward a theory about the properties of this invisible force. His theory specified the precise effects gravity would have on visible objects such as apples and planets, and it was the fact that these predictions could be tested, and when tested proved correct, that led to the theory's rapid acceptance. The fact that something cannot be seen, in other words, is not a barrier to creating a theory about it, *provided* that the theory leads to testable predictions.

This requirement of testability is crucial. The characteristic of science that distinguishes it from other approaches is that explanations are judged by evidence. In religion, for example, one person may believe passionately in religion A and another in religion B, and there is no way to prove which is right. In science, by contrast, theories are judged by the accuracy of their predictions. If theory A predicts behavior more successfully than theory B, then we must prefer theory A – at least until some more accurate account comes along.

One implication of this approach worth emphasizing, because it is so counterintuitive, is that it does not really matter whether a theory is plausible – all that matters is its success in accounting for known phenomena and predicting new ones. In physics, for example, some current theories are so counterintuitive as to verge on the bizarre. Einstein's theory of relativity posits that space is curved, even if that space is totally empty, and one of the key assumptions of quantum physics is that a particle can be in two places at the same time. These theories may not make sense, but they have proved extraordinarily successful in predicting characteristics of the universe, and for this reason are now widely accepted. Applying this logic to psychology, Tolman proposed that psychologists should also be able to create theories about mental events that they could not see, provided that their theories led to testable predictions. He used the term **intervening variable** to describe any internal event *X* that intervened between the presentation of a stimulus and the eventual occurrence of a response:

$$S \rightarrow [X] \rightarrow R$$

It was acceptable to theorize about the existence of such intervening variables, he said, provided that the theory was stated clearly enough to predict whether the presentation of stimulus *S* will trigger *X*,

and whether the occurrence of *X* will in turn lead to response *R*. Provided that these relationships are stated clearly, we can then evaluate the theory by seeing if the stimulus really does lead to the predicted response.

Behaviorists initially opposed the discussion of mental events, but evidence for phenomena such as *latent learning* and *learning without responding* (for reviews, see Goldstein, Krantz, and Rains, 1965; Lieberman, 2004) convinced S–R theorists that they too would need to posit the existence of internal processes if they were to explain behavior¹ (e.g., Hull, 1943).

One notable exception was B. F. Skinner, who believed that behavior should always be explained in terms of the environmental and genetic factors that give rise to it, rather than through mental states (e.g., Skinner, 1950). Skinner did not deny the existence of mental states; he simply believed that any practical science of behavior would ultimately have to focus on the environmental variables that shape behavior, and that theorizing about mental states would distract psychologists from this focus. A full discussion of Skinner's views would take us too far afield, but we should note that many psychologists still accept his view, and that his emphasis on the practical Both sides thus came to share the view that any successful account of reinforcement would need to consider what was going on inside the brain when a reinforcer was presented. They still differed sharply, however, in their views of what these internal processes were.

For S–R theorists, learning was still an essentially simple process involving the formation of associations, even if some of these associations might not be observable. For Tolman, learning involved much more sophisticated processes such as expectations. In the case of the puzzle box, for example, S–R theorists believed that food would stamp in an association between the response of pressing the latch and the box stimuli that were present, so that the box would thereafter elicit the correct response automatically:

***S*box → *R*press**

Tolman, on the other hand, believed that the cats learned that the door would open when they pressed the latch, and so pressed the latch in order to obtain the food. Thus where S–R theorists saw animals pressing the latch blindly, without knowledge of the consequences, Tolman believed that the cats pressed because they knew that doing so would open the door and provide access to food. So, which view was right?

2.a. Can there be a common ground between behaviorist principles of conditioning, theories of social learning and psychodynamic theories of human behavior? Critically evaluate. 20

Reference:

Dollard and Miller (1950) explicitly stated their intention to translate psychoanalytic theory into Hullian terms. Their hope was that psychoanalytic constructs, based as they are upon inner experience and

dynamics, could be translated into a set of theoretical constructs more relevant to observable behavior, which then could be subjected to empirical test more easily than the constructs which served as their original model. Derived as it was from the Freudian position, their view of the infantile origins of dependency, emphasized feeding, hunger, and orality, although other primary physiological drives were not altogether omitted from consideration.

In the first year of its life the human infant has the cues from its mother associated with the primary reward of feeding on more than 2,000 occasions. Meanwhile the mother and other people are ministering to many other needs. In general there is a correlation between the absence of people and the prolongation of suffering from hunger, cold, pain, and other drives; the appearance of a person is associated with a reinforcing reduction in the drive. Therefore the proper conditions are present for the infant to learn to attach strong reinforcement value to a variety of cues from the nearness of the mother and other adults [It] seems reasonable to advance the hypothesis that the . . . human motives of sociability, dependence, need to receive and show affection, and desire for approval from others are learned [Dollard & Miller, 1950, pp. 91-92].

Dollard and Miller resembled the Freudians in believing that derivative or secondary drives remain forever linked to their original primary drive roots. "These learned drives are acquired on the basis of primary drives, represent elaborations of them, and serve as a facade behind which the functions of the underlying innate drives are hidden". Others leaned rather to the principle of functional autonomy (Allport 1937). Thus, for example, Sears, Maccoby, and Levin (1957) say: "In the long run, a child seems to develop a 'need' for these surrounding things [the circumstances surrounding the food-the mother's talking, hugging, smiling, and so on] that is quite separate from his 'need' for food. They become 'rewards' for him, loved and desired objects or situations which he will strive to attain" (pp. 14-15). Although at first the baby merely seeks gratification and the mother is the gratifying agent, later he seeks the mother as an end in herself.

The social learning theorists do not give more than casual attention to a catalog of the primary drives upon which the secondary dependency drive depends. They mention hunger, thirst, pain, discomfort, cold, and wet. Some of them imply that there is a primary need for physical contact; others assume that this too is an acquired drive. Perhaps the reason for the casualness is that all of these drives, whether primary or secondary, are gratified in the course of the mother's care. The mother's nurturance is a necessary condition for the acquisition of dependency. According to Sears, Rau, and Alpert (1965), the concept of dependency is equivalent to and derived from Murray's (1938) need for succorance "the need for or dependence upon a nurturing object that must be always at hand or within call." The link between dependency and nurturance recurs throughout the dependency literature, and the most important aspect of nurturance is usually specified as the provision of food. Beller (1955) provided a very explicit account of how the dependency drive develops:

The parent and his behavior constitute a complex stimulus situation for the infant. Certain aspects of this situation may be assumed to occur regularly and repeatedly when the child experiences drive reduction, and therefore will acquire reward value by association. For instance, the infant experiences physical

contact with the parent while it also experiences reduction of its hunger drive through food intake. Thus physical contact with the parent, and later with people generally, acquires properties similar to those of food. just as in the case of food and hunger drive, the child will eventually manifest various kinds of behavior which will be terminated by mere physical contact with the parent. Conversely, when such behavior fails to lead to physical contact, frustration will set in. When this occurs the child may be said to have developed a secondary drive for physical contact. Second as the child's sensory apparatus develops and he no longer needs to be held during feeding, proximity to the parent acquires properties similar to those for physical contact [p. 25].

Along the similar lines various psychoanalytic/psycho-dynamic terms e.g. internalization, introjection, identification, inferiority complex, identity crisis etc. could be correlated with Social learning theories by Bandura with the help of concepts like, observational learning, self-efficacy, model imitation/behavior etc.

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And further, all the intricacies of Social learning theories could be explained with the help of Skinner's Radical behaviorism.

2.b. Discuss the implications of learned helplessness in various psycho-social pathologies with the help of suitable examples.

15

Reference:

More than 2 decades ago, researchers in the field of learned helplessness began to find in animals that encountering uncontrollable bad events resulted in inadequate rejection of implanted tumors and inadequate immune function. 2,3 Findings in these well-controlled studies were in line with the more anecdotal evidence on helplessness and mortality that had steadily accumulated since the early writings of Curt Richter⁴ on sudden death and of George Engel on helplessness-hopelessness and physical illness.

Researchers of learned helplessness turned to the study of humans in the 1970s and pursued work on a trait that turned out to be a major amplifier of helplessness: pessimism and optimism. It was found that pessimistic individuals (people who interpret bad events as permanent and pervasive) became helpless and depressed more easily than optimists (who see bad events as temporary, controllable, and local).

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A questionnaire, the Attributional Style Questionnaire, was validated for optimism and pessimism and was widely used to predict depression.⁶ A content-analytic method of measuring optimism and pessimism was then derived to index this trait in people who do not take questionnaires, such as Presidents of the United States, sports heroes, and the dead. Pessimism measured in this way predicted poor health in late middle age as well as mortality. The content-analytic measure of optimism-pessimism has 2 disadvantages, however: it is labor-intensive, and it requires authentic, extensive written or spoken material from an individual's life. Since there was a clear prediction from the work on learned helplessness and on pessimism that pessimistic individuals are at risk for poor health and premature death, a better method allowing wider sampling for measuring pessimism was needed. In stepped

Robert Colligan. Large numbers of people have taken the MMPI over the last 50 years, he reasoned. Many of these people are now dead, but their age and health were well documented at the time they took the MMPI. Therefore, by content analyzing every item on the MMPI for pessimism and optimism, a subscale could be created that could then be used to test for the long-term effects of this trait on physical illness and mortality.⁹ And this is the second important aspect of the study by Maruta et al in this issue: they tested and confirmed the predictive validity of this derived, but easily used, measure of optimism and pessimism. They have opened the field to use this scale to predict much in the way of the specifics of physical illness and its sequel from optimism and pessimism and the medical records of the many individuals who have taken the MMPI earlier in their lives.

The “learned helplessness” theory of depression proposes that individuals are susceptible to depression because they have pessimistic attribution to neutral events. For example, during a basketball game a player might miss a shot. If they have a pessimistic attributional style, they may believe they missed the shot because they are hopeless. They have attributed this event to a cause that is internal (self-referent), stable (a personality characteristic), and global (likely to affect other situations). In contrast, a player who explains the missed goal as a result of being distracted attributes the failure to a cause that is external, unstable, and specific. Research indicates that a pessimistic attributional style interacts with subsequent negative life events to predict ensuing increases in depressed mood. In general, these findings are applicable to both males and females.

Seligman (1975) was studying escape learning and found that dogs, forced to stay in a box where they were repeatedly shocked, soon gave up and stopped trying to escape. Not surprising. Moreover, 65% of the dogs didn't try to escape the next day when the box was modified so they could easily escape. They just laid down and whined. They had learned helplessness. Seligman said human depression with its passivity and withdrawal might be due to "*learned helplessness*." This single study of dogs stirred enormous interest among experimental psychologists who had heretofore ignored the ancient idea of hopelessness. Within a few years the "helplessness" theory was being questioned because many people in helpless circumstances do not become depressed and because this theory does not explain the guilt, shame, and self-blame that often accompanies depression. How can you feel helpless, i.e. without any ability to control what happens, and, at the same time, feel at fault and guilty about what happened (Carson & Adams, 1981)?

A few years later, attribution and/or cognitive theory (Abramson, Seligman, & Teasdale, 1978) came to the rescue with the *reformulated helplessness theory*. This suggests that the depressed person thinks the cause is internal ("it's my fault"), stable ("things can't change"), and global ("this affects everything"). This is a very different theory (no experimentalist had ever theorized that the dogs blamed themselves). But soon there were more problems, e.g. research showed that most depressed people, like dogs, see the causes of their depression as being outside forces, not themselves (Costello, 1982).

Moreover, both the hopeless self-blamer and the hopeful self-helper see the causes of their behavior and feelings as being internal. So, internal causes may lead to optimism as well as pessimism. And,

finally again, how do we know that the feelings of helplessness or hopelessness precede and cause depression rather than just being a natural part of feeling depressed?

To deal with some of these difficulties, Abramson, Metalsky, & Alloy (1989) modified the helplessness theory into a still broader hopelessness theory. The more complex *hopelessness theory* contends that prior to becoming hopeless the person has (a) a negative cognitive or attribution style (see next two theories) and (b) some unfortunate, stressful experience. Because both of these factors are involved, some people with depression-prone thinking don't become depressed (by avoiding traumatic experiences) and some people go through awful experiences without getting depressed (by avoiding negative thinking). *The hopeless person expects bad things will happen* in important areas of his/her life (pessimism) and/or that hoped for good things will not happen, and he/she doesn't expect anything to change that miserable situation.

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Considerable research has supported parts of the hopelessness theory. For example, Metalsky & Joiner (1992) found that *three cognitive views*: (a) attributing bad events to unavoidable and far-reaching causes, (b) drawing negative conclusions about yourself from a negative event ("it means I'm worthless"), and (c) assuming one bad event will lead to others in the future, *when combined with high stress*, are associated with depression. In another study, they found that *low self-esteem* was another crucial ingredient in order to produce depression (Metalsky, Joiner, Hardin & Abramson, 1993). Please note: depression might be avoided by reducing your negative thinking habits, avoiding high stress, or by building your self-esteem. Of course, your needs and personality will determine how stressful a particular event will be for you. Segal (1992) found that recovered *dependent* depressives were plunged back into depression by a loss or conflict in interpersonal relationships. But, *self-critical* depressives relapsed when they failed at school or work. Only our most dreaded problems seem to set off depression.

This new hopelessness theory explains depression to a considerable extent on the basis of pessimistic *expectations of the future*. Traditional thinking and other theories (#1, #5, #8, #9, #10 & #13) say depression is caused by obsessing about losses in the *past*. Selective perception of the past is also thought to be important, e.g. self-critical people don't see their successes. Both backward-looking and forward-looking theories are probably true, sometimes. Some people regret the past ("Of all sad words of tongue and pen, the saddest are these, 'it might have been'") and others dread the future (because they will mess it up or have no control), and some do both. Maybe the negativism of some depressed people extends to everything--the past, the future, me, you, the world...

