Being Concerned With Well-Being and With Learning

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The cognitive system is designed for knowledge and skill acquisition, but, as several researchers have pointed out, learning is also facilitated or hampered by emotions, moods, and feelings. Emotions are stored in memory along with declarative and procedural knowledge, and this information may be used as a gross discriminator to identify quickly problematic and nonproblematic situations. As such, emotions can be seen as action readiness changes that are linked to current concerns. They remind the person of past problematic or nonproblematic situations. When negative emotions create a pessimistic perceptual attitude, they may draw the learner's attention to task-irrelevant aspects that activate intrusive thoughts and create a concern for well-being rather than for learning. An optimistic perceptual attitude may lead to short-term learning intentions and to activity in the mastery mode.

When I started my research on the affective-learning process some 10 years ago, I tried to make the "person in situation" view more explicit in educational research. My model of the adaptable-learning process derived from a functional analysis of the learning process, as it occurs in the life classroom. It has evolved over time. Empirical results emanating from my own research as well as findings in the light of new personality theories have motivated several refinements and extensions of the model. Essentially, my functional analysis of goal-directed behavior in the classroom started with two main assumptions: (a) Students want to enlarge their available personal resources, and (b) they want to prevent loss of resources and distortions of well-being. I refer to adaptable learning when a student has found a balance

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between these two parallel priorities. One of my goals is to present a model of adaptable learning in the classroom. A second goal is to illustrate how the model works.

BACKGROUND IDEAS LEADING TO A
MODEL FOR ADAPTABLE LEARNING

The theoretical basis of my research on adaptable learning comes largely from emotion theory, mood theory, action control theory, stress research, social support, anxiety, and motivation research. My thoughts about learning in the classroom have been strongly influenced by the transactional theory of stress proposed by Lazarus and Folkman (1984) and Lazarus and Launier (1978). They made educational psychologists aware that learning in school is more than a linear form of logical problem solving. And, the learner's appraisals of learning situations, taking into account contextual, social, and emotional factors, are quintessential to understand and explain behavior in various learning situations. Drawing on the work of Lazarus and his colleagues, I theorized that when an individual appraises a learning situation and notes a discrepancy between perceived task demands and perceived resources to meet these demands, he or she may experience negative emotions, a change of mood, and a concern for well-being. It stands to reason that these changes in affect will influence a person's functioning. Over the 10 years, a vast amount of evidence has convinced even the strictest cognitivist that there is an interplay between cognitions and emotions. There is also accumulating evidence that cognitions and behavior affect the autonomic nervous system, neuroendocrine transmitters, and even the immune system (Taylor, 1986). Before presenting the model of adaptable learning, the central concepts that have directed our conceptualizations and research are discussed.

In the last 10 to 15 years, we have witnessed a renewed interest in the study of emotions. This is due to the fact that new experimental methods made it possible to analyze facial expressions of emotions (cf. Ekman & Friesen, 1978; Izard, 1979) and to construct theories in which distinct emotion states are linked to specific forms of behavior (Zajonc, 1980). Several authors have tried to parse the phenomenon of an emotional experience into its separate components, and they have attributed a central role to the appraisal process. For example, Frijda (1986) argued that emotions are stored in memory along with declarative and procedural knowledge, and that this information may be used as a gross discriminator to monitor upcoming and ongoing events in order to identify problematic and nonproblematic situations. Frijda conceptualized emotions as changes

in readiness for action (changes in level of activation, attentional arousal, action tendencies, desires, and enjoyments). The changes are not in the situation itself; but they are the end product of an appraisal process based on the individual's current concerns. Current concerns are internal representations that turn an event into a satisfier (nonproblematic, benign–positive situation, associated with positive cognitions and emotions) or into an annoyer (problematic, threatening situation that may cause damage or harm). Hence, as Frijda put it, current concerns underlie emotions; in other words, they underlie the meaningfulness of action readiness change.

Situations that elicit strong emotions and a concern for well-being may be problematic in the sense that extra processing capacity is required for toning down emotions and for tuning back in on the task. Bower's (1981, 1991) mood induction studies demonstrated that positive and negative affect may have a strong effect on information processing. Negative mood states prime the recall of negative events and experiences and initiate a more analytic, detailed way of processing. For example, Bower (1991) reported that people who are in a sad mood seek out information that will keep them feeling lousy. Not only do they read negative information about a specific topic more slowly, but they also spend more time reading and rereading negative details about the topic. But the reverse is also true: People who are in a positive mood state have the tendency to process incoming information in a holistic and creative way. They spend more time encoding positive details and remember later more positive things about the topic. Bower also showed that positive and negative mood states can influence the decision-making process. Mood states affect self-perceptions of competence and may be a strong source of bias in the appraisals. Sadness even seems to induce a fatalistic attitude that makes people ignore doctors' prescriptions and other advice. This research tells us a great deal about the effect of mood states on information processing, and it should convince us that it is important for students to learn and control their emotions and mood states. Lazarus's (1991) work helps us in studying students' efforts at emotion control.

