EDUCATIONAL PSYCHOLOGY

EDUCATIONAL PSYCHOLOGY

EDUCATIONAL PSYCHOLOGY

Session 10

Metacognition

Metacognition is defined as "[cognition](#) about cognition", or "knowing about knowing". It comes from the root word "**meta",** meaning beyond.[1] It can take many forms; it includes knowledge about when and how to use particular strategies for learning or for problem solving.[1] There are generally two components of metacognition: knowledge about cognition, and regulation of cognition.[2]

[Metamemory](#), defined as knowing about memory and [mnemonic](#) strategies, is an especially important form of metacognition.[3] Differences in metacognitive processing across cultures have not been widely studied, but could provide better outcomes in cross-cultural learning between teachers and students.[4]

Some [evolutionary psychologists](#) hypothesize that metacognition is used as a survival tool, which would make metacognition the same across cultures.[4] Writings on metacognition can be traced back at least as far as *Perì Psūchês;* and the *Parva Naturalia* of the Greek philosopher

This higher-level cognition was given the label metacognition by American developmental psychologist John Flavell (1979).

The term metacognition literally means cognition about cognition, or more informally, thinking about thinking. Flavell defined metacognition as knowledge about cognition and control of cognition. For example, I am engaging in metacognition if I notice that I am having more trouble learning A than B; [or] if it strikes me that I should double check C before accepting it as fact.J. H. Flavell (1976, p. 232). [Andreas Demetriou](#), in his theory, one of the [neo-Piagetian theories of cognitive development](#), used the term hypercognition to refer to self-monitoring, self-representation, and self-regulation processes, which are regarded as integral components of the human mind.[6] Moreover, with his colleagues, he showed that these processes participate in general [intelligence](#), together with processing efficiency and reasoning, which have traditionally been considered to compose [fluid intelligence](#).[7]

Metacognition also thinks about one's own thinking process such as study skills, memory capabilities, and the ability to monitor learning. This concept needs to be explicitly taught along with content instruction. Metacognitive knowledge is about our own cognitive processes and our understanding of how to regulate those processes to maximize learning.

Some types of metacognitive knowledge would include:

* Person knowledge (declarative knowledge) which is understanding one's own capabilities
* Task knowledge (procedural knowledge) which is how one perceives the difficulty of a task which is the content, length, and the type of assignment

- Strategic knowledge (conditional knowledge) which is one's own capability for using strategies to learn information. Young children are not particularly good at this; it is not until upper elementary where students start to develop the understanding of strategies that will be effective.

Different fields define metacognition very differently. Metacognition variously refers to the study of memory-monitoring and self-regulation, meta-reasoning, consciousness/awareness and auto-consciousness/self-awareness. In practice these capacities are used to regulate one's own cognition, to maximize one's potential to think, learn and to the evaluation of proper ethical/moral rules.

In the domain of experimental psychology, an influential distinction in metacognition (proposed by T. O. Nelson & L. Narens) is between Monitoring—making judgments about the strength of one's memories—and Control—using those judgments to guide behavior (in particular, to guide study choices). Dunlosky, Serra, and Baker (2007) covered this distinction in a review of metamemory research that focused on how findings from this domain can be applied to other areas of applied research.

In the domain of cognitive neuroscience, metacognitive monitoring and control has been viewed as a function of the prefrontal cortex, which receives (monitors) sensory signals from other cortical regions and through feedback loops implements control (see chapters by Schwartz & Bacon and Shimamura, in Dunlosky & Bjork, 2008).[3]

Metacognition is studied in the domain of artificial intelligence and modelling.[8]

Therefore, it is the domain of interest of emergent systemics. It has been used, albeit off the original definition, to describe one's own knowledge that we will die. Writers in the 1990s involved with the grunge music scene often used the term to describe self-awareness of mortality.

Metacognition is classified into three components:[9]

1. *Metacognitive knowledge* (also called metacognitive awareness) is what individuals know about themselves and others as cognitive processors.
2. *Metacognitive regulation* is the regulation of cognition and learning experiences through a set of activities that help people control their learning.
3. *Metacognitive experiences* are those experiences that have something to do with the current, on-going cognitive endeavor.

Metacognition refers to a level of thinking that involves active control over the process of thinking that is used in learning situations. Planning the way to approach a learning task, monitoring comprehension, and evaluating the progress towards the completion of a task: these are skills that are metacognitive in their nature.