The therapy for helplessness and hopelessness includes (a) making more good things happen and/or increasing positive expectations, (b) increasing self-control (c) increasing tolerance of whatever happens, and (d) increasing one's optimism. Ideally, the depressed person will develop internal, stable, and global explanations (attributions) for *good* events, e.g. "I'm responsible for what happens, and I can make good things happen again in lots of areas." Likewise, the shift should be to believing that external, unstable, and specific factors account for unpleasant life-events, e.g. one of Seligman's better adjusted

dogs in the shock box might say, "this man is hurting me, he will surely stop soon, people only shock me in this box... and I will vigorously avoid getting into this box again. For now, I'll just tough it out."

2.c. What are the essential characteristics of giftedness? Critically evaluate the correlation between giftedness and depression. 15

Reference:

Characteristics of giftedness

Generally, gifted individuals learn more quickly, deeply, and broadly than their peers. Gifted children may learn to read early and operate at the same level as normal children who are significantly older. The gifted tend to demonstrate high reasoning ability, creativity, curiosity, a large vocabulary, and an excellent memory. They can often master concepts with few repetitions. They may also be physically and emotionally sensitive, perfectionistic, and may frequently question authority. Some have trouble relating to or communicating with their peers because of disparities in vocabulary size (especially in the early years), personality, interests and motivation. As children, they may prefer the company of older children or adults.

Giftedness is frequently not evenly distributed throughout all intellectual spheres; an individual may excel in solving logic problems and yet be a poor speller; another gifted individual may be able to read and write at a far above average level and yet have trouble with mathematics. It is possible there are different types of giftedness with their own unique features, just as there are different types of developmental delay.

Giftedness may become noticeable in individuals at different points of development. While early development (i.e. speaking or reading at a very young age) usually comes with giftedness, it is not a determinant of giftedness. The preschool years are when most gifted children begin to show the distinctive characteristics mentioned above. As the child becomes older, classes that are 'too easy' and emotional issues may slow or obstruct the rate of intellectual development.

Many gifted individuals experience various types of heightened awareness and may seem overly sensitive. These sensitivities may be to physical senses such as sight, sound, smell, movement and touch. For example, they may be extremely uncomfortable when they have a wrinkle in their sock, or unable to concentrate because of the sound of a clock ticking on the other side of the room. Sensitivities of the gifted are often to mental and emotional over-awareness. For example, picking up on the feelings of someone close to them, having extreme sensitivity to their own internal emotions, and taking in external information at a significantly higher rate than those around them. These various kinds of sensitivities often mean that the more gifted an individual is, the more input and awareness they experience, leading to the contradiction of them needing more time to process than others who are not gifted.

Hypersensitivity to external or internal stimuli can resemble a proneness to "sensory overload", which can cause such persons to avoid highly stimulating, chaotic or crowded environments. This kind of highly sensitive nature has also been called "overexcitability" by Kazimierz Dabrowski. Some are able to tune out such unwanted stimulation as they focus on their chosen task or on their own thoughts. In many cases, awareness may fluctuate between conditions of hyperstimulation and of withdrawal. (An individual's tendencies to feel overwhelmed is also affected by their extraversion and introversion.)

These conditions may appear to be very similar to symptoms of hyperactivity, bipolar disorder, ADHD, autism-spectrum conditions, and other psychological disorders, but are often explained by gifted education professionals by reference to Kazimierz Dabrowski's theory of Positive Disintegration. Some researchers focus on the study of overexcitabilities. Overexcitabilities refer to ways people, both children and adults, understand and experience the world around them (Gross 2008). The more channels of overexcitabilities that are open to receive the information or stimulus, the stronger or more intense the experience is.

According to Gross (2008), an individual response to a stimulus is determined by his/her dominant overexcitability. Overexcitabilities are expressed in five dimensions: psychomotor, sensual, intellectual, imaginal, and emotional. These dominant channels of acquiring information differ by quantity in some individuals.

Giftedness and Depression

It has been thought in the past that there is a correlation between giftedness and depression or suicide. This has generally not been proven. As Reis and Renzulli mention,

"With the exception of creatively gifted adolescents who are talented in writing or the visual arts, studies do not confirm that gifted individuals manifest significantly higher or lower rates or severity of depression than those for the general population...Gifted children's advanced cognitive abilities, social isolation, sensitivity, and uneven development may cause them to face some challenging social and emotional issues, but their problem-solving abilities, advanced social skills, moral reasoning, out-of-school interests, and satisfaction in achievement may help them to be more resilient."

Also, no research points to suicide rates being higher in gifted adolescents than other adolescents. However, a number of people have noted a higher incidence of existential depression, which is depression due to seemingly highly abstract concerns such as the finality of death, the ultimate unimportance of individual people, and the meaning (or lack thereof) of life. Gifted individuals are also more likely to feel existential anxiety.

Affect plays a key role in creative performance. Positive as well as negative affect, both enhance creativity depending upon the final orientation. If positive affect relaxes one's motivation or negative affect instills depression and inactivity, it will hamper creativity. If affect increases motivation in either of the case, will lead to increased creativity. In the case of genius, being on either side of the manic episode

or bipolar phase, they might create something truly exceptional, depending on the motivational orientation. On the other way, contrast between their earlier performances and current state of affairs becomes very sharp, eventually leading to acute depression and sense of worthlessness.

However, numerous studies have shown that an active depressive state impairs cognition because it retards neurogenesis in the hippocampus.

3.a. "Sitting in the same classroom, reading the same textbook, listening to the same teacher, boys and girls receive very different educations." Elucidate. 15

Reference:

GENDER DIFFERENCES AND GENDER BIAS www.numerons.wordpress.com

At the beginning of this chapter, we asked you to think about the ways in which friends and classmates over the past 12 or so years may have differed from one another. In all likelihood, you thought about how those people differed cognitively, socially, and emotionally. And with good reason. As we have seen so far in this chapter and in preceding ones, students' academic performance is strongly influenced by their cognitive, social, and emotional characteristics. But there is another major characteristic you may have ignored: gender. Although it may not be obvious, there are noticeable differences in the achievement patterns of males and females and in how they are taught. As Myra Sadker and David Sadker (1994) point out, "Sitting in the same classroom, reading the same textbook, listening to the same teacher, boys and girls receive very different educations" (p. 1). Just how different is the subject of the next few sections.

Gender Differences in Cognition and Achievement

A large body of research shows that there are reliable gender differences in cognitive functioning and achievement. On some tests, boys outscore girls, and on other tests girls have the upper hand (Halpern & LaMay, 2000; Royer, Tronsky, Chan, Jackson, & Marchant, 1999; Wigfield, Battle, Keller, & Eccles, 2002). Although these differences are statistically significant (meaning they are probably not due to chance), they tend to be modest in size—about 10 to 15 percentile ranks. As research on gender differences has continued, it appears that the differences that were found in earlier studies may be due to factors that go beyond cognitive abilities (Spelke, 2005). Generally, research on gender differences has found that males tend to outscore females on the following tests:

- *Visual-spatial ability.* This category includes tests of spatial perception, mental rotation, spatial visualization, and generation and maintenance of a spatial image. A substantial body of research exists indicating that male superiority in visual-spatial ability appears during the preschool years and persists throughout the life span. More recent research suggests that the male advantage in spatial tasks is true only for children from middle-

and high-SES groups. When males and females from low-SES groups are compared, no difference exists (Levine, Vasilyeva, Lourenco, Newcombe, & Huttenlocher, 2005).

- *Mathematical reasoning.* This difference, thought to be related to males' superior visual-spatial skill, may have more to do with social influences on academic and career choices than with cognitive abilities. When such influences are taken into account, more recent analyses of gender differences do not always show that males are superior to females (Halpern, Wai, & Saw, 2005).
- *College entrance.* Tests such as the SAT Reasoning Test (which includes mathematical reasoning) are designed to predict grade-point average after the freshman year of college. The overall superiority of males in this category may be related to differences in mathematical experiences, which may give them increased opportunity to develop mathematical reasoning.

Research shows that females tend to outscore males on the following tests:

- *Memory.* This is a broad category that includes memory for words from word lists, working memory (the number of pieces of information that one is aware of and that are available for immediate use), name-face associations, first-last name associations, memory for spatial locations, and episodic memory (memories for the events in one's own life). This difference appears to persist throughout the life span.
- *Language use.* This is another broad category that encompasses tests of spelling, reading comprehension, writing, onset of speech, and rate of vocabulary growth. Gender differences in language use appear anywhere between one and five years of age and grow larger over time. For example, the average difference in the size of males' and females' vocabulary at sixteen, twenty, and twenty-four months of age is 13, 51, and 115 words, respectively. On tests of reading comprehension, the gender gap also grows larger over time. By the senior year of high school, girls outscore boys by almost 10 percentile ranks. The superior scores that girls get on tests of writing are due in large part to the fact that their essays are better organized, more grammatically correct, and more logical. It is worth noting that although these writing skills would strike most people as being reflective of intelligence, they are not part of standardized tests of intelligence.

Just as gender differences appear on tests of cognitive skills, the same differences appear in academic performance. A 1999 study of mathematics achievement among eighth graders in 38 countries concluded that most of the participating countries, including the United States, were making progress toward gender equity in mathematics education, but the study found a few notable differences between the genders (Mullis et al., 2001). Among the major findings were the following:

- In most countries, the mathematics achievement differences between boys and girls were statistically non-significant. Boys significantly outscored girls in only four countries: Israel, the Czech Republic, Iran, and Tunisia.
- There was, however, a modest overall significant difference in favor of boys.
- A slightly higher percentage of boys had scores above the median (the midpoint of a distribution) and above the 75th percentile.

Although gender differences have been found and documented in the research literature over many years, recent research that takes into account a number of social and cultural factors is calling many of the “well-established” findings into question. Even so, gender differences have been and continue to be found.

Why do gender differences in cognition and achievement exist? No one knows for sure, although hormonal differences, differences in brain structure, differences in cognitive processes, and socialization differences are all thought to play a role. Despite increased awareness of how society reinforces gender-role stereotyping and measures taken to ensure greater gender equity, girls and boys continue to receive different messages about what is considered to be appropriate behavior. Are gender differences the result of social pressures to participate in some activities and not others, or are socialization patterns the result of biological differences, or do both factors play a role? We simply do not know yet.

In addition to gender differences on tests of cognitive skills and in academic performance, students' emotional reactions to grades show gender differences. A study of more than 900 fourth-, fifth-, and sixth-grade children (Pomerantz, 2002) showed that the girls on average received higher grades than the boys in language arts, social studies, science, and mathematics. But, somewhat unexpectedly, girls expressed greater worry about academic performance, higher levels of general anxiety, and higher levels of depression. The girls' perceived self-competence was lower than that of the boys for social studies, science, and math.

To put this picture in stark terms, girls achieve higher grades than boys but don't seem to be able to enjoy the fruits of their labors as much. One possibility is that girls are more concerned than boys with pleasing teachers and parents. Thus failure or lower-than-expected achievement is interpreted as disappointing those on whom they depend for approval. Another possibility is that girls are more likely than boys to use academic performance as an indicator of their abilities, spurring them to higher levels of learning, as well as higher levels of internal distress because of the possibility of failure. Boys may be better able to maintain higher levels of self-confidence by denying the link between performance and ability.

A more recent study by Angela Duckworth and Martin Seligman (2006) offers an alternative, but related, explanation for the existence of gender differences in cognition and achievement. They note that throughout the school-age years, girls earn higher grades than boys in all major subjects, even though girls do not perform better than boys on achievement or IQ tests. In a study of eighth graders in an urban magnet school, Duckworth and Seligman found that, as a group, females demonstrated more self-

discipline than their male counterparts. In this study, eighth-grade girls earned higher grade-point averages (GPAs) than boys but did only slightly better on an achievement test and less well on an IQ test. After extensive analyses, Duckworth and Seligman (2006) concluded that part of the reason girls had higher GPAs was their greater self-discipline. The more researchers learn about gender differences, the more a number of factors beyond cognitive and perceptual abilities seem either to account for those differences or to suggest that such differences are less significant than once thought.

Although you should be aware of the gender differences we have mentioned and should take steps to try to reduce them, you should also keep the following points in mind. First, there are many tasks for which differences do not exist. In fact, a recent review of research on gender differences, supported by the National Science Foundation, advanced the “gender similarities hypothesis” over the hypothesis of “gender differences” (Hyde, 2005; see also Marsh, Martin, & Cheng, 2008). Second, some differences do not appear until later in development. For example, boys and girls have similar scores on tests of mathematical problem solving until adolescence, when boys begin to pull ahead. Third, what is true in general is not true of all individuals. Some boys score higher than most girls on tests of language use, and some girls score higher than most boys on tests of mathematical reasoning (Halpern et al., 2005; Wigfield et al., 2002). Finally, as Robert Sternberg and Howard Gardner have argued, virtually all cognitive skills can be improved to some degree with the aid of well-designed instruction.

Gender Bias

If you asked your class a question and some students answered without waiting to be called on, how do you think you would react? Do you think you would react differently to male students than to female students? Do not be so sure that you would not. Studies have found that teachers are more willing to listen to and accept the spontaneous answers of male students than female students. Female students are often reminded that they are to raise their hands and be recognized by the teacher before answering. Boys also receive more extensive feedback than do girls, but they are punished more severely than girls for the same infraction. These consistent differences in responses to male and female students when there is no sound educational reason for them are the essence of **gender bias**.