Lazarus and Folkman (1984) argued that goals, commitments, and beliefs vary across individuals and within individuals over time. They emphasized that a person makes several appraisals of a situation. *Primary appraisals* concern the stakes that a person has in the outcomes of a person–situation transaction. They have to do with the relevance of the goal, the kind of goal that is at stake, and whether the situation is beneficial, negative, or neutral for well-being. *Secondary appraisals* have to do with whether and in what way a stressful situation can be changed for the better: The individual considers his or her coping options in relation to the goal that is at stake. An appraisal decision is made on the basis of the total emotional encounter,

and whether or not stress (challenge, harm, threat, or loss) is experienced depends on the achieved balance between primary appraisals and secondary appraisals.

Coping is considered to be a key variable in the emotions, especially the negative emotions. Lazarus and Folkman (1984) defined *coping* as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the individual" (p. 141). They constructed a 66-item questionnaire to measure coping. They used it with different samples and showed that there are many different coping forms, including planful problem solving, tension reduction, wishful thinking, seeking social support, detachment, positive labeling, and self-blame. Notwithstanding these different coping forms, many authors agree with Lazarus (Roth & Cohen, 1986; Suls & Fletcher, 1986) that there are only two basic, universal ways of dealing with stressful situations: problem-focused coping (or approach) and emotion-focused coping (or avoidance).

Approach refers to individuals' efforts to act on the external or internal source of stress, often involving planful actions to change the actual person–environment relationship for the better by directly acting on the environment or on oneself. *Avoidance* refers to efforts to reduce the emotional distress associated with the stressful encounter. The term *emotion-focused coping* (or sometimes even *cognitive coping*) is used because this form of coping only changes what is in the person's mind either by attention deployment, denial, or distancing. Roth and Cohen (1986) predicted and found that approach and avoidance are highly consistent forms of coping with stress in a particular context and that these coping strategies are not mutually exclusive.

Seiffge-Krenke (1990) studied coping processes in adolescence and identified three major coping strategies: (a) active coping, (b) internal coping, and (c) withdrawal. She reported that when using an active coping strategy, students actively and constructively try to do something about the problem (e.g., putting in more effort; gathering information about the nature of the problem; or calling on their social support network for tangible help, advice, or emotional support). *Internal coping* refers to internal reflection on possible solutions, and *withdrawal* refers to coping strategies in which the student avoids more stress by inhibiting actions that may get him or her into more trouble. Seiffge-Krenke reported striking sex and cultural differences in the use of these three coping strategies but concluded that, in adolescence, both active and passive ways of coping with stress may be appropriate ways of dealing with taxing demands. In future research projects, a clear distinction should be made between students' perceived personal resources and their perceived social support.

Indeed, over the last 10 years, research on *social support* has clearly

demonstrated that perceiving one's environment as supportive can reduce the psychological impact of stressful events (cf. Billings & Moos, 1982; Schwarzer & Leppin, 1988; Thoits, 1986). Social support has been defined in different ways, focusing either on the number of people in somebody's social support network or on the quality and intensity of the perceived social relationships. There is a vast amount of evidence documenting the beneficial effect of social support on health (Taylor, 1986), but relatively few studies have been done in a school context. Existing findings display that social support given to students comes from parents, relatives, peers, neighbors, or teachers and suggest that it is highly plausible that students who perceive their environment as supportive are more inclined to use approach as a way to gain control over the learning situation (cf. Boekaerts, Wijdemans, & Seegers, 1991).

A MODEL FOR ADAPTABLE LEARNING: TWO INTERACTING MECHANISMS

Essentially, my functional analysis of goal-directed behavior in the classroom started with the assumption that students want to enlarge their available resources or to regenerate lost resources. They translate general-learning goals, which are basically long-term in nature, into short-term learning intentions, and they may or may not realize these intentions. An intention to learn can be defined as the willingness to put in effort to accomplish the learning goals or relevant subgoals. Note, however, that each learning opportunity finds the learner at a certain stage of skill development and with a certain degree of confidence and motivation in relation to that skill. Hence, it could be that some learning activities are perceived by the learner as "real" learning opportunities, whereas others are characterized as artificial or suboptimal learning situations. I postulated that the former types of learning activities may quasi-automatically lead to a learning intention, whereas the latter types may, at best, lead to behavioral intentions to stay out of trouble. The decision is apparently a result of appraisal.