Metacognition includes at least three different types of metacognitive awareness when considering metacognitive knowledge:[10]

1. **Declarative Knowledge**: refers to knowledge about oneself as a learner and about what factors can influence one's performance.[2] Declarative knowledge can also be referred to as "world knowledge".[11]
2. **Procedural Knowledge**: refers to knowledge about doing things. This type of knowledge is displayed as heuristics and strategies.[2] A high degree of procedural knowledge can allow individuals to perform tasks more automatically. This is achieved through a large variety of strategies that can be accessed more efficiently.[12]
3. **Conditional knowledge**: refers to knowing when and why to use declarative and procedural knowledge.[13] It allows students to allocate their resources when using strategies. This in turn allows the strategies to become more effective.[14]

Theory of multiple intelligences

The **theory of multiple intelligences** is a theory of intelligence that differentiates it into specific (primarily sensory) "modalities", rather than seeing intelligence as dominated by a single general ability. This model was proposed by Howard Gardner in his 1983 book *Frames of Mind: The Theory of Multiple Intelligences*. Gardner articulated seven criteria for a behavior to be considered an intelligence.[1] These were that the intelligences showed: potential for brain isolation by brain damage, place in evolutionary history, presence of core operations, susceptibility to encoding (symbolic expression), a distinct developmental progression, the existence of savants, prodigies and other exceptional people, and support from experimental psychology and psychometric findings.

Gardner chose eight abilities that he held to meet these criteria:[2] musical–rhythmic, visual–spatial, verbal–linguistic, logical–mathematical, bodily–kinesthetic, interpersonal, intrapersonal, and naturalistic. He later suggested that existential and moral intelligence may also be worthy of inclusion.[3] Although the distinction between intelligences has been set out in great detail, Gardner opposes the idea of labeling learners to a specific intelligence. Each individual possesses a unique blend of all the intelligences. Gardner firmly maintains that his theory of multiple intelligences should "empower learners", not restrict them to one modality of learning.[4]

Gardner argues intelligence is categorized into three primary or overarching categories, those of which are formulated by the abilities. According to Gardner, intelligence is: 1) The ability to create an effective product or offer a service that is valued in a culture, 2) a set of skills that make it possible for a person to solve problems in life, and 3) the potential for finding or creating solutions for problems, which involves gathering new knowledge.[5]

Those who believe in one kind of intelligence think that all intelligence comes from a single factor. They back up this idea with the fact that there is a high positive correlation between intelligence quotient (IQ) and the ability to complete simple cognitive tasks and between reaction time and intelligence.

Intelligence modalities

Musical–rhythmic and harmonic[

This area has to do with sensitivity to sounds, rhythms, tones, and music. People with a high musical intelligence normally have good pitch and may even have absolute pitch, and are able to sing, play musical instruments, and compose music. They have sensitivity to rhythm, pitch, meter, tone, melody or timbre.[6][7]

Visual–spatial[

This area deals with spatial judgment and the ability to visualize with the mind's eye. Spatial ability is one of the three factors beneath *g* in the hierarchical model of intelligence.[7]

Verbal–linguistic[

People with high verbal-linguistic intelligence display a facility with words and languages. They are typically good at reading, writing, telling stories and memorizing words along with dates.[7] Verbal ability is one of the most *g*-loaded abilities.[8] This type of intelligence is measured with the Verbal IQ in WAIS-III.

Logical–mathematical

This area has to do with logic, abstractions, reasoning, numbers and critical thinking.[7] This also has to do with having the capacity to understand the underlying principles of some kind of causal system.[6] Logical reasoning is closely linked to fluid intelligence and to general intelligence (*g* factor).[9]

Bodily–kinesthetic[
Gross motor skill and *Fine motor skill*

The core elements of the bodily-kinesthetic intelligence are control of one's bodily motions and the capacity to handle objects skillfully.[7] Gardner elaborates to say that this also includes a sense of timing, a clear sense of the goal of a physical action, along with the ability to train responses.

People who have high bodily-kinesthetic intelligence should be generally good at physical activities such as sports, dance, acting, and making things.

Gardner believes that careers that suit those with high bodily-kinesthetic intelligence include: athletes, dancers, musicians, actors, builders, police officers, and soldiers. Although these careers can be duplicated through virtual simulation, they will not produce the actual physical learning that is needed in this intelligence.[10]

Interpersonal

This area has to do with interaction with others.[7] In theory, individuals who have high interpersonal intelligence are characterized by their sensitivity to others' moods, feelings, temperaments and motivations, and their ability to cooperate in order to work as part of a group.