Why do some teachers react differently to males and females? Probably because they are operating from traditional gender-role stereotypes: they expect boys to be more impulsive and unruly and girls to be more orderly and obedient (American Association of University Women, 1999; Corbett, Hill, & St. Rose, 2008.)

Exposure to gender bias apparently begins early in a child’s school life. Most preschool programs stress the importance of following directions and rules (impulse control) and contain many activities that facilitate small-muscle development and language skills. Because girls are typically better than boys in these areas before they go to preschool, the typical preschool experience does not help girls acquire new academically related skills and attitudes. For example, preschool-age girls are usually not as competent as boys at large-motor activities (such as jumping, climbing, throwing, and digging) or investigatory activities (such as turning over rocks or pieces of wood to see what is under them). Lest

you think that climbing, digging, and investigating one's environment are trivial behaviors, bear in mind that they are critical to the work of scientists who do field research (for example, botanists, geologists, anthropologists, and oceanographers), occupations in which women are significantly underrepresented. As technology became more available in classrooms, many hoped that digital environments would reduce gender bias, but recent research suggests that biases have simply taken on a new form within technologically mediated learning. Moreover, there is evidence that some of the bias-reducing practices that were introduced in classrooms in recent years have been reversed within technologically mediated learning environments (Plumm, 2008).

Gender bias is not a simple problem and understanding it requires placing gender within the context of other social influences such as race, family structures, and socioeconomic class (Corbett, Hill, & St. Rose, 2008). Nevertheless, gender bias has been shown to affect students in a variety of ways.

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How Gender Bias Affects Students

Gender bias can affect students in at least three ways: the courses they choose to take, the careers they consider, and the extent to which they participate in class activities and discussions.

Course Selection There are modest but noticeable differences in the percentage of high school boys and girls who take math and science courses. In 1998, a larger percentage of girls than boys took algebra II (63.7 versus 59.8 percent) and trigonometry (9.7 versus 8.2 percent). Although there was no difference in the percentages of boys and girls who took geometry and precalculus, slightly more boys than girls took calculus (11.2 versus 10.6 percent). The pattern for science courses was similar. A larger percentage of girls than boys took biology (94.1 versus 91.4 percent), advanced placement or honors biology (18 versus 14.5 percent), and chemistry (63.5 versus 57.1 percent), whereas more boys than girls took physics (31.7 versus 26.2 percent) and engineering (7.1 versus 6.5 percent) (Bae, Choy, Geddes, Sable, & Snyder, 2000).

Career Choice As you may be aware because of numerous stories in the media, relatively few girls choose careers in science or mathematics. Wigfield and colleagues (2002) found that a much smaller percentage of women than men held positions in such math-and science-oriented professions as chemistry and biological science (about 31 percent), engineering (about 18 percent), computer systems analysis (about 27 percent), and drafting/surveying/ mapping (about 17 percent). On the other hand, a much greater percentage of women than men were found in such nonmath and nonscience fields as educational administration (63 percent), educational and vocational counseling (69 percent), social work (68 percent), and public relations (68 percent). Several factors are thought to influence the choice male and female students make to pursue a career in science or engineering. One is familiarity with and interest in the tools of science. In one study of middle school science classes in which instructors who were committed to increasing girls' active participation emphasized hands-on experiences, gender differences were still noted. Boys spent more time than girls manipulating the equipment, thereby forcing girls to participate in more passive ways (Jovanovic & King, 1998).

A second factor is perceived self-efficacy (how confident one feels in being able to meet the demands of a task). In the middle school science classes just mentioned (Jovanovic & King, 1998), even though end-of-year science grades were equal for girls and boys, only girls showed a significant decrease in their perception of their science ability over the school year. A 1996 survey found that although fourth-grade boys and girls were equally confident about their math abilities, by twelfth grade only 47 percent of girls were confident about their math skills, as compared with 59 percent of the boys (Bae et al., 2000).

A third factor is the competence-related beliefs and expectations communicated by parents and teachers. Girls who believe they have the ability to succeed in male-dominated fields were encouraged to adopt these beliefs by parents and teachers (Wigfield et al., 2002). This chapter's Case in Print describes the findings of a report from the National Academy of Sciences and how those findings account for the gender bias we observe in scientific career fields.

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Supporting evidence that factors such as self-efficacy influence career choice comes from a recent study of 15 women with established careers in math, science, or technology. Because there have always been women who have successfully carved out careers in math or science, Amy Zeldin and Frank Pajares (2000) wanted to know what sets them apart from equally qualified women who choose other fields. Zeldin and Pajares found that these 15 women had very high levels of self-efficacy for math and science that could be traced to three sources: (1) early and consistent academic success, (2) encouragement to pursue math and science careers from such influential others as parents and teachers, and (3) the availability of respected models (both male and female) whom they could observe and model themselves after. All three sources working in concert appear necessary to persuade women to consider a career in math, science, or technology.

Class Participation As we pointed out earlier, many children tend to adopt the gender role that society portrays as the more appropriate and acceptable. Through the influence of parenting practices, advertising, peer norms, textbooks, and teaching practices, girls are reinforced for being polite, helpful, obedient, nonassertive, quiet, and aware of and responsive to the needs of others. Although views of girls' academic abilities are changing (Corbett, Hill, & St. Rose, 2008), boys, to a greater extent than girls, are reinforced for being assertive, independent, aggressive, competitive, intellectually curious, and achievement oriented. The degree to which girls feel comfortable expressing themselves and their views is known as "level of voice." According to Carol Gilligan and others, adolescent girls learn to suppress their true personalities and beliefs. Instead of saying what they really think about a topic, they say either that they have no opinion or what they think others want to hear. Gilligan refers to this behavior as **loss of voice** (Harter, Waters, & Whitesell, 1997).

To measure the extent of loss of voice in different contexts, Susan Harter, Patricia Waters, and Nancy Whitesell gave questionnaires to several hundred students of both genders in grades 6 through 12. The questionnaire items asked students to rate how honestly they voiced their ideas when they were in the presence of teachers, male classmates, female classmates, parents, and close friends. Their main findings were as follows:

- Males and females are most likely to speak their minds when they are with close friends and classmates of the same gender and are less likely to do so when they are in the presence of members of the opposite gender, parents, and teachers.
- Loss of voice did not increase between grades 6 and 12.
- Equal numbers of males and females reported suppressing their true thoughts in certain circumstances.
- Girls who strongly identified with the stereotypical female gender role were more likely than androgynous females (those who exhibit behaviors that are characteristic of both gender roles) to suppress their true thoughts when interacting with their teachers and male classmates. This difference between feminine and androgynous females disappeared with close friends and parents.
- Androgynous males and females who said they were frequently encouraged and supported by teachers for expressing their views were most likely to speak their minds in classroom and other settings.

These findings have major implications for the way in which teachers address female students, particularly those who have adopted a strong feminine gender role, and for the use of constructivist approaches to teaching (discussed in detail in Chapter 13, "Approaches to Instruction"). Because constructivism relies heavily on free and open discussion to produce its effects, teachers need to monitor carefully the verbal exchanges that occur among students and to intervene when necessary to ensure that all students feel that their opinions are getting a fair and respectful hearing.

3.b. How does the "innate facility" for language acquisition explain the notion of "infinite use of finite means"?

15

Reference:

Language acquisition device

The Language Acquisition Device (LAD) is a postulated "organ" of the brain that is supposed to function as a congenital device for learning symbolic language (i.e., language acquisition). First proposed by Noam Chomsky, the LAD concept is an instinctive mental capacity which enables an infant to acquire and produce language. It is component of the nativist theory of language. This theory asserts that humans are born with the instinct or "innate facility" for acquiring language. Chomsky has gradually abandoned the LAD in favour of a parameter-setting model of language acquisition (principles and parameters).

Chomsky motivated the LAD hypothesis by what he perceived as intractable complexity of language acquisition, citing the notion of "infinite use of finite means" proposed by Wilhelm von Humboldt. At the time it was conceived (1957–1965), the LAD concept was in strict contrast to B.F. Skinner's behavioral psychology which emphasized principles of learning theory such as classical and operant conditioning

and imitation over biological predisposition. The interactionist theory of Jerome Bruner and Jean Piaget later emphasized the importance of the interaction between biological and social (nature and nurture) aspects of language acquisition.

Differing from the behaviorists who emphasize the importance of social interactions in language acquisition, Chomsky (1965) set out an innate language schema which provides the basis for the child's acquisition of a language. The acquisition process takes place in an infants mind because of this mental organ which enables him/her to speak despite the limited nature of the Primary Linguistic Data (PLD, the input signals received) and the degenerate nature (frequent incorrect usage, utterances of partial sentences) of that data. Given this poverty of the stimulus, a language acquisition model requires a number of components. Firstly, the child must have a technique for representing input signals and, secondly, a way of representing structural information about them. Thirdly, there must be some initial delimitation of the class of possible language structure hypotheses. Fourthly, the child requires a method for determining what each of these hypotheses implies with respect to each sentence. Finally, an additional method is needed by which the child can select which hypothesis is compatible with the PLD.

Equipped with this endowment, first language learning is explained as performed by a Language Acquisition Device progressing through the following stages:

- The device searches the class of language structure hypotheses and selects those compatible with input signals and structural information drawn from the PLD.
- The device then tests the compatibility using the knowledge of implications of each hypothesis for the sentences.
- One hypothesis or 'grammar' is selected as being compatible with the PLD.
- This grammar provides the device with a method of interpreting sentences (by virtue of its capacity for internally representing structural information and applying the grammar to sentences).

Through this process the device constructs a theory of the language of which the PLD are a sample. Chomsky argues that in this way, the child comes to know a great deal more than she has 'learned', acquiring a knowledge of language, which "goes far beyond the presented primary linguistic data and is in no sense an 'inductive generalization' from these data."

In some views of language acquisition, the LAD is thought to become unavailable after a certain age — the critical period hypothesis (i.e., is subject to maturational constraints). Feral children cases such as Genie provide key examples for the LAD aspect of the nativist theory and that it becomes unavailable after a certain age.

3.c. "Emotional intelligence cannot be recognized as a form of intelligence as it is in itself a misinterpretation of the intelligence construct." Elaborate. 20

Reference:**Criticisms of the theoretical foundation of EI****EI cannot be recognized as a form of intelligence**

Goleman's early work has been criticized for assuming from the beginning that EI is a type of intelligence. Eysenck (2000) writes that Goleman's description of EI contains unsubstantiated assumptions about intelligence in general, and that it even runs contrary to what researchers have come to expect when studying types of intelligence:

"[Goleman] exemplifies more clearly than most the fundamental absurdity of the tendency to class almost any type of behaviour as an 'intelligence'... If these five 'abilities' define 'emotional intelligence', we would expect some evidence that they are highly correlated; Goleman admits that they might be quite uncorrelated, and in any case if we cannot measure them, how do we know they are related? So the whole theory is built on quicksand: there is no sound scientific basis."

Similarly, Locke (2005) claims that the concept of EI is in itself a misinterpretation of the intelligence construct, and he offers an alternative interpretation: it is not another form or type of intelligence, but intelligence—the ability to grasp abstractions—applied to a particular life domain: emotions. He suggests the concept should be re-labeled and referred to as a skill.

The essence of this criticism is that scientific inquiry depends on valid and consistent construct utilization, and that before the introduction of the term EI, psychologists had established theoretical distinctions between factors such as abilities and achievements, skills and habits, attitudes and values, and personality traits and emotional states. Thus, some scholars believe that the term EI merges and conflates such accepted concepts and definitions.

EI has little predictive value

Landy (2005) claimed that the few incremental validity studies conducted on EI have shown that it adds little or nothing to the explanation or prediction of some common outcomes (most notably academic and work success). Landy suggested that the reason why some studies have found a small increase in predictive validity is a methodological fallacy, namely, that alternative explanations have not been completely considered:

"EI is compared and contrasted with a measure of abstract intelligence but not with a personality measure, or with a personality measure but not with a measure of academic intelligence." Landy (2005)

Similarly, other researchers have raised concerns about the extent to which self-report EI measures correlate with established personality dimensions. Generally, self-report EI measures and personality measures have been said to converge because they both purport to measure personality traits.

Specifically, there appear to be two dimensions of the Big Five that stand out as most related to self-report EI – neuroticism and extroversion. In particular, neuroticism has been said to relate to negative emotionality and anxiety. Intuitively, individuals scoring high on neuroticism are likely to score low on self-report EI measures.

The interpretations of the correlations between EI questionnaires and personality have been varied. The prominent view in the scientific literature is the Trait EI view, which re-interprets EI as a collection of personality traits.

Criticisms of measurement issues

Ability EI measures measure conformity, not ability

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One criticism of the works of Mayer and Salovey comes from a study by Roberts et al. (2001), which suggests that the EI, as measured by the MSCEIT, may only be measuring conformity. This argument is rooted in the MSCEIT's use of consensus-based assessment, and in the fact that scores on the MSCEIT are negatively distributed (meaning that its scores differentiate between people with low EI better than people with high EI).

Ability EI measures measure knowledge (not actual ability)

Further criticism has been leveled by Brody (2004), who claimed that unlike tests of cognitive ability, the MSCEIT "tests knowledge of emotions but not necessarily the ability to perform tasks that are related to the knowledge that is assessed". The main argument is that even though someone knows how he should behave in an emotionally laden situation, it doesn't necessarily follow that he could actually carry out the reported behavior.