I wanted to study students' appraisals and the way they affect their behavioral intentions. Following Lazarus and Folkman (1984), I conceptualized appraisals as ongoing comparison processes between task or situational demands and personal resources to meet these demands. This is expressed in my model by linking the appraisals to the contents of a dynamic internal model, in which information is constantly fed from three main sources.

The first source of information is the perception of the task and the physical, social, and didactic context in which it is embedded (Component

1). The second source of information is activated domain specific knowl-edge and skills relevant to the task (Component 2). The third source consists of manifest personality traits, including the self-concept and long-term and short-term goals (Component 3). A subset of the self-concept and the goal structure is made available and salient by the prevailing physical, social, and didactic context. Information from these three main sources is integrated in a sort of on-line working model. It is used as a frame of reference to appraise upcoming and ongoing situations and to decide on a continued or a new course of action.

I believe that (a) even when the learner is not aware of it, learning activities trigger a network of highly specific connotations (current con-cerns) with their concomitant positive and negative emotions (action readiness changes); and (b) even when the learner cannot make them explicit, appraisals are continuously being made. Following Lazarus and Folkman (1984), I proposed (see Boekaerts, 1992) that the outcome of these dynamic appraisals results in anticipated gains in resources, anticipated losses in resources, or a null operation (outcome of the primary appraisal process). I talked about a null operation when the learning task is considered by the student as irrelevant for his or her well-being and no intense emotions are elicited. By contrast, when an important goal is at stake, and students detect a discrepancy between the task demands and their personal resources to meet them, the task will have consequences for well-being. I expected that such threat appraisals about the learning task would coincide with negative emotions (anxiety, anger, or disappointment) to restore well-being and would lead to actions to do something about them (the use of specific coping techniques). On the other hand, I expected that when gains for reasonable costs are anticipated, positive thoughts and feelings will be dominant, leading to challenge appraisals. I further theorized that both null operations and positive appraisals lead to learning intentions and to activity in the mastery mode (symbolized by the learning route; see the dashed lines in Figure 1). When students are on this learning-oriented pathway, they are enacting their learning intention(s). By contrast, I hypothesized that threat appraisals initiate activity in the coping mode (symbolized by the well-being route; see the dotted lines in Figure 1) and that when learners are on this nonlearning-oriented route, their primary concern is to maintain or restore well-being.

In summary, the basic assumption underlying the model of adaptable learning is that students are walking a tightrope. When the mastery mode is in operation, students have found their balance; they are primarily engaged in enacting learning intentions. When the coping mode is in operation they have (temporarily) lost their balance. This model was used to guide my research. My first research question was: What tips the balance from the mastery mode to the coping mode and vice versa. At this point, I present
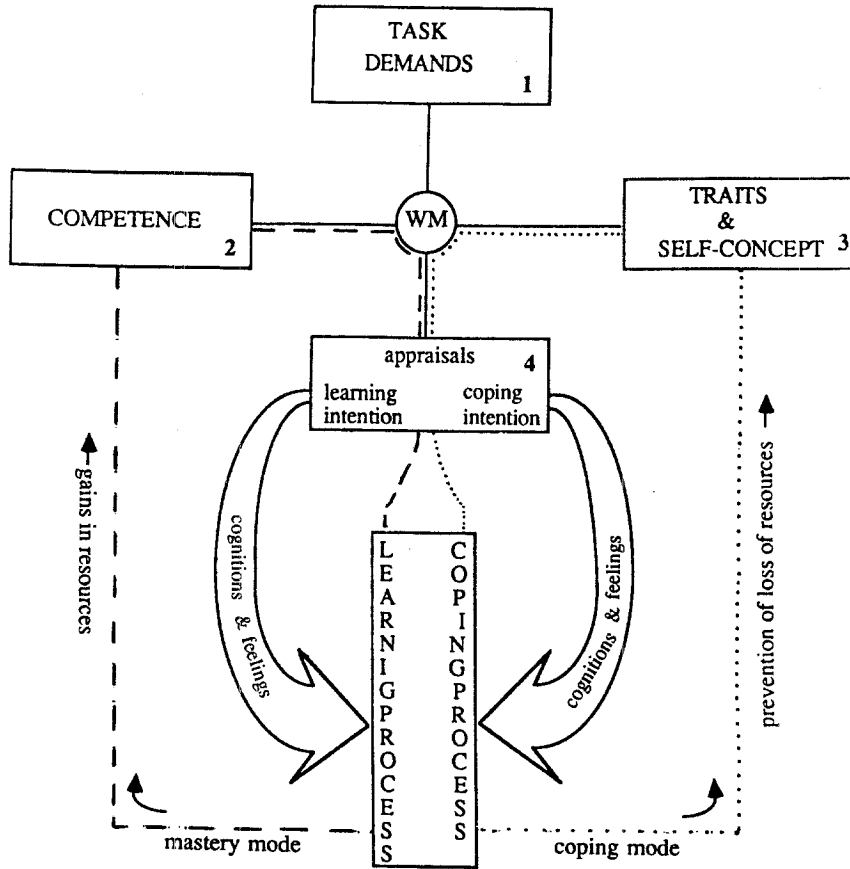
FIGURE 1   Heuristic model of the affective-learning process.