According to Gardner in *How Are Kids Smart: Multiple Intelligences in the Classroom*, "Inter- and Intra- personal intelligence is often misunderstood with being extroverted or liking other people..."[11] Those with high interpersonal intelligence communicate effectively and empathize easily with others, and may be either leaders or followers. They often enjoy discussion and debate.

Gardner believes that careers that suit those with high interpersonal intelligence include sales persons, politicians, managers, teachers, counselors and social workers.[12]

Intrapersonal[

Introspection

This area has to do with introspective and self-reflective capacities. This refers to having a deep understanding of the self; what one's strengths/ weaknesses are, what makes one unique, being able to predict one's own reactions/emotions.

Naturalistic

This area has to do with nurturing and relating information to one's natural surroundings.[7] Examples include classifying natural forms such as animal and plant species and rocks and mountain types. This ability was clearly of value in our evolutionary past as hunters, gatherers, and farmers; it continues to be central in such roles as botanist or chef.[6] This sort of ecological receptiveness is deeply rooted in a "sensitive, ethical, and holistic understanding" of the world and its complexities–including the role of humanity within the greater ecosphere.[13]

Existential[

Some proponents of multiple intelligence theory proposed spiritual or religious intelligence as a possible additional type. Gardner did not want to commit to a spiritual intelligence, but suggested that an "existential" intelligence may be a useful construct.[14] The hypothesis of an existential intelligence has been further explored by educational researchers

Self-efficacy

Self-efficacy is the extent or strength of one's belief in one's own ability to complete tasks and reach goals.[1] Psychologists have studied self-efficacy from several perspectives, noting various paths in the development of self-efficacy; the dynamics of self-efficacy, and lack thereof, in many different settings; interactions between self-efficacy and self-concept; and habits of attribution that contribute to, or detract from, self-efficacy.

This can be seen as the ability to persist and a person's ability to succeed with a task. As an example, self-efficacy directly relates to how long someone will stick to a workout regimen or a diet. High and low self-efficacy determine whether or not someone will choose to take on a challenging task or "write it off" as impossible.

Self-efficacy affects every area of human endeavor. By determining the beliefs a person holds regarding his or her power to affect situations, it strongly influences both the power a person actually has to face challenges competently and the choices a person is most likely to make. These effects are particularly apparent, and compelling, with regard to behaviors affecting health.[2]

Judge et al. (2002) argued the concepts of locus of control, neuroticism, generalized self-efficacy (which differs from Bandura's theory of self-efficacy) and self-esteem measured the same, single factor and demonstrated them to be related concepts.

Social cognition is the encoding, storage, retrieval, and processing, of information in the brain, which relates to conspecifics (members of the same species). At one time social cognition referred specifically to an approach to social psychology in which these processes were studied according to the methods of cognitive psychology and information processing theory. However, the term has come to be more widely used across psychology and cognitive neuroscience. For example, it is used to refer to various social abilities disrupted in autism[1] and other disorders.[2] In cognitive neuroscience the biological basis of social cognition is investigated.[3][4][5] Developmental psychologists study the development of social cognition abilities.[6]

Historical development[

Social cognition came to prominence with the rise of cognitive psychology in the late 1960s and early 1970s and is now the dominant model and approach in mainstream social psychology.[7] Common to social cognition theories is the idea that information is represented in the brain as "cognitive elements" such as schemas, attributions, or stereotypes. A focus on how these cognitive elements are processed is often employed. Social cognition therefore applies and extends many themes, theories and paradigms from cognitive psychology, for example in reasoning (representativeness heuristic, base rate fallacy and confirmation bias), attention (automaticity and priming) and memory (schemas, primacy and recency). It is very likely that social psychology was always a lot more cognitive than mainstream psychology to begin with, as it traditionally discussed internal mental states such as beliefs and desires when mainstream psychology was dominated by behaviorism.[8]

A notable theory of social cognition is social schema theory, although this is not the basis of all social cognition studies (for example, see attribution theory).[8] It has been suggested that other disciplines in social psychology such as social identity theory and social representations may be seeking to explain largely the same phenomena as social cognition, and that these different disciplines might be merged into a "coherent integrated whole".[9] A parallel paradigm has arisen in the study of action, termed motor cognition,[10] which is concerned with understanding the representation of action and the associated process