Ability EI measures measure personality and general intelligence

New research is surfacing that suggests that ability EI measures might be measuring personality in addition to general intelligence. These studies examined the multivariate effects of personality and intelligence on EI and also corrected estimates for measurement error (which is often not done in some validation studies). For example, a study by Schulte, Ree, Carretta (2004), showed that general intelligence (measured with the Wonderlic Personnel Test), agreeableness (measured by the NEO-PI), as well as gender had a multiple R of .81 with the MSCEIT. This result has been replicated by Fiori and Antonakis (2011); they found a multiple R of .76 using Cattell's "Culture Fair" intelligence test and the Big Five Inventory (BFI); significant covariates were intelligence (standardized beta = .39), agreeableness (standardized beta = .54), and openness (standardized beta = .46). Antonakis and Dietz (2011a), who investigated the Ability Emotional Intelligence Measure found similar results (Multiple R = .69), with significant predictors being intelligence, standardized beta = .69 (using the Swaps Test and a Wechsler scales subtest, the 40-item General Knowledge Task) and empathy, standardized beta = .26 (using the Questionnaire Measure of Empathic Tendency)--see also Antonakis and Dietz (2011b), who show how

including or excluding important controls variables can fundamentally change results—thus, it is important to always include important controls like personality and intelligence when examining the predictive validity of ability and trait EI models.

Self-report measures are susceptible to faking

More formally termed socially desirable responding (SDR), faking good is defined as a response pattern in which test-takers systematically represent themselves with an excessive positive bias (Paulhus, 2002). This bias has long been known to contaminate responses on personality inventories (Holtgraves, 2004; McFarland & Ryan, 2000; Peebles & Moore, 1998; Nichols & Greene, 1997; Zerbe & Paulhus, 1987), acting as a mediator of the relationships between self-report measures (Nichols & Greene, 1997; Gangster et al., 1983).

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It has been suggested that responding in a desirable way is a response set, which is a situational and temporary response pattern (Pauls & Crost, 2004; Paulhus, 1991). This is contrasted with a response style, which is a more long-term trait-like quality. Considering the contexts some self-report EI inventories are used in (e.g., employment settings), the problems of response sets in high-stakes scenarios become clear (Paulhus & Reid, 2001).

There are a few methods to prevent socially desirable responding on behavior inventories. Some researchers believe it is necessary to warn test-takers not to fake good before taking a personality test (e.g., McFarland, 2003). Some inventories use validity scales in order to determine the likelihood or consistency of the responses across all items.

Claims for the predictive power of EI are too extreme

Landy distinguishes between the "commercial wing" and "the academic wing" of the EI movement, basing this distinction on the alleged predictive power of EI as seen by the two currents. According to Landy, the former makes expansive claims on the applied value of EI, while the latter is trying to warn users against these claims. As an example, Goleman (1998) asserts that "the most effective leaders are alike in one crucial way: they all have a high degree of what has come to be known as emotional intelligence. ...emotional intelligence is the sine qua non of leadership". In contrast, Mayer (1999) cautions "the popular literature's implication—that highly emotionally intelligent people possess an unqualified advantage in life—appears overly enthusiastic at present and unsubstantiated by reasonable scientific standards." Landy further reinforces this argument by noting that the data upon which these claims are based are held in "proprietary databases", which means they are unavailable to independent researchers for reanalysis, replication, or verification. Thus, the credibility of the findings cannot be substantiated in a scientific way, unless those datasets are made public and available for independent analysis.

In an academic exchange, Antonakis and Ashkanasy/Dasborough mostly agreed that researchers testing whether EI matters for leadership have not done so using robust research designs; therefore, currently

there is no strong evidence showing that EI predicts leadership outcomes when accounting for personality and IQ. Antonakis argued that EI might not be needed for leadership effectiveness (he referred to this as the "curse of emotion" phenomenon, because leaders who are too sensitive to their and others' emotional states might have difficult to take decisions that would result in emotional labor for the leader or followers). A recently-published meta-analysis seems to support the Antonakis position: In fact, Harms and Credé found that overall (and using data free from problems of common source and common methods), EI measures correlated only $r = .11$ with measures of transformational leadership. Interestingly, ability-measures of EI fared worst (i.e., $r = .04$); the WLEIS (Wong-Law measure) did a bit better ($r = .08$), and the Bar-On measure better still ($r = .18$). However, the validity of these estimates does not include the effects of IQ or the big five personality, which correlate both with EI measures and leadership. In a subsequent paper analyzing the impact of EI on both job performance and leadership, Harms and Credé found that the meta-analytic validity estimates for EI dropped to zero when Big Five traits and IQ were controlled for.

4.a. How could behaviorist notions of different types and schedules of reinforcement affect attachment patterns in infants? Explain.

15

Reference:

SCHEDULES OF REINFORCEMENT

In operant conditioning, schedules of reinforcement are an important component of the learning process. When and how often we reinforce a behavior can have a dramatic impact on the strength and rate of the response.

A schedule of reinforcement is basically a rule stating which instances of a behavior will be reinforced. In some case, a behavior might be reinforced every time it occurs. Sometimes, a behavior might not be reinforced at all. Either positive reinforcement or negative reinforcement might be used, depending on the situation. In both cases, the goal of reinforcement is always to strengthen the behavior and increase the likelihood that it will occur again in the future.

In real-world settings, behaviors are probably not going to be reinforced each and every time they occur. For situations where you are purposely trying to train and reinforce an action, such as in the classroom, in sports or in animal training, you might opt to follow a specific reinforcement schedule. As you'll see below, some schedules are best suited to certain types of training situations. In some cases, training might call for starting out with one schedule and switching to another once the desired behavior has been taught.

Certain schedules of reinforcement may be more effective in specific situations. There are two types of reinforcement schedules:

1. Continuous Reinforcement

In continuous reinforcement, the desired behavior is reinforced every single time it occurs. Generally, this schedule is best used during the initial stages of learning in order to create a strong association between the behavior and the response. Once the response is firmly attached, reinforcement is usually switched to a partial reinforcement schedule.

2. Partial Reinforcement

In partial reinforcement, the response is reinforced only part of the time. Learned behaviors are acquired more slowly with partial reinforcement, but the response is more resistant to extinction.

There are four schedules of partial reinforcement:

Fixed-ratio schedules are those where a response is reinforced only after a specified number of responses. This schedule produces a high, steady rate of responding with only a brief pause after the delivery of the reinforcer.

Variable-ratio schedules occur when a response is reinforced after an unpredictable number of responses. This schedule creates a high steady rate of responding. Gambling and lottery games are good examples of a reward based on a variable ratio schedule.

Fixed-interval schedules are those where the first response is rewarded only after a specified amount of time has elapsed. This schedule causes high amounts of responding near the end of the interval, but much slower responding immediately after the delivery of the reinforcer.

Variable-interval schedules occur when a response is rewarded after an unpredictable amount of time has passed. This schedule produces a slow, steady rate of response.

LINKS BETWEEN ATTACHMENT PATTERN AND REINFORCEMENT

"In the first year of its life the human infant has the cues from its mother associated with the primary reward of feeding on more than 2,000 occasions. Meanwhile the mother and other people are ministering to many other needs. In general there is a correlation between the absence of people and the prolongation of suffering from hunger, cold, pain, and other drives; the appearance of a person is associated with a reinforcing reduction in the drive. Therefore the proper conditions are present for the infant to learn to attach strong reinforcement value to a variety of cues from the nearness of the mother and other adults [It] seems reasonable to advance the hypothesis that the . . . human motives of sociability, dependence, need to receive and show affection, and desire for approval from others are learned [Dollard & Miller, 1950, pp. 91-92]."

ATTACHMENT PATTERN

Continuous/fixed ratio --> Secure

- Uses caregiver as a secure base for exploration. Protests caregiver's departure and seeks proximity and is comforted on return, returning to exploration. May be comforted by the stranger but shows clear preference for the caregiver.
- Responds appropriately, promptly and consistently to needs. Caregiver has successfully formed a secure parental attachment bond to the child.

No Reinforcement/Learned helplessness --> Avoidant

- Little affective sharing in play. Little or no distress on departure, little or no visible response to return, ignoring or turning away with no effort to maintain contact if picked up. Treats the stranger similarly to the caregiver. The child feels that there is no attachment; therefore, the child is rebellious and has a lower self-image and self-esteem.
- Little or no response to distressed child. Discourages crying and encourages independence.

Variable-Ratio --> Ambivalent/Resistant

- Unable to use caregiver as a secure base, seeking proximity before separation occurs. Distressed on separation with ambivalence, anger, reluctance to warm to caregiver and return to play on return. Preoccupied with caregiver's availability, seeking contact but resisting angrily when it is achieved. Not easily calmed by stranger. In this relationship, the child always feels anxious because the caregiver's availability is never consistent.
- Inconsistent between appropriate and neglectful responses. Generally will only respond after increased attachment behavior from the infant.

Harsh and unjustified punishment --> Disorganized

- Stereotypes on return such as freezing or rocking. Lack of coherent attachment strategy shown by contradictory, disoriented behaviors such as approaching but with the back turned.
- Frightened or frightening behaviour, intrusiveness, withdrawal, negativity, role confusion, affective communication errors and maltreatment. Very often associated with many forms of abuse towards the child.

4.b. "The brain consists of a great many modules that process information more or less independently of each other." How does it challenge the usefulness of one-dimensional notion of general (g-factor) intelligence?

20

Reference:

"The brain consists of a great many modules that process information more or less independently of each other. It seems likely that it will be easier to discover how one of those modules works than to explain the functioning of the brain as a whole." (Frith, 1997, p. 5)

This quotation questions the validity of the notion that there is a general factor of intelligence. Much as the organs of the body are specific and diverse in their functions, the brain, although admittedly working as a whole, cannot be conceived to have one general intelligence function. Arguments against a general factor of intelligence arise both from logical considerations and from clinical observations. Clinically, in cases of brain damage, specific cognitive functions are often spared while others remain impaired. In addition, individuals who have significantly damaged frontal lobe functions may have normal IQs, despite the fact that the frontal lobes are essential for higher cognitive processes. Similarly, some dyslexic children have high IQs despite their significant difficulties in reading.

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Examples such as these challenge the usefulness of a one-dimensional notion of general intelligence, be it conceptualized as mental energy or speed. A general-ability view leads to different questions and measures of ability than a view that intelligence is made up of multiple and interdependent cognitive processes.

4.c. "Low level of latent inhibition can facilitate creative achievement." Discuss with suitable examples.

15

REFERENCE SUPPORT:

LATENT INHIBITION

Latent inhibition (potential prevention) is a technical term used in Classical conditioning. A stimulus that has not had any significance in the past takes longer to acquire meaning (as a signal) than a new stimulus. It is "a measure of reduced learning about a stimulus to which there has been prior exposure without any consequence." One is practicing latent inhibition when one tries to ignore an ongoing sound (like an air conditioner) or tune out the conversation of others.

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This tendency to disregard or even inhibit formation of memory, by preventing associative learning of observed stimuli, is an unconscious response and is assumed to prevent sensory overload and cognitive overload. Latent inhibition is observed in many species, and is believed to be an integral part of learning, enabling an organism to interact successfully in an environment (e.g., social).

Latent inhibition (LI) is demonstrated when a previously unattended stimulus is less effective in a new learning situation than a novel stimulus. The term "latent inhibition" dates back to Lubow and Moore (1959). The LI effect is "latent" in that it is not exhibited in the stimulus pre-exposure phase, but rather in the subsequent test phase. "Inhibition", here, simply connotes that the effect is expressed in terms of relatively poor learning. The LI effect is extremely robust, appearing in all mammalian species that have

been tested and across many different learning paradigms, thereby suggesting some adaptive advantages, such as protecting the organism from associating irrelevant stimuli with other, more important, events.

LATENT INHIBITION AND CREATIVITY

The brains of creative people seem more open to incoming stimuli than less creative types. Our senses are continuously feeding a mass of information into our brains, which have to block or ignore most of it to save us from being snowed under. Peterson calls this process latent inhibition, and argues that people who have less of it, and who have a reasonably high IQ with a good working memory can juggle more of the data, and so may be open to more possibilities and ideas. The downside of extremely low latent inhibition may be a confused thought style that predisposes people to mental illness. So for Peterson, mental illness is not a prerequisite for creativity, but it shares some cognitive traits.

One study indicates that people with "faith in intuition" tend to have lower latent inhibition i.e. they lower a gating mechanism that keeps out irrelevant (or seemingly irrelevant) stimuli. Low latent inhibition is related to types of schizophrenia but—with stronger executive functions, it is also related to creativity! Some of these new associations might be odder than others.²⁷ Yet, might a few unusual ideas, when the gates are lowered, lead someone to pathologizing a process that should lead to celebration? For example, a person diagnosed with a mild thought disorder might write something viewed as gibberish in a mental hospital; but the same creative product might be viewed as beautiful poetry in a different context.

Psychologist Shelley H. Carson of Harvard University reached an interesting insight in 2003. She analyzed studies of students and found that those who were "eminent creative achievers"—for example, one had published a novel, another a musical composition—demonstrated lower "latent inhibition" on standard psychological tests than average classmates. Latent inhibition is a sort of filter that allows the brain to screen out information that has been shown by experience to be less important from the welter of data that streams into our heads each second through our sensory system. The information is cast aside even before it reaches consciousness. Think about your act of reading this article right now; you have most likely become unaware that you are sitting in a chair or that there are objects across the room in your peripheral vision.

Screened data take up no brain capacity, lessening the burden on your neurons. But they are also unavailable to your thought process. Yet because creativity depends primarily on the ability to integrate pieces of disparate data in novel ways, a lower level of latent inhibition is helpful. It is good to filter out some information, but not too much. Then again, lower latent inhibition scores have been associated with psychosis.

Latent inhibition has a corollary: too much specialized knowledge can stand in the way of creative thinking. Experts in a field will often internalize "accepted" thought processes, so that they become automatic. Intellectual flexibility is lost. For example, a mathematician will very likely tackle a difficult

problem in an analytical way common to her professional training. But if the problem resists solution by this method, she may well find herself at a mental dead end. She has to let go of the unsuitable approach.