some findings that shed some light on the effect of emotions and appraisals on the learner's behavioral intentions, his or her performance, and health.

OPTIMISTIC AND PESSIMISTIC APPRAISALS

I constructed the quasi-on-line motivation questionnaire to measure students' appraisals. This questionnaire has been described elsewhere (e.g., Boekaerts, 1985, 1988). It consists of two parts. The first part is filled in before the students start with a regular curriculum task in class. They indicate on 4-point Likert scales how important, how personally relevant, and how difficult they think the type of task is; how competent they think they are; how attractive they find that type of task; how much effort they

usually have to invest, and how much effort they are planning to invest now; whether they feel happy, anxious, sad, angry, and so on. Example items are as follows: How competent do you consider yourself for these types of tasks? (competence judgment), and How much effort (attention) are you going to put into the task? (learning intention). The second part is filled in when the task is finished. Students again report on their cognitions and emotions; in addition, they record their assessment of their learning outcomes and their attributions.

Analyses of the data from different samples of 10- to 14-year-old students using a variety of curriculum tasks indicated a split between two complementary aspects of the appraisal process: One cluster of appraisals included the students' competence judgments, their perception of the attractiveness of the task, and eagerness to start. I called this cluster *situationally induced self-efficacy and pleasure*. The other cluster consisted of the perceived level of difficulty, success expectation, and perceived utility of the task. This cluster was coined *situationally induced outcome expectancy*. I found that situationally induced low outcome expectancy was associated with low situationally induced self-efficacy and pleasure. Students characterized by this pattern of appraisal reported more intense negative emotions and more avoidance behavior. By contrast, a high score on situationally induced self-efficacy and pleasure was associated with positive emotions and with a higher intention to learn. What the results seem to suggest is that the tendency to make optimistic appraisals (featuring primarily on self-efficacy and pleasure) may be the key mechanism to form an intention to learn (i.e., to achieve a gain in personal resources; see Helmke, 1989). However, the tendency to make pessimistic appraisals, focusing mainly on task outcome and difficulty level, may be the key mechanism to form a behavioral intention to maintain or restore well-being.

In this article, the focus is on the latter type of behavioral intentions. However, I refer briefly to some of my work on the mastery mode (Boekaerts, 1992). Earlier in this article I argued that optimistic appraisals may quasi-automatically lead to an intention or decision to learn. But learning intentions are no guarantee that the student will reach mastery: Optimistic appraisals may steer a student's activities toward the learning route, but staying on it requires active supervisory control. Kuhl (1985) and Kuhl and Kraska (1989) referred to this active mode of control as *action control*. They explained that to protect a behavioral intention from competing action tendencies, planned interruptions of behavior at critical points are necessary. Otten and I (Boekaerts & Otten, 1992) adapted Kuhl's Action Control Scale for classroom use, and our first results indicate that students' ability to exert action control over everyday activities is reflected in their skill of enacting an intention. Differential effects were found for narrative and informative texts.

