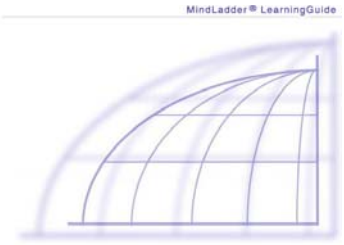

Printout of MindLadder® Advisor Section B-5•

C-7: Appraisal of Effort (Precision, Accuracy, Persistence and Intensity)

This knowledge construction function orients the student to supply the effort that best serves their knowledge, skills and abilities. The capacity to appraise the need for effort plays a role in each of the three phases of the mental act: It can be well-developed in one phase and be in need of development in one or both of the others. For this reason it is discussed separately under Reception, Transformation and Communication (for Reception see R-9; for Transformation see T-14).

Effort has to do with exertion. While each situation is different, all require some mix of four principal variables: Intensity, persistence, precision and accuracy. Intensity is how hard we need to work, persistence is how long we need to work, precision is how careful we need to be and accuracy is how correct we need to be. Here is a summary of the principal characteristics (see also R-9):

P	Precision		=	how careful
A	Accuracy		=	how correct
P	Persistence	=	=	how long
I	Intensity		=	how hard

Precision often overlaps with accuracy - but not when you do the wrong thing (accuracy) the right way (precision)! For example, in carpentry you can carefully measure the length of the wrong beam. In math you can carefully compute the value of the wrong equation. In social studies you can carefully examine an irrelevant problem. In each of these cases you would be precise but not accurate.

Together the four variables form the acronym PAPI. Ordinary events in school and daily life easily provide examples of tasks that call for

different mixtures of 'PAPI'. Judy's teacher assigns a project report at the beginning of the month that must be completed by the end of the month. Judy knows how much time and effort she will need to put into the project over the next four weeks to have it completed on time. She wants to avoid having to work at a high level of intensity just before the deadline. Students need to take control of this knowledge construction function by gaining familiarity with the PAPI variables and by experiencing their ability to regulate them as they use their knowledge, skills and abilities in different situations. They need to get a sense of the role that time plays across all of the four variables and learn how to manage their effort to put their knowledge, skills and abilities to their best possible use. Joshua is going out for cross country. He is learning how to develop a strategy for cross country races. As part of his learning process he appraises the amounts and types of effort that are required to run a good race including a strong finish.

To mediate the development of this knowledge construction function have students analyze different tasks from the standpoint of their PAPI requirements. Here are some examples: Taking a scholastic aptitude exam, rehearsing a school play, performing a school play, practicing a sport, playing in the league finals of the sport, collecting research data, presenting scientific findings to the class, running a 100 meter dash, running a 5K race, taking a walk in the park, responding to an emergency. You and your students can easily come up with additional tasks.

Have students experiment with different levels of intensity when they engage in ordinary task such as walking, writing, reading, conversational talking and speaking to an audience. Have them read and write and speak to others with very low and very high amounts of speed (intensity). Have them discover what level of intensity is most comfortable. Notice how uncomfortable some of the alternatives quickly become! Have fun with these exercises.

Have students experience being both overly persistent in what they do and not persistent enough. Likewise, have them experiment with being both less and more precise, and accurate, than a given situation may call for. Here are some situations you can use. You and your students can come up with many others as well.

Washing you hands
Arriving at the railroad station
Heating food
Preparing for a test
Writing a paper

Students may have a good vocabulary but not be aware of the need to be precise and accurate in expressing themselves. They may say things such as the book is "over there" rather than "the book is on the first desk in the second row". Sometimes we can speak casually and in an imprecise manner and at other times it can be important, even critically important, to be precise. Facilitate your students' discovery of the need to be precise. For example, have your class discuss what would happen if they gave imprecise or inaccurate directions to their house. Would their friend find the house? What might happen if the doctor was not precise in stating how to take certain medications?

Throughout your work in the classroom guide your students to appraise the effort that is required to complete tasks. For example, when giving instructions to begin a project, have your students discuss what kinds of effort they think will be needed for different phases of the project. Have students identify the importance of being accurate and precise at critical points during in the project. "What would happen if we rushed through cutting the wood and did not measure it accurately?"

Remember that unfamiliar tasks often will lead to incorrect appraisals of the effort required to perform them. Both time and experience are needed to produce and improve estimates of effort even for students who have acquired mastery of this knowledge construction function. When new tasks are introduced in the curriculum work with your students to come up with initial estimates of the kinds of exertion that may be required: "Where is persistence needed, where will intense efforts be required, where will precision and accuracy be important?"

The use of this knowledge construction function is sensitive to issues of self-esteem and expectations of success or failure. A student who has experienced failure over and over again may allocate effort in a way that is designed to protect her self-esteem. Trying and failing is sometimes harder to deal with than not trying and failing. Not trying and failing points to a lack of effort ("If I didn't try I didn't fail") whereas trying and failing point to a lack of ability. Students with low self-esteem may exert themselves more on harder than easier tasks because failure on difficult tasks, if incurred, can be ascribed to the difficulty of the task as opposed to the student's abilities.

This knowledge construction function is also sensitive to emotional and motivational pressures. Juna Singh shivers at the mere mention of a quiz. She studies so hard the night before that she usually is too tired to deliver even a decent test performance in the morning. Chico's fear of failure elevates his need for accuracy in every minor detail. On

tests he obsesses on questions he doesn't know and ends up with no time for others he might have known. On the other hand, Melanie, when she takes a test, moves on as soon as she thinks there is something she doesn't know. Like Chico, she does not apply her knowledge effectively. As you mediate the development of other knowledge construction functions to enable students with these kinds of problems to reach higher levels of functioning - such as Closure (R-1) and Systematic Exploratory Strategies (R-7) - also provide assistance to enable them to allocate effort effectively when they need to communicate and use their knowledge.

A simple paper-and-pencil activity has been created to enable teachers and students to explore the four dimensions of precision, accuracy, persistence and intensity of effort ('PAPI'). The task presents the learner with a series of similar signs arrayed in rows and columns. The learner needs to strike a line only through the target signs. Four levels of difficulty are formed by varying the number of target signs, the number of distracting signs and the total number of items in the grid.

The similarity of the signs and their number create a perceptual overload that puts precision, accuracy and persistence into play. Intensity is put into play by imposing a time constraint ("Let's see how many we can do in 60 seconds"). Remember that the objective of this activity is to gain familiarity with the four dimensions of effort. Students do not need to complete any of the grids although some may wish to do so simply for the sake of stepping up to the challenge. Introduce the grids in a lighthearted manner and have fun with them on the way to learning about the dimensions of effort. Connect the work on these tasks and the insights gained to other situations in and out of school where students need to regulate their effort. - The PAPI activity can be downloaded here and also from the discussion of the role of effort in the collection of information (R-9). Download the PAPI activity here.