5.a. What could be the possible effects of ethnicity and social class on teacher's expectations? Suggest ways to minimize such influence. **15**

Reference:

The Effect of Ethnicity and Social Class on Teachers' Expectations

So far we have described how students' ethnic and social class backgrounds influence their approach to and success with various learning tasks. Now we would like to tell you how those and other characteristics often affect (consciously and unconsciously) the expectations that teachers have for student performance and how those expectations affect the quantity and quality of work that students exhibit. This phenomenon has been extensively studied since it was first proposed in 1968 and is typically referred to as the **teacher expectancy effect**. By becoming aware of the major factors that influence teachers' perceptions of and actions toward students, you may be able to reduce subjectivity to a minimum, particularly with students whose cultural backgrounds are very different from your own.

The teacher expectancy effect basically works as follows:

1. On the basis of such characteristics as race, SES, ethnic background, dress, speech pattern, and test scores, teachers form expectancies about how various students will perform in class.
2. They subtly communicate those expectancies to the students in a variety of ways.
3. Students come to behave in a way that is consistent with what the teacher expects.

Research on the Effects of Teachers' Expectancies

Given the obvious implications of the teacher expectancy effect for shaping student behavior, researchers have been investigating its validity and limits for the last 40 years (see Spitz, 1999, for an excellent summary and analysis of the original and subsequent research, and Rosenthal, 2002, for the views of the senior author of the original study).

Research that has investigated the effect of teacher expectancy on classroom achievement and participation has generally found sizable positive *and* negative effects (Benner & Mistry, 2007; Chen & Bargh, 1997; Good & Nicholls, 2001; Jussim, Eccles, & Madon, 1996). For example, a study of several hundred low-income students between the ages of nine and sixteen (Benner & Mistry, 2007) found that both mothers' and teachers' expectations were positively related to students' expectations and students' perceptions of their own ability, and that students' expectations and ability perceptions were positively related to achievement. This study also found that low expectations by both mother and teacher had a negative impact on student achievement. In addition, it appears that teacher expectations

are more likely to maintain already existing tendencies than to alter well-established behaviors drastically. For example, primary grade teachers react differently to students in the fast-track reading group than to students in the slow-track group. When working with the more proficient readers, teachers tend to smile, lean toward the students, and establish eye contact more often, and they tend to give criticism in friendlier, gentler tones than they use in the slow-track group. They often overlook the oral reading errors of proficient readers, and when they give corrections, they do so at the end of the sentence or other meaningful unit rather than in the middle of such units. And they ask comprehension questions more often than factual questions as a means of monitoring students' attention to the reading selection.

In contrast, teachers correct less proficient readers more often and in places that interrupt meaningful processing of the text, give these students less time to decode difficult words or to correct themselves, and ask low-level factual questions as a way of checking on students' attention. Teachers' body posture is often characterized by frowning, pursing the lips, shaking the head, pointing a finger, and sitting erect. Offering unsolicited help and giving enthusiastic praise to Black students may lead at least some of those students to infer that they have lower levels of academic ability. In sum, through a variety of subtle ways, teachers communicate to students that they expect them to perform well or poorly and then create a situation that is consistent with the expectation. As a result, initial differences between good and poor readers either remain or widen over the course of the school career (Graham & Hudley, 2005; Wuthrick, 1990).

Factors That Help Create Expectancies In addition to documenting the existence of teacher expectancy effects and the conditions under which they occur, researchers have sought to identify the factors that might create high or low teacher expectations. Here are some important factors taken from analyses by Thomas Good and Sharon Nicholls (2001), Vonnie McLoyd (1998), Sonia Nieto (2008), Harriet Tenenbaum and Martin Ruck (2007), and Yong Zhao and Wei Qiu (2009):

- Middle-SES students are expected to receive higher grades than low-SES students, even when their IQ scores and achievement test scores are similar.
- Teachers have the highest achievement expectations for Asian American students, and more positive expectations for White students than for minority (meaning Black and Latino) students.
- Teachers direct more neutral and positive statements (such as questions and encouragement) to White students than to minority students, but they criticize all students equally often.
- Minority students are more likely than White students to be referred for disciplinary action or for special education placement.
- Teachers tend to perceive children from poor homes as less mature, less capable of following directions, and less capable of working independently than children from more advantaged homes.
- Teachers who think of intelligence as a fixed and stable capacity are more likely to formulate negative and positive expectations of students than are teachers who think of intelligence as a collection of skills that can be shaped.

- Teachers are more influenced by negative information about students (for example, low test scores) than they are by neutral or positive information.
- High-achieving students receive more praise than low-achieving ones.
- Attractive children are often perceived by teachers to be brighter, more capable, and more social than unattractive children.
- Teachers tend to approve of girls' behavior more frequently than they approve of boys' behavior.

It is important to bear in mind that these factors (plus others such as ethnic background, knowledge of siblings, and impressions of parents) usually operate in concert to produce an expectancy. The following Suggestions for Teaching will give you some ideas for combating the damaging effects of teacher expectancies, as well as other problems often faced by low-SES and minority students.

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Promoting Classroom Achievement for All Students

Use every possible means for motivating educationally disadvantaged students to do well in school.

Good suggestions for teaching educationally disadvantaged students come not only from those who teach them, but also from the students themselves. You may notice some overlap in the two following lists, but that only serves to strengthen the validity of the suggestions.

David Gardner (2007), who taught for 33 years in schools that had high concentrations of low-income and ethnic minority students, was able to motivate his students and raise their achievement levels by doing the following:

- Setting high standards for students because he was convinced they were capable of meeting them.
- Telling students every day, both explicitly and implicitly, that he believed they were capable of high levels of achievement.
- Telling students that he would not accept poor-quality work and would return it to them to be redone.
- Avoiding helping students figure out how to meet the demands of a task when he was convinced they were capable of figuring it out for themselves.
- Telling students that failure was inevitable yet acceptable because that's how we learn.
- Making learning fun by using games and manipulables.

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According to the responses of almost 400 low-income, inner-city middle school and high school students, good teachers do the following:

- Push students to learn by such actions as not accepting excuses for missed or late work, constantly checking homework, giving rewards, and keeping parents informed.

- Maintain an orderly and well-run classroom in which disruptions are kept to a minimum. (You will find more detailed information on how to create such an environment in Chapter 12, “Classroom Management.”)
- Make themselves always available to provide a student with help in whatever form the student prefers. Some students, for example, want help after school, some during class, some individually, some by working with peers, and some through whole class question-and-answer sessions. Some students may ask for help only if they are sure that no one besides the teacher knows they are receiving it.
- Strive to have all students understand the material by not rushing through lessons and by offering explanations in a clear step-by-step fashion and in various ways.
- Use a variety of instructional tactics, such as group work, lecture, textbook reading, worksheets, whole-class instruction, and hands-on activities.
- Make an effort to understand students’ behavior by trying to understand the personalities and after-school lives of students (Corbett & Wilson, 2002).

We need to add a last word about homework as a way to promote achievement. The amount of homework assigned to students over the past 15 years has increased, largely because of the need for increasing numbers of students to achieve statemandated standards and comply with the provisions of the No Child Left Behind Act of 2001. Educators believed that increasing the amount of homework assigned to students would lead to higher grades and test scores. Does it? Not surprisingly, the main conclusion to be drawn from the research literature (see, for example, Cooper, 2001; Cooper, Robinson, & Patall, 2006; Marzano & Pickering, 2007; and Muhlenbruck, Cooper, Nye, & Lindsay, 2000) is that it depends on the student’s grade level and how the homework is structured. Compared with peers who did no homework, there was a small benefit for late primary and elementary grade students and only a modest benefit for middle school students. The greatest benefit occurred among high school students. The benefits experienced by late primary and elementary grade students occurred only when the homework was sufficiently easy that they could successfully complete all or most of it. As one former K–12 teacher pointed out (Jackson, 2007), there is still much to be learned about how such variables as students’ skill levels, level of parental involvement, and attitudes of parents and siblings toward school affect the benefits of doing homework, so keep an eye out for updates to this topic.

Use a variety of instructional techniques to help educationally disadvantaged students master both basic and higher-order knowledge and skills.

Research from the 1970s (Brophy & Evertson, 1976) found that the classroom and standardized test performances of educationally disadvantaged students improves when teachers follow these seven guidelines:

- Eliminate distractions and maximize the amount of time students actually spend working on a task.
- Establish high expectations and a classroom climate that supports achievement.

- Break tasks down into small, easy-to-manage pieces, and arrange the pieces in a logical sequence.
- Have students work on specific exercises in small groups.
- Ask direct questions that have direct answers.
- Provide frequent opportunities for practice and review.
- Provide timely corrective feedback.

Designing classroom instruction along these guidelines has both benefits and costs. The benefits are that students spend more time on-task, success tends to be more consistent, and more students reach a higher level of mastery of content knowledge and skills. The main cost is the lack of transfer that usually occurs when knowledge and skills are learned as isolated segments in a nonmeaningful context. A second cost is that students have few opportunities to interact with one another. If teachers combine the seven guidelines just mentioned with current learning theory and research (Gordon, Rogers, Comfort, Gavula, & McGee, 2001; Knapp & Shields, 1990; Knapp, Shields, & Turnbull, 1995; Means & Knapp, 1991; as well as later chapters of this book), they may be able to raise the basic skill level of educationally disadvantaged students *and* improve their ability to transfer what they have learned to meaningful and realistic contexts. To accomplish this two-pronged goal, a teacher should also do the following:

- Provide opportunities for students to apply ideas and skills to real-life or realistic situations to make the lesson more meaningful. For example, after collecting and analyzing information, students might write letters to the mayor or city council requesting more streetlights for increased safety at night or improvements to basketball courts and baseball fields.
- Allow students the opportunity to discuss among themselves the meaning of ideas and their potential applications. In making a request of a government official, students should be encouraged to discuss which arguments are likely to be most effective and how they would respond should the official turn their proposal down.
- Embed basic skills instruction within the context of complex and realistic tasks. Letter-writing campaigns, for example, can be used to practice such basic English skills as vocabulary acquisition, spelling, punctuation, and grammar.
- Point out how classroom tasks relate to students' out-of-school experiences. One example is to draw attention to the basic similarities between poetry and rap music.
- Model for and explain to students the various thinking processes that are activated and used when one engages in a complex task. As you will see when you read Chapter 9, "Social Cognitive Theory," effective learners approach tasks strategically, which is to say they analyze the task, formulate a plan for dealing with it, use a variety of specific learning skills, and monitor their progress. These are fundamental learning processes that are almost never made explicit to students.
- Gradually ease students into the process of dealing with complex and realistic tasks.

There is no question that the approach described in this list carries with it more risk of failure than was the case for the structured, small-scale approach of the 1970s. But much of this risk can be minimized by

scaffolding, which we described in Chapter 2. As you may recall, in scaffolding, the teacher initially provides a considerable amount of support through explanations, demonstrations, and prompts of various types. As students demonstrate their ability to carry out more of a task independently, the scaffolding is withdrawn.

Be alert to the potential dangers of the teacher expectancy effect. Concentrate on individuals while guarding against the impact of stereotyping.

Myrna Gantner (1997), an eighth-grade teacher in an inner-city middle school near the Mexican border, learned the following lessons about treating her Latino students as individuals:

- Treat Latino students the same as you would treat any other student. When teachers believe that inner-city Latino students are less capable than other students, they tend to give them less time and attention. Students quickly notice these differences and may respond with lower-quality work and more disruptive behavior.
- Don't prejudge students. If you believe that most Latino children use drugs, belong to gangs, or have limited academic ability, students will eventually become aware of your prejudice and act accordingly. Gantner's students said they were most appreciative of teachers who were interested in them as individuals, had high expectations for them, and showed them how to achieve their goals.
- Don't ridicule or make fun of students' limited English proficiency. The best way to acquire proficiency in a second language is to use it frequently. Students will be less inclined to do so if they think teachers and other students will laugh at their mistakes.

Remember that in addition to being a skilled teacher, you are also a human being who may at times react subjectively to students.

Try to control the influence of such factors as name, ethnic background, gender, physical characteristics, knowledge of siblings or parents, grades, and test scores. If you think you can be honest with yourself, you might attempt to describe your prejudices so that you will be in a position to guard against them. (Do you tend to be annoyed when you read descriptions of the exploits of members of a particular religious or ethnic group, for example?) Try to think of a student independently of his or her siblings and parents.

5.b. "Coping with ambiguity is a key element of intercultural competence." In the context of given statement, evaluate the role of empathy and effective listening in intercultural communication. 20

Reference:

A well-known American Indian saying tells us, "We should not judge another person until we have walked two moons in his moccasins." Actually, what we should say is that empathy is about your trying to imagine how you would feel if you were wearing those moccasins. We used the word *imagine* here

because it is physically and psychologically impossible to really know what another person is feeling and experiencing. The process of empathy is, of course, much more complicated than merely imagining. Empathy, broadly defined, is a part of interpersonal sensitivity and social competence, 27 and, as Bernieri indicates, “is the ability to sense, perceive accurately, and respond appropriately to one’s personal, interpersonal, and social environment.”²⁸ Haynes and Avery further define empathy as “the ability to recognize and understand another person’s perceptions and feelings, and to accurately convey that understanding through an accepting response.”²⁹

Defining empathy in a cultural setting, Ting-Toomey describes it in the following manner: “Through empathy we are willing to imaginatively place ourselves in the dissimilar other’s cultural world and to experience what she or he is experiencing.”³⁰ While these definitions might lead you to believe that empathy is a difficult process, it is in fact a skill everyone is capable of developing.