STUDYING STRESS IN THE CLASSROOM

The study of stress and coping in the classroom has already developed into a specialized area of academic enquiry (Colton, 1985; Compas, Davis, Forsyth, & Wagner, 1987; Grannis, 1985; Metcalfe, Dobson, Cook, & Michaud, 1982). I started my stress studies with the beliefs that negative emotions are a natural part of classroom life, that students experience stress in different situations, and that they vary in their ability to control their emotions and, consequently, in the degree to which negative emotions disrupt their thinking and learning. I first wanted to know which types of situations elicit negative emotions in 10- to 12-year-olds. Based on structured interviews with 10- to 12-year-olds, I constructed a list of 42 unambiguous, stressful situations. The things students reported as problematic posed some kind of special difficulty; for example, an upcoming exam that they had not prepared well, having too much homework, and a conflict with a fellow student or with the teacher were situations that ruminated in the students' minds and elicited negative emotions.

Next, I asked students to perform a card-sorting task on the 42 stressful situations. Each situation had to be rated on a number of 4-point Likert scales, measuring how problematic the situation was and the intensity of anxiety, anger, and sadness experienced in each situation. A principal component analysis performed on these results showed that students perceived these situations as belonging to four separate domains: (a) confrontation with failure and shortcomings (CF), (b) confrontation with taxing academic demands (CTD), (c) identification with stress in others (IS), and (d) social isolation (SI). The first two domains pertain to academic situations and the last two to social conflict situations. From each domain, the two most frequently experienced situations were selected, and students were again interviewed to get an inventory of the most frequently used coping strategies. These coping strategies were factor analyzed into approach and avoidance. The Stress and Coping Scale for the final forms of primary education (Boekaerts, Hendriksen, & Maes, 1987) that came out of this research was then used with 10- to 14-year-old students from different types of schools. The scale has acceptable psychometric properties (cf. Boekaerts & van den Goor, 1991; Hendriksen, 1990).

Several conclusions concerning stress and coping emerged from my early work on stress. At the end of primary education (age range = 11 to 13): (a) Social conflict situations are more frequently experienced than problematic academic situations; (b) frequency of experiencing problematic situations does not affect the intensity of reported negative emotions, except for specific emotions in specific domains; (c) students report more anxiety in problematic academic situations than in social conflict situations, whereas they report more anger and sadness in social conflict situations than in

academic situations; and (d) students indicate more approach and less avoidance in academic situations than in social conflict situations. But boys, especially younger boys, report more avoidance behavior than girls. These findings are in line with the results of a German study (Seiffge-Krenke, 1990) with 2,000 German 12- to 19-year-olds: Young Germans predominantly use approach as a mode of coping, with the exception of self-related problem situations, in which about one third of the responses involve avoidance. Hence, in relation to stressful academic situations, most students believe that approach is the best strategy. Through learning and socialization experiences students may indeed have learned that, in the long run, mastery is contingent on approach strategies and that reducing tension and discomfort through avoidance may only serve short-term goals. But, whether these beliefs are translated into the use of approach strategies in a particular stressful encounter may well depend on the nature of the threat appraisal and the degree of perceived personal or borrowed resources. Each of these aspects are addressed separately.

Two Types of Threat Appraisals

Before exploring the intentions that may underlie students' coping processes in stressful academic situations, let me first point out the similarities and differences between CF and CTD. Both of these situations refer to threat appraisals, in which the student perceives a discrepancy between task demands and his or her own resources to meet these demands. Lazarus (1991) explained that in such cases the elicited emotions will be negative. But in order to distinguish between different types of negative emotions, goal content and personal involvement should be taken into account. In both the CF and CTD situations used in this study, students have an important goal at stake and will consider options for coping (see Table 1). However, the students' involvement may be different. In CF, failure has already occurred or is quasi-unavoidable. Hence, there is not so much the student can do to change the transaction; the only thing the student can do is preserve his or her ego and resolve to prevent this type of situation in the future. In CTD, failure has not occurred yet and can still be avoided by immediate action. I wanted to find out whether, at the end of primary education, students differentiate between these two threat appraisals, which are reflected in the reported emotions and coping strategies. On the basis of Lazarus's theory, I expected that anxiety would be the dominant emotion in CF and anger in CTD. Lazarus reasoned that when anxiety is experienced, there is nothing concrete to avoid, unless one can make the threat source more concrete and undertake actions to control the danger. By contrast, anger is experienced when something or someone (external or internal) can be held accountable for the threat or harm. The person will then direct his

TABLE 1

Example of a Confrontation With Failure and Shortcomings (CF)
and Confrontation With Taxing Academic Demands (CTD) Situation
With Some Approach and Avoidance Items

Confrontation	Approach	Avoidance
CF: You have an exam today, and you have not studied for it.		
	Do my best	Pretend nothing is wrong
	Try to study before the exam	Think about something else
	Ask the teacher to take it on another day	Try to forget it
	Try to concentrate as hard as I can	Do not worry about it
CTD: When the teacher wants you to copy from the blackboard and (s)he is going fast.		
	Do my best	Do something else
	Try to copy as fast as possible	Think about nice things
	Tell the teacher (s)he is going too fast	Try to forget it
	Put in all the effort I can	Do not worry about it

or her anger toward that source. Such theorizing led to the expectation that anxiety, experienced in CF, would coincide with avoidance behavior and that anger in CTD would facilitate approach.

