

## METACOGNITION: SOME THOUGHTS ON THINKING

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When people deliberately manipulate their own thought processes, as when they rehearse a phone number over and over, they are demonstrating that they recognize the importance of *knowing how* to remember. They are demonstrating that they know that (a) they will forget the number unless they do something, and (b) the memory requires constant replaying to keep it from disappearing. This kind of knowledge about one's own thought processes (or "thinking about thinking") is known as "metacognition." The importance of metacognition lies in the fact that knowledge about cognition can be used to direct cognitive efforts.

Some researchers (Flavell, 1979; Baker & Brown, 1982) have made a distinction within the general concept of metacognition between *metacognitive knowledge* and *metacognitive experiences*. Metacognitive knowledge refers to knowing about one's thinking and being aware of the thought processes that are being used. For example, mature thinkers understand that there is a difference between "knowing" something and "guessing" about something. "Knowing" implies some degree of certainty about a fact or situation. Persons may know that the capital of Texas is Austin or that they feel happy. "Guessing" implies a degree of uncertainty about a fact or situation. Persons might guess that the capital of Texas is Houston or guess that another person feels happy because it is their birthday. Understanding the differences between these two kinds of thought processes is an example of metacognitive knowledge.

Metacognitive experience refers to the use of metacognitive knowledge in directing cognitive efforts. When persons systematically solve problems or otherwise consciously direct their own thinking, they are putting the metacognitive knowledge they have into use. Examples of such implementation of metacognitive knowledge might be planning a route for errands, planning food for a dinner party, deliberately rehearsing a phone number, using mnemonic devices to remember names, imagining the solution to a math problem, and deploying attention. To continue the previous example, mature thinkers understand that there are instances in which guessing and knowing are (and are not) appropriate. "Guessing" may be necessary when doing a crossword puzzle, but is probably not a good strategy to use when completing an income tax form. "Knowing" factual information is important when writing an authoritative report, but it may not be important if someone asks your opinion about which player will win a tennis match. In these and similar ways, persons need to be able to use the metacognitive knowledge they have acquired.

Another important aspect of the concept of metacognitive experiences is knowing when one is confused or does not understand something. Such awareness may be useful in circumstances such as monitoring comprehension while reading an article, while listening to directions, or while studying for a test. Only when persons know they do not understand can they do something to correct the problem (e.g., read slowly, ask someone to repeat directions, and eliminate distractions while studying). These activities may occur as a result of "private dialogues," during which persons may ask questions of themselves or give themselves instructions. These questions might include:

- "What do I do here?" (defining)
- "What is the nature of the problem?" (assessing)
- "What are the parts, and which ones are important?" (analyzing)
- "What should be done first, next . . . ?" (sequencing)
- "Is this working? Why, why not?" (monitoring)
- "What other approaches can I try?" (shifting)

Because these questions come from metacognitive knowledge, they can be called metacognitive strategies. According to Vygotsky's (1962, 1978) theory, these metacognitive strategies come, in large part, from internalization of questions asked by others.

Metacognitive knowledge normally comes about in unsystematic ways (e.g., a comment by someone, modeling by someone, or trial-and-error). Well-educated adults have acquired a large store of metacognitive knowledge from their everyday experiences. They know the names of many of their thought processes (e.g., remembering, figuring out, reasoning, recalling, recognizing, concentrating, understanding, memorizing, paying attention to, guessing). They also can identify conditions under which they learn well (e.g., with practice or rehearsal, with no distractions around, by active participation in the experience, with auditory or visual presentation, with some reference to prior knowledge) and know how to facilitate their own learning through use of this knowledge. Thus, adults have a large store of information about the processes they use to learn and the ways to maximize their use of these processes.

Metacognitive curricula such as *Bright Start* (Haywood, Brooks, & Burns, 1986, 1992) and *Instrumental Enrichment* (Feuerstein, Rand, Hoffman, & Miller, 1980) use the mediational teaching style to teach children to be aware of their own thinking processes. This awareness is emphasized because the ability to reflect on one's thoughts is a prerequisite to the application of reasoning processes. By labeling their various cognitive and learning functions, children are better equipped to manipulate them when necessary to solve a problem. Once children know something about their own learning and thinking, teachers can talk to them about these processes. They share a common vocabulary and referents concerning these activities. Children can then be reminded to look systematically, make a plan, or make a picture in their heads.

In *Bright Start*, some metacognitive knowledge is represented as cognitive functions. All of the cognitive functions in the curriculum have metacognitive components to varying degrees. Examples of the metacognitive nature of some cognitive functions are:

"Comparing to a model" encompasses knowledge that seeking a model and matching it can be part of the solution to a problem.

"Mental imaging," once under voluntary control, can be used as a device to remember things.

"Role-taking" can be used as a deliberate strategy to understand another person's otherwise incomprehensible behavior.

"Interiorizing" involves practicing and applying new concepts or rules so that they become automatic.

"Gathering clear and complete information" is an instruction that even adults sometimes give themselves when they know they may overlook important details.

"Keeping two (or more) things in mind at the same time" requires that one recognize the need to do so and marshal strategies that succeed (e.g., rehearsing the items together or in sequence).

When these cognitive processes are isolated and identified for children, then they can apply them in other contexts in which they might be useful. This process is facilitated through the small group lessons and the bridging discussions that occur within them. These activities help children to understand how the cognitive processes (metacognitive knowledge) that they are learning can be put to use (metacognitive experiences) in real-life events. By doing this, Bright Start and the mediational teaching style are doing systematically what everyday experience does for most adults. *Bright Start* makes children's experiences more efficiently organized for learning about thinking and thinking about learning.

### References

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