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The importance of empathy to the study of interpersonal and intercultural competence cannot be overstated. After reviewing the literature on the topic of empathy, Broome concluded, “Empathy has been recognized as important to both general communication competence and as a central characteristic of competent and effective intercultural communication.”³¹ Calloway-Thomas, Cooper, and Blake echo Broome’s commentary when they write, “Empathy is the bedrock of intercultural communication.”³²

UNDERSTANDING EMPATHY

Here, we need to mention two ideas that will aid you in understanding the role of empathy in intercultural communication. First, although we have focused primarily on culture, we also are concerned with the interpersonal aspects of intercultural communication. As Miller and Steinberg note, “To communicate interpersonally, one must leave the cultural and sociological levels of predications and psychically travel to the psychological level.”³³ Simply put, while knowledge about another’s culture can be used to make predictions, empathy also demands that the point of analysis be the individual’s personality. Second, it is best to view empathy as a complex activity composed of many variables. It involves a cognitive component (thinking), an affective (emotional identification) dimension, and a communication element (activity). Bell explains these three variables and how they interact with each other:

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Cognitively, the empathic person takes the perspective of another person, and in so doing strives to see the world from the other’s point of view. Affectively, the empathic person experiences the emotions of another; he or she feels the other’s experiences. Communicatively, the empathic individual signals understanding and concern through verbal and nonverbal cues.³⁴

ROADBLOCKS TO EMPATHY

Before we look at some of the ways you may improve your empathic skills, it might be helpful to examine a few characteristics that can impede empathy.

Diverse Cultural Backgrounds. Our first hindrance reminds you that you must approach each situation and individual from your own cultural perspective. Countless studies have verified the notion that individuals from similar cultures exhibit greater mutual empathic ability than do those from dissimilar cultures. What this means is that when talking with someone from a different culture, it will improve your empathic ability if you have as much knowledge as possible about that culture.

Constant Self-Focus. Perhaps the most common of all barriers to empathy is a constant self-focus. Attending to your own thoughts, or telling your own stories, uses much of the energy that you should direct toward your communication partner. At times, everyone is guilty of behaving according to the German proverb “Everyone thinks that all the bells echo his own thoughts.”

Stereotypic Notions About Gender, Race, and Culture. The tendency to note only some features of an individual to the exclusion of others can cause you to misuse the data you gather about another person. If, for example, you notice only a person’s gender, skin color, or surname and from this limited information make assumptions about the nature and character of the person, you are apt to do a poor job of empathizing. Admittedly, gender, color, and name offer you some data about the other person, but you must add to this knowledge. Although it is an overused analogy, you should remember that most outward features represent only the tip of the iceberg.

Self-Protective Behavior. When you appear to be evaluating other people, whether by what you say or by what you do, you are likely to make them feel defensive toward you. If you believe others are judging and evaluating you, you will hesitate to offer information that will foster empathy. Think about how awkward you would feel if, immediately after you shared some personal information with another person, the other person lectured you on the foolhardiness of your act. After a few minutes of criticism and ridicule, you probably would decide not to disclose any other information to that person.

IMPROVING EMPATHY

Up to this point, we have discussed the difficulties related to practicing empathy in intercultural encounters. Although it is nearly impossible to know another person completely, with a little practice, you can develop the skills necessary to be effective in the practice of empathy.

Pay Attention. Being focused during an interaction is the first step toward improving your empathic ability. Fracaro emphasizes the importance of hearing the intended message instead of focusing on your own agenda.³⁵ Trenholm and Jensen emphasize the importance of paying attention: “The single most important thing you do is remind yourself to pay attention to the spontaneous emotional expressions of others.”³⁶ As you must know from personal experience, concentrating on one idea or one person requires a great deal of energy. This high level of attention is even more strenuous when applied to empathy, for it, like our attention span, tends to wander.

Communicate Empathy. Empathy is a reciprocal act; you and your communication partner must be expressive (unless you are interacting with someone from a culture that values interpersonal restraint). You cannot expect individuals from other cultures to offer you verbal and nonverbal messages about their internal states if you do not reciprocate their efforts. Trenholm and Jensen also maintain that if your expressive behavior encourages others to be more expressive, and you pay attention to the wider range of nonverbal cues they are displaying, you should be more accurate in reading their emotional states.³⁷

Engage Only in Culturally Accepted Behaviors. Empathy can be enhanced through awareness of specific behaviors that members of a particular culture or co-culture might find impertinent or insulting. For instance, you would not receive vital information to use for empathy if you refused the hospitality offered by an Arab. The point here is that to be successful as an intercultural communicator, you must be empathic, and that skill can be cultivated only if you are sensitive to the cultural values and customs of the person with whom you are interacting.

Learn to Accept Differences. Our final recommendation for improving your empathic skills is that you learn to accept and appreciate cultural differences. You must learn to suspend, or at least keep in check, the cultural perspectives that are unique to your experiences. Arasaratnam and Doerfel reflect this notion when they say, “Competent intercultural communicators are person-centered, sensitive, and kind, have experience with different cultures, want to learn about cultural matters, and are good at these processes.³⁸ This link between empathy and acceptance is mentioned by Lewis when he notes, “Empathy is based on accepting differences and building on these in a positive manner.”³⁹ Closely related to empathy is the skill of effective listening. In order to practice empathy effectively, you must have the ability to listen effectively in order to pick up the subtle clues given off by your communication partner. These clues make it possible for you to “experience” their feelings and states of being.

Practice Effective Listening

A major theme of this book has been that culture greatly influences how you communicate, what you communicate, and how you respond to communication. Listening skills are embedded in all three of those important intercultural communication activities because listening and culture are interconnected. Morreale, Spitzberg, and Barge speak to the importance of that connection when they write, “Cultural differences in how people engage in listening are a reality, so you need to recognize and respect such culturally based differences in listening style.”⁴⁰ In addition, as Brownell says, “effective listening reduces costly misunderstandings.”⁴¹ To help you better understand the role culture plays in listening, we are going to examine some of ways the two go together.

DIRECT AND INDIRECT LISTENING

According to Lewis, cultural differences in listening behavior may be categorized as *direct* or *indirect*⁴² While these orientations represent two extremes, they nevertheless provide a useful way of understanding listening. In direct listening cultures such as France, Germany, and the United States,

people listen primarily for facts and concrete information. Listeners in these cultures also confront speakers directly and feel comfortable asking questions. In indirect listening cultures such as Finland, Japan, and Sweden, people listen in a very different manner. Interruptions do not occur while the speaker is talking, and politeness is part of the listener's behavior.

THE VALUE PLACED ON LISTENING

As we have noted elsewhere, in many cultures in the Far East, the amount of time spent talking and the value placed on talking are very different from what happens in cultures that value conversation (the Middle East, Latin America, and the United States). Japan is a relatively homogeneous culture, and therefore most people share a pool of common experiences. This commonality helps one discern what the other is thinking and feeling without using words. The Roman philosopher Cato recognized the value of silence and listening when he said, "Never am I more active than when I do nothing." Hence, silence is often valued over talk. Think about the connection between speaking, listening, and silence in the Buddhist expression "There is a truth that words cannot reach." Place that against the Arab proverb that notes, "Your mouth is your sword." Two very different orientations—one favoring silence and one preferring talk.

NONVERBAL COMMUNICATION AND LISTENING

Even the nonverbal responses to what you hear are often influenced by culture. In the United States, it is often a sign of paying attention when you make the sound "mm-hmm" or "uh-huh" when someone is talking. Within the African-American co-culture, the paralinguistic responses on the part of the listener are even more pronounced with what is termed "call and response." When this technique is employed there is an active exchange between speaker and listener that is not found in most cultures.⁴³ Eye contact is another nonverbal action that influences the listening process. In the United States and other Western cultures, a good listener is seen as paying attention if he or she makes direct eye contact with the person talking. But you will recall that direct eye-to-eye contact is not the correct custom in many Asian cultures or in the American Indian co-culture. In short, to be a good listener you need to know what nonverbal actions are appropriate and which might hamper the communication encounter.

ENCOURAGE FEEDBACK

The interactive nature of communication brings us to our next suggestion: encourage feedback. Feedback is the information generated by the person who receives the message—information that is "fed back" to the person who sent the original message. This information may be a smile, the words "No, thank you," or even complete silence, void of any outward expression. As Wood points out, "Feedback may be verbal, nonverbal, or both and it may be intentional or unintentional."⁴⁴ Regardless of the form of the feedback, it allows you the opportunity to make qualitative judgments about the communication event while it is taking place. These judgments offer useful data that enables you to correct and adjust your next message. A competent communicator uses feedback both to monitor the communication process and to exercise some control over it. Feedback clearly manifests the three

axioms we discussed at the beginning of this chapter—you can learn, you can make choices, and you can act differently. Granting that feedback is critical, you must learn to create an atmosphere that encourages other people to give you feedback. Therefore, we will review a number of communication skills that encourage other people to send you messages about the current situation—messages that might be useful as you continue the communication event.

Nonverbal Feedback. The first step in improving nonverbal feedback is recognizing that it takes many forms and its meanings are culture bound. This is perhaps best illustrated by relating a personal experience of one of your authors. After missing an exam, one of his Japanese students came to office hours. During the visit, the student continually giggled, averted her eyes, and held her hand over her mouth. From a Western perspective, the student's nonverbal behavior suggested she was frivolous (laughing), deceptive (averting eyes), and very nervous (hand over mouth), which further contributed to the impression of deceptiveness. The student offered no reason for missing the exam and did not ask for a retake. She simply apologized for not being there. A third party, however, had already told your author that the student's absence was due to the death of her grandfather. This demonstrates the importance of not assuming that nonverbal feedback in one culture carries the same meaning as it does in another culture.

Verbal Feedback. Positive verbal behavior can also encourage feedback. In cultures that value conversation and openness, asking questions is an excellent method of encouraging feedback about the quality of your messages. You can ask questions such as "Perhaps we should start the meeting by introducing ourselves. Is that agreeable?" or "How do you think we should start the meeting?" Further questions can be used to seek additional clarification. If asked in a non-threatening manner, even the question "Am I clear?" assists in monitoring the level of comprehension. We should remind you before we leave this topic that in some Asian cultures, as we have already pointed out, the word *no* is often avoided.⁴⁵ Your use of words also encourages feedback if you relate the words directly to what the other person has just said. You know from your own experience that it is very disconcerting if you tell a friend that you do not feel well, and your friend responds that she or he just received an "A" on an examination.

Silence as Feedback. There are times when silence instead of words will inspire feedback. You have repeatedly seen that every culture has a unique communication style. Some cultural styles call for periods of silence and/or long pauses, and you must learn to respect these phases during the encounter. Giving the person this quiet period creates an atmosphere that promotes feedback once the silence is broken. As we noted elsewhere in the book, many people from Asian cultures do not enjoy being hurried when they are negotiating and/or solving problems. If you learn to remain silent, you will be sending them some positive feedback about the transaction. As we noted, in some cultures there is no positive compensation for a quick decision, particularly if one made that decision without sufficient feedback.

Offer Non-Evaluative Feedback. Although the idea of being non-judgmental might be an idea embedded in all our other suggestions, it is important enough to justify making it an independent

category. The major advantage of non-evaluative feedback is that it sets a positive tone. As Gamble and Gamble point out, “When we provide non-evaluative feedback, we refrain from revealing our own personal opinions or judgments.”⁴⁶ When you engage in non-evaluative feedback, you enable your communication partner to take part in the conversation without feeling that you are saying (verbally or nonverbally), “I don’t think much of your ideas and beliefs.” Built into our last suggestion is the recommendation that you should try to avoid negative feedback. We will now list a few of the kinds of feedback that carry negative connotations. We should mention that while some of them might have a Western point of reference, your experiences should tell you they are common enough that they can have a negative outcome regardless of the culture. Hence we suggest that you avoid (1) frequent shifting of your body as if you are bored with what the other person is saying, (2) a slouching posture, (3) engaging in other activities (talking to someone else, writing) while the other person is talking, (4) having your arms folded in front of your chest, and (5) frowning and scowling.

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Before we conclude this section on developing intercultural communication competence, we have one more piece of advice for you: learn to be flexible in your communicative interactions.

Develop Communication Flexibility

Many experts in communication competence believe that one definition of competence is having the ability to adjust and fashion your communication behavior to fit the setting, the other person, and yourself.⁴⁷ As a clear rationale for malleability in the intercultural context, Gudykunst and Kim offer the following advice:

To gather information about and adapt our behavior to strangers, we must be flexible in our behavior. We must be able to select strategies that are appropriate to gather the information we need about strangers in order to communicate effectively with them. This requires that we have different behavioral options for gathering information open to us.⁴⁸ When speaking to the issue of how communication flexibility applies to international negotiations, Foster used an analogy:

The better [international] negotiators are ultimately pragmatic. They are not oaks; rather, they are more like willows. Unable to predict every situation, every twist and turn, even in a domestic situation, they know that it is nearly impossible to do so in a cross-cultural one.⁴⁹ An obvious component of being flexible is having a tolerance for ambiguity. If your culture values competition and aggressive action, and you are around someone from a culture that values cooperation and interpersonal harmony, you might find his or her behavior ambiguous and confusing; yet coping with ambiguity is a key element in intercultural competence. As Ruben and Kealey note, “The ability to react to new and ambiguous situations with minimal discomfort has long been thought to be an important asset when adjusting to a new culture.”⁵⁰

There are some selective behaviors that competent intercultural communicators employ to increase their tolerance for ambiguity. Guirdham suggests some specific actions that might be helpful. First, “[delay] the decision on how to approach a new person or situation until as much information as

possible has been gained by observation.” 51 Second, “[use] trial and error rather than the same formula until what works becomes clear.”52 Finally, perhaps the best advice on how to develop a tolerance for ambiguity is to be nonjudgmental, practice patience, expect the unexpected, and be adaptive. Remember the advice contained in the Spanish proverb, “I dance to the tune that is played.”