I conducted linear multiple regression analyses on my data, with approach and avoidance as the respective criterion variables. I found that a student's intelligence score did not affect his or her coping strategy in CF, but that boys avoided significantly more than girls. In line with my expectations, frequency of experiencing stress in CF facilitated avoidance and inhibited approach. But intensity of experiencing negative emotions had a differential effect on the selected coping strategy. Neither anger nor sadness experienced in CF affected the coping strategy used, but anxiety did. However, contrary to expectation, anxiety facilitated approach and had no effect on avoidance. I expected that in CF, students would consider approach as pointless and that they would try and reduce their stress by avoidance (minimizing emotional costs). Apparently, in CF, students who report anxiety seem to believe that doing something to control the anticipated danger pays off. This finding can be interpreted in the light of Leventhal's (1980) parallel response model. Leventhal made a distinction between emotional control (anxiety control) and cognitive reactions (danger control) to threatening stimuli or events. He explained that anxiety control is primarily based on internal information and is geared toward the reduction of tension and discomfort. Danger control processes are based on environmental information; their aim is to approach the situation in an attempt to limit or control its danger.

What may happen is that when students are faced with an exam for which they have not prepared well, they experience threat and feel anxiety mount. But, they may believe that they can still somehow control the danger. This

belief may give students the illusion of control over the threatening situation and, as such, reduce tension and discomfort. This is not an isolated finding: Wieland (1984) also reported that anxious individuals redouble their efforts after failure and spend more effort (as measured by physiological activity, behavioral involvement, and subjective ratings) than nonanxious subjects with equal or inferior performance. This increase in speed of performance produces an increase in quantity of performance while decreasing the quality of performance. (See Helmke, 1989, who made a distinction between quantitative and qualitative effort. He found that students who were low on self-concept for math spent a lot of quantitative effort. This led to cognitive interference and low math achievement, whereas students who scored high on self-concept for math spent a lot of qualitative effort, which led to high math achievement.)

From an intervention point of view, knowing the students' intention for using a particular coping strategy is very important. For example, in CF, approach may be used with the intention to prevent failure. Enacting that intention may give the student the feeling that he or she is in control of the situation, thus attenuating tension and discomfort. One should realize, however, that this way of coping with anxiety in CF is not minimizing but maximizing emotional costs for the benefit of feeling better. Further analyses of these results with different data sets informed me that: (a) frequently reporting anxiety in CF is not related to a student's grade point average (GPA) for math, (b) approach in CF has a positive effect on GPA, and (c) the Anxiety × Approach interaction is not related to GPA. This means that students who approach in CF, whether they experience anxiety or not, have the potential of affecting their GPA for math. However, a high score on psychosomatic complaints was predicted by the Anxiety × Approach interaction. This finding allows for the inference that it is not anxiety as such that is detrimental to performance and to one's health but the way of coping with anxiety. Educators must realize that approach in CF is beneficial for achievement in math, but that students who experience anxiety in these situations and approach may build up a health risk. Furthermore, they may give themselves and the teacher the false impression that they are working in the mastery mode, but, in fact, they are coping with threat inadequately and camouflaging failure.

Close analyses of the data relating to CTD revealed that intelligent students approached more and avoided less than less-intelligent students, but that neither age nor sex effects were present. The coping strategy used was neither affected by the frequency of experiencing stress in CTD nor by anxiety or sadness experienced in these taxing situations. In line with my expectations, anger affected the coping strategy used but not in the expected direction: It facilitated avoidance and inhibited approach. What this pattern of results seems to imply is that when anger is experienced in CTD,

avoidance is the way out. This reaction may reflect students' beliefs that it will not help to retaliate against the teacher. Nevertheless, they communicate the message that they no longer have the intention to work in the mastery mode, because they consider the learning situation as suboptimal. This interpretation is in line with findings reported by Tzuriel, Samuels, and Feuerstein (1988). They reported that for some students situations with many unknowns, problems that require considerations of complex information or continued mental effort trigger negative emotions. These pupils cope with the experienced discomfort by (a) giving up easily, especially when experiencing difficulty; (b) being defensive; and (c) showing signs of anger when asked to cooperate.

It is also interesting to note that frequently experiencing CTD situations predicted low GPA and that frequently experiencing anger in these situations increased psychosomatic complaints. When students who frequently had threat appraisals in CTD tried to minimize emotional costs by avoidance behavior, lower psychosomatic complaints were predicted and found. What these results mean is that students who are not provoked by anger in CTD situations and those who have enough capacity to invest resources have the intention to approach in CTD and to work in the mastery mode. On the other hand, ruminating anger evoked by the situation may be a health risk. Students who have learned to turn off under such circumstances reduce the possibility of developing psychosomatic complaints, but they also give the teacher a signal that the learning conditions are suboptimal and ought to be improved.

In my opinion, anger is a much neglected emotion in educational research. I have reason to believe that Anger × Anxiety interaction produces a detrimental effect on performance and health variables (Boekaerts, 1990). More research is needed to help understand the underlying mechanisms of these effects.

PERCEPTION OF PERSONAL RESOURCES AND SOCIAL SUPPORT

When studying coping with stressful academic situations, one is dealing with approach and avoidance vis-à-vis threatening situations. An essential feature of these situations is that they are not isolated experiences. Students expect these situations to occur; they can describe them and give causal explanations for their occurrence. The literature on self-efficacy (Bandura, 1986; Schunk, 1989; Stipek & Weisz, 1981) clearly demonstrates that students who believe that their performance is contingent on their own actions outperform those who do not have such favorable beliefs. In the light of this robust finding, I expected that students who felt in control of

their personal resources to do math tasks would report less stress in academic situations and would earn better grades for math. Drawing on the literature on social support, I also expected that students who perceived their environment as supportive would report less stress in stressful academic situations and would earn better grades.

To study the effects of self-efficacy and of perceived social support on stress and coping, I administered the Self-Efficacy Scale for math and the Social Support Questionnaire (Boekaerts, 1987) to 10- to 12-year-old students. An example item of the 4-point Likert items of the Self-Efficacy Scale for math is "I am competent to do simple calculations such as adding and subtracting." The Social Support Questionnaire measures the students's perception of how they can count on both teachers and peers to give instrumental support (explain, give feedback, and help when things get difficult) and emotional support (the degree to which they feel that teachers and parents value their effort and care for them as persons). It broke down factor analytically into four factors: (a) Perception of Instrumental and Emotional Support From Classmates, (b) Perception of Instrumental and Emotional Support From the Teacher, (c) Perception of Esteem Support From Parents, and (d) Perception of Companionship (e.g., see items in Table 2). The goodness of fit indices informed us that the four factors reliably represent the same underlying structure in different data sets.

Using LISREL analysis, we (Boekaerts et al., 1991) found that students who believe they have adequate personal resources for math earn higher grades for math, report less-intense negative emotions in the CF and CTD situations printed in Table 1 and use approach strategies in all stressful

TABLE 2
Example Items From the Social Support Questionnaire

Perception of Instrumental and Emotional Support From Classmates
   Will your classmates encourage you when you are less successful?
   Are your classmates willing to explain things you do not understand?
   Are your classmates happy when you are successful?
Perception of Instrumental and Emotional Support From the Teacher
   Do you think the teacher has your best interest at heart?
   Does the teacher like it when you ask for help?
   Does the teacher encourage you when you are less successful?
Perception of Esteem Support From Parents
   Do your parents encourage you when you are less successful in school?
   Do your parents value your effort for schoolwork?
   Do your parents criticize you when you are less successful in school?
Perception of Companionship
   Do your classmates give you the feeling that you are a member of the "in" crowd?
   Do your classmates share experiences/empathy?

academic situations. Interestingly, students who perceive the learning environment as supportive do not report less-intense negative emotions, but they do report more approach in all stressful situations. Approach in the exam situation (CF) was positively linked to math performance. I concluded that perceived personal resources affect the primary appraisals, but that perception of social support does not: Students high on perceived social support report just as much stress as students who are low on social support. Both perceived personal resources and perceived social support affect the secondary appraisals, probably by increasing the student's perception of control. The beneficial effect of social support has been replicated with students from the first form (12- to 14-year-olds) of secondary education. In this age group, I found that being satisfied with the quality on one's social support network, especially perceiving classmates as supportive and having a sense of belonging in class, predicted low *frequency* (not intensity) of stress in class. If stress occurred, these students mainly used approach as a coping strategy, whereas students who were dissatisfied with their social support network predominantly used aggressive coping strategies.