Although intercultural communication competence is requisite to successful interactions with people from different cultures, it also gives you a huge advantage when you venture into a new culture for an extended period.

5.c. How does the cultural difference of East and West result in quantitative as well as qualitative difference in intellectual achievement? Explain with the help of suitable examples. 15

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The Asian Drive for Achievement

Harold Stevenson and his coworkers studied the intellectual abilities and school achievement of children in three different cities chosen to be highly similar socioeconomically: Sendai in Japan, Taipei in Taiwan, and Minneapolis in the United States. They measured the intelligence and reading and math achievement of random samples of children in the first and fifth grades. We cannot know if the IQ tests really provided measures of intelligence that are fully comparable across the three populations (though the researchers believed they did—and make a pretty good case for that). Nevertheless, in the first grade, the Americans outperformed the Japanese and the Chinese on most intelligence tests. The authors attributed this to the greater effort of American parents to stimulate their preschool kids intellectually. Whatever the reason for the high American performance in the first grade, by the fifth grade the superiority of American children in IQ was gone. From these sets of facts we learn that regardless of who was smarter than whom in the first grade, the Americans had lost considerable ground to the Asian children by the fifth grade.

But the truly remarkable finding of this study was that math achievement of the Asian students was leagues beyond that of the U.S. students. The identical problems were given to Japanese, Taiwanese, and American children. By the fifth grade, Taiwanese children scored almost 1 SD better in mathematics than American children, and the Japanese scored 1.30 SDs better than American children. Even more astonishing, in a more extended study, Stevenson and his coworkers looked at the math performance of fifth-graders in many different schools in China, Taiwan, Japan, and the United States. There was not a lot of difference among the Asian countries. Schools in all three countries performed at about the same level. There was more variability among the U.S. schools. But the very best performance by an American school was equal to the worst performance of any of the Asian schools! IQ is not the point: something about Asian schools or the motivation of Asian children differs greatly from American schools or American children's motivation.

Let's start with the schools. Children in Japan go to school about 2.40 days a year, whereas children in the United States go to school about 180 days a year. The Asian schools are probably better, but the performance of Asian American children in U.S. schools shows that Asian motivation counts for a awful lot. The Coleman report on educational equality in the United States, published in 1966, measured the intelligence of a very large random sample of American children, and Flynn followed them until they were thirty-six years old on average. Americans of East Asian descent scored about 100 on the nonverbal portion of IQ tests and about 97 on the verbal portion, so they had a slightly lower overall IQ than did Americans of European descent.

Despite their slightly inferior performance on IQ tests, the Chinese Americans of the class of 1966 were about half as likely as other children to have to repeat a grade in K-12. Foreshadowing things to come, when the Chinese American children were compared with European American children in grade school, they did slightly better on achievement tests. By the time they were in high school, the Chinese Americans were scoring one-third of a standard deviation higher than European Americans on achievement tests. At a given IQ level, the Chinese Americans performed one-half of a standard deviation higher on typical achievement tests, compared with European Americans. The overachievement was particularly great on mathematics tests. In tests of calculus and analytic geometry, the Chinese Americans surpassed European Americans by a full standard deviation. When students were seniors in high school, the Chinese Americans performed about one-third of a standard deviation better on SAT tests than did Americans of the same IQ. By the age of thirty-two, the determination of the Chinese Americans in the class of 1966 had paid a double dividend. To get the educational credentials to qualify for professional or technical or managerial occupations, they needed a minimum IQ of 93, compared to 100 for whites. More important, of those with the IQ to qualify, fully 78 percent had the persistence to get their credentials and enter those occupations compared to 60 percent of whites. The resulting total dividend was 55 percent of Chinese Americans in high-status occupations, compared to a third of whites. The number for Japanese Americans was about halfway between the numbers for these two groups.

Flynn found similar overachievement relative to IQ on achievement tests and in occupations in a wide variety of studies of East Asians.

Note that the overachievement of Asian Americans, as indicated by the marked difference between measured IQ and academic achievement, is sufficient by itself to establish that achievement tests such as those given in K-12 classrooms and the SAT are not merely IQ tests by another name. They measure intellectual achievement as opposed to the power of memory, perception, and reasoning of the kind that IQ tests measure. Note also that the overachievement of Asian Americans establishes that academic achievement can be a better predictor of ultimate socioeconomic success than IQ.

Recently, Flynn studied the children of the members of that original class of 1966. Since we know that being raised in homes of higher social class is associated with higher IQ, we would expect the children to have higher IQs than not only their own parents but also the population at large. And

indeed they did. The mean of the Chinese American children when they were preschoolers was 9 points higher than the white average. But then most went to ordinary American schools, which we would expect would not be ideal for their intellectual development. In fact, the average of their IQs steadily declined until it was only 3 points above the white mean by the time they were adults.

Notice the arbitrariness of describing what Asians accomplish as overachievement. I used the phrase "Asian overachievement" to a Korean friend who had just spent a year in the United States, where his children attended public schools. "What do you mean by 'Asian overachievement'?", he expostulated. "You should say 'American underachievement'!" He told me that he was astonished when he attended ceremonies at the end of the year for his daughter's school and discovered that an award was given for having done all of the homework assignments. His daughter was one of two recipients of the award. To him, giving an award for doing homework was about as preposterous as giving an award for eating lunch. It is taken absolutely for granted by Asians. He is right to insist that the phenomenon is one of American underachievement. It's quite reasonable to regard high achievement as the default state of affairs and what most Americans do as slacking to one degree or another.

My Korean friend's bemusement touches on the key to understanding Asian achievement magic. Asian and Asian American achievement is not mysterious. It happens by working harder. Japanese high school students of the 1980s studied 3V2 hours a day, and that number is likely to be, if anything, higher today. The high-school-age children of the Indochinese boat people studied 3 hours a day. American high school students in general study an average of 1 Vi hours a day. (Black eighth-grade children in Detroit study, on average, z hours per week. Of course, at least some of this failure to do homework would have to be attributed to a school milieu that does not expect much.)

There is also no mystery about why Asian and Asian American children work harder. Asians do not need to read this book to find out that intelligence and intellectual accomplishment are highly malleable. Confucius set this matter straight twenty-five hundred years ago. He distinguished between two sources of ability, one by nature—a gift from Heaven—and one by dint of hard work. Asians today still believe that intellectual accomplishment—at any rate, doing well in math in school—is primarily a matter of hard work, whereas European Americans are more likely to believe it is mostly a matter of innate ability or having a good teacher. Asian Americans have attitudes on this topic that are in between those of East Asians and European Americans.

Asians and Asian Americans have another motivational advantage over Westerners and European Americans. When they do badly at something, they respond by working harder at it. A team of Canadian psychologists brought Japanese and Canadian college students to a laboratory and had them work on creativity tests. After the study participants had been working on them for a while, the researchers thanked them and told them about how well they did. Regardless of how well they had actually done, the researchers told some of the participants that they had done very well and others that they had done rather badly. The investigators then gave the participants a similar creativity test

and told them to spend as much time as they wanted on it. The Canadians worked longer on the creativity test if they had succeeded on the first one than if they had done badly, but the Japanese worked longer on the creativity test if they had failed on the first one than if they had succeeded.

Persistence in the face of failure is very much part of the Asian tradition of self-improvement. And Asians are accustomed to criticism in the service of self-improvement in situations where Westerners avoid it or resent it. For example, Japanese schoolteachers are observed in their classrooms for at least ten years after they begin teaching. Their fellow teachers give them feedback about their teaching techniques. It is understood in Japan that you cannot be a good teacher without many years of experience. In the United States, we tend to toss teachers into the classroom and assume they can do a good job from the get-go. Or if not, it's because they haven't got what it takes.

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But a still more important reason for Asians making the most of their natural intelligence is that their culture—as channeled to them by their families—demands it. In the case of Chinese culture, the emphasis on academic achievement has been present for more than two thousand years. A bright Chinese boy who worked hard and did well on the mandarin exams could expect to elevate himself to a well-paying high government position. This brought honor and wealth to his family and his entire village—and the hopes and expectations of his family and fellow villagers were what made him do the work. There was substantial upward mobility via education in China a couple of millennia before this was the case in the West.

So Asian families are more successful in getting their children to achieve academically because Asian families are more powerful agents of influence than are American families—and because what they choose to emphasize is academic achievement. *Eastern Interdependence and Western Independence* Why should Asian families be such powerful agents of influence? Here I need to step back a bit and note some very great differences between Asian and Western societies. Asians are much more interdependent and collectivist than Westerners, who are much more independent and individualist. These East-West differences go back at least twenty-five hundred years to the time of Confucius and the ancient Greeks.

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Confucius emphasized strict observance of proper role relations as the foundation of society, the relations being primarily those of emperor to subject, husband to wife, parent to child, elder brother to younger brother, and friend to friend. Chinese society, which was the prototype of all East Asian societies, was an agrarian one. In these societies, especially those that depend on irrigation, farmers need to get along with one another because cooperation is essential to economic activity. Such societies also tend to be very hierarchical, with a tradition of powerful ruling from the top to the bottom. Social bonds and constraints are strong. The linchpin of Chinese society in particular is the extended family unit. Obedience to the will of the elders was, and to a substantial degree still is, an important bond linking people to one another.

This traditional role of the family is still a powerful factor in the relations of second- and even third-generation Asian Americans and their parents. I have had Asian American students tell me that they would like to go into psychology or philosophy but that it is not possible because their parents want them to be a doctor or an engineer. For my European American students, their parents' preferences for their occupations are about as relevant to them as their parents' taste in art.

The Greek tradition gave rise to a fundamentally new type of social relations. The economy of Greece was based not on large-scale agriculture but on trade, hunting, fishing, herding, piracy, and small agribusiness enterprises such as viticulture and olive oil production. None of these activities required close, formalized relations among people. The Greeks, as a consequence, were independent and had the luxury of being able to act without being bound so much by social constraints. They had a lot of freedom to express their talents and satisfy their wants. The individual personality was exalted and considered a proper object of commentary and study. Roman society continued the independent, individualistic tradition of the Greeks, and after a long lull in which the European peasant was probably little more individualist than his Chinese counterpart, the Renaissance and then the Industrial Revolution took up again the individualist strain of Western culture and even accelerated it.

It is hard for someone steeped only in European culture to comprehend the extent to which achievement in the East is a family affair and not primarily a matter of individual pride and status. Like the ancient candidate for mandarin status, one achieves because it is to the benefit of the family — both economically and socially. Although there may be pride in personal accomplishment, achievement is not primarily a matter of enriching oneself or bringing honor to oneself.

And — here's the big advantage of Asian culture — achievement for the family seems to be a greater goal to success than achievement for the self. If I, as an individual Western free agent, choose to achieve in order to bring myself honor or money, that is my decision. And if I decide that my talents are too meager or I don't want to work hard, I can choose to opt out of the rat race. But if I am linked by strong bonds to my family, and feel its achievement demands a long with my meals, I simply have no choice but to do my best in school and in professional life thereafter. And the demand is reasonable because it has been made clear to me that my achievement is a matter of will and not just innate talent.

The achievement advantage of Asian Americans over European Americans is likely to increase. Prior to 1968, Asian immigrants to the United States were probably not more natively intelligent than their compatriots who remained at home. But the immigration laws of the 1960s make it relatively easy to come to the United States for a person who is a professional and relatively hard for someone who is not. The Asian American newcomers are going to have a cultural advantage over European Americans in general because they are professional and managerial types as well as being East Asians. Both their social class and their culture are going to be favorable for

the maximum development of educational and professional success of their children. And their children are going to have a genetic advantage as well because of the selection for talent. (This genetic advantage is likely to be slight. As we will see in the next chapter, environmental bottlenecks do not have much effect on the IQ of generations after the bottleneck.)

Holistic and Analytic Habits of Thought

The cultural differences of East and West result not just in quantitative differences in intellectual achievement but also in qualitative differences in habits of mind. Effective functioning for East Asians depends on integrating one's own desires and actions with those of others. *Harmony* has been the watchword for social relations for twenty-five hundred years in China. Effective functioning for Westerners is not so dependent on dealing with others. Westerners have the luxury of acting independently of the wishes of other people.

These social differences have given rise to habits of mind on the part of Easterners that I describe as *holistic*. Easterners pay attention to a wide range of objects and events; they are concerned with relationships and similarities among those objects and events; and they reason using dialectical forms of thought, which includes finding the "middle way" between opposing ideas. Western perception and thought are *analytic*, which is to say that Westerners focus on a relatively small part of the environment, some object or person that they wish to influence in some way; they attend to the attributes of that small part with a view toward categorizing it and modeling its behavior; and they often reason using formal rules of logic.

The need to attend to others means that the perception of Easterners is directed outward to a broad swath of the social environment and, as a consequence, to the physical environment as well. Takahiko Masuda and I showed people brief animated films of underwater scenes and then asked them to tell us what they had seen. Take a look at Figure 8.T, which shows a still photo taken from one of the films. The Americans focused primarily on the most salient objects — large, rapidly moving fish, for example. A usual first response would be, "I saw three big fish swimming off to the left; they had pink spots on their white bellies."