It is strange that social support has been extensively studied in adult populations, but that only scarce data are available on the effect of students' social support when faced with stressful academic situations. There are sex differences in the use of social support, but the literature is not very consistent. For example, Rauste-Von Wright (1987) reported that in early adolescence, Scandinavian girls more often try to find social support to cope with difficulties than boys, whereas boys try to manage more by themselves. These differences were most pronounced at age 13 but decreased as the subjects got older. Between ages 13 and 15, the proportion of boys who looked for social support increased and the proportion of girls who tried to manage by themselves also increased. However, Seiffge-Krenke (1990) reported that from age 14+ German girls discussed and attempted to clarify their difficulties more frequently, and they sought advice, help, and comfort from others significantly more than boys, regardless of the nature of the problem. Presently, I conclude that some students may interpret a supportive environment as an extension of their personal resources. They borrow resources from others at a time when they are not yet capable of doing the task on their own or when they perceive the learning environment as suboptimal.

OPTIMISTIC AND PESSIMISTIC PERCEPTUAL SETS

When students are confronted with a stressful learning situation, they have to do two things. First, they have to master a skill; second, they have to deal

with emotions and intrusive thoughts arising prior to or during task performance. At such times, the mastery mode and the coping mode may be highly incompatible. But the results illustrate that threat appraisals do not necessarily lead to avoidance strategies. In threatening situations, negative emotions, seen as action readiness changes, may lead to approach or avoidance, and this may depend on the perceptual set that is created by the appraisals. I believe that, like moods, emotions may create an optimistic or a pessimistic perceptual set. When negative emotions create a discouraging perceptual set, they may act as a choker not only because the learner approaches (i.e., expends, risks, or borrows resources to no avail) but also because information processing is done in terms of threat value. In the short term, this may lead to maximizing emotional costs. In the long term, it may lead to the use of routine coping strategies and to educational and health risks. Negative emotions may also have a beneficial effect. Indeed, they may create a short-term pessimistic perceptual set as well as a long-term optimistic perceptual set. More specifically, when students perceive themselves as competent to manage the type of task, but simultaneously perceive the task as one in which there is little controllability of the factors determining being able to complete the task (e.g., low latitude of decision), they may conclude that the current learning conditions are suboptimal. Such a negative appraisal of the learning situation may lead to a coping intention in the form of seeking social support to change the learning conditions or to a decision to conserve energy rather than to expend resources to no avail.

It is important that students learn to interpret their emotions (i.e., build up meta-emotional knowledge) and learn to regulate their emotions (gain emotion control). They must also be given the opportunity to differentiate between long-term and short-term behavioral intentions and to discover when to minimize or maximize emotional costs. For example, in some learning situations, students must realize that the short-term approach is an ineffective coping strategy because it is too late to control the danger (CF) or too harmful from a personal point of view to maximize emotional costs (CTD). At the same time, they must understand that avoidance (seen as minimizing emotional cost or conservation of energy) is counterproductive in the long term because similar stressful situations must be prevented by putting in preparatory effort and/or eliciting social support.

CONCLUSIONS

The scope of bringing research on emotion, mood, stress, and social support closer to the world of instruction must be readily apparent, even from this brief review. In my view, educational psychologists need not only to be able to redesign instruction on the basis of sound instruction theories,

but they should also be able to criticize existing teaching–learning situations through studying their adverse effects on student motivation, self-concept, and health. What have we achieved, if we produce generations of students who finish high school but who feel loss of control when they have to solve a problem in everyday life or develop psychosomatic complaints and health risks? In The Netherlands, 29% of fifth-grade students ($n = 500$) and 30% of eighth-grade students ($n = 2,000$) reported psychosomatic complaints when seeing the school doctor. These complaints were strongly related to the intensity of their reported negative emotions vis-à-vis the four domains of stressful situations of the Stress and Coping Scale (Boekaerts, Kroesbergen, Maes, Pijpers, & Van Veldhoven, 1990). There are still many questions to be asked and answered about the effect of appraisals, emotions, moods, and social support on coping, learning, and health. An important item on my research agenda is to study the dynamic interplay between students' perception of personal resources and their perception of social support in a longitudinal research design.

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