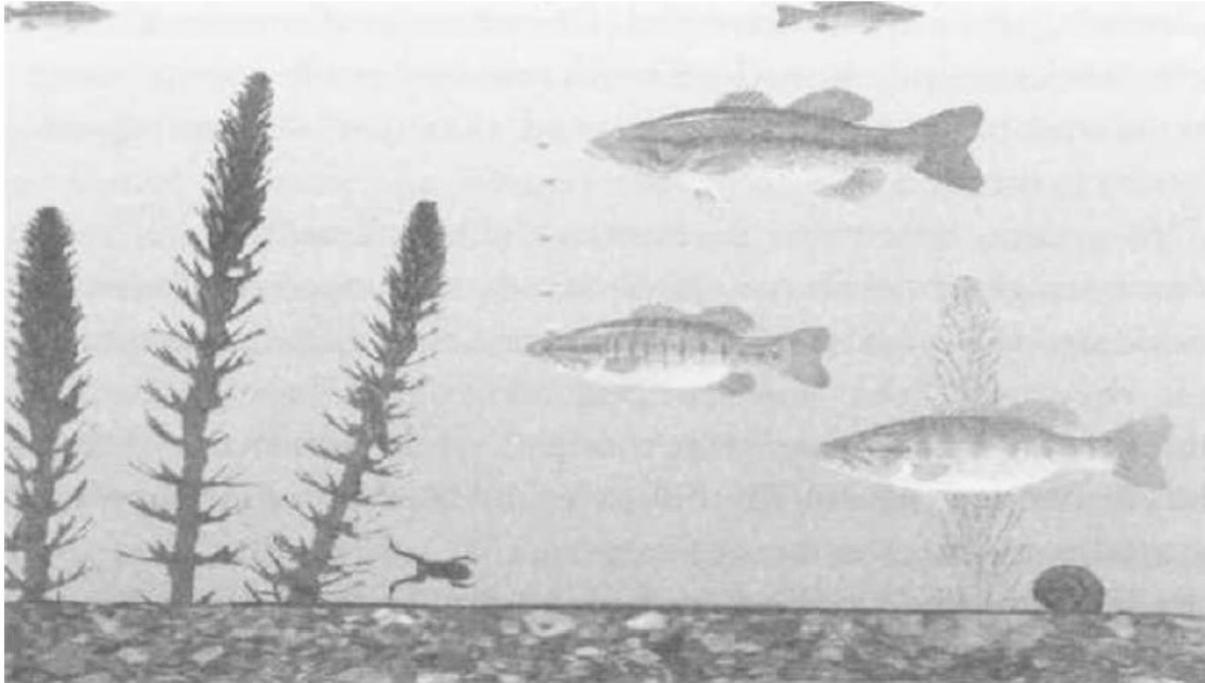


Figure S.I. Still photo from a color animation film shown to Japanese and Americans who were asked to report what they saw. From Mastda and Nishett (zooi).

The Japanese reported seeing much more of the environment — rocks, weeds, inanimate creatures such as snails. A typical initial response would be, "I saw what looked like a stream; the water was green; there were rocks and shells on the bottom." In addition to paying attention to context, the Japanese noticed relationships between the context and particular objects in it. For example, they were inclined to note that one object was next to another or that a frog was climbing on a plant. Altogether, the Japanese were able to report 60 percent more details about the environment than were Americans.

In another study, Masuda demonstrated that when shown cartoon pictures of a central figure flanked by other people and asked to judge the mood of the central figure, the Japanese were much more influenced in their judgments by the expressions on the surrounding faces than were the Americans.

Asians and Westerners see different things because they are looking at different things. My coworkers and I have rigged people up with devices that can measure what part of a picture they are looking at every millisecond. Chinese spend more time looking at the background than do Americans and make many more eye movements back and forth between the most salient object and the background.

The greater attention to context allows East Asians to make correct judgments about causality under circumstances where Americans make mistakes. Social psychologists have uncovered what they call "the fundamental attribution error." People are prone to overlook important social and situational causes of behavior and attribute the behavior instead to what they assume are attributes of the actor — personality traits, abilities, or attitudes. For example, when reading an essay that an instructor in a course or an experimenter in a psychology study has asked someone to write in favor of capital punishment, Americans assume that the writer must hold the view that he expressed. And they do this even when the experimenter has just requested that they write an essay upholding a view the experimenter chose. Koreans in this situation correctly make no assumption that the person whose essay they read actually holds the position he takes in the essay. The greater attentiveness to context has been characteristic of East Asians since the time of the ancient Chinese, who understood the concept of action at a distance. This made it possible for them to understand the principles of magnetism and acoustics and allowed them to figure out the true cause for the tides (which escaped even Galileo). Aristotle's physics, in contrast, was completely focused on the properties of objects. In his system, a stone fell to the bottom when dropped in water because it had the property of gravity, and a stick of wood floated on the water because it had the property of levity. There is no such property as levity, of course, and gravity is not found in objects but in the relation between objects.

Despite the greater correctness of ancient Chinese physics, and despite the fact that China was leagues ahead of the Greeks in technological achievements, it was the Greeks who invented formal science. Two things made this possible for the Greeks. First, because the Greeks were fixated on objects, they were concerned with the attributes of objects and with determining the categories to which they belonged. In order to understand the behavior of objects, the Greeks invented rules that presumably governed the behavior of objects. And rules and categories are what constitute science at base. Without them, there can be no explicit, generalizable models of the world to test. There can only be technology, no matter how sophisticated.

Second, the Greeks invented formal logic. As the story goes, Aristotle had gotten impatient with hearing poor arguments in the marketplace and the political assembly and so came up with logic in order to rule out forms of argument that are defective. In any case, logic does in fact serve that function in the West.

Logic was never of much interest in China. In fact, it appeared just once, briefly, in the third century BC, and it was never formalized. The Greeks could invent logic precisely because their habit of argumentation was socially acceptable. In ancient China, and in most of East Asia today, disagreements are a risky business—you might make an enemy if you contradict another person's point of view. Instead of logic, the abstract reasoning patterns of the East tend toward dialecticism, including a concern with finding the "middle way" between opposing arguments and an emphasis on integrating different points of view.

Like rules, categories, and explicit models, formal logic is an extremely helpful tool for science. But the Greeks went overboard in their fondness for logical argument. They rejected the concept of zero because, they reasoned, zero was equivalent to "non-being" and non-being cannot be! And Zeno's famous paradoxes are the result of logic gone wild. (For example, motion is impossible. For an arrow to reach a target, it would have to go half the distance between the bow and the target, then half that distance, and so on ad infinitum, and thus could never reach its target. This strikes us as comical, but the Greeks thought this was a real stumper.) Social practices and habits of thought tend to get ingrained, and so contemporary social and cognitive differences between East and West are much like those of ancient times. Thus we might expect Westerners to be more likely to emphasize rules, categories, and logic, and Easterners to be more likely to emphasize relationships and dialectical reasoning. And, in fact, my coworkers and I find this to be the case.

When we presented people with three words such as *cow*, *chicken*, and *grass*, and asked them which two go together, we got very different answers from Easterners and Westerners. Americans were more likely to say *cow* and *chicken* go together because they are both animals; that is, they belong to the same taxonomic category. Asians, however, focusing on relationships, were more likely to say that *cow* goes with *grass* because a cow eats grass. We also presented syllogisms to Americans and Asians and asked them to judge the validity of their conclusions. We found that Asians are just as good as Americans at judging the validity of syllogisms that are stated in abstract terms—all *As* are *X*, some *Bs* are *Y*, and so on—but are likely to be led astray when dealing with familiar content. Asians are inclined to judge conclusions that follow from their premises to be invalid if they are implausible (e.g., All mammals hibernate/rabbits do not hibernate/rabbits are not mammals). And Asians are likely to judge as valid conclusions that are in fact invalid but which are plausible.

Finally, it is possible to show that Americans sometimes make mistakes in reasoning owing to the same kind of "hyperlogical" stance that characterized the ancient Greeks. My coworkers and I showed that Americans will sometimes judge a given plausible proposition to be more likely to be true if it is contradicted by a less plausible proposition than if it is not contradicted. The Americans assume that if there is an apparent contradiction between two propositions, the more plausible one must be true and the less plausible one must be false. Asians make the opposite error of judging a relatively implausible proposition to be more likely to be true if it is contradicted by a more plausible proposition than if it is not contradicted — because they are motivated to find truth in both of two opposing propositions.

These perceptual and cognitive differences rest on brain activity that differs between Easterners and Westerners. For example, when Chinese are shown animated pictures of underwater scenes, an area of the brain known to respond to background and contexts is more active than it is for Americans. Conversely, an area of the brain known to respond to salient objects is less active for Asians than it is for Americans. Another brain-function study pursued the fact that Americans find it easier to make judgments about objects while ignoring their contexts, and East Asians find it easier to make judgments about objects which take into account their context. Consistent with this fact, regions of the frontal and parietal cortices that are known to be

involved in attention control are more active when a person makes judgments of the nonpreferred, more difficult kind—that is, judgments taking into account contexts for Americans and judgments that require ignoring contexts for East Asians.

How do we know that these differences in perception and thought are social in origin and not genetic? There are two main reasons. First, in several of the studies we conducted, we compared Asians, Asian Americans, and European Americans. In all the studies the Asian Americans perceived and reasoned in ways that were intermediate between Asians and European Americans, and were usually more similar to those of European Americans. Second, Hong Kong is known to be a bicultural society, with Chinese customs mingling with English ones. We found residents of Hong Kong to reason in a fashion intermediate between how Chinese and European Americans reason. And when Hong Kong residents were asked to make causal attributions about the behavior of fish, they reasoned like Chinese after being shown pictures such as temples and dragons and like Westerners after being shown pictures such as Mickey Mouse and the U.S. Capitol!

Eastern Engineers and Western Scientists?

The different social inclinations and thought patterns of Easterners and Westerners have implications for doing well in engineering versus science.

Everyone has heard the cliché that Japanese make good engineers but lag in science. This is no mere stereotype. Japanese prowess in engineering is the wonder of American industry. And my colleagues who teach engineering and my friends who hire engineers tell me that not only are there more Asian American engineers per capita but they also make better engineers than European Americans on average.

However, in the decade of the 1990s, forty-four Nobel Prizes in science were awarded to people living in the United States, the great majority of whom were Americans, and only one was awarded to a Japanese. This is not entirely the result of a difference in funding. The Japanese have spent roughly 38 percent as much on basic research as have Americans over the last twenty-five years, and they spend twice as much as do Germans, who won five Nobel Prizes in the 1990s. China and Korea have been relatively poor, developing countries until recently, and it is too early to tell how successful their citizens will be in basic science. But it is possible to point to some of the roadblocks in the path to scientific productivity that might apply to all interdependent peoples who are inclined to be holistic thinkers.

First, several social differences between East and West favor Western progress in science. In Japan, which is more hierarchical and organized than the West in many respects, and which places a greater value on respect for elders, more research money goes to older, non-longer-productive scientists. I believe that the premium on individual achievement and the respect for personal ambition in the West favors scientific accomplishment. Long hours in the lab do not necessarily do much for the scientist's family, but they are essential to personal fame and glory. Debate is

taken for granted in the West and is regarded as an essential part of the scientific enterprise, but it is considered rude in much of the East. A Japanese scientist recently reported on his amazement at seeing American scientists who were friends sharply disagree with one another—and in public. "I worked at the Carnegie Institution in Washington, and I knew two eminent scientists who were good friends, but once it came to their work, they would have severe debates, even in the journals. That kind of thing happens in the United States, but in Japan, never."

Second, the Confucian tradition, of which Japan and Korea are a part, has little use for the idea that knowledge is valuable for its own sake. This starkly contrasts with the ancient Greek philosophical tradition, which prized such knowledge above all other kinds. (I emphasize the term *philosophical tradition* in the preceding sentence. There is an amusing passage in *The Republic* where an Athenian businessman castigates Socrates for his pursuit of abstract knowledge, telling him that although it is admittedly attractive in the young, it is disgusting in a grown man.) Third, logic, the intellectual tool of debate, is more readily applied to real-world content by Westerners than by Easterners. Even the occasional hyperlogical habits of Westerners can be useful in science, however clumsy and even comical they can be in everyday life. Related to logic is the Western type of rhetoric found in formal discourse in science, law, and policy analysis. This consists of an overview of what is being discussed, general concerns about the topic, specific hypothesis, operations to test the hypothesis, discussion of pertinent facts, defense against possible counterarguments, and summary of conclusions. Training in this pattern of argumentation begins in nursery school: "This teddy bear is my lovey, I like him because . . ." Perhaps due to its roots in debate and formal logic, the Western form of rhetoric is not common in the East. I find with my own East Asian students that the standard rhetorical form is the last thing they learn on their way to a PhD.

Finally, there is the matter of curiosity. For whatever reason, Westerners seem to be more curious than Easterners. It is Westerners who have explored the Earth and immersed themselves in science and who regard the proper study of philosophy to be the fundamental nature of humankind. I do not know why this should be, though I can speculate on one possible source. We know that Westerners are constantly building causal models of the world. In fact, the children of Japanese who are living in the United States for business reasons are often regarded by American teachers as having weak powers of analysis because they do not build such causal models. One consequence of building explicit models is the element of surprise. The models lead to predictions that turn out to be wrong. This makes a person eager to get more accurate views—and more curious.

None of the habits of mind that are more characteristic of Easterners pose insurmountable obstacles to scientific excellence. The practice of science encourages mental patterns I have labeled as Western advantages, and the more steeped in scientific culture that Easterners become, the more natural will scientific habits of mind become. And Easterners may well be able to shape their distinctive habits of mind in ways that will provide advantages for scientific inquiry. Quantum theory in physics rests on contradictions that are anathema to the Western mind but congenial to the Eastern mind. Nils Bohr credited his deep knowledge of Eastern philosophy with his

ability to generate quantum hypotheses. For the time being, Westerners' advantage in science may be their ace in the hole in their friendly competition with the East.

But don't count on the advantage lasting for long. Until fairly far into the last century, European scientists were puzzled by the failure of Americans to produce much science of note.

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